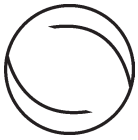

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Organizational Ingenuity in Nascent Innovations: Gaining Resources and Legitimacy through Unconventional Actions

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Abstract

How do innovators in large organizations acquire resources for their early-stage, untested, unproven innovations? Multiple established projects compete for scarce resources in large organizations. Innovators pursuing early-stage, untested innovations face considerable constraints in accessing scarce resources. Literature enumerates various sanctioned and unsanctioned methods by which innovators acquire resources, such as borrowing, begging, scavenging, amplifying, bootlegging, and finagling – defined as obtaining resources through deceitful or underhanded methods. However, few theories explain how innovators act unconventionally, elude constraints to acquire resources, and yet gain acceptance for their innovations. To address this question, this study uses field data from nine organizations based primarily in Silicon Valley. Successful innovators employ organizational ingenuity or creative solutions to gain resources in the face of constraints. They employ two types of ingenuity: material ingenuity, creatively re-imagining the use of resources; and process ingenuity, using creative processes to gain resources. In the early stages, innovators focus on managing their innovation's legitimacy and use managerial attention as a key lever. They maximize managerial attention when employing material ingenuity and minimize managerial attention when utilizing process ingenuity. Theories highlighting the relationship between legitimacy and resource acquisition suggest that individuals gain resources when they establish legitimacy. Conversely, study results indicate that the process of gaining resources can lend legitimacy to early-stage innovations.

Keywords

early-stage innovations, legitimacy, managerial attention, material ingenuity, organizational ingenuity, process ingenuity, resources

Introduction

How do innovators in large organizations gain resources for their early-stage, untested, unproven innovations? Organizational structures are rarely conceived to support autonomous innovations

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(Burgelman, 1983). Resources for innovations are scarce because multiple established projects compete for resources (Dougherty, 2008; Dougherty & Hardy, 1996). Large organizations typically view unproven innovations as illegitimate and innovators face significant constraints in accessing these resources (Angle, 2000; Christensen & Bower, 1996; Dougherty & Hardy, 1996; Dougherty & Heller, 1994; Jelinek & Schoonhoven, 1990). Organizational structures in large, mature organizations reinforce existing practices, leaving little room for unexpected bottom-up innovations (Dougherty & Hardy, 1996).

Research suggests that the key to acquiring resources is gaining legitimacy, the social judgment of appropriateness and desirability (Zimmermann & Zeitz, 2002; Zott & Huy, 2007). Innovators in organizations must gain internal legitimacy or consensus for their innovation from organizational participants such as decision-makers (Drori & Honig, in press) to acquire resources. Studies suggest that individuals gain legitimacy for their innovations by demonstrating proof of potential success (Dougherty & Heller, 1994; Zott & Huy, 2007). For example, Dougherty and Heller (1994) suggest that putting a product on the market to show it works provides legitimacy to innovation. Similarly, Zott and Huy (2007) in a study of independent entrepreneurs demonstrate how partially working products such as prototypes serve as artifacts to help innovations gain legitimacy and subsequently acquire resources. Innovators pursuing early-stage innovations must construct artifacts to show proof of potential success to gain legitimacy and resources. The dilemma facing innovators is the need for resources to construct partially working artifacts, but a lack of access to resources until they can demonstrate legitimacy. In this study, I address this conundrum and focus on how innovators gain resources for their early-stage innovations by negotiating their organizational constraints.

Literature suggests that innovators in large organizations use organizational ingenuity (Lampel, Honig, & Drori, 2011) to gain resources for their innovation. Organizational ingenuity is defined as creative solutions that individuals use to gain resources despite the structural constraints of their organization (Lampel, Honig, & Drori, 2011). Innovators use several sanctioned and unsanctioned methods to access resources under constraints. These include borrowing, begging, scavenging, amplifying, bootlegging, and finagling (Augsdorfer, 2005; Jelinek & Schoonhoven, 1990; Morris, Kuratko, & Covin, 2010; Starr & MacMillan, 1990). Borrowing enables innovators to secure resources temporarily, while begging or tin-cupping (Kanter, 1983) allows them to secure resources permanently (Starr & MacMillan, 1990). Through scavenging, innovators extract usage from resources that others do not perceive as valuable (Starr & MacMillan, 1990). Amplifying allows innovators to leverage more value out of an asset than what is perceived by the original owner of the asset (Starr & MacMillan, 1990). Innovators use other strategies such as bootlegging or diverting resources from other projects without formal authorization (Augsdorfer, 2005; Shane, 1995). A form of bootlegging is finagling, i.e. obtaining resources through deceitful or underhanded methods including 'off-time' and stealing time from official projects to work on their innovation (Jelinek & Schoonhoven, 1990). Innovators also gain resources by accessing slack resources from sponsors (Burgelman, 1983; Burgelman & Sayles, 1986).

Although literature has highlighted the various sanctioned and unsanctioned methods that innovators use to gain resources, the process by which they negotiate organizational constraints to access resources and the effects of such actions on innovation legitimacy is not well documented. There is little theory on the process by which innovators evade structural constraints to access resources yet manage to gain legitimacy for early-stage ideas. To address this gap, this study examines how innovators gain resources for their early-stage innovations by negotiating structural constraints and the effects of such action on their innovation's legitimacy. It builds upon a growing number of studies that address the micro-institutional context of established firms focusing on

innovators within large organizational structures (e.g. van Dijk, Berends, Jelinek, Romme, & Weggeman, 2011; Vermuelen, van den Bosch, & Volberda, 2007).

I pose this research question with a grounded theory approach (Corbin & Strauss, 2008; Glaser & Strauss, 1967). Data for this study come from 99 interviews with innovators and senior managers in nine large, high-tech organizations from Silicon Valley's information technology and computing sector. Additionally, I use data from confidential and public documents, innovation blogs, and site visits. Results indicate that innovators employ two types of organizational ingenuity to gain resources for early-stage innovations: material ingenuity and process ingenuity. Innovators seek to gain legitimacy in the early innovation stages by maximizing managerial attention when using material ingenuity, that is, when they are able to creatively re-imagine the use of resources. In contrast, they minimize managerial attention when employing process ingenuity, that is, when they use creative processes to gain resources. Innovators employing material ingenuity were able to show to their managers that they were utilizing resources that the organization had invested in but were currently wasting or underutilized. This enabled them to gain legitimacy. Innovators employing process ingenuity in contrast were using resources that other well established projects in the organization were competing for. They therefore did not disclose their strategies until they were able to show success. Theories highlighting the relationship between legitimacy and resource acquisition typically suggest that individuals gain resources when they establish legitimacy (e.g. Parsons, 1960). Conversely, the process of gaining resources might lend legitimacy to early-stage innovations.

The findings of this study have interesting implications for our understanding of how innovators gain resources and legitimacy for their early stage innovations. Firstly, in contrast to previous studies that emphasize process ingenuity for gaining innovation resources, this study identifies and distinguishes between two different types of organizational ingenuity: material ingenuity and process ingenuity. Secondly, this study highlights the role of managerial attention in the relationship between resource acquisition and the legitimacy that is accorded to early-stage innovations. Previous studies do not clarify the relationship between innovators' resource acquisition strategies, managerial attention and its impact on the innovation's legitimacy. Results of this study indicate that innovators employ managerial attention as a key lever for managing their innovation's legitimacy, when they engage in either type of organizational ingenuity. In sum, innovators proposing early-stage innovation projects might have to use the process of gaining resources as an additional pathway to gaining legitimacy.

Theoretical Background

Exploring how innovators gain resources creatively in the face of constraints and manage legitimacy for their innovation builds on three main literature bases: research on resource acquisition under constraints and organizational ingenuity, the relationship between legitimacy and resource acquisition, and theories of managerial attention.

Resource acquisition under constraints and organizational ingenuity

Organizational ingenuity is the innovators' ability to design creative solutions when bound by structural constraints; that is, creativity under conditions of necessity (Lampel et al., 2011). Innovators design these solutions under constraints by using limited resources and by imaginative problem-solving (Lampel et al., 2011). Although the notion of organizational ingenuity is relatively new, instances of creative resource acquisition under constraints are found throughout the

literatures of entrepreneurship and innovation. Two well-established concepts related to organizational ingenuity are bootstrapping and bricolage.

Bootstrapping. Bootstrapping refers to a collection of methods typically used by entrepreneurs and small business owners to minimize the need for outside debt and equity financing (Ebben & Johnson, 2006). Entrepreneurs and small business owners typically face major problems in securing long-term external finance, which inhibits their business's development and growth (Winborg & Landstrom, 2001). To gain resources for business development without resorting to a financial transaction, entrepreneurs use bootstrapping and acquire resources creatively at very little or no cost (Bhidé, 2000; Brush, Carter, Greene, Hart, & Gatewood, 2006, Landstrom & Winborg, 1995).

Bootstrapping entrepreneurs use unused equipment or use equipment in the evenings or during downtime, borrow equipment from other businesses, achieve payments in advance from customers but delay payments to suppliers, and engage university students and known contacts such as customers and former colleagues to gain knowledge without paying consulting fees. These different bootstrapping techniques can be classified into six different methods: (1) owner financing, (2) minimizing accounts receivable, (3) joint utilization by sharing or borrowing of resources from other firms, (4) delaying payments, (5) minimizing stock, and (6) financing through government subsidies (Ebben & Johnson, 2006; Winborg & Landstrom, 2001).

Effective bootstrapping is critical to small firms because lack of capital constrains a firm's growth, impacts subsequent survival, and puts firms at a higher risk of failure (Chaganti, DeCarolis, & Deeds, 1995; Davila, Foster, & Gupta, 2003). Bootstrapping also allows firms to avoid borrowing capital at high interest rates, which puts a strain on cash flow (Cooper, Gimeno-Gascon, & Woo, 1994).

Bricolage. Bricolage refers to 'making do by applying combinations of resources at hand to new problems and opportunities' (Baker & Nelson, 2005, p. 333). The key concept in bricolage is the notion of transformation. Resources obtained through bricolage are transformed either from their current activity or their fallow state for application into another value-creation activity such as innovation. In contrast, standard resources are those withdrawn from one activity for application into another in their current state without being transformed.

The transformation aspect of bricolage presupposes a constructivist view to resource environment (Baker & Nelson, 2005). Bricoleurs reimagine resources without being limited by their dominant definitions or understandings (Baker & Nelson, 2005). They explore the extent to which the constraints posed by the environment should be regarded or ignored and typically disregard such external limitations. They insist on trying out new solutions, observing the effects of their actions and dealing with results (Baker & Nelson, 2005). Bricolage also implies recombining elements instead of fabricating them from scratch. Bricoleurs tend to combine and repurpose resources, especially those that are cheaply available or free because others judge them to be substandard. Bricoleurs have the unique ability to make these inputs valuable for new purposes, both individually and in combination.

Some actions classified as bootstrapping and bricolage are instances of organizational ingenuity. Reimagining the nature of resources to avoid cash outflow – such as reimagining colleagues and customers as consultants – is an example of bootstrapping (Brush et al., 2006), bricolage (Baker & Nelson, 2005), and organizational ingenuity; it involves a creative solution under constraints (Lampel et al., 2011). However, not all instances of bootstrapping and bricolage are instances of organizational ingenuity. For an action to be ingenious, it must demonstrate creativity and focus on resource acquisition under constraints. While bootstrapping focuses on gaining resources under constraints, it does not necessarily emphasize creativity. For example, borrowing

equipment is an example of bootstrapping but not of organizational ingenuity because, although it is resource acquisition under constraints, it is not necessarily creative. Similarly, bricolage does not pre-suppose constraints, but emphasizes creativity through re-imagining the use of resources. For example, making sculptures out of discarded soda cans might be an act of both bricolage and organizational ingenuity if it is due to lack of art supplies (a constraint). Alternatively, it could be a creative art form by itself, in which case, it is an instance of bricolage but not an example of organizational ingenuity. Entrepreneurs use both bricolage and bootstrapping as methods, not only for gaining resources under constraints but also for establishing new venture legitimacy (Brush et al., 2006; Ebben & Johnson, 2006).

Legitimacy and resource acquisition

A general definition of 'legitimacy' is the perception that an actor's behavior is desirable and appropriate within a socially-constructed system of norms, values, beliefs, and definitions (Suchman, 1995). Innovators within organizations gain legitimacy when their actions are perceived as desirable within the organization's socially-constructed systems. Innovators have to also strive for internal legitimacy (Drori & Honig, 2013), i.e. their actions should not only be seen as desirable but their innovation should gain the consensus of other organizational participants. This internal validation is necessary to reinforce organizational practices and to mobilize organizational members around a common vision (Drori & Honig, 2013) for the innovation. Audiences such as organizational members are most likely to supply resources to entities that appear legitimate (Suchman, 1995).

Individuals can gain legitimacy and resources within an organization by gaining endorsement from sponsors, tapping into the organization's internal expertise, and showing small advances (Markham, 2002; Morris, Kuratko, & Covin, 2010). Through these actions they leverage different types of legitimacy, such as legitimacy based on governance structures when seeking endorsement from executives (Hale, 2004), cognitive legitimacy (Suchman, 1995) when showing small advances, and procedural legitimacy by conforming to existing structures (Suchman, 1995) when accessing unused resources.

Studies addressing the relationship between legitimacy and innovations or new ventures suggest that gaining legitimacy for innovations is challenging (e.g. Dougherty & Heller, 1994; Zimmermann & Zeitz, 2002; Zott & Huy, 2007) but a prerequisite to gaining resources. Previous research suggests that innovators are likely to gain legitimacy by reframing their organization's understanding of the innovation; conforming to existing structures; selecting a favorable environment; manipulating norms and values; creating new practices, and using strategic, symbolic action (Zimmerman & Zeitz, 2002; Zott & Huy, 2007). For example, Zott and Huy (2007) find that showing a partially working product to venture capitalists can successfully hook resources for independent entrepreneurs. However, initial prototypes also require resources such as time, expert advice, and basic materials, necessities that an innovator might not yet have. To gain access to these resources, innovators need to handle their manager's attention for sneaking resources or accessing them in other ways (Morris, Kuratko, & Covin, 2010).

Managerial attention and resource acquisition

Managerial attention is defined as how organizational decision-makers notice, encode, interpret, and focus their time and efforts upon organizational issues and answers (Ocasio, 1997). Theories of attention suggest that managers are bombarded with information (Cho & Hambrick, 2006; Cyert & March, 1963) and will, therefore, selectively attend to some events while ignoring others

(Weick, Sutcliffe, & Obstfeld, 2005). Allocation of attention is determined by how organizational decision-makers interpret the meaning of events (Ocasio, 1997).

Interpreting meaning and allocating attention are contingent upon both an organization's formal control systems and social control systems. Formal systems like management control systems enable managers to focus on strategic events or significant variances while ignoring those that are regular or non-strategic (Simons, 1991). Managers tend to categorize information and allocate their attention to unusual events based on this categorization (Tamuz, 2000). If an event is sorted into one category, then standard control systems require the organization to gather additional information on it (Tamuz, 2000). However when sorted into another category, no additional information is gathered (Tamuz, 2000). For example, managers pay attention to formal control systems like budgets and to toggles such as adverse budget variance. Traditionally, budgetary systems are designed to provide negative feedback: only adverse variances are noticed and corrected (Ansari, 1979). Thus, during the regular course of business, managers might not look closely at all figures, but would note and correct adverse variances.

Managerial attention to events is also governed by the organization's social control systems. Social control systems such as an organization's culture and embedded norms determine what is appropriate in a given organization (O'Reilly & Chatman, 1996). Top management provides a corporate vision and organizational members use this vision to infer norms and rules to guide their daily actions (Barker, 1993). For example, Silicon Valley companies are known to encourage innovation (Jelinek & Schoonhoven, 1990; Saxenian, 1994). Managers in such organizations tend to notice but overlook bootlegging material, equipment, and space as long as innovators tend to show successful projects most of the time (Jelinek & Schoonhoven, 1990). But managerial attention is cued in these companies to monitor the innovation's success when resources have been stolen. By contrast, in other industries or settings it is possible that managers would notice and be more disapproving when innovators access resources without permission.

To summarize, the above literature reviews suggests three main findings. Firstly, most studies that focus on resources acquisition under constraints by individuals focus on independent entrepreneurs. They suggest that entrepreneurs facing resource constraints engage in a variety of strategies such as bootstrapping or bricolage to gain resources at very little or no cost. Secondly, entrepreneurs of new ventures gain resources when they demonstrate legitimacy for their enterprises or innovation. Thus, most studies focusing on methods by which individuals gain resources under constraints, and the relationship between legitimacy and resource acquisition, focus on individual entrepreneurs and not on innovators in large organizations. However, innovators in large organizations seem to face resource challenges that are different from independent entrepreneurs. For example, for independent entrepreneurs or owners of small firms, resource constraints at the individual level and firm level are congruent. In contrast, innovators in large organizations face resource constraints at their level, but their firms typically have abundant resources that are not yet available to them for their innovation. Thus the options available to innovators in large firms are likely to vary from individual entrepreneurs.

Thirdly, the few studies that focus on innovators in large organizations suggest that innovators in these organizations tend to access resources without their manger's approval. They then demonstrate proof of success of their innovation to gain legitimacy within the organization. Literature suggests that when innovators in large organizations access resources surreptitiously, they must show proof of success to justify their resource-seeking behaviors to gain innovation legitimacy. However, the process by which innovators in large organizations negotiate their organizational constraints and managerial attention to gain resources, and the impact of their actions on innovation legitimacy, is not well-documented.

This study fills these gaps in literature. Firstly, it focuses on early-stage innovators in large organizations where individuals face a paradox of resource constraints at the individual level for their innovation, when resources are available in the organization. Secondly, while previous studies have underscored the importance of legitimacy as a prerequisite to gaining resources, this study emphasizes the importance of the process of acquiring resources as a legitimating procedure that subsequently leads to innovation legitimacy. Finally, previous studies in large organizations have identified process ingenuity as a key route to gaining resources and have emphasized the importance of minimizing managerial attention to gain innovation legitimacy. In contrast, this study emphasizes the need to handle managerial attention differently when using material ingenuity versus process ingenuity for gaining resources under organizational constraints.

Methods

This study utilizes data primarily from Silicon Valley's high technology industry. I chose this setting because Silicon Valley's emphasis on innovation (Jelinek & Schoonhoven, 1990; Saxenian, 1994) provides adequate opportunities to observe many early-stage innovation projects and resource strategies that innovators use when constrained by organizational structures. I approached several Silicon Valley organizations such as HP, IBM, Google, Yahoo, Applied Materials, and Apple and was able to access managers from nine different organizations. The annual revenues for these firms, at the beginning of this study in early 2008 ranged from approximately $1.34 to $118 billion, with employee strength ranging from approximately 13,000 to 170,000. The details of these organizations are provided in Table 1. All firm and innovator names are fictional due to confidentiality agreements.

Data collection

Data were collected over a period of two years via 99 interviews with 25 managers and 30 innovators, archival documents, public documents, and observations during site visits. Most individuals were interviewed twice to ensure accuracy. The average interview times were between 60 to 90 minutes. All interviews were recorded and transcribed. The transcription and archival documents were over 2,500 pages.

I first approached senior managers of organizations for help in identifying people whom they considered as innovators. Given that innovators are a hidden sample, this was the best way of identifying them. Furthermore, it is important to find out whom the managers or the participants within the organizational system identified as innovators instead of imposing my (or external researchers') definitions. Innovators have no formal title within organizations. Others in the organization, especially power holders such as senior managers, have to recognize an individual as an innovator. It was therefore appropriate to solicit senior managers' view of who the innovators were. Semi-structured questions were used to ask managers to identify individuals whom they considered innovators and the resources such innovators had received during this gestational stage. The managers were on average 40.8 years old with 15.83 years' work experience (range = 3 months to 32 years) and 12.8 years average tenure (range = 1 year to 30 years) in the current organization. Their sample titles included vice president, general manager, and distinguished engineer.

I interviewed innovators separately and asked them to describe their projects. The issues of organizational barriers to innovation and how they managed to acquire resources despite constraints and gained legitimacy emerged during these interviews. The interview protocol used for the manager and innovator interviews is listed in Appendix A. In line with the grounded theory approach, I started coding the data as soon as the first interview was completed (Corbin & Strauss,

Table 1. Company Profiles.

Organization name	Year established	2008 revenues (in billions of dollars rounded)	Number of individuals	Number of interviews
AMX	1967	8.0	2	4
DISX	1935	38.0	7	14
EBIX	1995	8.5	2	2
GIX	1998	21.8	7	10
IBI	1896	104.0	10	20
INF	1981	4.18	5	8
IQX	1939	118.0	15	28
SYNX	1986	1.34	2	4
YTI	1994	7.21	5	9
Total			**55**	**99**

1990; Glaser & Strauss, 1967). Iterating between coding, theory, and data collection, questions for every subsequent interview were modified and drilled down further to explore what barriers the innovators faced, how they gained resources for their innovation, and whom they approached during the initial stages of their idea. This format provided good detail on the different innovations launched, including the ones that had failed, and a timeline of development for the different innovations. The innovators were on average 43 years old with an average of 20 years of work experience (range = 10 to 41 years). They had an average tenure of 16 years (range = 1.5 to 41 years) in the current organization with sample titles such as general manager, CEO, senior vice president, and senior engineer.

Data analysis

I used a grounded theory approach (Corbin & Strauss, 2008; Glaser & Strauss, 1967) for data analysis because available theories to explain this process are too abstract (Martin & Turner, 1986). Data were analyzed inductively using constant comparison techniques (Glaser & Strauss, 1967; Lincoln & Guba, 1985). This analysis assists in determining the content of the next rounds of data collection. When creating codes I triangulated innovators' and senior managers' interviews with archival data to understand each innovation and its context (Charmaz, 2003; Miles & Huberman, 1994).

In the first step open coding was performed (Corbin & Strauss, 2008) to identify initial concepts including in-vivo (Corbin & Strauss, 1990) or first-order codes (Van Maanen, 1979) related to the phenomenon. In the next step, axial coding (Corbin & Strauss, 1990; Corbin & Strauss, 2008) was used, in which I looked for relationships among and between these first-order categories to arrive at second-order themes (Corley & Gioia, 2004; Gioia & Thomas, 1996; Van Maanen, 1979). The next step was to find aggregate dimensions based on these first- and second-order categories. Although this process is described in linear steps, it was recursive in nature. I continued until I had a clear idea of emerging theoretical relationships. The data structure as a result of this analysis is presented in Figure 1.

To ensure data trustworthiness I followed steps suggested by Lincoln and Guba (1985) and Corley and Gioia (2004). Nvivo, a qualitative software management program, was used to maintain data including contact records, field notes, and interview data, as well as to code data.

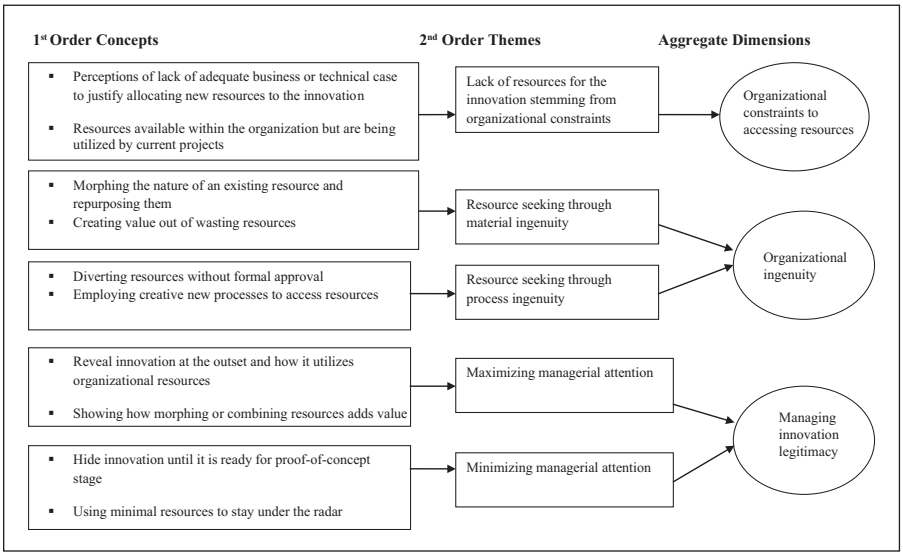

Figure 1. Data Structure.

Additionally, I used peer and expert debriefing to discuss my emerging codes and relationships, with qualitative experts and subject matter experts. I also leveraged my contacts in the industry, to assess if the theoretical conclusions that were reached were plausible.

During the initial stages, the existing theoretical classification of resources – financial, physical, human, organizational, or intangible (Mahoney & Pandian, 1992) – was used. In this stage I found two things. First, innovators did not ask for financial resources at the early stages before showing proof of viability. They mainly needed human and physical resources (such as materials, software, or equipment). Secondly, when innovators needed minimal resources, such as time to work on projects or informal consultations from others, it was readily available. Given that these organizations were primarily in Silicon Valley, where collaboration is encouraged (Saxenian, 1994), accessing resources that required no significant diversions from existing projects was not an issue. Innovators were able to obtain resources by tapping into their internal networks, and worked on innovations on their own time. For example, Sean from IQX said:

> [T]he one thing that is easier in a company than I think would be outside is to marshal an incredible number of very qualified, very good people, you know. … If I was just outside somewhere and I needed some advice about software architecture or data center structures or something, I … at IQX I have two phone calls and I've got, you know, a guy or a girl that's willing to talk about it for five hours if I wanted.

This is consistent with findings in the corporate entrepreneurship literature, which indicate that corporate entrepreneurs have easy access to 'people to talk with' (Morris, Kuratko, & Covin, 2010, p. 41). Two of the organizations in my sample encouraged employees to spend 15% or 20% of their time on innovations. Gaining time from others by leveraging their networks or using the organization's informal structures assisted innovators in gaining human resources.

Looking closely at data, it appeared that although obtaining minimal resources on an ad hoc basis was not an issue, continuous time commitment from other employees or other material investments, such as software on a consistent basis, created resource constraints for innovators.

Table 2. Resources Required in Focal Innovations.

Innovator	Innovation	Innovation Description	Resources Required
Arav (YTI)	Structured search application	This was a new type of search in an organization whose main focus was on unstructured search.	Engineers on a full-time basis
Danny (AMX)	New process for photomask etching	A new photomask etching business and expansion of customer base.	Materials such as photomask
Frank (IQX)	Ink jet printers	Ink jet plant to manufacture new type of ink jet printers instead of using the previous technology.	New equipment to manufacture new type of printers
Kathy (IQX)	Testing tool	A new testing tool for testing customer products that would result in significant cost reductions for different departments and set new industry standards.	Materials for building the new testing tool
Mick (IBI)	Frosting	Testing tools built out of vestigial products within the organization.	Vestigial products from different departments
Rich (IQX)	OEM business	OEM was initially a cost center at IQX. The innovation was to validate their existence as a P&L center and start selling to external customers.	Machine to prototype processes
Sean (IQX)	Hello	Video-conferencing solution. The purpose of Hello is to provide a virtual meeting experience. This was proposed in the printer division of an organization whose focus was not on video-conferencing solutions.	Room for beta-testing Hello

These resource constraints were even more pronounced when innovators sought resources that were expensive to purchase, required extensive diversion from existing projects, and required management approval for reallocation. Examples included expensive equipment that could be used for other purposes, or full-time engineers who were working on current products.

Following the pattern of grounded theory research, I refined my data collection strategy to match insights evolving from data analysis. In this phase innovations that required extensive investments, diversions from existing projects, or managerial approval were identified. Seven innovations discussed in this paper met at least one of these criteria.

Methodologically this is consistent with a theoretical sampling approach where the researcher chooses extreme cases in which the phenomenon of interest is easily observable (Corbin & Strauss, 1990; Eisenhardt, 1989; Glaser & Strauss, 1967; Zott & Huy, 2007). I wrote detailed case studies on these innovations and gathered further data on them. The focal innovations and the resources that the innovators required are summarized in Table 2. Other innovations in my study were coded to calibrate my findings from the seven innovations. I did not find any new first-order concepts or second-order themes.

During data analysis, I observed that in some cases innovators kept their resource acquisition hidden away from management's attention and in others highlighted it. But why and when? A variation of the Thematic Conceptual Matrix (Miles & Huberman, 1994) was used to understand these resource acquisition strategies in the focal cases. Strategies identified in each focal case (Eisenhardt,

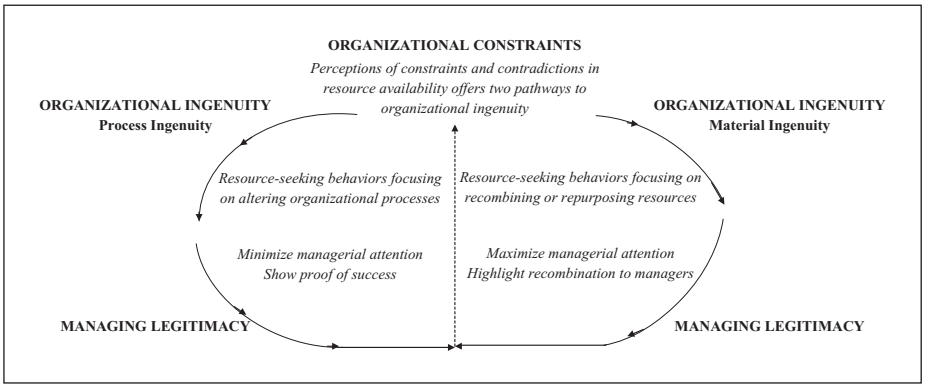

Figure 2. Resource acquisition in early-stage innovations.
Note: Curved lines represent findings based on the current study. Broken arrow indicates a future research direction

1989) were compared with other innovations in my sample. This was to uncover any new strategies that the innovators used that were not identified through the focal cases. I did not find any new types of resource acquisition strategy or patterns by which innovators managed attention across innovations. This corroboration helped me attain satisfactory theoretical saturation for my proposed model.

Findings

Figure 2 summarizes my findings on resource acquisition process in early-stage innovations. To the best of my knowledge, the inductive model presented in Figure 2 is the first to empirically ground the resource-seeking behaviors of innovators in large organizations. Table 3 shows data supporting Figures 1 (data structure) and 2.

In Figure 2, I begin with perceptions of constraints serving as antecedents to the resource acquisition process in early-stage innovations. Innovators stumble upon an interesting contradiction; at the individual level, they face constraints in accessing resources for innovation but at the organizational level their organization holds the resources they need. Based on these perceptions of constraints and contradictions, innovators pursue two pathways to gaining resources, which results in two types of organizational ingenuity. The first pathway is identifying resources at the organizational level that can be recombined or repurposed for their innovation. This recombining or repurposing resources results in material ingenuity. The second pathway is circumventing organizational procedures and using creative processes to seek resources that other organizational projects may compete for. Using creative processes to access resources results in process ingenuity. When innovators use material ingenuity or recombine resources, they actively seek management attention. In contrast, when employing process ingenuity they stay under the radar, minimize managerial attention to their behaviors until they show proof of success. Actively managing managerial attention when seeking resources drives innovation legitimacy. In this section, I elaborate upon this model. Table 4 presents the exemplar focal cases to provide an outline of how innovators gained resources despite constraints. Although I use these focus cases in data display (Table 4), I use examples from other organizations in my sample, in addition to these focal cases, when discussing my findings.

Table 3. Data Supporting Interpretations of Resource Acquisition Process from Innovator Quotes.

Theme	Concepts and representative quotations
Constraints and contradictions in resource availability	
Perceptions of organizational constraints to accessing resources for innovation	Well, I mean it's just you know starting a business inside of a company, you're never gonna get, you're never gonna get more funding for some speculative business. So you're gonna need to go and literally take those resources from existing groups … so it's really to their advantage to protect it and so, so then you have a tradeoff of you're gonna have to you're gonna literally have to you know rob resources from current commitments to you know to get it through that incubation phase. *(Steve, IQX).* You're talking about something … that nobody has an idea of whether it's going to really pan out, right? At the same time, are you asking for siphoning resources off a product that's being successful right now? Are you looking for hiring more people? If you are looking for siphoning teams from today's product, right. You better have a really, really strong case why you want to do that, and how are you going to be able to manage that such that the impact to the existing product is minimized. *(Li, Snyx)*
Organizational ingenuity	
Material ingenuity	We turned engineers into salespeople, and we made some adjustments like that, but we essentially had the resources. We just needed to repurpose them. (*Rich, IQX)* The idea was, you can go around to a number of these organizations and find old products that actually are making a profit. That have a cash stream, a cash profit that people would be willing to move onto your organization if you just agree to take care of it. *(Mick, IBI)*
Process ingenuity	So basically we went and the next time we had a meeting with the executives to show them the other project, and so at the end we kind of slipped that in and showed it. [laughter] *(Alon, EBIX)* I had been talking to our UK team for a different project. And I knew that they never got good projects. So I talked to them. I said, 'Look, you never get good projects. If you work with me on this, it has visibility at this point, I need your help.' They said, 'Why not?' Exactly. So while I was fighting for resources in the US, I had three people there working on it. On this project. Yeah, I spun it right. The UK GM came – when I met with him I said, 'Look, with the previous project' – that I had been working with them on – 'I love the team that you have' – which was true – 'and you are here because we are trying to negotiate what happens in 2009 and 2008. What if they started working on this and they can go to your manager and say, 'We are already working on this. A great working relationship. Give it to us formally… … because they were UK their current projects weren't that interesting and were being phased out anyway. So … knowing where resources exist that you can use, that's critical. *(Arav, YTI)*

Table 3. (continued)

Theme	Concepts and representative quotations
	Managing legitimacy
Maximize managerial attention, draw managerial attention to resource-seeking behaviors	Okay, so, you're running this big, new thing that's important to you. Doing well in this big, new thing is going to determine whether you get promoted or not, to get to the next level. You've got this other little thing that's just an irritant to you. It's not important to you, it's just something that you've been required to manage. Right? So I'll come to you and say, 'Look, I'm going to take this off your hands for you. I will manage this for you but I will take the revenue and the profit and the expense. I'll take the whole thing from you and …', there's a few that will say, 'No way', but there will be a few that'll say, 'Are you serious? Is this real? You going to take this off my hands? Absolutely.' *(Mick, IBI)* … customer was quite a successful company that you know there was a lot a start-ups at the time called fabless integrated circuit companies and these were companies that were designing chips but they didn't have their own fabrication facility. And so you know frankly you know lucky for us we came into this space right when it just started and there weren't that many you know high quality foundries available. So my next focus was bringing this customer on board and they made floating processors. And so without you know any real sales experience I just went down and decided with my boss that I would just simply sort of move to the Bay Area until I signed the deal. So I spent about three weeks down there – go meet with one of the designers or one of the procurement engineering people, and so after about three weeks I got them agreed to run a test run with us and we performed really well on that and they ended up being about a $30 million customer for us. *(Rich, IQX)*
Minimize managerial attention, divert managerial attention away from resource-seeking behaviors	But I mean, it's not – nothing in a corporation is that tightly controlled. I mean, it's a – I mean, we buy – I mean, it's not like it's not doing anything illegal. It just – we're doing something that is more kind of lower key, under the radar a bit … And you have – it's – in any kind of big corporation, 'Oh, I have a couple of people doing this and they're spending a few dollars', and say, 'Oh, yeah, whatever. No one cares.' If it's – if it was like I have 25% of my people, 25% of my budget working on something I wasn't supposed to work on, then that would be a problem. So, you just keep it – you kind of just keep it like I say, low key. Getting it to the point where you can walk people up and say, ;Well, what do you think about this?' *(Glen, IQX)* I tend to work a lot on my own stuff and just not tell anybody about it because then it doesn't have to get funded and be approved and all that stuff and a lot of stuff I like to do, like, I couldn't' really explain to anybody why I want to do it or the purpose of it would be so I tend to like show it better by example than trying to say, 'Oh I want to do this. Can I have some official hours to do that?' I mean that becomes difficult to do because then you have to get approval, getting approval means, especially in a crunch time that you have more time than things to do, so why don't they give you more things to do so then you wouldn't be able to do the things you want to do so I tend to get the things that I need to do done and work on my own projects at the same time and then when I get it to a place where I'm like, 'I think that other people will get it. Then I start showing people and then a lot of times those projects will be picked up as real projects.' *(Brendan, DISX)* It's more I mean a very common tactic here is: Do stuff under the radar as long as you can get a prototype to show and then start showing people and then you know you can get through some of the initial, 'Oh that'll never work.' *(Jordan, GIX)*

Table 4. Resource Acquisition Strategies in Focal Innovations.

Innovator	Innovation	Innovation Description	Resources Required	Organizational Ingenuity Type	Conceal or Reveal
Arav (YTI)	Structured search application	This was a new type of search in an organization whose main focus was on unstructured search.	Engineers on a full-time basis	Process Ingenuity	Conceal
Danny (AMX)	New process for photomask etching	A new photomask etching business and expansion of customer base.	Materials such as photomask	Process Ingenuity	Conceal
Frank (IQX)	Ink jet printers	Ink jet plant to manufacture new type of ink jet printers instead of using the previous technology.	New equipment to manufacture new type of printers	Material Ingenuity	Reveal
Kathy (IQX)	Testing tool	A new testing tool for testing customer products that would result in significant cost reductions for different departments and set new industry standards.	Materials for building the new testing tool	Process Ingenuity	Conceal
Mick (IBI)	Frosting	Testing tools built out of vestigial products within the organization.	Vestigial products from different departments	Material Ingenuity	Reveal
Rich (IQX)	OEM business	OEM was initially a cost center at IQX .The innovation was to validate their existence as a P&L center and start selling to external customers.	Machine to prototype processes	Material Ingenuity	Reveal
Sean (IQX)	Hello	Video-conferencing solution. The purpose of Hello is to provide a virtual meeting experience. This was proposed in the printer division of an organization whose focus was not on video-conferencing solutions.	Room for beta-testing Hello	Process Ingenuity	Conceal

Constraints and contradictions in resource availability

When innovators required resources, they perceived organizational constraints such as the need to gain approval from relevant departments and different procedures to be followed. This meant that their innovation ran the risk of being delayed and eventually derailed due to not receiving resources in a timely manner. Such risk held for both innovations that had some visibility within the organization and for those with no visibility at all. For example, Amy, an innovator at GIX, said:

> So, it's just always a resource battle. At a large company it is a resource battle. … I was searching for engineering resources to help me do this, because nobody was assigning them to me. [I asked,] will you give me resources? And it was like, no, no, no, no, no.

Managers from organizations concurred with this view. For example Francis, a Director of R & D at IQX, said:

> When it's just at the idea stage, you're never going to get the corporation, if you will, to fund it. They'll want to see that it's feasible. They'll want to see a business plan. They'll want to see it's technically feasible; they'll want to see a business plan. They'll want to see some kind of demonstration of the concepts so it feels real to them. And all that takes time and money. Typically, the corporation allocates all of its official time and money to the core business.

The resources that innovators sought were available widely within the organization but not to them. Thus, the availability of resources differed depending on the level of analysis. At the individual level innovators were impoverished for resources, while at the organizational level there were some resources available, although not an abundance. Perceptions of organizational constraints at an individual level but *possibilities* of accessing resources at the organizational level propelled innovators to engage in resource-seeking behaviors.

Why would the perception of constraints and contradictions in resource availability offer innovators two possible pathways to organizational ingenuity? Because penury at the innovator level enabled them to think creatively and repurpose the materials. This is in line with the concept of bricolage (Baker & Nelson, 2005), where entrepreneurs in penurious environments engage in bricolage because of resource constraints. Another possibility is that of diverting resources the organization possesses but are not allocated to the innovation. These are resources allocated to another project or kept in reserve for future use. This concept is similar to that of short-term organizational slack, i.e. a pool of resources in an organization that is in excess of the minimum required to produce output and can be recovered from their current use to be used in an innovation (March & Simon, 1958; Nohria & Gulati, 1996). Innovators could think creatively to alter the organizational processes by which they can divert these resources to their innovation.

Thus perceptions of contradictions in resource availability at the individual and organizational levels of analysis opened two new pathways for innovators within organizations to engage in organizational ingenuity. Despite penury at the individual level, the possibility of accessing resources from the organization encouraged innovators to engage in creative resource-seeking behaviors under constraints.

Organizational ingenuity: Material ingenuity and process ingenuity

Innovators choose one of the two pathways open to them for accessing resources under constraints. They creatively re-imagine the use of resources resulting in material ingenuity. Alternatively, they use creative processes to gain resources resulting in process ingenuity. Material ingenuity results

when innovators utilize currently wasting or underutilized resources that the organization has invested in and transform the nature of a resource (Baker & Nelson, 2005). Material ingenuity is similar to bricolage. In both material ingenuity and bricolage individuals recombine resources for new purposes and reimagine the use of resources without being limited by the dominant understandings.

However, both concepts are not synonymous. For something to be considered materially ingenious and not bricolage it must fulfill two additional conditions: it should be a creative solution as judged by the participants in a given context and the purpose of morphing resources must be to gain resources under constraints. In contrast, bricolage need not be creative or under situations of constraint. For example, utilizing a book as a paper weight is not necessarily creative or utilized under a situation of constraints; it might not be considered as an example of material ingenuity. It is, however, considered bricolage because it utilizes the book without consideration of the institutional limits to the purpose or use of a book.

When innovators employ material ingenuity they scavenge and amplify (Starr & MacMillan, 1990) underutilized resources to derive value out of them. For example, when Frank (IQX) needed a plant to make ink jet printers, he was able to employ material ingenuity and modify the use of the resource under constraints. He modified wasting equipment purchased for a previously failed liquid crystal display (LCD) project. This saved IQX thousands of dollars of investment on new equipment. He employed material ingenuity to use existing equipment without regard to institutionalized understandings of its function (Baker & Nelson, 2005), under a situation of constraints. When discussing how he acquired expensive equipment for manufacturing ink jet printers, Frank said:

> Remember we had just shut down another Fab that was ready to go into production … The exact pieces of equipment that we were going to build the *other* shop out of. Now there were some unique pieces of equipment as well … those were usually modified pieces of things we already had built. (emphasis added)

Innovators who were unable to reimagine the use of resources but needed standard resources that other projects competed for creatively altered organizational processes to access these resources. This resulted in process ingenuity. Examples include creating slack; identifying resources in projects that are near completion and absorbing those resources into the innovation, before formal approval or before these could be reallocated; using creative accounting procedures to show procedural conformity; and 'slipping in' additional resources when requesting resources for an approved project. To elaborate, Arav (YTI) required engineers with particular skills to work on his project and continued to seek people with that set of skills. Other projects in the organization were also competing for these engineering skills. This is an example of standard resource seeking. To access engineers for his project Arav was formally requesting resources from the US. At the same time, he was able to seek engineers with similar capacities from the UK without formal approval from or notification to the management. He spoke directly to his UK counterpart and gained a similar set of resources. Arav's idea was to get the resources informally committed and then seek formal approval when the project had some success and gained legitimacy. For example, Arav said:

> I had been talking to our UK team for a different project. And I knew that they never got good projects. So I talked to them. I said, 'Look, you never get good projects. If you work with me on this, it has visibility at this point, I need your help.' They said, 'Why not?' Exactly. So while I was fighting for resources in the US, I had three people there working on it. … because they were UK their current projects weren't that interesting and were being phased out anyway. So .. knowing where resources exist that you can use, that's critical.

Note that these engineers, or slack, were not readily available. Arav had to acquire them before they got off the other project. In other words, Arav had to create slack by altering organizational processes to gain resources.

Similarly, when Kathy (IQX) needed materials for a project she had to leverage the accounting process creatively. Kathy said:

> In order to run some of the tests we needed material. I had no budget. [laughs] So we had to figure out through the accounting system how to buy material. Okay we had to get it like reassigned to us … do some work on it, so we had engineers doing work on this material … and then we'd sell it back to manufacturing it … It was really working internal system constraints.

In sum, when the innovators were able to creatively reimagine and repurpose the use of resources that were currently unutilized or underutilized in the organization they employed material ingenuity. When innovators were unable to repurpose the use of resources, and needed resources that other projects in the organization were competing for they engaged in process ingenuity.

Managing legitimacy: Maximizing or minimizing managerial attention

Innovators actively shape management attention by enhancing it or limiting it to their projects based on whether they use material ingenuity or process ingenuity. When Mick (IBI) and Frank (IQX) acquired resources through material ingenuity, they tried directing management attention to their resource acquisition. In contrast, when Danny (AMX) and Kathy (IQX) required materials and used process ingenuity, they attempted to stay under the radar.

When Mick (IBI) was using wasted organizational resources for a new purpose (bricolage), he ensured that the management was aware of his recombination at the outset. Mick symbolically called his project the 'K-9' (canine) suggesting that he was using 'dogs' or resources that no one in his organization wanted. Mick said, 'The way we sort of clamped on this, the way we would really get this initial funding is go after these products, the dogs. The dogs in the organization that people don't want!'

He wanted to highlight the fact that he was creating value for his organization by reusing the vestigial products within it that were currently useless. He was tapping into resources that IBI had already invested in which he then modified to utilize in his innovation.

In contrast, when Danny (AMX) and Kathy (IQX) required resources, purchase requisitions had to be signed by managers before buying parts from outside vendors or internally. However, Danny (AMX) purchased parts from machine shops and promised to pay them later once he had approval for the project. He did not put in the standard purchase requisition because it would have brought management's attention to his project. His vice president had explicitly disapproved of the innovation because he felt that AMX did not have expertise in this area. He had, therefore, asked Danny not to pursue it. Danny, however, wanted to continue but did not want to highlight his resource-seeking behaviors. When questioned about his purchase, Danny said:

> Well, actually – I had to purchase parts for this project. And [the vice president] was the one who was approving purchase requisitions. … I took a big chance … And so I took a risk and I ordered those parts and so then I called … a few of my machine shops who were working with me and I said, 'Ok, I cannot give you formal PR purchase acquisition for the next parts.' Because he – of course not. I cannot submit it but I told him to go and do me a favor. And later on, I'll figure out how to give you more business. So I got the parts.

Similarly, Kathy (IQX) found a way to buy materials internally for her project and sell them back to manufacturing. She was over her budget, which would have attracted management attention and required approval, so she carefully worked the procedures for buying materials internally, thereby avoiding attention.

Why did innovators choose to highlight their resource acquisition strategies when using material ingenuity and not process ingenuity? Results from interviews indicate that managing their innovation's legitimacy was key. When innovators were able to use material ingenuity, the act itself seemed to provide the necessary legitimacy for their innovation. Note what Frank (IQX) said when discussing how he morphed a facility used for manufacturing LCD displays into one for manufacturing ink jet printers:

> [W]e always went and we made them an offer they couldn't refuse. They had a facility that was sitting there idle anyway. It was just going to be written off, and we were suggesting here's a way that we'll not only use that … we'll make an organization … that'll be larger than the entire division.

Dan, a vice president (IBI), when talking about Mike's innovation at (IBI), for which Mike had approached different divisions that owned unused vestigial products at the beginning stages of his innovation, said:

> [T]he guy's name is Mike and he came up with this idea, really his idea completely, which was to take products that had been sort of sitting on the shelf for a long time, slowly declining in revenue, and see if he could take that and with very, very small incremental investment pick up some additional revenue. And so he was doing that, he had a whole bunch of products that he had picked up, some of which were these database tools that were left over from a long time ago. … So we still had these vestigial products and so he used those to get us that first business, that first piece of business.

Thus, utilizing resources the organization had actually invested in and were otherwise wasting seemed to provide early-stage innovations the required legitimacy. This is consistent with theories of sunk costs (Peteraf, 1993) and resource fungibility (Edwards & McCarthy, 2004). The focus of firms is to leverage resources to maximize investment value through optimal deployment of assets (Barney, 2001; Grant, 1996). When the organization invests in certain resources, the investment is treated as sunk costs and as non-recoverable (Peteraf, 1993). However, using material ingenuity makes assets that were previously deemed non-recoverable seem fungible. All resources lie along a continuum, from having a fully fungible use value (such as money) to those whose value is completely context dependent and in its use (such as LCD equipment) (Edwards & McCarthy, 2004). Making assets previously deemed useless as fungible to maximize value provides legitimacy to the innovation. The primary task of management is to maximize value through optimal deployment of existing assets (Grant, 1996). Innovators bricolaging assets provide an opportunity for their managers and higher-ups to maximize the value of assets that are otherwise unsalvageable or those that are marginally utilized. Thus innovators gain legitimacy through this process.

In contrast, when innovators required resources for which other projects were competing, they had to prove their innovation's worth before gaining resources. If they used process ingenuity to divert resources that the organization wanted to allocate to other viable projects, they had to keep their resource acquisition under the radar until they could show proof of success. As Bob from IBI mentioned:

> Well, [everyone says] that sounds really interesting but we just don't have the resources to do it. … And so my experience has been that it's nice if you can instead work with individuals and often times show a proof of concept before you even – if you go in with an idea, you won't get anywhere. You need to go in

> with some real proof that, hey, this is a good thing. Once you've done the rebel thing and kind of shown that, hey, this thing can work, then you can start getting buy-in from management.

Arav from YTI echoed similar feelings:

> I think the fact like you mentioned earlier that we didn't ask for resources. There came a point when they said, 'Okay how much resources do you need?' … After we had validated that this actually works, they said, 'How many resources do you need?'

Managers of organizations also corroborated this view on according legitimacy and further resources for the project only after innovators demonstrated proof of success when using process ingenuity. Arthur, a manager from DISX, corroborated this strategy used by innovators in his organization:

> They'll work on it kind of in secret or on their own time or on the company's time but not really talk about it until there's something to show and then once they show, everyone's like, 'Whoa! That's so awesome that you were able to do that!'

This strategy by innovators matches the literature on how legitimacy is accorded to entities. Legitimacy is conferred to entities subjectively (Suchman, 1995). If an entity diverges dramatically from norms, but the breach goes unnoticed, then the entity retains legitimacy (Suchman, 1995). Innovators in our sample did not want their managers to notice the diversion of standard resources to innovations whose legitimacy was questionable. They wanted to keep their diversion under the radar.

Thus, innovators varied their strategies for gaining internal legitimacy based on their resource acquisition strategies. Innovators who were successful in employing material ingenuity highlighted their resource acquisition strategies in the early innovation stages. They were able to demonstrate to their managers and higher-ups that repurposing resources enabled them to maximize the value of unused or marginally used assets. The very act of repurposing provided the necessary legitimacy to their innovations. In contrast, innovators employing process ingenuity concealed their resource acquisition strategy in the early stages. They were diverting resources from officially approved projects. They deliberately kept their innovations under the radar until they were able to demonstrate proof of success for their innovation to justify these unapproved diversions.

Discussion and Conclusion

In this study I address the question of how innovators within the structural constraints of their organization gain resources for early-stage untested innovations. Innovators in large, established organizations are excellent subjects for understanding the phenomenon of organizational ingenuity. Such innovators are constrained by organizational structures and find it difficult to gain resources for early-stage innovations. Innovators need resources to succeed in their innovations (Van de Ven & Chu, 2000) but large organizations are not configured to support such innovations (Dougherty & Hardy, 1996). Thus, innovators must employ organizational ingenuity to negotiate structural constraints. How else can they gain resources and legitimacy for their projects?

Extant studies on innovation and entrepreneurship explore how innovators gain resources. They always emphasize the importance of establishing legitimacy first (Zimmerman & Zeitz, 2002; Zott & Huy, 2007). In contrast, this empirical study finds that the process of gaining resources can itself offer legitimacy to early-stage innovations. This finding recasts light on some of the previous studies. For example, in Zott and Huy's (2007) study, it could be pertinent to assess if the ways in which

entrepreneurs gained their initial set of resources might be perceived as symbolic by investors for conferring legitimacy to their innovation, in addition to other symbolic actions identified in the study.

Innovators used two types of ingenuity: material ingenuity and process ingenuity. They used managerial attention as a key lever. When using material ingenuity, innovators tended to highlight their resource acquisition strategies. Showing how to use materials that the organization had already invested in but were currently unutilized or underutilized helped innovators conform to the organizational understandings of maximizing return from investments (Barney, 2001; Grant, 1996). In contrast, when using process ingenuity, they kept their resource acquisition strategies under the radar until they showed success to gain formal resources. They were conforming to their organization's practices of supporting innovations after their legitimacy has been established. When outcomes are unknown, as in the case of early-stage innovations, procedural conformity is required to gain legitimacy (Suchman, 1995).

Interestingly, although the actions by innovators seemed unconventional, two caveats are essential. Firstly, innovators using both types of ingenuity were conforming to the organization's deep understandings. Both institutional theory (Scott, 2001) and research on embedded actors in micro-institutional contexts suggest that institutional forces propel actors into conformity (van Dijk et al., 2011). Innovators following either resource acquisition strategy acted as structurally reproductive agents (Hays, 1994). Although unconventional actions by innovators were beyond the organization's dominant understandings, innovators reproduced institutionalized constraints by hiding what was unacceptable within the organization and highlighting what was culturally acceptable. Thus, their actions had very little impact on the deeper structures of the organizations and did not significantly affect how resources should be gained or viewed for future innovations. By and large the procedures or the rules of how resources should be acquired or viewed remained intact. Innovators in this study were similar to that of Willis' lads (Hays, 1994). They were not minions of structural constraints. They actively exercised unconventional options. This ironically enabled the reproduction of organizational structures for innovation. This reproduction of existing structures and structural constraints by innovator actions is shown by a broken arrow in Figure 2.

Secondly, previous studies suggest that managers in such organizations are aware of these autonomous processes through which innovations occur (Burgelman & Grove, 2007, Jelinek & Schoonhoven, 1990). For example, in an empirical study of Intel Corporation, Burgelman and Grove (2007) found that the percentage of resources allocated to autonomous projects, as compared to induced projects, has been steadily on the rise during critical times in the firm's history. As of 2005, almost 50% of the development resources were allocated to such autonomous processes. Burgelman and Grove (2007) assert that innovators in these organizations must be able to engage in autonomous initiatives before they have formally obtained the resources to do so. These researchers conclude by stating that Intel Corporation, a Silicon Valley giant, relied on cycles of autonomous processes, in addition to, induced top-down innovation initiatives to keep it viable. Similarly, Jelinek and Schoonhoven (1990) in a study of Silicon Valley organizations find that managers are aware of, and tacitly approve of, stolen resources, as long as innovators are able to show success in their projects. Thus, although innovators were gaining resources surreptitiously in this study, when engaging in process ingenuity they were following practices that were widely accepted in these organizations.

This study also highlights managerial attention as a key variable for gaining resources and innovation legitimacy. Previous research suggests that the greater the managers' perceived understanding of the issue and the greater the issue capability, the higher is the assessed issue feasibility (Dutton, Stumpf, & Wagner, 1990). That is, when managers understand the issue better, and believe that the organization has the knowledge and resources to respond to it, the greater they assess its

feasibility (Dutton et al., 1990). They tend to allocate resources and time, and place an issue high on the priority list, when they perceive its high feasibility (Dutton et al., 1990). Innovators in my study tried to maximize their managers' perceptions of innovation feasibility and capability. Innovators brought their innovations to managers' attention when they believed that managerial understanding of the innovation and its capability would be maximized. For innovations that utilized wasting resources, managers were able to gain a quicker understanding of the innovation and its capability and feasibility. Innovators, therefore, brought these issues to managerial attention at the earliest stages. In contrast, for innovations that were unfamiliar or required new resources or for resources to be diverted from other projects, managers' perception of innovation capability and feasibility was questionable. Innovators, therefore, avoided attention until they could help managers understand the innovation and its capability and feasibility.

Whereas previous research suggests that innovators of early-stage innovations are likely to engage in process ingenuity (e.g. Jelinek & Schoonhoven, 1990), this study underscores material ingenuity or creative re-imagining of resources to be an alternate pathway for innovators pursuing such innovations. Although, in this study, it appeared that innovators determine how resources should be re-imagined, based on technical or substantive aspects of their innovation's resource requirements, symbolic considerations might also be important. Future research must identify the symbolic conditions in an organization that determine how innovators re-imagine resources for early-stage innovations. One theoretical area that might provide compelling insights into this question is the notion of symbolic environments in institutional theory (Phillips & Tracey, 2007; Rao, Monin, & Durand, 2005). Exploring the role of symbolic environments (Phillips & Tracey, 2007; Rao et al., 2005) will provide further insights into how innovators make material ingenuity decisions in early-stage innovations based on their cultural contexts, in addition to technical or substantive considerations.

Future research must also explore the generalizability of these results to innovations that are beyond early stages and have gained initial approval from organizational decision makers. Researchers have found that initial approval from decision-makers restricts product development teams (Sethi & Iqbal, 2008). Innovators and teams lose the freedom to use their resources in the manner that they deem fit (MacCormack, Verganti, & Iansiti, 2001; Sethi & Iqbal, 2008). For example, if an innovation team would like to explore a particular technology after an innovation has been initially approved, it might be extremely difficult to divert resources allocated, for some other purpose, to explore the suitability of the new technology (Sethi & Iqbal, 2008). In such situations, it is difficult for innovators to use process ingenuity because decision-makers are already alerted to the innovation and likely to notice such diversions promptly. It might also be difficult for innovators to use material ingenuity because the resource requirements might be of a larger magnitude than early-stage innovations. Thus, innovators might not be able to acquire them easily by re-imagining the use of wasting or underutilized resources. Future research must investigate how innovators gain resources for advanced innovations as compared to early-stage innovations, and assess if innovators use other types of organizational ingenuity in such situations.

Results of this study also emphasize the role of slack in nurturing organizational innovation. Researchers studying slack classify it into two broad dimensions: absorbed slack that is tied up in the current operations and harder to redeploy, and unabsorbed slack that is available for immediate use (Tan & Peng, 2003). Slack allows experimentation and enables innovators to pursue projects that are not perceived as immediately valuable to the organization (Nohria & Gulati, 1996). Studies addressing the role of slack in organizational innovation have typically assessed how slack encourages or inhibits innovation at the organizational level (e.g. Bromiley, 1991; Cheng & Kesner, 1997; Hambrick & D'Aveni, 1988; Miller & Leiblein, 1996). For example, Geiger and Cashen (2002) show that both absorbed and unabsorbed slack have a U-shaped relationship with organizational

innovation. In contrast, in this study the focus is on how slack operates at the individual level of analysis. Both material and process ingenuity enables innovators to identify and utilize both absorbed and unabsorbed slack for gaining innovation resources. Without this slack, it would have been very difficult for innovators to gain resources for early-stage innovations. Thus, it is possible that although organizational slack has a U-shaped relationship with innovation at the firm level, it has a positive relationship with early-stage innovations at the individual level. Future research must examine the relationship among organizational slack, organizational ingenuity, and innovation at the individual as well as at the firm level of analysis.

One of the limitations of my study is that the data used in the case exemplars depend upon retrospective data. Although innovators mentioned their current projects and how they were gaining resources for them, I was unable to observe this for the innovations discussed in this study. Real-time understanding of how innovators gain resources at the early stages will provide deeper insights into the dynamics of this phenomenon. Secondly, my data is based primarily on companies in Silicon Valley that are known for encouraging innovation. It is possible that gaining preliminary resources through the methods suggested here might be inappropriate in industries in which innovations are not as highly encouraged, leading to loss of legitimacy for the innovation. It is possible that innovators might be penalized for these actions in such industries. Future research must look at other industries and in cross-cultural contexts to assess if the same patterns of resource acquisitions manifest in other industries and contexts. Additionally, it is possible that the type of firm influences the availability of informational resources. Silicon Valley firms may be more open to innovation, providing me with more access to information regarding innovations.

Thirdly, I observed only those cases in which innovators were successful in gaining resources though material or process ingenuity. Although innovators mentioned innovations in which they failed, when employing organizational ingenuity, they were hesitant to elaborate upon the details of their unsuccessful attempts due to hopes of pursuing these innovations in the future. However, from the information that they shared on these failed attempts, it appears that when innovators insisted on gaining resources only through proper procedures, the projects were delayed or canceled due to lack of timely resources. This finding needs further research. In the same vein, future research also needs to discover if there are other ways in which organizational ingenuity manifests in the resource acquisition process. For example, are there other types of ingenuity at the team level of analysis as compared to individual level of analysis?

This study explores how innovators gain resources for their early-stage projects before having proof of success. The setting and the focus of this study offers a look at innovation within organizations from a unique perspective. While previous studies have focused on independent entrepreneurs (e.g., Lounsbury & Glynn, 2001; Zott & Huy, 2007) and on innovations that are relatively advanced (e.g., Dougherty & Heller, 1994), my work looks at early-stage innovations. Additionally, beyond understanding the mechanism of how innovators gain resources, my study also provides rich insights into how unconventional actions, successful resource acquisition, and legitimacy operate at the micro-institutional level. My work seeks to explain a paradox: how non-conformity and seemingly unconventional actions are in fact conforming actions that can somehow confer legitimacy. This study offers a robust explanation of how unconventional actions to gain resources can be seen as conforming to extant structures. Studies that have examined resource acquisition in innovations highlight how innovators hide their innovations from managerial attention. In contrast, the central tenet of my findings is that highlighting managerial attention when utilizing material ingenuity and minimizing attention when engaging in process ingenuity might be key to legitimizing early-stage innovations.

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Appendix A

*Selected Questions from Basic Interview Protocol**

Manager Interviews

Please provide a brief background about yourself such as your role in the organization, title, years in the company, experience in the industry, and educational qualifications.
Whom do you consider as innovators in your organization?
In what capacity do you know them?
Describe a project that they brought to fruition that will help me to understand why you consider them to be innovators?
What were some of the resources that these innovators needed to bring their projects to fruition?

Innovator Interviews

Please provide a brief background about yourself such as your role in the organization, title, years in the company, experience in the industry, and educational qualifications.
What are some of the innovations that you have pursued within your organization? Mr./Ms._____ mentioned this _____ innovation that you had launched. Can you elaborate more about this innovation from start to finish?
What were some of the critical resources that you needed to go after the idea, at different stages of the process? Describe each step of the process. Specify the exact nature of resources that you needed for that step, for example financial resources (e.g. money), human resources, materials etc.? Were the resources easily available within your organization? If not, what were some of the barriers that you faced?
How did you go about obtaining the necessary resources? Whom did you reach out to?
Did you disclose the innovation to your manager or other decision makers at the outset? When did you decide to disclose it to them?
Describe other innovations that you launched within your organization that were successful and innovations that you did not succeed in launching.

For each innovation describe what were some of the critical resources that you needed to go after the idea, at different stages of the process? Describe each step of the process. Specify the exact nature of resources that you needed for that step, for example financial resources (e.g. money), human resources, materials etc.? Were the resources easily available within your organization? If not, what were some of the barriers that you faced? How did you go about obtaining the necessary resources? Whom did you reach out to?

Did you disclose the innovation to your manager or other decision makers at the outset? When did you decide to disclose it to them?

*Note: Only the first set of questions that were asked during the first interview relating to this study are provided here. Interview questions for the remainder of the first interview and the second interviews were modified based on participants' responses to these questions.