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Human Resource Slack as an Antecedent to Instilling the Entrepreneurial Mindset within Department of Defense Organizations

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HUMAN RESOURCE SLACK AS AN ANTECEDENT TO INSTILLING THE ENTREPRENEURIAL MINDSET WITHIN DEPARTMENT OF DEFENSE ORGANIZATIONS

THESIS

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Abstract

The Department of Defense has been called to transform the way it fights, thinks and operates to more effectively counter the changing threats to the United States. Private organizations have long been faced with a similar need to be flexible to meet the dynamic market which they serve. The Office of Force Transformation has been tasked to facilitate the mandated transformation of the DoD. Based on literature on slack resources, slack may be a necessary tool for proper transformation to a more innovative and effective military.

The multiple case study methodology was utilized to gather private firms' best practices to utilizing excess human resources for innovation, termed creative capacity, and instilling the entrepreneurial mindset. Analysis of these practices resulted in the formation of a creative capacity implementation methodology as well as an organizational human resource slack typology. With these tools, Department of Defense organizations will be able to more effectively implement creative capacity to achieve process and product improvements, and ultimately, enhanced capabilities and efficiencies.

HUMAN RESOURCE SLACK AS AN ANTECEDENT TO INSTILLING THE ENTREPRENURIAL MINDSET WITHIN DEPARTMENT OF DEFENSE ORGANIZATIONS

I. Introduction

Innovation and adaptation are innate to airmen and the nation's air and space culture. The AF is led by, supported by, and comprised of innovators who embrace change and aggressively pursue transformation.
(Secretary of the Air Force Dr. James G. Roche, 24 April 2002)

Chapter Overview

This chapter describes the basic aspects of slack resources. It begins with a definition of slack resources, the motivation to explore the benefits of slack resources, and the importance of the research. This chapter then outlines the research objectives, the problem statement, the investigative questions, and finally, the scope and limitations of this effort.

Introduction

Organizational slack or slack resources are defined as a cushion of excess resources that can be used in a discretionary manner (Bourgeois, 1981). Research has found that the use of organizational slack enables organizations to better adapt to changing operational environments. Companies utilizing slack are more flexible, efficient, and successful.

This research effort deals with excess human resources, or human resource slack. For this purpose, slack human resources will be referred to as innovative capacity or creative capacity and defined as excess human resources used for the purpose of innovation.

Today's operational environment for the Department of Defense is vastly different from any ever seen before. Enemies of the United States are no longer just countries with standing armies, marching in uniforms and carrying flags. There is also a new threat of terrorism on our own soil as well as the threat of nuclear weapons controlled by small extremist countries and rogue forces. To cope with the changing and diverse threats to our country, top Defense officials are calling for an innovative military with a new way of thinking and fighting (Rumsfeld, 2002).

Importance of Research

The study of slack resources stems from today's dynamic and complex business environment. For private firms to be competitive, it is crucial that they are efficient, adaptive, and informed. Unnecessary costs cut into the bottom line, hurting a firm's ability to invest in the future, be it process improvements or product improvements. Inadequate resources may cause firms to be late in their decisions, often missing first-mover advantages or worse, missing the changing market all together.

Recent recessions have forced managers to cut the fat from organizations, attempting to improve short-term profit margins and ultimately, company survivability. But with those cuts went organizational resources that gave companies the ability to be flexible and innovative, as well as to utilize the learning curve (Lawson, 2001). Worse, the resources eliminated included those that ensure quality and safety. One dramatic example of efficiency gone wrong is the disaster at Three Mile Island nuclear-power plant (Lawson, 2001). "The information necessary to avoid the 1979 accident in

Pennsylvania was known but no time was taken to use the available knowledge" (Lawson, 2001).

Sadly, the fat trimming is not unique to private industry. While intentions to protect and efficiently utilize tax revenue by public organizations are well meaning, necessary resources have been removed along with the unnecessary organizational fat.

Research Objectives

The objective of this research is to investigate current uses of slack human resources by private firms and explore similar uses by the Department of Defense. Attention must be paid to the effects of the human slack utilization as well as slack implementation techniques, achieving stakeholder buy-in of slack resources, and optimizing the amount of slack human resources within the organization.

Problem Statement

Current research on organizational innovation and adaptation has resulted in the conclusion that organizations without the necessary tools in place to change with the operational environment fail. One of the necessary tools is organizational slack. While the DoD has made transformation a priority, the research suggests that these efforts will be severely hindered by the lack of slack resources within defense organizations. Organizations without excess resources change slowly and are reactive, instead of proactive, to the dynamic operating environment. The competition, our enemies, is changing rapidly to exploit the weaknesses of the US and its allies. Without slack resources to adapt and change, private firms go out of business; public firms such as the

DoD lose wars. Could the use of slack resources, specifically slack human resources, be the difference between the United States as a world power and the United States as a cowering country?

Investigative Questions

To accomplish the objectives stated above, the researcher collected data from multiple organizations known to be innovative. Open-ended interviews were conducted with personnel knowledgeable about the innovative processes to determine the use of slack human resources. The data collected served to answer the questions:

1. How do firms use excess human resources to pursue innovation?
2. How do firms pursue innovation when adequate human resources are not available?

Scope and Limitations of the Research

Research has shown that the specific utilization of slack resources changes its effect on organizations (Cheng and Kesner, 1997). Therefore, the results of this study will serve only as guidelines or best practices of organizations and should not be applied directly without modification. Many factors must be considered before implementing slack resources, such as desired outcome, market volatility, and diminishing returns. The findings may only encourage further organizational research into the use of excess human resources.

II. Literature Review

Chapter Overview

This chapter reviews the current literature on organizational slack, or slack resources, and explores the need for research on human resource slack for the purpose of innovation.

Current Literature

Organizational slack has been defined by Bourgeois as:

> …that cushion of actual or potential resources which allow an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy as well as to initiate changes in strategy with respect to the external environment (Bourgeois, 1981).

Sharfman et al. (1988) clarified that the excess resources must be visible and employable to be considered organizational slack.

Bourgeois conducted a review of literature and knowledge on the topic of slack resources in 1980 and found that there has been an ongoing debate, which continues today, of the role slack plays in the flexibility and adaptation of organizations. One side of the debate argues slack resources enable innovation and change, enhancing a firm's ability to respond to shifts in the business environment, increasing long-term performance (Carter, 1971; Cheng and Kesner, 1997; Cyert and March, 1963; Mohr, 1969). This proactive view supports that slack enables an organization to experiment with business models and approaches to the dynamic business environment. Slack resources are necessary to instill the entrepreneurial mindset within organizations: seeking new products through research and development and finding the right management fit to achieve the organization's purpose in the market (McGrath and MacMillan, 2000). The

argument is that change and innovation within a corporate culture require excess resources (Cheng and Kesner, 1997). Without the necessary resources, operations shift to a more reactive, survival mode. Management's decision options are limited when little slack exists, hindering organizational ability to capitalize on market conditions. Another positive effect of slack resources is the reduction of posturing among business units for the limited, and necessary, resources for respective operations (Moch and Pondy, 1977). Along with this relaxed corporate environment, units have been found to cooperate at a higher rate, achieving better overall organizational performance.

The other camp in the debate believes, as the popular press does, that slack is inefficiency and acts as a buffer between an organization's ability to observe and respond to environmental changes (Cheng and Kesner, 1997; Litschert and Bonham, 1978; Thompson, 1967; Yasi-Ardekani, 1986). With slack resources, it is believed, there is no incentive to make the best choices or be proactive to the changing business environment. This "slack-as-a-buffer" argument believes slack reduces a firm's aggressiveness in responding to environmental shifts (Cheng and Kesner, 1997).

Additional research on slack yielded the identification of three types of slack resources: available, recoverable, and potential (Bourgeois and Singh, 1983; Cheng and Kesner, 1997; Sharfman, Wolf, Case and Tansik, 1988). Cheng and Kesner (1997: 2) defined them as follows:

> Available Slack: resources not yet committed to organizational design or a specific expenditure (e.g. excess liquidity).
>
> Recoverable Slack: resources that have already been absorbed into the system

operation as excess costs (e.g. excess overhead expenditures) but can be recovered through organizational redesign.

Potential Slack: future resources that can be generated from the environment (e.g. raising additional debt or equity capital).

Though there has been very little research comparing the three types of slack, Cheng and Kesner found indications that each affects a given situation differently. From this, it could be said that the generalization of "slack resources" is erroneous and must be referred to and studied in the three distinct slack types.

Greenley and Oktemgil (1998) synthesized slack resources literature in their study comparing performance and slack in British companies. They divided the areas that are believed to be affected by slack resources into strategic adaptation, strategic flexibility, and overall company performance.

Strategic Adaptation

The investment of slack resources into company capabilities has been argued to improve companies' ability to adapt to environmental change. Greenley and Oktemgil (1998) use Chakravarthy's (1982, 1986) assertion that adaptation is composed of adaptive specialization and adaptive generalization. The first, adaptive specialization, is defined as "the process for improving overall goodness-of-fit, by improving adaptation to the current environment, with an emphasis on exploiting the current environment to improve performance by generating surplus profits" (Greenley and Oktemgil, 1998), or more simply, the generation of slack resources. The second, adaptive generalization, "is the

process of investing these generated slack resources for improving capabilities for adapting to uncertain and unknown future environments, and in particular for exploiting future long-term opportunities to gain long-term improvements in performance" (Greenley and Oktemgil, 1998; Bourgeois, 1981; Bromiley, 1991; Clark et al., 1994; Segars and Grover, 1994; Sharfman et al., 1988).

Strategic Flexibility

Researchers have defined strategic flexibility as a firm's ability to respond to the demands of a dynamic environment characterized by high levels of uncertainty (Evans, 1991; Fiegenbaum and Karnani, 1991; Genus, 1995; Porter, 1980; Sanchez, 1995; Wernerfelt and Karnani; 1984). Firms are more likely to gain sustainable competitive advantage through organizational resources and capabilities than through long-range plans (Hitt and Reed, 2000). Greenley and Oktemgil believe Evans' (1991) assertion that there are two types of flexibility: offensive and defensive.

Offensive flexibility is the company's advanced preparation for environmental change. When companies have slack resources available, choice among opportunities is increased (Dimmick and Murray, 1978). In fact, high-performing companies have been found to have higher levels of slack investment than low-performing companies (Chakravarthy, 1986).

Defensive flexibility enables firms to react to unexpected opportunities by quickly developing strategy options (Evans, 1991). The slack resources at a company's disposal allow them to use the wait-and-see approach which mitigates risk, or to capitalize on first-mover competitive advantages (Bower and Hout, 1988; Porter, 1980; Stalk, 1988).

Another variant of the defensive flexibility posited by Evans deals with a firm's flexibility to learn from mistakes through new strategy development to cope with the new environments. This type of slack use has been studied in the area of competitor defensive actions, such as fending off a takeover (Greenley and Oktemgil, 1998). One study found that bankrupt firms had low slack resource levels while a matched sample of non-bankrupt firms had higher levels of slack at their disposal (Hambrick and D'Aveni, 1988).

Company Performance

Many strategy researchers suggest that the use of slack resources to facilitate company flexibility should result in improved company performance (Evans, 1991; Greenley and Oktemgil, 1998; Hambrick and D'Aveni, 1988; Miller and Leiblein, 1996). However, the variability of findings relative to the impact of slack indicates that the context in which a company finds itself plays a critical role. A relationship between firm performance and slack resources has been identified relative to three independent variables: the amount of slack, the area of slack allocation, or the sum of characteristics described by the contingency theory.

The Amount of Slack

The arguments vary as to whether there is a positive relationship between slack and performance (Cyert and March, 1963; Singh, 1986), or a curvilinear (Bourgeois, 1981) relationship where slack improves firm performance to a point but thereafter, slack becomes inefficiency. Some theorists have gone as far as to imply that slack is

completely wasteful (Simon, 1957; Jensen, 1986, 1993). Such sharp contrasts in theory beg for further research into the determination of slack resource use.

The Allocation of Slack

The specific allocation of slack resources has been found to have a large impact on its effect on the organization. As previously discussed, some research seems to indicate that slack has a positive effect on organizations, the slack is good argument, while other research seems to indicate a negative effect on organizations, the slack is bad argument. One such study, by Cheng and Kesner in 1997, looked at the allocation of slack resources as an influence on the outcome on the firm.

Cheng and Kesner (1997) found that the allocation of slack resources determines the effect on the organization, supporting both the slack is good and the slack is bad arguments. Slack resources can be allocated to improving internal operating efficiency or external market effectiveness (Cheng and Kesner, 1997). Allocation of slack to internal efficiency does, in fact, improve operations, supporting the slack is good theory. However, they found that the improved efficiency also meant a decrease in the firm's ability to adapt to the changing environment. They also found that slack resources allocated to external market effectiveness, such as promotion and sales, increase the organizational ability to adapt to environmental changes.

Bowen (2002) provides a perspective of analyzing slack use at more than one level within the organization and found that the level of slack implementation varied the benefits of the excess resources. This further complicates the decisions of slack resource allocation.

Slack Resources and the Contingency Theory

The use of slack resources may depend on the characteristics of the organization. Most theorists today believe that there must be a fit between the structure, size, technology, and operating environment and that there is not single best way to organize (Borgatti, 1996). While no research has been found to directly address slack resources viewed from a contingency theory mindset, most organizational slack literature implies that slack resource use depends on the firm's size, environment, activities, strategies, and technologies. For example, Chandler and Hanks (1994) comment on the availability of slack when resource-based capabilities are abundant. Dimmick and Murray (1978) posit that slack resource use is discretionary in the pursuit of market opportunities and developing future strategy options for changing environments (Bowman and Hurry, 1993; Sanchez, 1993).

Slack and Innovation

Organizational adaptation, whether proactive or reactive, to the dynamic environment in which they reside has been described as innovation (Damanpour, 1996). Drucker (1985) defined innovation as "the effort to create purposeful, focused change in an enterprise's economic or social potential." Today, organizations are searching for the tools to implement the necessary innovative processes and outcomes to succeed in the dynamic environment. Damanpour (1996) lists environmental uncertainty as one factor affecting an organization's ability to be innovative. The research on slack has found that the use of excess resources has, at least to a certain level, a positive effect on a firm's flexibility, and thus innovation, in a dynamic environment.

A study of the biotechnology industry found that the level of slack resources correlated to organizational innovation (Judge et al, 1997). Organizations using slack resources have time to learn and improve, as well as a no-punishment culture. This buffer of time, or slack time, also allows decision makers the ability to think through options to increase the likelihood of making the correct choice (Lawson, 2001). These organizations have the ability to operate according to the environment; hierarchical and disciplined structure during emergencies as well as team-based during times of innovation (Lawson, 2001).

Slack has been found to ease managerial controls (Cyert and March, 1963; Nohria and Gulati, 1996), granting employees the latitude to experiment and innovate. Bourgeois (1981) said that organizations implementing slack were likely to develop innovative cultures. Slack resources in innovative organizations provide room to innovate and room to fail. When slack resources are used as a buffer, organizations are less worried about ideas failing during innovation and experimentation. However, organizations that have leaned down in search of operating efficiency have made the cost of unsuccessful ideas unacceptable. As a result, the organization is forced to adopt the wait-and-see or follow-the-leader strategies. It could be said that organizations without slack risk losing ground to organizations using slack to innovate and adapt.

Another view of the relationship between slack and innovation is that slack is self-servicing and results in decreased innovation and experimentation. The basis for this view of slack and innovation rests on managerial motivators. Jensen (1986) posits that managers will use the excess resources for their own personal interests, as well as approve options that are far-fetched and destined to fail (Cheng and Kesner, 1997). This

position asserts that managers aren't trustworthy enough to be given excess resources because they'll use it to their benefit rather than the company's. While the research in this area is still scarce, early results indicate that certain types of slack resources act as a buffer during innovative projects. Findings seem to indicate that managers in a slack-rich environment neglect the best interests of the firm (Geiger and Cashen, 2002). For instance, management may institute sub-optimal organizational structures since the excess resources, or slack, is available to cover the costs of the poor fit between organizational design and the environment in which it is operating (Yasai-Ardekani, 1986; Litschert and Bonham, 1978).

Slack Human Resources

Much of the research on slack resources seems to concentrate on excess financial resources. However, many firms have cultures or even formal policies that allow for employees to spend less than 100% of their workdays accomplishing assigned tasks. For some firms, such as 3M, employees are encouraged to pursue their own innovative ideas that may eventually be profitable for the company (Gundling, 2000). This policy has proven effective, establishing 3M as a innovation leader and resulting in products such as Post-It Notes. Other companies, like Kone Corporation, retain skilled labor during periods of low demand to ensure they are able to capitalize on boom markets.

Creation and Defense of Slack Human Resources

Since slack resources are those resources in excess supply, slack resources can be created by either increasing the amount of the resource or decreasing the demands for that

resource. While the literature on slack resources concentrates on financial slack measures that can be created through capital-raising or expense-cutting measures, similar logic can be applied to non-financial resources as well.

Creating human capital, a non-financial resource, may be accomplished by hiring additional personnel or, as Hitt and Reed (2000) explained, by outsourcing positions or filling slots with contingency workers. Outsourcing and the use of contingency workers enable an organization to realize the benefits of a leaner force, such as lower costs and higher efficiency, as well as the increased responsiveness to environmental shifts without the additional fixed costs of full-time employees.

Organizations are constantly monitored by their stakeholders who desire the greatest possible return on investment. Because excess resources directly affect the bottom line, they will be under scrutiny to provide a solid return for the organization. Simon (1957) posited the concept of "zone of acceptance", also known as "zone of indifference" (Barnard, 1938), that is the range of organizational behaviors and outcomes that stakeholders will tolerate without defecting. No research has been found to discuss the defense of excess resources which may be viewed by stakeholders as inefficiency.

Emerging Trends Related to Slack Resources

Slack resources effect organizations enough that they are a big topic in today's business world. Research to this point supports the idea that slack resources can give an organization a competitive advantage through innovation, first-mover benefits, and flexibility. However, research also indicates that the use of slack resources can be a very delicate matter. Overuse leads to diminishing returns or even negative returns and the

allocation results in efficiency or flexibility, but probably not both (Cheng and Kesner, 1997).

The question of how much creative capacity is a good thing will probably need to be answered on an industry specific basis, or even a company-by-company basis. Research may only be able to narrow the scope of creative capacity use to allow companies to more specifically pinpoint their optimal amount. Ironically, it seems that companies already utilizing various types of slack resources will be in the best position to experiment with different levels and locations of slack to determine the effects on the organization. And even with a company specific slack-use profile, it appears that the business operating environment would have a large effect on the benefits of creative capacity. Therefore, the decision of how much creative capacity a company should have would be an iterative process, changing as the markets change.

The allocation of slack resources is just as important as the amount allocated (Cheng and Kesner, 1997). Internal investment in slack improves operational efficiency but reduces the firm's ability to change with the environment. Decision makers must decide carefully where to invest slack, taking into consideration the operating environment and the organization's goals. It is also important for the decision makers to understand the three types of slack and the consequences of each. Application of available slack may not be the optimal choice for a company while the same amount of recoverable slack might gain a competitive advantage without the risk.

It should be stressed that caution should be exercised with the use of slack resources just as with any other management principle. History has repeatedly shown that good principles applied hastily or incorrectly may have devastating effects on an

organization. For example, TQM, or Total Quality Management is a great tool when implemented correctly. But, for many organizations, TQM is now the butt of jokes and makes personnel cringe. There are more extreme examples of mis-applied theories that have done far worse than attempts at TQM; promising businesses have gone bankrupt and people's lives have been destroyed. An extreme example is the accident at Three Mile Island where managers didn't have the time to review available information. The use of slack resources is meant to improve company performance, not hinder it. If there is any doubt if the rewards of slack implementation outweigh the risks, more research needs to be done by the organization.

Creative/Innovative Capacity Defined

This research effort focuses on slack human resources used for the purpose of innovation, which will be referred to as creative capacity or innovative capacity. As explained in Chapter 1, this effort seeks to explore the use of slack human resources within the Department of Defense. Currently, the DoD is pushing to transform itself into an organization that is able to meet tomorrow's challenges (Rumsfeld, 2002). Threats to national security have changed, as evidenced by the attack on 11 Sep 2001, forcing the military to think and fight in new ways (Rumsfeld, 2002). Recently, the military has had problems with retention and recruiting, resulting in fewer people available to accomplish operational taskings. When personnel are overworked to just 'keep their heads above water,' innovation seems unlikely. Further, and perhaps more importantly, if all available human resources are dedicated to meeting existing requirements, then by definition, there

is no remaining organizational capacity to create or innovate. The models in figures 1 and 2 depict this relationship.

Figure 1. Human Resource Slack Equation

Human Resource Capacity	-	Existing Requirements	=	Human Resource Slack

Figure 2. Creative Capacity Equation

Human Resource Slack	+	Motivation	=	Creative Capacity

Organizational Behavior and Creative Capacity

Firms using creative capacity must take into consideration the organizational structure. Innovation literature suggests that centralization and formalization negatively influence innovation (Damanpour, 1996). Organizations desiring innovative units must carefully consider bureaucratic controls and organizational design to facilitate effective innovation. No literature was found addressing the conflict between using human resources as innovative capacity and using the same human resources to efficiently fulfill the organizational mission. For example, 3M allows employees to spend 15% of their time to pursue their own projects (Gundling, 2000). However, because 3M is primarily an R&D company, this generally applies to the personnel within the research and development offices. Future research will need to be done addressing how support

organizations, often characterized by bureaucratic controls, can benefit from the use of creative capacity while maintaining an acceptable efficiency in operations.

III. Methodology

Chapter Overview

This chapter describes the research objectives of this study and the methods used to meet those objectives. The chapter begins by explaining the research objectives and outlining the case study methodology. Then, the chapter explains the aspects of data collection and question formation. Finally, the chapter discusses the steps taken to ensure applicable replicability and confirmability.

Research Objectives

The objective of this research was to determine the use of creative capacity, also known as human resource slack or innovative capacity, within successful entrepreneurial and innovative firms and map those methods to Department of Defense operations. As explained in Chapter 2, the Department of Defense has determined that it is necessary for national defense to transform the way they do business at every level. Top Defense officials are calling for an innovative military with a new way of thinking and fighting (Rumsfeld, D. 2002), leading to the formation of the Office of Force Transformation. This transformation calls for departmental flexibility and innovation to meet the changing threats to national defense. The required flexibility and innovation is similar to that needed by private firms within dynamic industries. Through the interviews and analysis, this research intended to isolate industry practices in the use of creative capacity. This researcher hoped to find similarities in organizational design between functional areas within private firms and the Department of Defense. Where similarities existed, creative

capacity implementation within private firms, and the resulting benefits, were explored as possible improvements to the DoD way of doing business.

Method

Investigating creative capacity and its consequences requires the holistic approach of a case study (Feagin et al, 1991). Stake (1995) believed that the data generated by case studies could be understood through the experiences of the readers, enabling them to better understand and contextualize the study results.

In preparation for the case study, it was important that this researcher have a firm grasp on the issues of slack resources, have the ability to ask the correct questions and seek the correct data, and be flexible to react to various situations posed during the data collection process (Yin, 1994). An extensive review of the relevant research was accomplished to understand the current knowledge base and to aid in interview question development. Interview questions were reviewed by the thesis committee for the purpose of face validity and to provide refinement.

A major criticism of case study research is the inability to replicate it. However, Yin, Stake, and Feagin have argued that careful planning and documentation of the procedures greatly enhance the studies reliability (Tellis, 1997). In accordance with Yin's (1994) findings, a protocol (attached at Appendix M) was developed including an overview of the project, field procedures, study questions, and a report guide. Each of these was designed to ensure a disciplined approach allowing replicability and enhancing study reliability and progress.

The project overview portion of the protocol includes the background of slack resources and the current push for transformation within the Department of Defense. Also, the overview contains the case study statement that relays the purpose of the study, the rationale, and propositions for the study. The field procedures portion outlines the data collection plan, including the method of collection, the source of entrepreneurial firms and contacts, and the method of gaining access to interviewees. The case study questions portion of the protocol presents the questions used in the interviews. This will also aid in the replicability of the study. The final section of the protocol is the report guide. The report guide outlines the directed audience of this effort as well as the deadline for completion and a bibliography for the cited documents.

This research was designed to view the use of creative capacity and the results in a real-life context. The preliminary portion of this research was to learn how organizations are using slack human resources. This was accomplished by asking key people within the firm open-ended questions concerning creative capacity. The questions were formulated based on current literature on slack resources and innovation. Once it was determined where each organization is implementing creative capacity, further questions were asked to determine the specifics of the creative capacity use, such as organizational design and corporate culture. The multiple case study methodology used in this research gives the necessary flexibility to more adequately uncover the phenomenon in its real-world setting and allows for comparisons between cases. Comparisons were made between the case studies to integrate the findings (Jenson and Rogers, 2001). According to Jenson and Rogers (2001: 238),

"The objective of the comparative study…is cross-unit comparison within-unit synthesis. Comparisons are made in an attempt to tease out generalizations about an underlying

commonality reflecting a policy, process, program, or decision. Comparative studies broaden the perspective to include many different entities, and thus offer insights that can be unearthed from comparative analysis."

Each case in a multiple case study should be viewed as a self-contained experiment rather than as a single observation of an experiment (Ellram, 1996). The multiple case study methodology facilitates the "development of a rich, theoretical framework (Ellram, 1996)."

While some case studies lend themselves to statistical analysis, this one does not. The findings of this case study will not be used as a decision tool for or against creative capacity implementation in government organizations. The desire of this research was to determine the feasibility of creative capacity use in Department of Defense organizations. Determinations of creative capacity use in the Department of Defense will require additional research.

The analytic strategy of this research was to determine the use of creative capacity in private firms and identify best practices. The best practices will provide DoD organizations with information on how private innovative organizations are succeeding by using creative capacity to adapt and transform to a dynamic environment.

Data Collection

Data collection in case studies should be treated as an issue of design to increase validity and reliability (Yin, 1994). The data for this research relied heavily on interviews with key management personnel. Additional sources such as published literature were used if it was determined more information was needed to complete the findings.

Through the available literature and the opinions of entrepreneurship/innovation experts within the academic community, a list of firms was created. The list was narrowed to firms that would maximize the applicability of the findings to the Department of Defense using the following criteria: (1) the formally expressed desire by the firm to pursue entrepreneurship and innovation in the firm's processes and production, (2) the number of employees, (3) the number of operating locations, and (4) the age of the firm. These criteria differentiate the firms that would most closely resemble DoD organizations.

Firm's Desire to Pursue Entrepreneurship and Innovation

Firms desiring innovation must be willing to invest time and effort to implement the entrepreneurial mindset. Since this effort focuses on innovative organizations and their use of creative capacity, it was necessary to differentiate between organizations that are actively being innovative and entrepreneurial and those that rely on other business practices.

Number of Employees

Current literature suggests that a company's size affects its ability to change (Conceircao et al, 2002; Tuggle, 2002; Reilly and DiAngelo, 1984). Because of this, only firms with at least 50,000 employees were included so that the results would be applicable to the DoD.

Number of Operating Locations

DoD organizations have instillations throughout the world, creating problems with cultures, logistics, and operating practices. To gather data credible for comparison

in a DoD context, it was necessary to look at only the firms that have multiple operating locations.

Company Age

New companies have a more intense focus on survival while older firms have a larger interest in the status quo (Hitt and Bartkus, 1997). With this in mind, only firms that have been in business for at least 10 years were used in this effort to ensure that the research findings would be applicable to DoD organizations.

Firm's Position

Using current industry indexes, the positions of the firms were determined to ensure that the study only included those firms that did not experience a negative effect from being more entrepreneurial and innovative.

Questions

Through an extant literature review of slack resources, questions were formulated to determine the nature of each firm's creative capacity. These questions were combined with entrepreneurial mindset survey instruments used by Tuggele (2002), Markman (2002), and McGrath (2002). The guided interview/questionnaire is located in Appendix N and the sources for each question are located in Appendix O.

The decision to interview rather than distribute a questionnaire stems from the holistic and contextual nature of the subject. The case study must be formulated to offer insight into numerous variables and interactions within the firm. Open-ended interviews allow for interviewees to volunteer information that may otherwise be omitted, and go

unrecognized by the study, if the interviews were closed. A closed questionnaire may have forced a more passive role by the interviewee.

The selected firms were contacted to determine their willingness to participate, resulting in some firms declining to participate based on firm policies against interviews or a fear of divulging important strategies, leaving 12 willing firms. Findings from six to ten cases are generally sufficient to provide evidence to support or reject propositions (Ellram, 1996, Yin, 1994). The willing firms provided the contact information for the individual most knowledgeable about the innovation processes and culture within the firm.

Each of the points of contact was phoned to schedule a guided phone interview. The interviews lasted approximately 30 minutes and were followed by a short questionnaire that was emailed to the strategic leader. Clarification and further interviews were conducted on an as-needed basis over the telephone.

Reliability/Validity

Research design quality is measured by reliability and validity. Reliability is the degree to which the observed data is free from errors of measurement (Dooley, 2001). Yin (1994) describes tests for internal validity, external validity, and reliability.

Internal validity is achieved by establishing a causal relationship (Yin, 1994). In this study, causality will not be identified but must be inferred because the experts or witnesses are reviewing firm history. Since case studies are generally observational and descriptive, internal validity is not applicable (Trochim, 2000; Ellram, 1996).

External validity refers to the generalizability to a larger universe of the observations and recommendations. This research effort did not attempt to generalize its findings to other firms, but rather to generalize to the theory of creative capacity. It simply attempted to pattern match, or find similarities, between the firms' use of creative capacity. The goal of this study was to determine the methods successful firms are using to encourage innovation. Because of the nature of innovation and the uniqueness of organizations, direct generalizability was very low. However, highly generalizable patterns were identified in the basic makeup and culture of the innovative organizations through the replication logic, or studying multiple cases, of this study. Replication logic is the same logic used by scientists to generalize from one experiment to another (Yin, 1994). This study did not seek to create a step-by-step methodology for creating and using creative capacity, but rather to draw insight from innovative organizations' histories to find the tools used to enable organizational transformation. Merriam (1985) said that "qualitative research should be judged as credible and confirmable as opposed to valid and reliable."

Reliability is the ability to obtain the same results from the same data collection methodology by another researcher. To ensure the reliability, or confirmability, of this study, careful documentation of the research procedure was completed. This documentation will enable future research efforts to audit or replicate the process and gather the same data. Documentation includes the cited literature, expert sources used to determine sample, company contacts, survey tools, and transcribed interviews.

Conclusion

This research effort utilized the multiple case study methodology to identify patterns or best practices in creative capacity use among leading innovative companies. A case study protocol was developed to enhance replicability and credibility of the research. The guided-interview questions, which allow for more detailed and complete answers from the strategic leader, were formulated through the use of existing literature on slack resources and innovation.

IV. Results and Analysis

Chapter Overview

This chapter explains the results of the research and analyzes some of the possible implications of creative capacity use for organizations attempting to instill an entrepreneurial culture. The chapter begins with a brief background of the firms interviewed, followed by a discussion of the findings and their impact on the study of creative capacity. The chapter concludes with a summary of the major findings of this research.

Background on Firms

As discussed in Chapter 3, the firms included in this research effort were selected due to their relative success implementing the entrepreneurial mindset and their similarities with the Department of Defense.

3M

3M started in 1910 as a mining company. Because they were unable to locate a needed raw material, they decided that to develop a laboratory to develop more marketable products (3M, 2002). The development efforts resulted in Three-M-ite Abrasives Cloth which was 3M's first "exclusive" product (3M Worldwide, 2003). Since then, 3M has gained a reputation for innovation with breakthrough products such as Scotch Tape and Post-it Notes (3M Worldwide, 2003). The firm has been involved in international markets since 1929 and continues today to be a major global player with operations in more than 60 countries (3M Worldwide, 2003).

AT&T

AT&T provides voice, video, and data communications to homes, businesses, and the government (AT&T, 2003). In the 19th century, AT&T was the parent company of the Belly System telephone monopoly (AT&T, 2003). This monopoly was broken up into eight companies in 1984 through an agreement between AT&T and the U.S. Department of Justice (AT&T, 2003). After the breakup, AT&T evolved and grew to the point where, in 1995, the firm voluntarily restructured itself into three separate publicly traded companies (Hochheiser, 2002). Lucent Technologies focused on systems and equipment, while NCR contained the computer operations, and the communications service company kept the AT&T name (Hochheiser, 2002). Further growth prompted another split in 2000, forming AT&T Wireless, AT&T Broadband and AT&T (Hochheiser, 2002).

Canon USA

Canon USA began as a camera company in Japan in the early 1940s (Canon USA, 2003). Recognizing and exploiting other applications to its technology, Canon USA has grown and expanded into other markets (Canon USA, 2002). They are now involved with digital and optical technology with potential applications from television to medical fields (Canon USA, 2002). The firm is technology driven, placing it as one of the top companies in the U.S. filing for patents in recent years (Canon USA, 2002). The U.S. Canon USA organization is a subsidiary of the Japanese Canon USA, Inc. Currently, approximately 90% of R&D and manufacturing is done in Japan (Canon USA, 2002).

Dow

Since its inception in the late 1890's, Dow has grown into the largest chemical company in the U.S. (Hoover's Online, 2003) as well as having customers in 170 countries (Dow, 2003). Dow is a science and technology company that focuses on chemicals, plastic, and agricultural products and services (Dow, 2003). Some of Dow's most well known products include performance plastics such as adhesives, sealants and coatings, as well as herbicides and insecticides (Hoover's Online, 2003).

Duke/Flour Daniel

Duke/Flour Daniel was formed in 1989 when Duke Energy and Flour Corporation joined in partnership (Duke/Flour Daniel, 2003). The company deals with all aspects of power generation and is one of the world's largest builders of fossil-fueled power plants (Hoover's Online, 2003). Duke/Flour Daniel offers engineering, procurement, environmental and construction services, in addition to operations and maintenance services, for both combustion turbine and coal-fire facilities (Hoover's Online, 2003). The firm's customers range from utilities to smaller cogeneration units (Hoover's Online, 2003). Duke/Flour Daniel also helps negotiate fuel and electricity supply contracts as well as provide upgrades to existing power plants (Hoover's Online, 2003).

General Electric Capital

General Electric Capital Corporation is a diversified financial services company dealing with commercial finance, consumer finance, equipment management and insurance (GE Capital, 2003). GE Capital serves both consumers and businesses in 47 countries (GE Capital, 2003).

Intel

Intel was founded in 1968 to build semiconductor memory products (Intel, 2003) and has become the world's top semiconductor maker (Hoover's Online, 2003). Intel introduced the world's first microprocessor and is best known for its Pentium and Celeron microprocessors (Intel, 2003). Intel also makes flash memories and embedded semiconductors for the communications and industrial equipment markets (Hoover's Online, 2003).

Kone

Kone is major player in the global elevator and escalator business (Kone, 2003). The Kone Corporation was founded in the early 1900s in Finland and was the first Finnish company to go international (Kone, 2002), with more than 800 operations in over 40 countries (Kone, 2003). Sixty percent of the company's sales come from the maintenance and modernizations business (Kone, 2003). In 1968, Kone began to acquire elevator companies throughout the world, though they didn't have the resources or experience to integrate these newly acquired companies (Kone, 2002). As a result, Kone was operated as a "federation of local companies" for approximately 30 years before the firm had the desire and resources to create a more unified company (Kone personal interview, 2002).

Mobil

When the Mobil Corporation merged with the Exxon Corporation in 1999, the newly formed Exxon Mobil Corporation became the world's largest integrated oil company (Hoover's Online, 2003). Exxon Mobil operates globally in oil and gas exploration, production, supply, transportation and marketing (Hoover's Online, 2003).

The company supplies refined products to almost 120 countries under the Exxon, Esso and Mobil brand names (Hoover's Online, 2003).

NCR

Founded in the late 1800s, the National Cash Register Company was the first maker of mechanical cash registers (NCR, 2003). Some of the firm's most commonly known products include ATMs, point-of-sale terminals, and bar code scanners (Hoover's Online, 2003). The firm became NCR Corporation in 1974 and was acquired by AT&T in 1991 (NCR, 2003). Also in 1991, NCR purchased Teradata Corporation, which became the world's most powerful database for data warehousing (NCR, 2003). In 1994, the NCR name was changed to AT&T Global Information Solutions (GIS), but changed back two years later to NCR Corporation (NCR, 2003). In 1998, NCR moved away from computer hardware manufacturing and began to concentrate solely on the software and services components of their solutions portfolios (NCR, 2003).

Shell

Shell Oil Company is actually part of Royal Dutch/Shell Group (Hoover's Online, 2003). Most of the Group's crude oil is produced in Nigeria, Oman, the United Kingdom and the United States (Hoover's Online, 2003). Shell Oil explores for, produces and markets oil, natural gas and other chemicals. To retain a competitive advantage as well as meet growing environmental concerns, Shell is implementing sustainable development practices throughout the organization (Shell, 2003).

Xerox

Xerox Corporation officially got its name in 1961, but the company's roots date back to 1906 (Xerox, 2003). Xerox invented the first automatic plain-paper office copier

and even delved into the manufacture and sale of mainframe computers until the early 1970s (Xerox, 2003). While Xerox is best known for its color and black-and-white copiers, the firm also makes printers, scanners and fax machines (Hoover's Online, 2003). Aside from products, Xerox markets consulting and document outsourcing services (Hoover's Online, 2003). Xerox has a history of being technology driven and the firm has a long list of innovations credited to the firm's name (Xerox, 2003).

Results

Content analysis and pattern matching of the comparative case studies resulted in findings that support various theories and findings of the previous research outlined in Chapter 2.

Strategic Adaptation, Flexibility, and Company Performance

Question 7 of the phone interview inquired as to the nature of the firm's creative capacity. It seemed that many companies assumed that this meant product development, so the answer offered most often was that creative capacity was in the research and development units of the firm. Other firms believed that the question was concerning a contingent of workers with nothing to do except wait for a new project. The replies under this assumption were usually negative, with Kone even saying that it "doesn't make sense in real life" (Kone, 2002). Further questioning, however, uncovered the true nature of creative capacity within the companies.

The firms were asked to explain the reasons they have creative capacity and to describe the primary outcome of having that capacity (Questions 7, 8, 10, 13, 15, 16, 17,

18). The firms indicated that the extra resources were intended to enable them to maintain core competencies, capitalize on new opportunities, accelerate work to gain first-mover advantage, prepare for the future, and above all, improve company profitability. These findings seem to indicate that firms are using creative capacity to cope with many of the challenges of a dynamic business environment.

Examples such as 3M's development of Post-It Notes, which was born from an employee's own work during personal time, highlight the possible benefits and profitability to organizations. GE prepares for the future with an Audit Staff, made up of experts in finance, information technology, and risk management, which develops future leaders for the firm. Kone on the other hand, staffs and trains elevator installers during boom periods, but "when the bottom falls out of the (cyclical) market, you have all these people with skills that you know you may need in three, four or five years. Therefore, you try to put them into parts of the services business, modernization business, where you can keep them going until you need them" (Kone, 2002). Duke/Flour Daniel refers to human resource capacity awaiting use, such as in a down market, as "bench strength" (Duke/Flour Daniel, 2002). While the purpose of this research effort was to look at excess human resources used to innovate, and not to meet changing market demands, this finding is important to the body of slack research nonetheless. According to Duke/Flour Daniel, last year's peak power market was the first time "everybody was fully utilized" (Duke/Flour Daniel, 2002). For Xerox, ". . . the world has changed. Lots of other companies have been formed and are in direct competition with Xerox. [Xerox is] in a technological crunch, always to identify what new technologies you need for the future and be the first to market with these" (Xerox, 2002).

In experience, the firms relayed that the creative capacity had fulfilled its desired purpose (Questions 5 and 8). Firms pointed to their success in meeting peak demands, making profits through product and process innovations, and moving quickly to capitalize on opportunities. For example, Kone's "bench strength", or skilled elevator installers that remain with the company even when the cyclical market demand is down, has enabled the firm to work to capacity during boom periods without competing for the necessary skilled labor or investing to train unskilled labor. Another example is Xerox, whose experts in corporate governance provide guidance in negotiation and finance that enable the company to move quickly on mergers and acquisitions, sometimes valued in the billions of dollars, rather than getting bogged down in the contracting and clearance processes for expert consultants. For 3M, the results of creative capacity were simple: "The whole company" (3M, 2002). These responses strongly support previous literature, confirming that firms may gain flexibility, adaptability, and profitability through the use of slack resources.

The Amount, Allocation, and Contingency Theory

How Much Creative Capacity?

Many of the firms stated that they were constantly trying to determine the amount of creative capacity to use (Questions 6, 7, 11, 16, 17). Shell Gamechanger went as far as to say that if they knew, they'd keep it a secret so as to gain a competitive advantage. Mobil said, "That is almost impossible to answer. You have an idea…and hopefully you are close" (Mobil, 2002). But the emergent pattern was that the amount of creative capacity was dependent on the following: the industry and business function, the current

market condition, the firm's market position, and the competition. Intel posited that the answers depend on "the complexity of the product we are building, the volume of the product we are building, [and] the high capital cost of what we are doing" (Intel, 2002). As an example, Intel offered a factory work environment. "These [operations] will tend to be best utilized with a high degree of discipline, with very little variation from the specifications, because you have to build the very complex thing. If you don't, if you screw it up anywhere along the way, it doesn't work" (Intel, 2002). However, Intel also cautioned that there must be a way to institute change and foster innovation coupled with discipline, even in these types of organizations. Kone stated that the amount of creative capacity "depends an awful lot on what we are talking about" (Kone, 2002). According to Kone, people in research and development should be dedicated to innovation, but people in their elevator installation units are "probably not spending too much of their time being very innovative at all" (Kone, 2002). Duke/Flour Daniel commented that some of their business units need to be "very efficient" (Duke/Flour Daniel, 2002). Canon USA said that they are not in very creative markets. "We are in nut and bolts markets based on technology, cameras, copiers, printers; these are all highly competitive markets, not necessarily a lot of companies. We are more in the functioning role rather than the creative role" (Canon USA, 2002). According to Canon USA, competitive advantage is gained in their markets by better pricing and service after the sale, not innovative products.

Kone and Duke/Flour Daniel contrasted the main pattern concerning the relationship between the amount of creative capacity and the market condition. Most companies were similar to AT&T and Canon USA in that creative capacity diminished

during down economies to help make the company "lean and mean" (Canon USA, 2002). "If [personnel] are not assigned to projects they are overhead, and you have to cover them with dollars, or what drops to the bottom line is less, and you in effect co-balance what you are trying to accomplish" (Duke/Flour Daniel, 2002). Kone and Duke/Flour Daniel both said that during downturn economies, their creative capacity increases because the markets they serve are cyclical, making it impractical and even expensive to lay off workers during the low points. However, Duke/Flour Daniel recognizes that care must be taken in supporting creative capacity, or their 'bench strength', so as to not cost the company more than the expected benefits. In firms where creative capacity is implemented, the amount of creative capacity may decrease in poor markets due to the heightened effort to restore or improve profitability. In firms such as Kone and Duke/Flour Daniel where excess human resources are used to maintain core competencies and meet changing market conditions, the amount of slack human resources increases in poor markets, forming 'bench strength' that enables the firm to capitalize on future market booms.

Some of the strategic leaders indicated that the amount of creative capacity was dependent on the goals of the firm, specifically concerning market position and the competition. For example, 3M has increased its efforts in the laboratory to produce new products because the company's growth has slowed. Another example, Shell Gamechanger, was born out of a need to regain position as a market leader in innovation as well as differentiate Shell from the largely homogenous petrochemicals market. Canon USA desires to be number one in the camera and semiconductors markets, so has focused energy and resources to develop products through research and development.

Xerox commented, "We are not in the business as usual mode. Xerox has had its share of financial difficulties in the past few years, and competitive pressures, so we are constantly challenged to find better ways to do things. Sometimes you have to think of an entirely new way of doing something…when the gap to where you want to be is so big" (Xerox, 2002). Xerox, whose ventures are typically set up as independent companies in higher growth areas, has found it essential to look at the markets extensively in order to properly nurture the venture. "If you are going to start up a firm in Silicon Valley, you want to set up those firms, the incentives, the structure, to be competitive with Silicon Valley startups. They are going to attract different people. You want to be relevant to the kinds of business they are in" (Xerox, 2002).

When asked to explain the measures used to determine the amount of creative capacity to implement (Questions 16 and 17), most strategic leaders relayed that the firms were still trying to figure that out. Some firms said they had measures of innovation such as profit from new products, number of patents, and revenue per R&D dollar. For example, 3M has historically set goals such as gaining 40% of sales from new products in 4 years. Canon USA, who is responsible for US marketing and sales of the products produced in Japan, relies on utilization factors, desiring to be as close to efficient as possible without affecting the work. All of the interviewed firms indicated that the process of determining the amount of creative capacity, like most other firm resources, was constant and rigorous.

In answering question 16, many strategic leaders described the resource review processes the firms had in place. Most said that formal reviews were in place, such as quarterly reviews for shareholders, but that informal, daily reviews were also conducted

by personnel throughout the firm. Projects may be constantly evaluated to estimate their future value, with the resources going first to those most promising for organizational profit. For NCR, the reviews are in the form of project progress reports while Intel constantly monitors project status with project plans and focuses resources to projects that have fallen behind. "[Managers] may take somebody who is normally assigned to a given product line, and pull them off and do something else because [they] need more done on this other thing" (Intel, 2002). Shell uses stage gates to prioritize and filter projects. "[We] might take 100 ideas to produce one commercial revenue stream. [The eliminated ideas] will generally be that technically it doesn't work, economically you can't get the margins out of this, or it is not a strategic fit" (Shell, 2002). Xerox stated that it is important to make the decision to cut a project early enough, rather than investing in it only to quit much later. AT&T used the analogy of planting flowers: You don't want weeds, or bad projects, to grow too big, if at all. The organization needs to have the capability to cull the flowers to ensure the best receive the resources necessary for them to grow to their full potential. This pattern seems to indicate that the process of measuring creative capacity is difficult and inexact, but still fits well with other resource and project monitoring activities.

The Allocation of Creative Capacity

There was little agreement on the allocation of creative capacity within the firm (Question 7). As explained previously, it seems that the allocation was dependent on characteristics such as the type of innovation desired and company goals. Firms with R&D units typically viewed innovation in that function as a full time job and not as

creative capacity. Many strategic leaders implied that some business units don't require as much creative capacity as others. Intel offered that it is necessary to analyze each situation to ensure the application of creative capacity, and entrepreneurship in general, are applicable to the circumstances and situation. "The effective ways for a military to run often are with tremendous precision and discipline without probing or questioning orders, and without straying and free lancing much from what the strategy is" (Intel, 2002). However, Kone's view is that personnel should feel entrepreneurial in their part of the business, "whether it's cleaning the floors in the factory or being in charge of the sales team for the whole country. I have never heard anybody say that that kind of spirit hurts anywhere" (Kone, 2002). Some of these firms have fostered this entrepreneurial spirit through formal or informal structures that encourage innovation in addition to the full time work, such as 3M, Shell Gamechanger, Dow, and Intel. Formal structures include 3M, which has its widely known and benchmarked 15% rule that acts as a "permission slip" for employees to spend that portion of their time on their own ideas and Gamechanger which facilitates and funds innovative ideas from employees, from 5-50% of their time. Informal structures include Intel, which has a culture that promotes employees to "beg, borrow, and steal" resources below the radar from other programs in pursuit of new ideas as long as the effort doesn't disrupt current projects, and AT&T which admits that "in any large corporation you could have a skunk works develop…to keep [a project] warm. It is not the most effective way of doing things" (AT&T, 2002), but according to AT&T, skunk works are hard to detect. Other firms, such as Xerox and GE, have excess human resources to guide and expedite efforts, not necessarily innovate. This guidance and expediting comes through policy and goal formation, expert

consultation, and additional manpower. Xerox views the personnel in research and development as the innovators, but maintains a group of business experts to expedite acquisitions and GE has a management development program that can be used as a pool of personnel for high priority projects.

Creation, Defense, and Culture of Creative Capacity

Many of the interviews uncovered the firm's culture of innovation. As noted earlier, some firms had formalized creative capacity built in, such as 3M's 15% rule, while other firms had informal, underground cultures like Intel that encouraged employees to work "below the radar" pursuing innovation. GE stated flatly, "culture is very important" (GE, 2002). Formal or informal, many organizational cultures encourage innovation by all employees, not just those in R&D type units (Questions 7a, 7b, 7c, 13, 15). Dow cautioned that innovation concentrated in R&D will ignore non-technology innovations and the value they create (Dow, 2002). Shell Gamechanger will facilitate an innovative idea, regardless of who it comes from.

Many firms indicated that the down economy had forced them to cut the fat and become as lean as possible. However, most of the strategic leaders implied that even in thin times, innovation must still occur. A pattern emerged that an organizational understanding of the cost of innovation was necessary to defend creative capacity (Questions 14, 18a). Intel feels that "if you aren't failing, then you aren't trying hard enough" and views innovation as "betting on your own skill" (Intel, 2002). 3M feels that failures aren't really failures because you always learn something that will help the company in the future. Even in the informal innovation, or skunk works, management

may look the other way as long as the primary projects are getting done and are on schedule. The emergent pattern was that firms feel that the results speak for themselves, defending the entrepreneurial and innovative process from stakeholder scrutiny. Shell Gamechanger said that defending creative capacity was still a struggle since the system has only been in place since 1995, but that the stakeholders were beginning to understand the entrepreneurial mindset (Shell, 2002). Canon USA stated that they were probably under less intense scrutiny because of their success during recent recessions, especially in comparison to their competitors (Canon USA, 2002).

There were many methods of obtaining creative capacity (Questions 13 and 15). Many of the firms relayed that additional resources may be hired when the workload outpaces the existing capacity. Some firms, like NCR, hire additional employees when necessary to enable the firm to take on new initiatives. DOW commented that certain activities are always better if they can be contracted out. Canon USA agreed, finding it advantageous to hire an outside firm to produce an online training program for salespeople and maintenance technicians across the country. By doing so, Canon USA simplified the training, saved time and money, and didn't need to acquire the software production knowledge necessary for the program development. For Kone, however, the level of training required of elevator installers, the cyclical market, and the business environment of Finland that doesn't have union hiring halls, a place where trade union jobs are dispatched to union members who are not permanently employed by a particular company, requires that they retain as many technicians as possible, even during economic downturns. Kone tries to stockpile people and "put them into parts of the service business, modernization business, where you can keep them until you need them" (Kone,

2002). Kone cautioned that this may not be as necessary in the US because of union hiring halls, but in Finland, this flexibility doesn't exist and companies must keep everyone on their payrolls. Some firms, like 3M, who have the flexibility to contract out, try instead to never go outside, relying on reprioritization to free the necessary personnel. GE also maintains internal creative capacity in its Audit Staff, which also serves to bolster the firm's entrepreneurial culture. The Audit Staff serves to breed the future leaders of the firm, propagating the mindset necessary for innovation. Kone and Canon USA faced a challenged that appears unique among the interviewed firms: location. Kone, based in Finland, was forced to compete with fellow Finnish company Nokia for talent. As a result, Kone couldn't get enough good people. Canon USA, located right outside New York City, "really cannot pull as diverse a group of highly trained people as if we were located in Manhattan. . . where you have the railroads and other mass transit" (Canon USA, 2002). These responses again confirm that most decisions of creative capacity depend on many factors, including the nature of the job, the firm's desired culture, and even the firm's operating location.

Challenges to Creative Capacity

AT&T quickly rattled off the main challenges they have faced to implementing entrepreneurship and creative capacity. "How can you create a process that allows for quick ideas to flourish in an organization that is used to, and depends upon, large, well-defined, maybe slower moving processes? There is a barrier of the general expectation that everything must follow the process" (AT&T, 2002). In addition to the process barriers, AT&T expressed problems with funding. "Where do you get the money for this

thing? [I]f the typical way of obtaining money in a corporation for a project is to do a business case, do this, do that, everyone competes for the money, a small, ill-defined, or not as well defined process will always find itself not being able to compete against the bigger projects, so the little tree always gets shaded out by the bigger ones" (AT&T, 2002). Duke/Flour Daniel echoed this barrier: "You have to give [new ideas] a fair chance" (Duke/Flour Daniel, 2002). These barriers are summed up by Xerox, "Eternal cultures can defeat dramatic departures from the norm" (Xerox, 2002).

Gordon Moore, one of Intel's founders, often talked of the Goldilocks Theory. Some problems are easily solved, but also easily and quickly copied or solved by competitors who may be able to produce the item cheaper. Other problems are too difficult to solve, and companies that have gambled their entire future in these will fail. Then there is the "just right" problem. "It was easy enough to solve, but difficult enough that competitors could not do it casually" (Intel, 2002). But, Intel learned early on that developing a marketable product was not enough. "If you make a product in the commercial world but you can't get the word out or can't get it sold, can't get it made or distributed, then you still aren't successful as a commercial enterprise" (Intel, 2002). According to Intel, the company founders "had to go through all of that early learning" (Intel, 2002). The strategic leader for Xerox shared his experience with the national labs. The labs were under pressure to find civilian application for their developments, but because the labs were trying to compete against more agile, resource rich companies, the push failed. "[The lab's] technology was very good. But it takes more than that to succeed. They failed to round up the resources they needed.

Duke/Flour Daniel mentioned the lack of funding, personnel and the fear of failure as barriers, but notably in commenting on risk management. Sometimes the barrier is simply 'We can't take on anymore risks at the moment'" (Duke/Flour Daniel, 2002). Xerox also talked of risk. "New ventures, spin-offs, can attract external investment. It helps Xerox balance the risk and return" (Xerox, 2002). It is likely that risk management is an inherent part of the reprioritization that many of the firms talked about, companies focusing resources on the projects that are most likely to produce the greatest results.

Kone was recently a federation of local companies spread across the world. However, globalization of the world markets has forced Kone to change the way it does business. With the European Union's standardization, it became a liability for Kone to do nation-based business. "The European-wide product and services were being offered at much greater efficiency and lower cost than could possible happen on a country-by-country basis. [Customers in the past] wanted to feel that they could get a local product. This is clearly no longer the case" (Kone, 2002). Today, Kone has integrated into a single global organization, but is now challenged to keep the spirit of entrepreneurship and innovation that was present when it was a federation. During the interviews, other firms spoke of challenges to creative capacity and entrepreneurship when operating on a global scale. Several strategic leaders relayed that the economic conditions, the amount of available workforce, and perception of entrepreneurship may be different throughout the world. "It is viewed differently in Europe than it is here, and is viewed differently in Asia than here, and is viewed differently between different sectors and it is viewed differently at different times in the economic cycle" (Shell, 2002). While this problem is

significant, it appears similar to other cross-cultural challenges that have been faced by global organizations for years.

Summary

The dominant theme of the interviews on creative capacity was 'it depends.' It appears that every aspect of creative capacity use and implementation depends on numerous factors specific to each organization. These factors include organizational goals, market position, market condition, operating environment, employee skill levels, risk, and organizational culture. The participating firms seem to be undertaking directed discovery in the use of creative capacity, applying general business sense and modifying assumptions and practices as necessary. Whatever the case, the interviewed firms have shown that the benefits of creative capacity far outweigh the costs, even when venturing into unknown waters. The use of creative capacity is itself an innovation in businesses processes, proving to facilitate further innovations that enable a firm to be successful.

V. Analysis

Chapter Overview

This chapter begins with a discussion of the results, continues with an analysis of the data as well as an explanation of the limitations of the study and ends with recommendations for future studies on creative capacity and human resource slack.

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Discussion of Results

The responses to the telephone interview questions identified numerous primary and secondary patterns as discussed in Chapter 4. As the data was analyzed, a conceptual model emerged that shed some light on issues such as creative capacity and the implementation of an entrepreneurial mindset, the barriers to the use of creative capacity, and the outcomes of creative capacity implementation. These patterns enabled me to develop a model of the process organizations go through as they initiate and implement creative capacity. The general process is:

1. Identify a need to be entrepreneurial
2. Identify the resources necessary to become more entrepreneurial
3. Implement creative capacity
4. Analyze the results of creative capacity use and modify as necessary
5. Defend the use of creative capacity when necessary

1. Identify a Need to be Entrepreneurial

Central to the use of creative capacity is a firm's desire to be innovative and entrepreneurial. Chapter 4 explains the results of the interviews, but I believe it was captured best by the Xerox strategic leader who said that entrepreneurship is necessary when "the gap to where you want to be is so big" (2002). As the literature on slack resources suggests, firms are using creative capacity to survive in a highly competitive and dynamic business environment. Business as usual is no longer proving to ensure success for many of these firms. Many of the interviewed firms speak as if they were, either in the past or currently, faced with a situation that forced the reaction of a cornered animal: come out swinging. The findings on creative capacity, which seeks process and product improvements, confirm the current knowledge on process improvement. As such, firms desiring innovation will find the best results if early efforts concentrate on areas of strategic importance and a large portion of the total expenditures of the company.

2. Resources: What Will it Take to Get There?

It has been said over and over that the greatest resource of an organization is its people. Organizations in this study echoed that, finding that their people are a great source of innovation, and thus, firm profit. Similarly, firms have recognized that employees can be counted on to do the right thing, so to speak, and rally behind the important organizational efforts. Many firms pointed to successes of personnel innovation and the profits which have resulted.

3. Go: Implementation of Creative Capacity

There was no silver bullet identified for the use of creative capacity. However, it became obvious that the firms were succeeding in entrepreneurship and creative capacity

use by using good business sense. Management identified the gap or shortfall in the company, and then allocated additional resources to the department responsible for that effort. For many, research and development units received the creative capacity, but for others, the gap was in areas of finance or negotiations so those units were allocated creative capacity. The most significant finding of this research though, is that the subject firms have had incredible success from the entrepreneurial culture within the organization. In some firms, the culture takes the form of slack: employees are given excess time to innovate. In others, and perhaps more notably, firms have cultivated innovation to the point where employees do it voluntarily on their own time.

Firms have found that the best way to evaluate creative capacity use is to try it. Firms stated that they estimated or projected the needed creative capacity as they would any resource, and "hope [they] are close" (Mobile, 2002).

4. Analysis of the Results and Modification of Creative Capacity

Firms indicated that there is a feedback loop for creative capacity use. Organizations measure creative capacity similar to the way they measure any resource. Most firms agreed that in the end, everything is about the bottom line and all measures eventually point to firm profitability. Firms constantly monitor return on investment in creative capacity and adjust resource allocation to achieve the highest return. Naturally, creative capacity without results gets eliminated while successful creative capacity is enhanced. For some firms, successful creative capacity comes from skunk works projects that eventually become company-backed projects that lead to a return.

5. Defense of Creative Capacity

Especially during poor economies, company stakeholders look hard for ways to cut costs and increase profits. Slack resource literature suggests that cost-cutting has benefits, but if taken too far, it could handicap and even kill a company. Many of the firms stated that they were being forced to become lean and mean, but it seemed that the leanness included necessary creative capacity. This is likely the result of each firm's history and success in innovation and may not be the case in a firm implementing creative capacity for the first time. In the end, the firms commented that the best they could do was point to the value the creative capacity had added to the firm in the past. In addition to this, most of the interviewed firms had utilized creative capacity for long enough that the culture allowed and encouraged it, so no defense of creative capacity itself was necessary.

Motivation: Necessary for Slack to be Creative Capacity

Figure 3. Motivation of Creative Capacity

	Short Term	Long Term
Motivation	Rally	Driven

An emergent pattern of motivation appeared during this research effort. The participating firms all alluded to the motivation of the employees as a necessary factor for any type of creative capacity. Without motivation, innovation will not occur, even if human resource slack is present (see figures 1 and 2). From the data, two types of

motivation were identified: short term motivation or, as many of the firms referred to it, "Rally" motivation; and long term motivation or a case where employees were "Driven." Firms expressed the ability of either type of motivation to overcome the lack of human resource slack, fostering innovation from personnel who are already fully utilized.

Rally motivation, or motivation for short term creative capacity, was often described as a reaction by the firm to a crisis in the marketplace, such as eroding market position, or within the firm, such as an important project falling behind schedule. Either way, management "rallies" the firm around the cause to correct the problem. Some firms tied this short-term motivation with reprioritization, while other firms experienced employees that worked extra hours without overtime compensation to meet the new demand. Firms implied that this type of motivation only worked for the short-term and could not be sustained without employees returning to business as usual. Future research needs to be done to determine the possible duration of rally-type motivation before complacency returns and employees stop working extra hours.

Driven motivation, or a case when employees are motivated to be innovative over a long period, was found to be based on the firm's culture. For example, as discussed in Chapter 4, Intel describes itself as a company of innovators: "If you aren't failing then you aren't trying hard enough" (Intel, 2002). In firms such as Intel, employees desire to innovate. Some of the strategic leaders talked of the formal and informal cultures, while other firms implied that their employees were they type to innovate because that's the type of people they are. Employees with driven-type motivation may pursue innovation even if time does not permit.

Two Human Resource Slack Types

Through the data, two types of human resource slack were revealed.

1. Time Human Resource Slack: personnel within the organization have slack time in their day. For example, 3M's 15% rule.
2. People Human Resource Slack: a firm maintains excess personnel, above what is necessary to complete daily work. Examples include Kone's "Bench strength" or GE's Audit Staff.

Human Resource Slack Typology

Each of the two types of human resource slack identified was found to be constantly available, contingently available, or never available. As a result, the following typology was constructed:

Figure 4. Human Resource Slack Typology

	Time	People
Constantly Available	Hall Pass	Reinforcements
Availability Contingent	Completion	Bench Strength
Never Available	Time Efficient	People Efficient

Each of the names of the human resource slack was derived from the terms used by the strategic leaders as they explained their use of human resource slack.

Hall Pass: Human Resource slack that is creative capacity. Employees are given a "pass" or allotment of time to pursue innovation. This allotment is always available to the employees.

Reinforcements: Human resource slack that may be creative capacity, but likely as a secondary benefit. This slack consists of a firm having excess personnel who are always available to provide expertise. The firms that contained reinforcements slack had sufficient numbers to ensure the expertise was always available. It may be possible that manning levels of expertise move this type of slack to "availability contingent" if the firm ever experiences a demand for these experts greater than the supply.

Completion: Completion is creative capacity that is made of time given to employees to innovate, but only after their assigned tasks are complete.

Bench Strength: This human resource slack may provide creative capacity as a secondary benefit, but is primarily designed to cope with surges in demand. Personnel are retained during down-turns in demand to enable the firm to retain core competencies.

Time or People Efficient: These circumstances occur when employees are used as efficiently as possible, such as in production lines, and time or extra people for innovation are never available. For creative capacity to exist here, employees must be motivated to an extent that they are willing to invest personal time to pursuing innovation.

Creative Capacity and the Department of Defense

Department of Defense organizations could benefit from creative capacity use. Some organizations, such as those devoted to research and development, already have

creative capacity in areas such as research laboratories. However, other organizations have been manned for efficient operations, leaving no time or personnel to innovate.

A good first step for many Department of Defense organizations and leadership may be to reprioritize on a greater scale. The human resource slack equation depicted in figure 2 can be effected in two ways: increase human resource capacity or decrease existing requirements. If leadership and management within Department of Defense organizations are given the authority and flexibility to decide what tasks are most important and what tasks can be delayed or even eliminated, human resource slack may be created. The adage of "do more with less" is finding less and less support, and in light of the views of the data gathered for this effort, the strategic leaders agree.

The creative capacity typology outlined above provides a good start for Department of Defense leadership to implement creative capacity throughout. The typology allows each DoD organization to be categorized as having creative capacity constantly available, available on a contingency basis, or never available. From there, leadership can determine the next steps in implementing creative capacity within those organizations that present the biggest "gap" between current operations and needed operations, and promise the biggest possible gains.

In support functions, such as contracting and acquisition, the current push by Defense leadership is to improve processes. It would probably be too costly to grant personnel within contracting a hall pass, even for only 5% of their time. But the current gap, or shortfall between today's contracting process and where the process needs to be, calls for some sort of process improvement. Leadership within the contracting community has been working on this problem for years, acting as reinforcement creative

capacity. However, Department of Defense leadership may determine that the results of this type of creative capacity are not sufficient to close the gap. If this is the case, a different type of creative capacity may be necessary, such as a hall pass similar to that granted by Shell's Gamechanger. This creative capacity, enabled by motivation, may begin as that of time or people efficient where personnel start innovations on their own time but then submit it to a facilitating process. If the Department of Defense already has a facilitating process but is not receiving innovative ideas, the problem may lie in the motivation of employees.

Limitations

This research effort was designed to cull the best practices of creative capacity of innovative firms. Therefore, the firms interviewed were all successful in implementing the entrepreneurial mindset and utilizing creative capacity. Future research may need to observe firms that have attempted to become entrepreneurial through creative capacity implementation and failed.

A second limitation of this research was that a single point of contact was used within each firm. To achieve a more complete view of each firm's culture, it will be necessary to interview personnel from different levels of the firm. In this study, the strategic leadership conveyed optimism and success, but it may be possible that leaders in other departments, such as finance, see creative capacity differently.

This research effort appears to have been influenced by the current economic conditions. Many of the strategic leaders commented on the economy and implied that it was forcing the firm to change operations. While the data appears to show that the firms

understand that creative capacity may be even more important during these times, it may be that firms are actually cutting excess resources more drastically than was expressed.

Possibly the greatest limitation of this research effort was the lack of previous research in the areas of slack in public organizations, human resource slack, and creative capacity. Hopefully, this research effort will provide a solid foundation for future research in these areas.

Recommendations for Future Study

The opportunities for future research into creative capacity abound. For the Department of Defense application, however, I will list the ones that I believe are most important.

Motivation was found to be the biggest and most necessary element of creative capacity. Research should be done to determine where motivation exists to an extent that personnel are willing to spend personal time to pursue innovation. From that effort, it is likely that more studies will be necessary to determine Department of Defense actions to ensure that motivation exists where it is needed.

Another promising topic for further research is a more micro-level effort to determine best practices. Once the Department of Defense has determined where increased innovation is necessary, efforts should be conducted to look at how successfully entrepreneurial firms have overcome similar problems in similar fields.

Perhaps the most necessary future research for creative capacity implementation within the Department of Defense is trial and error. The firms that participated in this effort continually stated that they identified what needed to be done, then worked to get

there utilizing the necessary creative capacity. Through constant monitoring, the use and amount of creative capacity was adjusted to better meet the objectives. The Department of Defense will likewise need to depart on the path of directed discovery, implementing creative capacity where it appears to be most beneficial, then adjusting as further information becomes available.

Conclusion

This research effort identified the types of creative capacity as well as the motivation necessary for its implementation. Using this knowledge, Department of Defense leadership will be able to utilize creative capacity to improve operations, both during wartime and peace.

Appendix A. 3M Interview Transcript

Interviewer: Captain Jason Whittle

Date: 21 November 2002

Jason	Good morning. This is Captain Jason Whittle. How are you?
3M	Good morning! I'm just excellent, how are you?
Jason	I'm good. You got about 30 minutes? Again, just real quick answers if that is all you can give me.
3M	Let's try. Was the book helpful?
Jason	Yes, and it is actually really good reading too. I am enjoying that.
3M	Well you were asking a lot about the history, and that is just full of it.
Jason	I have kind of modified my methodology, so what I am going to do is combine your interview questions, or draw a distinction between what I got from interviews and what I got from the literature. It is going to be just as helpful. I just had to tweak things a little bit.
Q1:	What caused the company to pursue entrepreneurial ventures or new innovations?
R1:	It's the story in the book, you know, they were trying to be a mining company up in northern Minnesota, and they were not finding the material they were looking for, which was corundum, so they decided that they needed to develop a laboratory and start developing new products.
Q2:	Describe the key challenge that was faced regarding this venture or innovation.
R2:	It was probably lack of money.
Q3	That is clear in the book as well. Describe the barriers that had to be overcome to accomplish the challenge.
R3:	It was probably trying to figure our what customers needed, and the stories are around going out to customers and trying to find out what their needs are, then come back to the laboratory and see if they

Q4:	could develop products that met those needs. Would you say the organization as it existed at the time the venture kicked off was well designed for the venture, or were changes to the organization design required?
R4:	Totally changed. It was designed to be a mining company and it turned into an R&D company.
Q5:	What were the expected benefits that compelled your company to strive to be more entrepreneurial?
R5:	The expected benefits would be growth, sales, and you know, profits.
Q6:	Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice, should they arise? Then we talked about this a little before when I went fishing—if a new opportunity comes up, you mentioned---
R6:	We shift those resources around until we figure out what we can stop doing, and move people to the new opportunity.
Q8:	Are these people in all sorts of jobs, including support type jobs?
R8:	Yes, all over the company.
Q9:	Who do they report to, and you mentioned it was decentralized?
R9:	Yes. There are different divisions, different staff groups.
Jason	Just so I am clear, each division would have its own small finance group or contracting group, or a personnel group?
3M:	Yes.
Q11	Can you provide examples of the types of goals these resources, I guess the people, are aimed at achieving?
R11:	It could be a new product launch. It might be a process improvement of some kind, might be aimed at a new market, like right now with 9-11, and everything that is going on in the world, the security market is falling. So we have a team aimed at that, for example.

Jason	Did that come from recognizing a need?
3M	Yes.
Jason	The firms always worked this way, which is evident from the book, the reprioritizing of the human resources?
3M	Yes. Since I've been with the company I have watched us get out of—again, we were very big in the copying business and we got out of that. We were in the facsimile business and we got out of that. So the company is constantly evolving and changing itself.
Jason	Can you explain the 15% rule a little more?
3M	Yes. It is really simple. If I have an idea for a new product or something new, I am allowed to use 15% of my time to work on it. What it really means is, it doesn't mean like at 2:30 in the afternoon I stop working and starting working on my 15%. It is really more of permissions slip, that my boss won't say no if I'm trying to push some new idea.
Jason	How do other resources within the organization fit into that? The book talks about the 3M resources being available for people to be innovative, even during that 15%.
3M	Yes, but what you do is go around, and you know, I'd come to you and say I've got an idea Jason, would you be interested in working on it with me? If it is a compelling enough idea, people will want to help you.
Jason	What about things like resources such as raw materials that cost money?
3M:	You sort of beg, borrow, and steal however you can. There are little grants and stuff that are available in the company, but it is pretty much, you know, what can you scrape together?
Jason	You talked earlier about not hiring extra people. Do you want to elaborate at all on that? So you always get things in-house, I guess it's just the reprioritization?
3M	Yes. Really the key is trying to figure out what it is you can stop doing? What can you say no to, so that you can work on a new priority? It is a constant process of asking yourself, am I working on the most important things.

Q17	This question is talking about the stakeholders balking at this, we call it kind of an inefficiency, but the stop and go mentality of R&D? To clarify that, did stakeholders balk at perceived inefficiency?
R17	Yes. It can look messy, so it is not sort of the model of mechanized efficiency, and you've got to have a high tolerance for human feelings and mistakes and that sort of thing. But it really boils down to do you trust people to be doing the right thing? That is what 3M's original CEO really established. There is probably a quote in there somewhere from Mr. McKnight about people will eventually want to do the right thing, so management has to be very tolerant of their mistakes. That's really part of the culture.
Jason	How did the firm create creative capacity, and where did the excess capacity come from, and I kind of bated you with talking about BPR and contracted experts, which we've already discussed, and you talked about the mind-set within the company—the flexible mind-set, and you touched on that just a second ago. Is there anything more you want to elaborate on?
3M:	Not that I can think of.
Q19	How did, or does the firm determine the optimum amount of the creative capacity, or in your case, the reprioritization? You know, when you were talking about it being a constant process of reprioritizing, how do you determine that?
R19:	I guess it is by how well the company is growing. Right now our growth has slowed, so there is lots of effort on what can we do to get new products coming out of the laboratory?
Jason	How often does it change? You talked about it being constant; anything more you would like to elaborate on that?
3M:	It is kind of a constant process of how are we doing, what new is coming, and if it is not, what can we do to fix it?
Jason	And the measures that determine----?
3M:	Well I think the latest version is 40% new products in four years. So 40% of what we're selling, we weren't selling four years ago.
Q21	This question might be kind of silly in light of the reprioritization we were talking about, but what has been the primary outcome

	resulting from this shuffling of resources?
R21:	It is really the whole company, $17,000,000 in sales. How's that?
Q22	That sounds good. The last question is what are, or were some attempts at this reprioritization or reshuffling that had failed, and you mentioned that failure happens and is expected? Is there anything more that you want to elaborate on?
R22	Well, if you're turning over your product max, you know 60%, or 40% every four years, there's a lot of failure in there, so there are tons of stories around the company about different products that were tried and failed. Usually what happens is the technology or thinking that was developed then becomes part of something else. So failure is never really a failure, because you learn something that you can apply somewhere else.
Jason	That concludes the questions. Is there anything else you want to elaborate?
3M	Not really. I think the books really will give you the depth that you need for your report, but I think you have the general idea.
Jason	Yes. I got the book and I got your survey, so I think we're good to go for now. Thank you again for your help and have a good day.
3M	O.K. Take care.

Appendix B. AT&T Interview Transcript

Interviewer: Lieutenant Rochelle Smith

Date: 6 November 2002

Rochelle	I have 18 questions, and if there are some that don't apply, or you don't have answers for, please feel free to say you cannot answer that, or you do not have time.
AT&T	Could you just give me a little background as to what's the thesis of your thesis is?
Rochelle	My thesis is that what is going on in the entrepreneurship in the private sector, AT&T and other large private sector firms, is something that DOD, Department of Defense organizations, like the Air Force, should be looking at because when we try to become more entrepreneurial, we might be able to use some of the examples. For instance, if you have one manager that is wonderful in entrepreneurship, and that's how AT&T became entrepreneurial, then that is something that the Air Force might need to do--get one person who knows a lot about entrepreneurship, and you'd think about it that way. So that's what we are looking for right now, kind of general ideas about how we can become more entrepreneurial as a force.
AT&T	O.K. I'm ready.
Q1	What caused your company to pursue entrepreneurial ventures or new innovations?
R1	Two or three things. First of all, obviously, we are a large company, and as in any company where you have large established clientele and a development practice in software development, or anything else like that, you could be pretty process-bound in some of the work that you do; therefore, for small quick things that you might want to get done, you may want to have a different path to pursue. So there is always trying to seek ways of having the small simpler ideas, have a quicker path to blossom, than going through the bigger process. That is what would cause any large company to decide that they want to try something a little bit entrepreneurial, and there are different ways of accomplishing that.
Q2:	What were some of the key challenges that your company faced regarding this venture or entrepreneurship in general?
R2	Like anything else, what you are trying to do is work a way, as I would

	say it---you want to let 1,000 flowers bloom, but you want to also make sure that you are not planting a lot of weeds with them, or that you know how to cull out the flowers that you want to pick, once 1,000 of the bloom. The other thing that could happen quickly in a large company is that you could start a lot of small projects, but the numbers get pretty big pretty fast. If you don't know how to control that number, then the cost, even though you small amounts of dollars and people time, the multiplier could get pretty large pretty quickly. You could kind of lose the forest through the trees here.
Q3	What barriers had to be overcome to accomplish the challenge?
R3	The challenge, I would say, is how can you create a process that allows for quick ideas to flourish in an organization that is used to, and depends upon, large well-defined, maybe slower moving processes. The barriers that you would have are people who expect processes to work at a certain rate. There is the barrier of the general expectation that everything must follow the process, and there is the barrier that says where do you get the money from this thing? In other words, if the typical way of obtaining money in a corporation for a project is do a business case, do this, do that, everyone competes for the money, a small ill-defined, or not as well defined processes, will always find itself not being able to compete against the bigger projects, so the little tree always gets shaded out by the bigger ones.
Q4:	So would you say that AT&T as it existed at the time that your entrepreneurial venture kicked off was well designed for that venture, or were changes to the organization design required?
R4	When you say venture, I keep looking at lots of different things that we did that would be considered entrepreneurial, so let me define the ones that I am thinking about. (1) In AT&T labs we have a way of funding some types of development that eventually could get spun off into a separate company, or developing intellectual property that could be sold to another company. (2) Then there was a time that, and this was several years ago, prior to the spin of Lucent Technologies, where we actually created a Venture Fund. We funded those ventures through something called AT&T ventures funding.

Q5:	What were the expected benefits that compelled AT&T to strive to be more entrepreneurial?
R5	Expected benefits would be that a technology that might be useful, that would not normally fit into the large business case process, could be allowed a chance to blossom. Some smaller or off the beaten path technologies that did not have a direct impact on a particular business project we were working on, would be allowed to blossom and be given a chance to grow, and potentially make some money for the corporation one way or another.
Rochelle:	You had mentioned the AT&T Venture Fund. Prior to that fund, was there someone or an organization within AT&T that watched over entrepreneurial ideas?
AT&T	The fund that I remember was created probably in the 1992, 93, 94, time frame. It was at the time run by a person named Dick Bodman, I think, when we eventually spun that fund off. It was a venture fund that outside people could contribute to as well as AT&T, and we put funding into it and made it a typical venture-cap type or worth where they put seed money into ventures. Prior to that what you had was in Bell Laboratories, which as you know, is not affiliated with AT&T anymore, but is in Lucent Bell Laboratories. AT&T Bell Laboratories is the research and development on AT&T when it was the Bell System, and when it was AT&T after it spun off the Bell operating companies between 1982 and 1996. When we spun off Lucent Technologies, AT&T Bell Laboratories went with it. AT&T, the remaining AT&T—the company you are talking to now—also took some of those people and created AT&T Laboratories. The difference in the name is there is no Bell Labs in there. As a matter of fact, Bell Laboratories was the only time that the AT&T Company was allowed to use the term Bell after 1982. Think of prior to 1982 you had the Bell System, and that was AT&T, long distance; it was all the Bell operating companies: New York Bell, Pacific Bell, Southwestern Bell, etc. In 1982 AT&T merged and thus the baby Bells, Ninex, Bell Atlantic, etc. AT&T retained Bell Laboratories in it. By 1996 we then spun off Lucent which was our manufacturing company and hardware company. That took Bell Laboratories with it, but AT&T retained some of the people and created an AT&T lab. So when I say Bell Laboratories I am talking pre-1996. If I say AT&T Labs I'm talking AT&T post-1996. In either of those laboratory environments, what you would normally do is try to, particularly in Bell Laboratories, they try to have small

	organizational teams that would look at and design certain technology, and most of that entrepreneurship around technology really stems from the technology piece of AT&T.
Rochelle	That is very helpful. I wasn't sure. Some of the companies do it differently, but that makes sense.
AT&T	Some people would say that's the way AT&T did it because they were a technology driven company. Other companies do it differently when they try to work from the marketing end and figure out what the market needs, then go try to spawn that technology. But when you do have a company that works on basic research, which was what Bell Laboratories did, and someone stumbles across something that says hey this could have an application, then you try to use that type technology to drive an application. That is one way it was done inside of AT&T for entrepreneurial type ventures.
Q6	My next set of questions is about reserved human resources, still related to entrepreneurship, but some people call it slack. Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice should they arise.
R6	I think the simplest answer to that is no. I am speaking of AT&T as it exists today, particularly in the state of the telecom industry as it exists today. You may have a small funding, and I will say it is probably tens of millions of dollars, for basic research but there is not a lot of slack of a lot of people that just say, hey, if we have a great idea, let's put these 20 people on it. So, the answer is, effectively, no.
Rochelle	So when it is, for instance you have these entrepreneurial ideas that sound great and the company wants to do them, where do those people come from?
AT&T	Well, there what you might have been able to do is say we're going to fund something inside of AT&T, and not fund something else, but there was not a cash of people which would be readily available to put on a project. Now, what can always happen in any large corporation is you could have a skunk works develop. That is where somebody says, well I'm going to keep, under some other project, just kind of fund this thing and keep it warm as part of another project. So that could always happen, and they are small enough that they are hard to detect.
Rochelle	So is there an area of AT&T where that is more likely, for instance in

	the labs, or in research and development?
AT&T	Yes, it is probably more likely in a place like the labs, or maybe even in software development. If somebody stumbles onto a new technique and they say we're just kind of going to work on this on the side because it may bear some fruit. It's usually kind of done on the side or in spare time type of thing. It is not the most effective way of doing things and, by the way, AT&T pretty much, as it exists today, and I am not going to say the same for the previous AT&T with Bell Laboratories, is not a company at this point. Most of our intellectual property that we develop is probably around methods patents, and things like that as opposed to material patents or new electronic devices. So there are companies, and I would not kind of classify AT&T as one of them today, whose raison d'etre to be is to develop new intellectual property. We do develop intellectual property, but we do it purposefully aimed at improving our business. Every once in a while, you might develop some intellectual property that is nice stuff, but really not in the mainstream of our business. In that case, you could let the labs license the intellectual property to someone who is interested, and we do have an intellectual property group that does try to license that technology to other people.
Rochelle	Well, wonderful. That was my last question actually, as far as the phone interview. Now I do have a few questions that are numerical assessment, and I was going to e-mail them to you. You can just answer them and they are on a scale of 1 to 5, if this applies to your company. I e-mailed all my questions to your assistant Shirley Wagner, and I do not know if you got these with that.
AT&T	Yes. I am also looking at questions like #7: describe nature of the resource, and question 8 which was passed.
Rochelle	In the transcribed report numbers 7&8 were applied to other questions. I did not ask those because if you say you don't have reserve of human resources, there is no need to go to those. If you think that you do, I would love to ask you those questions as well if they apply?
AT&T	I would say in general the AT&T that exists today, does not have a group of people that is spare resources to put on a project that, just in case one comes up, we have people to throw against it. Most of the people are purposely aimed at particular business projects. We do have what I would call people working on basic research, it's relatively limited in funding, but their purpose is to create new ideas or technology, so it's a funded research effort.
AT&T	I hope your thesis goes well. I would like to see it, and if we are quoted

	in here at all, or if you want to come back and ask another question, more probing question or something, and you need to kind of clarify, feel free to do that.
Rochelle	Thank you, and if I need that it will probably be in the next month as I began to analyze all of the data I have collected. So if you need to hear from me it will be in the next month; otherwise, in January you will have a copy of the finished product that hopefully you and my thesis advisor will like. Thank you very much and have a good afternoon.
AT&T	You too. Bye.

Appendix C. Canon Interview Transcript

Interviewer: Captain Jason Whittle

Date: 24 January 2003

Jason	Good morning. This is Captain Jason Whittle.
Canon	Hi! How are you. Give me a little background again.
Jason	A colleague and I are studying innovation in entrepreneurial organizations. We are at the Air Force Institute of Technology at Wright-Patterson Air Force Base in Dayton, Ohio.
Canon	O.K.
Jason **Q1**	What we are hoping to do is –you know the military is in its time of transformation, trying to think outside-the-box stuff that organizations like Canon have been doing for years. We are just trying to look and see what you guys are doing and see if it can apply to the military in any way. So we will see where it takes us. The first question is what caused the company to pursue entrepreneurial ventures and new innovations?
R1	Canon started over 60 years ago in Japan as a camera company, and it just decided in the course of doing business at that time that a lot of its technology had other applications, so gradually expanded that basic imaging quality to other product lines. As we have gotten over the years, as more technology has gotten into digital, we realize that same kind of technology, coupled with or dove-tailed with, optical technology, because we are known for optics-like camera lenses-that mutual technology has brought us unto many more areas of business such as the medical field, providing digital x-rays, and also taking pictures of the retina digitally to test for the formation of diabetes. It has taken us to broadcast lenses, since we are good in optics. A lot of the TV lenses, lot of the TV studios, the major networks--there is only two companies that make those TV lenses, and we are one of the primary players. It has then taken us also into the consumer side, well of course with our cameras, but now digitally with cameras and with camcorders, and those camcorders are not only for the consumer, but we make a professional model that a lot of the Hollywood producers are using. Schools use them, and I believe the military may even use them. I know for a fact

	that when we had the tragedies at the World Trade Center, FEMA came in to record everything, not only for a historical record, but to have a training record. They used our professional model digital camcorders because of not only what the digital technology provided, but also what the lens could provide. So as you can see, it brings us into a lot of different areas of business, and the company is very much technology driven to bring us into new areas. The last 10 years in the US we have been in the top 10, and in the last few years, the top 3 of filings with the US patent office.
Q2:	Describe the key challenge that was faced regarding this venture, or ventures in general, or innovation?
R2:	I think our challenge is unique compared to-lets say if you are talking to a US based company, we are US based, but we are a subsidiary of the Japanese Canon, Inc. Currently over 90% of the research and development, and manufacturing are done in Japan. We did a couple of years ago create an R&D facility in California, and that is going to take a while to rev up and really contribute. The key challenge is the decisions--on what to pursue globally, what technologies to pursue, what markets to pursue—-are being made in Japan, and up until very recently, it is whatever Japan told us, is what we had to do. Only recently have they started accepting the feedback—the marketing strategy feedback, what will work here, what will not work here, and it has been a slow process. Now they need to adapt their research, they need to adapt products that might be excellent for the Asian market, may not be appropriate here, or without subsidiary in Europe. So the key challenge to this is that there be a two-way input. We understand what they are working on, but they have to accept back the information that some things need to be tweaked, some things may not fly in a certain market, or certain company in that market, and they have become a little more adaptable to that. Just to put in perspective for you Canon USA, which is where I am here in New York, which is the headquarters for the Americas, takes in North, Central, and South America. Then Westward we have Canon Europe that takes care of all of Europe, the Middle East and Africa. Then you have headquarters Canon, Inc. that takes care of the Asian countries, and I believe they might also take care of, like the Oceania – you know, Australia, Indonesia, in that area.
Q3:	Describe the barriers that had to be overcome to accomplish the challenge.

R3	Going back, the barriers are the cultural differences, and I'm just going to talk about between this company and our headquarters. Europe will have the same problems. It's the cultural differences, the language barrier, also the needs, that Canon for so many years was driven and just putting out the product. Now the challenge that has been met and is being overcome is that they are listening more to what their subsidiaries need. I know for a fact that some of our top executives in our various product divisions go to Japan two or three time each year to have meetings to have feedback, to see what they are doing on the research, and they are to provide input from the Americas so products can be adapted for this market. This did not happen six to ten years ago.
Q4:	Would you say the organization, as it existed at the time the venture kicked off was well designed for the venture, or were changes to the organization design required?
R4:	Canon USA has always been in a state of flux. I have never been in a place that changes so rapidly, and the change is two-fold. It changes to adapt to the market, as each product market we're in is by changes, so in order to compete successfully we have to adapt. Also, we adapt so that we can make the input, and make the cross-communications with Japan work better. So Canon USA is, from a structural standpoint, within the division's product. Product group is always in a state of flux to adapt what comes in from Japan, as well as to adapt to the local market.
Q5:	What were the expected benefits that compelled your company to strive to be more entrepreneurial?
R5:	The bottom line for Canon is two things, of course sells, and that being important to any company, but it is usually not something that is always stressed or important to a Japanese company. Usually in Japan it is lifetime employment and its loyalty. We have a CEO in Japan now who spent 25 years in the US. He was one of the first employees at the New York office before it was a subsidiary. It was just an office, and he eventually became president and started up the subsidiary Canon USA. He adapts from both the east and the west. From the west he adapts-bottom line-be profitable; from the east he adapts the loyalty, lifetime employment in Japan. He has a nice blend of both. Between the bottom line, the employee loyalty, and also the customer satisfaction, we like to hear about a camera that we made 25 years ago. Some people still write in and say "I bought this 25 years ago and I think I got my money's worth; it is still working beautifully". That puts a smile on the faces of people who have been here that long to hear that about the workmanship and the quality. Of course we would like them

	to buy a new product because that is how you make your money. But to hear someone who was that satisfied and said I have never needed to buy another camera, that touches you also, to say we marketed it correctly, we manufactured it correctly, and if the person ever needed some attention on it, we serviced it correctly. That's so important too.
Q6:	Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice, should they arise?
R6:	Not here in the US. They will have to be pulled from other existing projects. I cannot answer for Japan. I just don't have the knowledge of what they do. Here, whenever we need to, we pull people who are on other projects and get them to handle the situation as the need arises. I think at least here in the US with the way the economy is, a lot of companies are trying to be "lean and mean". Sometimes you can be leaner than you should be, but that is the nature of the economy right now.
Q7:	Describe the nature of the reserve resources.
R7:	Again, it is the same. We have a lot of people in senior positions who are very good at what they do--whether they have grown internally at Canon, or have come from other companies, or even competitors—-and they bring all that knowledge to bear. In a way we are lucky at this point. Canon USA is not a manufacturing operation. All the products come from Japan, though we do have a small manufacturing capability in Virginia for certain parts of products. We are really marketing and sells driven, so we really have to concentrate on the problems in marketing, sells, and take the information that comes back to us. That's when we get it back to Japan to see where things need to be adapted, or if a new generation of a product needs to be created, what is good for the America's market when a situation like that arises. Right now it is just a sells and marketing situation. We don't really have manufacturing. That would take time away from the others.
Q9:	Is Canon centralized or decentralized—the structure? For instance, if people were diverted, these human resources were diverted from one project to another project, a new opportunity, could they be pulled from one product group to another? When they come together for the new product group, or all the product groups, are they all in the same office together?
R9:	Canon is, from what I have found, very silo-oriented, meaning everyone is in their round cylinder, and sometimes, not that there is a lack of cooperation, there is when there is needs to be, but there is sometimes no integration between one group and another, and these groups could

	be within the same product group. We are organized with divisions within a product group. Sometimes the divisions in the group may not even be communicating with each other because they are so focused on the product launch that they have, or the sells situation that they have. So they don't necessarily interact with the others unless there seems to be a need. I guess we would classify the structure as very centralized. There is no divergence. It is not easy to pull someone out to do something else. It takes a lot of approvals and a lot of management thought on that.
Q11:	Can you provide some examples of the types of goals these resources are aimed at achieving?
R11:	It has come from headquarters that we have several goals over the next five years. These include being #1 in the camera market in the world, where we are currently, I think, #3. Also to be #1 in semiconductors in the next five years where we are currently, depending where you are in the US, I think we are #3, in Europe we are #2. So we have very specific goals, and a lot of that is being driven from our headquarters in Japan where they are focusing on these goals and providing us with the products through R&D, that will help not just Canon USA, but Canon worldwide get to achieve its goals.
Jason	Does Canon have any creative capacity, or innovative culture where employees are allowed a specific amount of time during the day, or time during the year to pursue thoughts of their own, or are they always directed?
Canon:	I wish it were the case that we were allowed at that time. I came from a company, and I don't know if it is one that you have interviewed—you may have heard of 3M—but I worked there for ten years. When I left, and I think the philosophy is still there that certain employees, especially in the laboratory, are allowed about 15% of their time to be dedicated to anything they have an interest in that they could pursue that might lend itself to a technology or a product. On the marketing side or the sells side, you could do that to a smaller degree, maybe not 15% of the time, but to pursue things out-of-the-box. The culture here is not that way, and it has been something that I have had a problem with, though I have silently pursued things that some pay off and some do not pay off. It is not viewed that way, and that really comes down from two things. It is the Japanese cultural influence that does not permit that. Then it is the kind of markets we are in. I would not say we are in considerably creative markets, we are in nut-and-bolts markets based on technology, cameras, copiers, printers; these are all

	highly competitive markets, not necessarily a lot of companies. Maybe in some instances some markets might have ten competitors, some might have 15, and some might only have 4, but they are highly competitive within those companies, and you are making nuts-and-bolts products. Why you are better than the other one is really three-fold--better technology, better pricing, and better service after you sell the product. So it is really driven; the R&D people do the technology, the product is created; market, and sell. You don't deviate from that, and again that could be because of the culture. That could also be because of the industries we are in. We are not in industries where you need a lot of, in a sense, creativity. I cannot think of a product off hand, but in you investigation, you would probably say well how creative that is, versus a product like a computer that just sits and functions. We are more in the functioning role rather than the creative role.
Q16	That's a good answer. I will be interviewing 3M later. Are additional resources ever hired or obtained, or were efficiencies ever gained from existing resources to provide the reserve or the creative capacity, or does that go back to your answer to the last question?
R16	We do at times, throughout the company, hire external resources. It could be only because there might be a ceiling on how many people you can hire because of the current economy, so if a project needs to be done, whatever it is, you might need to go externally. Sometimes the expertise just does not exist internally and you need outside support. One example is we have for our copier and printer group, and in that group there is one division responsible for sells training. They train all Canon employees in sells who handle those product lines. We also have independent dealers who are not Canon employees, who we have arrangements with. They need to be trained on the product too because they sell it. We have tried to get away from the traditional classroom type of learning, because you have to take people from all around the country, bring them to a spot, wherever that might be, spend a week in a classroom instead of them being out there selling. They then decided to develop on-line course ware, where 85 to 90% of the work can be developed at the sells person's pace, just like as if you were a student doing correspondence class work. They could do it at their own pace, on line, and then they could supplement that once a year or twice a year with some class work, if they wanted interaction with others, if they wanted to gain more. That resource concept was developed internally. We did not have the capability, the manpower to turn on the switch. We needed this all developed. We went to an outside resource for a year or 18 months to help us develop this, and it became more developed. Now we are managing it in-house.

Q17	Looking at the steak holders of Canon, do they ever balk at perceived inefficiency, or something that is in place that is obviously not leaner and meaner, but has a desired impact?
R17:	We get questioned from several areas. One would be our own management who needs to have a mandate, let's say at this juncture with our economy, to make things as lean as possible without affecting the work, but we also get questioned considerably by the financial community. One of our big competitors in printers and copiers is Xerox, if you've heard, over the last year or 18 months Xerox has been in serious trouble. We want to make sure we do not end up with the same situations that Xerox did. We are constantly reminded of that. Also, the financial community, while they'll question our practices versus other companies in the same industry, Canon—even during these economic time which have been tough here, but have also been extremely tough in Japan's economy, Canon every year has turned a profit, and that is because of management style that has been cultivated over the last 10 to 20 years. So we have turned a profit, we continue in this tough time to turn our positive numbers; therefore, we are not peppered as much as a company in a tough situation like Xerox that has to justify everything it is doing. We don't have to justify everything we do to the outside world because we are turning a profit.
Q19	How or when does the firm determine the optimum amount of the creative capacity or R&D?
R19	That is something that is controlled almost like 98% in Japan, and I wouldn't even be able to go there.
Q21	Has there been within the organization, when there are the additional hires, what has been the primary outcome of this availability of the additional resources? Has it been widely successful, kind of because of the nuts-and- bolts operations there, whether they are permanent or temporary hires?
R21:	I can only speak for what I see here in New York as we are at the headquarters. We are in a funny position. We are located just on the beginning of Long Island, right outside of New York City. Because of the dense population, and it can take you an hour to get to work by car because of the traffic patterns, we really cannot pull as diverse a group of highly trained people as if we were located, lets say, in Manhattan. If you were in Manhattan, you have the railroads and other mass transit. You can pull people from Jersey, from five boroughs of the city, but also north of the city to get into southern Connecticut, as well as Long Island people who filter into Manhattan. I would say that over 85% of our workforce is either from Queens County, which is one of the

	boroughs of New York City which we are right on the border of, or Nassau County Long Island which is where we are actually located. I would say about 85% of the workforce comes from there, so now you are drawing from a smaller pool of talented people. Sometimes I feel, and it's my personal feeling, we don't receive the top of the talent pool. We are not tapping the best because some people do not want to commute two hours, and get stuck in traffic, and spend two hours coming in and two hours going home at night. We have some people who do that, mostly in higher management. The average person would not do that. Sometimes if you have a person like myself, I live 20 minutes from here, and I worked in Manhattan for over 20 years. I just decided I had enough of the commute, and I wanted to back off that for a while. It is your life style. I have a son who wanted to make sure I make his little league games, make other school events, now I want to be a little closer, so I decided to make a life style change. Most people will not. Most people want the excitement in Manhattan, the high paying jobs in Manhattan, and, of course the best talent goes there. So, it's a trade off for the company.
Jason	That is it for the phone interview. If it is O.K., I would like to be able to e-mail you a couple of pages, and it might take you 10 minutes to do it?
Canon:	Fine, do you have my e-mail address?
Jason	Yes. Any parting thoughts?
Canon:	Nothing I can readily think of. I think in my detailed responses to you everything should be pretty clear. It is just if you are talking to us versus American companies, we have a distinct difference because we are driven by our Japanese parent who has cultural differences. Again, we don't manufacture here, at least not yet, so we have unique circumstances, but we are a company that is seen, both in Japan and here, as one that kind of is bucking the trend, especially in the current economic situation. We are making profits. It is not necessarily maybe the goal we set maybe a year ago to be at adjusting for the economic conditions around the world, we are still in the black. We are not losing money, and we have not had the need, like other companies, for layoffs. We have a leaner situation, not because of layoffs, but because if someone leaves, they may decide at this point, we don't know where the economy is going so let's not replace that person. So it's more to attrition, at least at this point. We have not had any significant layoffs of any kind.
Jason	Thank you so much for your time.

Canon	When do you need a response on that e-mail?
Jason	I've got a couple of weeks, so if you could find 10 minutes?
Canon	I'll keep my eye out for it and I'll probably get it back to you the same day or the next day. Goodbye.

Appendix D. Dow Interview Transcript

Interviewer: Captain Jason Whittle

Date: 22 November 2002

Q1:	I am working with one other person and we are looking at innovative and entrepreneurial organizations. We are just going to ask them some questions about it, then we will try to map that to the Department of Defense. This is the first time anything like this has been undertaken, so we are just kind of laying the foundation for it. Question 1 is what caused the company to pursue entrepreneurial ventures or new innovations?
R1	People do this because they need to grow and they need to make money.
Jason	Has Dow always been doing this, or was it a change?
Dow:	Certainly for the last 25 years.
Jason:	Did something happen at that point, or was it just a decision?
Dow:	It became obvious that our existing businesses were not going to be adequate to take care of our growth fantasy.
Q2:	Describe the key challenge that was faced regarding this venture or innovation?
R2:	I don't know if there is one---you know this is a very program and there are lots of things going on. There isn't any one project, and they are all sort of their own animal, so there isn't a generic answer to that question.
Q3:	This question is kind of similar, but can you describe the barriers that had to be overcome to accomplish the challenge?
R3:	You have to generate more revenue.
Q4:	Would you say the organization as it existed at the time the venture kicked off was well designed, or were changes to the organization design required?
R4:	All of these are works in progress, so they are in a continuous state of flux. The probability that you are going to correctly anticipate all of this at the beginning is zero.

Q5:	What were the expected benefits that compel your company to strive to be more entrepreneurial? You touched on that in the first question. Is there anything else you want to add to that?
R5	No.
Q6	This is going to be a lot shorter than 30 minutes. Does your organization have the reserve of human resources that are available to pursue new opportunities on short notice should they arise?
R6:	No.
Jason:	How does your organization adjust to opportunities that do rise? Do you reprioritize?
Dow:	Yes.
Jason	Does that happen pretty continuously?
Dow:	No, on an as-needed basis.
Q8	Are these people in all types of jobs, or are they specifically research and development, anything like that?
R8:	If you have this activity centered in research and development, you are guaranteed to fail. So the answer to your question is they come from all over.
Jason:	You want to expound on that, I've never heard that?
Dow:	Well, R&D organizations are preoccupied with technology. The development of new businesses may or may not have a technology component. So if you are limiting yourself to technology then you are keying yourself up for disaster.
Q9	That's an answer I haven't heard yet, so I am kind of excited about it. Is the organization centralized or decentralized in the supporting structure? For instance, you kind of inferred earlier that Dow has multiple business units, and I guess the head of each business reports to someone else. Right?
R9:	Yes, the president.
Q9	Does each business unit have a fair amount of latitude to make the decisions? In some organizations they spawn business units, and these business units, for the most part, are a separate entity. Is it that way

	with Dow, or is it more centralized than that?
Q9	No it is not that way. Generally the existing businesses are not a very good place to try to do this, because they will spend all their resources on the existing business. So, if you localize new business growth, other than line extension type stuff in the business, you are guaranteeing nothing is going to happen.
Q11	Can you provide examples of the types of goals that the resources are aimed at achieving, such as process, product improvements, specific markets, anything like that?
R11	We spend about $300,000,000 a year in trying to develop new businesses. In other words, non-line extension type work.
Q14	Do the people within the firm have an allotted amount of time, or are there specific people who are sat aside to be innovative?
R14	Innovation is a full-time job. If you are trying to innovate with part-timers, you don't understand the issue. There are specific people who are doing this full time.
Jason	Are people who are in support organizations given any kind of leeway to improve the processes that they do from day to day?
Dow:	Yes, but that has nothing to do with innovation. That is in operational, transactional type stuff. Leeway to improve the processes is there all the time, but that has nothing to do with new business development.
Q16	Do you ever hire or contract for additional people? Is it a frequent thing, and is it on an as-needed basis?
R16:	Sure. If you can do this kind of activity outside the company it is always an advantage, at least in the early stages. This is on an as-needed basis.
Q17	Do the stakeholders of Dow ever balk at any of these investments, or do they just accept it as part of the way you do business---these new business ventures?
R17:	We are a publicly owned company with about 100, maybe 70 million shareholders, and for whatever reasons, they vote on whether or not they want to hold our stock every day.
Jason	So there are no instances of having to convince them other than your bottom line, in a further stakeholder, large shareholders, anything like

	that?
Dow	The biggest shareholder in the company owns maybe 2%. This is a non-issue for big public companies.
Jason	Does your firm ever participate in business process re-engineering, or things like that?
Dow:	Yes, but again, this has nothing to do with new business development. People re-engineer processes because their existing business is in trouble. This is hardly where you go for innovation.
Jason	In the Department of Defense the way we do business, is we need to find deficiencies by doing things in different ways.
Dow	So do we, but in the context of developing new business, that's a separate question. All organizations try to improve their operational efficiency, but you normally do that by slashing cost.
Jason	I would say that concludes it. Do you have any closing thoughts on anything?
Dow	Basically, developing new businesses---which is what I thought the target was---fundamentally the way that process works, basic research is done by taxpayers through things like the NSF, The Department of Defense, NIH, who basically give money to national labs and universities. The next step in that process is to venture capital industry. It basically takes the output of the basic R&D and does reductions to practicing prototypes. Then other people pick that up, and they either buy those companies, or those companies go public and become companies themselves. That is kind of the process.
Jason	One last question, if you don't mind. Within your support organizations, do you strive for 100% efficiency within your processes?
Dow	Yes, I suppose. Again, innovation and efficiency tend not to go into the same sentence.
Jason	Thank you very much. I appreciate this, and good luck with everything next week.
Dow	O.K. Thanks. Bye.

Appendix E. Duke/Flour Daniel Interview Transcript

Interviewer: Lieutenant Rochelle Smith

Date: 8 November 2002

Rochelle	Hello, this Lieutenant Rochelle Smith. How are you this morning?
Duke	I'm good, how are you?
Rochelle	Doing pretty well. Basically today--I think I sent you a copy of the questions, correct?
Duke	I don't see anything on my e-mail.
Rochelle	No problem. Some people have asked specifically for the questions beforehand. What I have is a total of 18 questions that are guided-answered, and so some of them you might answer three questions at one time, so I won't ask all of them, and if we are running out time, again, I won't ask all of them. If you want a copy I can send it to you. I'm just trying to get you to talk about what your company is doing, and for some people it is more difficult than others. The first question is what is the title or job position of your supervisor?
Duke	President and CEO.
Q1	What caused Duke/Flour/Daniel to pursue entrepreneur ventures or new innovation?
R1	The short answer is to make money. In the business we are in, which is engineering procurement, and construction, then operation and maintenance, we're a partnership of two parent companies, Duke Energy, and Flour Corporation. They are both very large companies in their own right, both Fortune-probably 100, and in the list of most admired companies. So we focus strictly on the power business. In DFD, to answer that question, we do entrepreneurial things because, one, we have the capability to do them, where our competition may not, so it provides us a niche in the market. Secondly, it provides us an opportunity to make money, which is what we are in business for. It sounds cold and hard, but that is what we are here for, to return value to out shareholders. Thirdly is, just the definition of entrepreneurial means taking credible risks, and we have the ability to manage risks.

Q2	After your company decided to do that, what were some of the challenges faced by Flour/Daniel or even each of the individual companies, before you became a partnership?
R2	I think the first one has to always be around the area of selectivity. You can be entrepreneurial, and if you're not selective, you are going to get into some deals that will cost you money, and waste certain efforts of the workforce that you are trying to make very efficient. You can't avoid getting into some deals that maybe are less than economically attractive, or less than the risk profile you are looking for, but if you don't have a good screening process, and you don't adhere to a regimen of selectivity, you're going to find yourself in trouble as an entrepreneur. The second part of that is maintaining credibility. If you want to be looked at by, especially in that business, the financial community, investment and commercial, and by other clients or customers that you are serving, you'd best come with a bt of credibility. Don't do deals that don't appear to have good thinking or all of the homework that you are supposed to do in a deal. Don't take those on. If you don't bring credibility, you will never finish the project you are taking on. A lot of people try to be entrepreneurial, and they come in with less than well thought out plans as it regards to the whole life span of the process. If you do that, you may well entrust others to go along with you, and in two years from now, companies have done this and found themselves in chapter eleven and they can't perform, and they take everybody else down with them.
Rochelle	In your company, do you actually have an individual, or group of individuals, that if I have an entrepreneurial plan that I thought would be great for Duke/Flour/Daniel, would I present it to them, or is it depending on where I had that plan that it would be brought to an individual or to a group?
Duke	Generally, anything like that, whether it is a new opportunity, or new perspective thought process like that and needs to be evaluated, to be honest, that comes through me. I'm Senior Vice President of Sales and Marketing, and as such, it is my job and the responsibility of the people that work for me to screen and manage these opportunities, if we believe it passes the first "sanity", so to speak. Then we would leverage others in the company such as our financial group, and in the parent companies the strategic initiators groups, and those that look at investments or acquisitions.

Rochelle	So there are different levels that you need to go through the plan with?
Duke	There are different levels, but it starts with the sales and marketing function to screen and put some meat around the opportunity to prepare it for the others who need to help in those decisions.
Q3	What were some of the barriers that most of the parent companies have experienced as you've tried to accomplish this change?
R3	I think (and this is one of those maybe related questions) one of the first barriers is that people tend to put entrepreneurial thought in the "too hard" basket. You know it's more work to think through it and go through all the regimen that is required to qualify it as something you want to do, and with the busyness of everyone's schedule, just the fact that it is a new thought or an outside-the-box thinking type of approach, it does not get the attention it may deserve. So, just the thought process of not taking the time to quantify and qualify it—that's one barrier—because of current schedules and workloads. Another is lack of funding in a priority fashion. Today's corporations have to do several things. They have to protect their credit rating. They have to watch their cash position. They have to balance the amount of debt they are taking on with the cash that they have. Sometimes the barrier is simply "we can't take on anymore risks at the moment. So it doesn't get its day in court, if you will. Other barriers just may be not having the right people in the right place at the right time. There is just resource limit. You can't do everything for everybody. Then I think a final is if you or I, are the one's initiating an entrepreneurial action, we may think of it as the greatest thing we have ever seen, but it may not fit the strategic plan of the company that it is being served up to. If it doesn't, if it's just a little bit too outside the balance in the public sector (people's credit ratings and balance sheets are valued by Wall Street, and their stock rises and falls accordingly), taking on some things that look like they are out of your core competency, a lot of times will get a negative reaction, no matter how good it may be, so that is obviously a barrier.
Rochelle	Now, when Duke/Flour/Daniel first began becoming entrepreneurial — you could just think of maybe a specific venture that the company took on--what was the mindset of the company at that point—when it moved from not being an entrepreneur to becoming entrepreneurial?
Duke	The mindset was probably that we'd better get some training in place. We don't want people going off using their own instinct to drive this

	entrepreneurial idea. We want communication to be very focused. We want to make sure everybody understands the task at hand, and more importantly, what is the expected outcome?
Q5	What was an expected outcome at that point? Was it just to make money?
R5	That would certainly be the underpinnings of it, or you wouldn't be getting into it, but the expect outcome was the litigation and management of the risk of the activity to quantify and qualify that, and that doesn't always have to be money. You can quantify and qualify risks in your contractual language, for example. Where you cannot do that, then you have to provide a contingency to make sure that you are going to be able to manage it properly, an bring in all the required associated portions of your company to support it, and make sure it is going to be successful. I think the other thing is you have to have a mindset that this is not a two-month window type of opportunity. You have to give it a fair chance, and you have to make sure you dedicate the resources that are necessary to get it done.
Q6	We have some questions about critical capacity, also known as slack. Does your organization have reserved human resources that are available to pursue new opportunities on short notice?
R6	I'd say the general answer last year would have been absolutely not, because in the power business we were in a peak market. Everybody was fully utilized, and we had more personnel than we have ever had in the history of our company. We are in a down turn market now, and because our business happens to be cyclical, we do tend to have more bench strength, and we have people that can be assigned for these kind of initiatives that are outside the general core competency or adjunct to it. I hate to give you an answer that is not just black and white, but it does depend on a particular cycle of our business that we are in at that moment in time. However, if we think it's a valid enough opportunity, we will create the people to do it. We will borrow them from our parent companies, or we will go hire them if we don't have them. It doesn't become a constraint to say we don't have the people, therefore, we cannot do it.
Q7	Then the nature of reserved resources you have, does it depend, or is there a certain nature that you usually have of these reserve resources?
R7	In our particular business we do things in teams, so you would have project teams for example, or home office engineering design teams, or financial estimating teams. They are all functional responsibility. What we find is when we do have bench strength or reserved resources they

	are across the whole line. We have them because any particular project finished and there is not another one for them to go to, so it would generally be a full-service line from, in our case, design all the way through all the disciplines of the work that we perform that would be available in some form or fashion. We don't have a think-tank group sitting along the sideline that does research, R&D for example--we don't have that.
Q9	Are your reserved people centralized or decentralized? Do they report to one person, or to a wide variety?
R9	Their account responsibility is up through their discipline to one person. They have an immediate supervisor, then that supervisor has an ultimate person that is accountable, such as myself, or the President I report to. We also have a matrix organization where those disciplines work across various lines to support one another. The true accountability is vertical.
Q11	Can you provide examples of types of goals that the company has by maintaining this excess number of people?
R11	Yes. The first one is to maintain core competency. The second one is if and when we have a reserve of these people it is because we want to maintain an ability to address a new strategic initiative, or uptake in the cycle of the work, the industry that we pursue. Uptake is not a very good word, but an increase in the need out there for the services we provide. The third leg of that is just to be able to react to an opportunity that may or may not be core competency, but just by the nature of our business, you can never be 100% utilized. You are always going to have some of that capacity where you can do collateral functions. That's what we find, and I'm forever, when a new opportunity comes in the door, assigning it to someone who, for all intent and purposes, their plate is normally full. We can always seem to stretch to take on one more thing.
Q12	Did you always have extra capacity, or was that something that you intentionally implemented?
R12	Yes, I think it is just the nature of the industries we serve. It creates itself. We do not intentionally ask for the backlog that we have in hand, and the new work prospects that we are pursuing, and say we need "X" people, and "X" people only, then let's go out and hire 50 more. We don't do that. We suitably size ourselves to the projected needs of the work we are pursuing and the backlog we have in hand. Sometimes we

	will miss it, so we normally have a little of bench strength. Unless we get in an all-out peak market like last year's power market, which was just unparalleled. Then we would not find an extra person if we needed them.
Q14	How often are these people that you might have that received a little bit of extra capacity being innovative—one hour a day, or 15% of the time?
R14	That is hard for me to quantify, but it is not anywhere near 50/50 of their time. If you say the one hour a day, that is probably generous, because in our particular industry, there is no R&D department sitting around looking for these kind of opportunities. By their normal research and interrelation with outside entities such as banks and customers and other developers and entrepreneurs, and so and so forth, I would say an hour of their day is probably about right in terms of the interaction they have outside of doing their normal function.
Q20	How often does this change? What measures are you using to determine the effectiveness of the capacity that you have?
R20	We do that on a very routine basis, because if we have too much overhead (I think I just called human resources overhead) if they are not assigned to projects they are overhead, and you have to cover them with dollars, or what drops to the bottom line is less, and you effect co-balance of what you are trying to accomplish, so it is very routine. We have a human resources group and we have our financial or accounting group that looks at the bottom line on a daily basis for accounting purposes, then we report quarterly to the market. That is an ongoing routine function of evaluating our staffing loads.
Rochelle	So you are using number of people to measure that? Each quarter you are measuring it, but what measures are you using?
Duke	The measures are the amount of work in hand versus overhead needed to perform. What is left is the utilization factor. If people are being 90% utilized that means 10% of their time they are flexible enough to do some of these other things. For the most part, we are project specific I most cases. Maybe Microsoft, for example more than likely have a group of people who sit around and do exactly the focus you are talking about. That is their day—that is what they do. The turn rocks and they look for opportunity. We are more opportunistic about that, because we are doing a detailed function most of our day, but we are looking for the opportunity to create new challenges and new ways to stretch our charter, more than

	adjunct of what we do.
Q21	What has been the primary outcome resulting from the availability of additional resources?
R21	The ability to expand our charter to build more resource capability, because once some of the ideas that come out, and challenges that we take on are adopted, that generally leads you to build on to that function, so by nature you become a larger company and/or you become more thoughtful about how these people can leverage your business. Also, you began to look at capabilities you may have inherently, and you look at the landscape, you say well I'm not participating there, but I have that capability. So you create the opportunity, then go market that so people know you have it, then leverage off of it.
Rochelle	Wonderful! You have been very helpful. We have a few more questions that are just numerical, 1 to 5, and I was going to e-mail those to you. I have your e-mail address. If you can get them back to me by next Friday, that would be wonderful. All of the questions are 1 to 5, and if they don't apply feel free to skip any of them. There are instructions at the top. If you have any questions for me, feel free to call me or e-mail me as well, whatever is easiest. Right now we are still collecting data, and we will be writing starting next month, so if you want to see the final product, or have any questions about how we are using your interview, feel free to contact me.
Duke	I thoroughly trust the government.

Appendix F. GE Capital Interview Transcript

Interviewer: **Lieutenant Rochelle Smith**

Date: 25 October 2002

Q1:	What caused GE to pursue entrepreneurial ventures or new innovations?
R1:	Because we are a financial company, it's always managing growth with making good risk decisions—-you know, for balancing out, trying new ideas without putting the balance sheet, or write-offs or anything at risk. We have to always look at that.
Q3:	For the barriers that the companies had to overcome, is that one of them?
R3	Yes, the risk part is definitely one of them. I think the other is probably pricing—how you price a product. I'm on the financing side, not the new product development side. Our products are really structuring transactions. I would think risks and pricing probably are the two.
Rochelle:	When GE decided to become more entrepreneurial for growth reasons, did they call that something? Most companies call that something, and we refer to it as a venture.
GE:	I don't think GE is a big de novo venturer to start up stuff. I feel if you think of GE for GE, for us entrepreneurial would be creating better products and services—coming up with a new product this year; that kind of entrepreneurship, or possibly buying a company that is synergistic to what we do. I do not think we necessarily just start up new things. Most of our company is 100 years old. We are not creating new software, or something like that. We tend to buy companies that can align with our offerings, and then maybe look at innovation more on a product development side.
Q5	What were some of the expected benefits of being more entrepreneurial--for trying to grow, or trying to buy new companies, what's the end-all benefit that the company is looking for in that?
R5	Bottom line growth. I think from a GE perspective, the company was very much focused on cost, productivity, and things like that traditionally. You know, when Jack came in and restructured the company, he always wanted to be one or two in a product set**.** So his viewpoint is, you can only take car theft for so long, and then you have to really figure out how you are going to expand you revenue lines. You want to do that through innovation, and innovation can be buying new companies, developing new products, thinking of how to structure deals differently.

	So for us, I think it really is all about how you expand your penetration within a market, and just draw the top line.
Q6:	Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice if a new opportunity arose? Then where would those resources be?
R6:	Yes. They traditionally come out of our program. GE has fairly sophisticated programs, like the audit staff. We have a lot of development programs--we hire externally; so we have an audit staff, we have a financial management program, we have a technical leadership program, a risk management program, an IT leadership development program; there are several of them. Those resources are kind of young, green, energetic people who go through a program, and as they off rotation they are kind of new resources available. But if we ever have something where we are really trying to drive hard, the audit staff is a big organization for us that we'll pull on if we have additional needs.
Q9	Who do these additional resources report to? Is there is one centralized place?
R9	Each one of those programs has program managers, so it is centralized. It is up to HR, except for audit staff. Audit staff is financial, but the FMP program, or some of those other programs are through HR.
Q11	Can you provide examples of the types of goals these resources are aimed at achieving? By maintaining these people, what is the goal for that?
R11	I think the primary goal is creating future leaders for the company. That's the primary goal, with specific skill sets, so by hiring in and training them within certain areas they become the future leaders within those functions, with the exception of Audit Staff, who, if you look at GE, probably more than half of CEOs are former audit staff people.
Q12	Has the firm always had extra capacity? Has GE always tried to maintain this, in the audit staff of elsewhere?
R12	Yes. I've only been here six years, but the audit staff has been around forever—I mean years and years, like over twenty.
Q13	So why did they do that to create that extra capacity?
R13	Originally? I don't know. The audit staff obviously is the audit staff. They look at the financial internal where withal of the company.
Rochelle	Did they get to see the whole company?

GE	Maybe they have some kind of free reign around and we'll throw them up against tough acquisitions, or integrations, or things like that, because of their financial acumen. My sense is that's why they were there, but I think the initial intent was to be sure we're doing all the right things.
Q14	For your creative capacity, when is it that they are being innovative? For instance, one hour a day that you would estimate that they were being innovative, or 15% of their day?
R14	On the product development side, we have a whole couple of centers where that is all the people do—100%, is be innovative. CR&D, which is our global research and development centers, and we have multiple centers where 100% of their job is to think up new ideas. It's a separate team and group that used to be state of the art; we are now enhancing, and making them state of the art facilities. You know, they are kind of think-tank kind of people, and basically it works two ways. They work with individual businesses within GE to come up with new product innovations, software innovations in some cases, maybe risks models or whatever, and there is individual expertise within that center. On the industrial side they will work very closely with the engineering organization and marketing organizations. On the financing side they may work with our risks organization or pricing organization or marketing organization.
Q14	So this is depending on which department it is?
R14	Yes, and depending on what we are developing. Obviously some product development takes years, right? If we are creating a new engine, it takes a long time to create this, but if you are dealing with a new feature on a refrigerator, that might be something different. These guys really do the bigger ideas. That's probably a bad example to use—you know, the refrigerator. These are bigger idea people, thinking of making something different than refrigerators, you know, out-of-the-box kind of thinking, and they are put in an environment where they have the luxury to do that.
Q15	How was standard capacity implemented? Was it incremental, or radical? Was it a long period of time or a short period of time? When you decided to implement these people for instance, did you take them out of one department, your auditing for instance, is that done all at once, or do you take them out one at a time, and place them elsewhere as they are needed?
R15	I think it is more where needed, if we need them.

Q16	Were additional resources hired or obtained, or were efficiencies gained from existing resources?
R16	We never go outside. We always stay internally.
Q17	What about your stakeholders, did they ever question you on the inefficiency of having extra resources at a given point in time? Could you say they are there and they are being fully utilized?
R17	I don't call them extra resources. We don't really have a lot of extra energy. It is kind of a structure that has been put in place that I think we leverage as we need, but their fundamental job is to audit the financial to make sure we are doing our thing. If a new initiative comes out, like when we were making the Honeywell acquisition, I'm sure we had the audit staff helping us on that. I think there is enough of them so that we can get basic day-to-day stuff done, because that we are not going to mess up, but then there is enough within there that we know we are always going to have these different things pop up.
Q19	So then how does GE determine what the optimum amount is? So if everybody is working and something new pops up?
R19	I think they have been pretty consistent on the numbers they have, so they kind of have a rhythm in that I think. I think if there is dire need somewhere, they would pull them no matter what. It's kind of built into the plan that they know some of us will be working on this, and some of us will be working on new things.
Q20	Is there a specific measure that they use to indicate if it's being effective, or if you have people who could be doing more?
R20	The CFO manages most of that on the audit staff side. On the R&D side, I think people look at that all the time; double checking to see if they produced anything, and some have been put against very tight time lines, and then budgeted so they get clear budgets that they need to work within.
Rochelle	Well, that was my last question actually, and you are the most efficient person that answered any of my questions, and I do appreciate it. Did you have any questions for me about our study?
GE	What do you want me to do with this other information?
Rochelle	You could just answer the questions, or we could do it over the phone or you could e-mail it to me.
GE	I'll just e-mail it to you. I have kind of worked on it. What are you doing anyway?
Rochelle	This is a thesis research for my Masters thesis, and I am at that Air Force Institute of Technology in Ohio at Wright-Patterson. Basically

	what the Air Force and the Department of Defense are trying to do is to become more innovative and more entrepreneurial, but they do not know how to do it. So what they have asked us to do is talk to private sector companies, asking how they became entrepreneurial, what benefits were you looking for and what barriers were encountered. Some of the things will obviously be very different just by the nature. We have tried to get a wide range, and many companies have been very helpful, just talking to us. At this point, however, the Department of Defense is not even sure which organizations they are trying to implement it in. It might just be maybe the Air Force Finance Office would be only one they change, or they are trying to see where they could change it, or when we work with other companies like Bowing or Lockheed and Martin, how we could work with them and be more entrepreneurial with them, since they are entrepreneurial in many ways and we are not. So we are trying to decide, and basically my thesis will be a recommendation for how we should proceed. The next person that follows onto my work will be saying these are some organizations in the Department of Defense that we can look at in hopes of working with. So that's where are right now. We are very much in the infancy, so a lot of the questions we are asking, we're hoping that they are the right questions even. We will see if these are the ones that the Air Force can use.
GE	My reaction to some of this is I do think, the ones that I was looking at was to kind of get a gauge on the company itself. I think there are cultural assets in the company; but just as a thought, like when you do these questions, to take that into account more with the questions. That makes sense too, because I've worked at other companies, and the big thing about GE that I think makes it very different is kind of like the whole structure, and culture of the place. I just don't think you get that everywhere.
Rochelle	That makes sense, especially considering the work we are doing; there is a very strong culture here too. That definitely will play into it and that is the sort of thing that we need to be hearing.
GE	So whoever does the next one should really try to understand the cultural. You ask some of them in here, but even focus more on that, because that is going to be one of the things you might encounter for sure.
Rochelle	Thank you very much for your time. Have a good day.

Appendix G. Intel Interview Transcript

Interviewer: Captain Jason Whittle

Date: 22 October 2002

Jason	Good morning! This is Captain Jason Whittle. How are you this morning?
Intel	Hi! I'm pretty good. How are you?
Jason	Good! Do you have about 20 minutes?
Intel	Sure.
Jason	O.K. Great. The questions here are open-ended. Just say whatever comes to mind, even if the questions are not completely clear. First, would I be able to e-mail you a questionnaire that will take about 10-minutes, with scale numbered answers?
Intel:	Sure.
Jason	What is your position within Intel?
Intel:	I am a Strategic Communications Manager, and I have the Technology Press area.
Jason:	Who do you report to?
Intel	I report to the head of the Press Relations Organization. They report into the head of the Corporate Marketing Organization.
Q1:	What caused the company to pursue entrepreneurial ventures or new innovations?
R1:	That was actually in our life, blood. When the company was founded by Bob and Gordon Moore, and Andy Grove joined them almost immediately, they all came from Fairchild. Their whole thought was to create a new type of large-scale integrated circuit they had been working on, and developed from the basic transistors and integrated circuits at Fairchild. They came over to Intel to create a semiconductor memory chip, and then things evolved from there. So we have had innovation as our starting point from the beginning of the company, and it is one of the things that has remained with the company every since then. We view ourselves as a company that has innovation as one of its added

	values.
Q2	Describe the key challenge that was faced regarding this venture or innovation, or ventures and innovations in general.
R2	I think that Intel, like any start-up, (we started up in 1968) you have a set amount of money that you've got, and you've got, hopefully some tricky problems that you are going to try to solve to allow you to bring a product to the market place. In fact, Gordon Moore describes Intel's initial effort as pursuing three problems, and kind of calls it the Goldilocks Theory. They had one problem, which was a bipolar memory device called the bipolar ram, and it was fairly easy to solve. The solved it, got the product out, and it was the first product that Intel made, but it was easy enough that others could also solve that; so consequently they had competitors much larger than them in the marketplace with the same product very quickly. They had another product idea they were pursuing which was multi-chip modules all in the same package. This was a problem that the industry only solved a few years ago, and again we started in 1968. So that was a problem that was too hard, and if that would have been their only avenue of pursuit, we would have run out of money way before they would have ever solved the problem. The third one was just right. It turned out to be a MOS, silicon metal oxide semiconductor, and that was a problem that was technically difficult enough that, by focusing on it, having some very smart people do some clever work, you could solve the problem. It was easy enough to solve, but difficult enough that competitors could not do it casually. They would have had to focus an effort on it, and it took them several years to do so. Fortunately, the company not only solved the problem, but was able to get its products into the market and establish a customer and revenue base before it faced significant competition. So that was kind of how Intel approached the early days.
Q3:	I think you touched on this some, but can you describe the barriers that had to be overcome to accomplish this challenge or these challenges.
R3:	I think that discovery is a fickle thing, so you are going out to solve problems that exists, but there is no known solution yet. So, you are kind of betting on your own skill, your own intuitive innovation, and placing a bet against that versus time and money. Sometimes you don't get there; the inspiration does not happen, the experiment doesn't work, and things don't work out. In Intel's case, they were able to solve some technical problems, create a

	product that people wanted to buy, successfully get out and communicate that they had this capability for sell, and set up a successful sales activity as well. If you make a product in the commercial world but you can't get the word out or can't get it sold, can't get made or distributed, then you still aren't successful as a commercial enterprise. So they had to go through all of that early learning in the very early years of this industry when a lot of things that we would take for granted today didn't exist. The equipment to build the things you are trying to build, when the things you are trying to build are not yet discovered, doesn't exist. So, you have to either make your own, or you have to work with others that create that type of equipment, and convince them to make the equipment that you need to buy. All of these are difficulties. I am often up in the Sierra Nevada here in California, and I look at places that we cross over the mountain range on these large freeways, and try to imagine what it was like for pioneers with wagons trying to get across these mountains with no roads, and physically taking the wagon apart, and piece by piece carrying it over the mountain, and reassembling it on the other side. I think of how many trips back and forth you'd have to make, and how difficult is just to walk without anything impeding your effort, let alone having to transport your worldly goods. So, pioneers, whether it be in technology, in business, or in the classic sense of expansion in our history, they face a tough road. They have to solve many, many problems, some of which are minutia, but critical if you are going to reach the goal.
Q4:	Would you say the organization as it existed at the time of the venture kick-off, or again generally, kick-offs and innovations, that the organization was well designed, or were changes needed?
R4:	I think it was pretty well designed. Our people had been through a start-up of Bob and Gordon Moore, then two of eight founders that started Fairchild semiconductor. So they had kind of been through the process at least once before, and had some ideas on how they wanted to run Intel when they created it. So it was a different structure that what was typical of the big companies of the day, and obviously as a start-up you are not a big company. This is a company that was predominantly formed by scientists and engineers. I think a lot of the core structure and organization revolved around a similar structure that you would find in a research lab setting, where you

	do have a person in charge, but really it is a collaborative effort amongst peers. Everybody on the team has expertise and knowledge that they are expected to bring to the problem, and everybody operates predominantly more at an equal level. Then, there is someone that ultimately has to make the final decision. So I think that was the basic structure then, and Intel really had not changed that much over the years, even though we have grown to be a very, very large company.
Q5:	What were the expected benefits that compelled Intel to strive to be more entrepreneurial?
R5:	I don't know that the word "more" fits in there, but the benefits of entrepreneurship were that we were a brand new organization and company. So the biggest motivation is survival. No motivation, in our particular business that we were pursuing, meant no success, and consequently, no company, and meant you would be back on the street looking for a different job. So survival is the first thing. The second thing is do you have a great idea that you think is going to have an impact on the world? Intel's first idea was semiconductor memory, much more cost effective, much more reliable, much lower cost ultimately, than what was the standard of the day, which was a magnetic core memory. Along that road as we went through that path of both discovery and development of that product line, we had smart people who came up with additional ideas such as the microprocessor, such as the erasable read-only, programmable read-only memory that used the same fundamental skill-set that we had developed to create semiconductor memory, but provided completely different attributes---the microprocessor being the brain of the computer, re-programmable with software. Next was to take these additional discoveries, recognizing the ones that should have great promise, then being able to bring those capabilities to the market place, and be successful in marketing those that allow you to grow from a small, successful start-up to a continually growing, successful large business.
Q6:	Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice, should they arise?
R6:	Not in the way that is described. I think that, like anything, you have the ability to readjust priorities. If you look at Peter Drucker's definition of entrepreneurship, it is taking resources from an area of lower return and moving them into an area of higher return. So, in that sense, as an organization you always have the ability to readjust your priorities and move resources from an area you perceive of lower return on your

	investment, to an area of higher return on your investment. You don't have a group of people sitting around with nothing to do, waiting for somebody to come up with a grand idea, to jump to it. The reality is that most of the ideas come off of the work that you are already doing, and you will want to tap into the thinking and the skills of people that are involved. So people who are sitting, their skill and knowledge is sitting, and that is usually not going to do much for you. If they are involved in developing and refining, and improving a given aspect of your product line of whatever it is that you do, and they come up with a clever idea, an opportunity that off-shoots from that, you will want to take part of that team, and have them pursue that new element. That means that you have a core there that knows what direction you are heading in. You can always hire and supplement and customize some of your skill-set, but you do not want an idle pool sitting around waiting for somebody to walk through the door with a great idea.
Q9	In general, these R&D groups, I guess is a good way to describe it, is it centralized or decentralized, or has it even changed from the start-up when you described the collaborative effort?
R9:	Well, it is actually a very good question with a very broad answer, but I think that Intel—part of the company with the idea of a decentralized research effort, and part of it was because Gordon Moore and Andy Grove ran the Research and Development effort at Fairchild, and they had experienced first hand that often developments that were made in the R&D lab took years and years to transfer to the manufacturing, and consequently to the market place. Often it did not transfer successfully. So their thoughts were from the beginning, to tightly tie Intel's Research and Development directly with the manufacturing and the marketing of the products, so as not to have that wall between research and development and the rest of the company. We are structured that way today. In fact, I would tend to venture and claim that Intel has a decentralized R&D approach as opposed to more of a classic centralized R&D, like maybe an IBM or a Bell Lab, even Microsoft. They have centralized research efforts. Intel's is spread out. We work a lot with entities outside the company such as universities, other companies all around the world. We have probably 6,000 researchers within Intel that will blend between research and product development at different points in their career. So I think we are the largest and most successful decentralized R&D effort in the industry that I am aware of.
Q11	Some of this question may not be applicable, but in my past interviews,

	people have rolled with it. See what come to mind when I read this. Can you provide examples of the types of goals these resources are aimed at achieving? The resources I am talking about are the excess capacity or excess human resources, or the people who are pulled into a new venture. It's kind of redundant.
R11:	The first thing you are assuming is that you have excess capacity, excess people, or what was the third category?
Q11.	I am not necessarily assuming that. I understand your answer from the beginning, that when there is no excess capacity, you just readjust priorities. So with that in mind, when people, I guess, are pulled from one project to pursue the new project or venture, are there other types of goals that arise from pursuing this new venture, or is it just a new entity?
R11:	Well, the first and foremost is that Intel is a commercial entity, so ultimately the goal is that you are going to bring a technology through a product into the market place. People are going to buy it, you are going to make money, and that is going to be a benefit to your shareholders. So given that as a general assumption that this is going to be somewhat common for all commercial ventures, or it should be, or they are not going to be making money. The next thing is to try to have chosen something that makes a difference, something that matters, something that will have an impact, and that people are going to want buy, then to have effectively and efficiently as possible refine that technology and bring it to the market place. So we are not an organization that tends to do research and experimentation for research and experimentation sake. We tend to have to have a very specific goal in mind. All of our actions are driven to make that goal a reality, and ultimately that reality comes to the market place. If I can give you an example, the thing that Intel does is make computer chips. In order to make computer chips you have to be able put a pattern down on the surface of the chip, much the way a printer has to put ink of various types down on a piece of paper in order to either have text there or to form photographs, etc. So we put patterns down on silicon and connect them that they ultimately create transistors that allow us to get our work done. We currently use a type of lithography called deep ultraviolet light. Deep ultraviolet light is wavelengths of light that are shorter than the human eye can see. They tend to range from a high of about 253 nanometers and goes down to about 157 nanometers. Our current technology uses the middle spectrum there, which is about 193,

	and so the next generation 157, and after that spectrum of light runs out of steam there is no more wavelength in it. We as an industry, and we as a company looked many years ago at this, and could extrapolate out and see that if we couldn't find something to take the place after the 157 nanometer light source, that our continued rate of progress of shrinking the elements of a chip to finer and finer dimensions was going to hit a wall. We had researchers that recognized that the laser technology that at the time was being developed for the Star Wars Defense initiative to shoot missiles out of the sky might be redirected and used to print pattern on paper. The problem was that the wavelength of light was so tiny that there was no material it could pass through as a lens, so you couldn't focus it, and you couldn't put the pattern on it. So they also figured out that instead of going through a lens and through a pattern called a mask, kind of like a negative on a film, that instead you would have to use reflective technology and reflect off of a pattern, and there the technology that had been created for the Hubble telescope would come in handy. We funded to a tune of a quarter of a million dollars, this idea that we could take these two very different technologies out of the national lab and, in fact, make a commercial lithography machine out of it. That at the time was a glimmer in somebody's eye. This was in 1997. Today that technology is the #1 choice for the industry to adopt after 157, deep ultraviolet light, and we will see chips on the market using that technology probably in 2007. So not research for research sake, but taking ideas, trying to solve a problem, one that was an important problem, and then doing a lot of hard engineering and scientific work to make it happen. That's what our research team does.
Q14	Is there anything in your organization that gives your researchers or employees in general, time to pursue things that have not been adopted by the organization? I don't know if you are familiar with 3M having that 15% rule?
R14:	We do not have a 15% rule. There are skunk work projects that start within the company. The fact is that people here at Intel are not micromanaged. The culture of the company is that you sign up and you have a job to do, and you are obligated to get that job done. If you have extra time, and sometimes that extra time is not 8:00 to 5:00. Intel employees typically are not an 8:00 to 5:00 crowd. They will devote time and energy to pursue something of interest to them, and at a point in time where they think it has possibilities, they will bring it to management to seek resources funding, etc., and maybe they will drive their own job shift from what they doing to pursuing their new idea. We

	do have some formal programs to encourage internal entrepreneurship, in the sense that, again, somebody has a great idea, and we give them the resources and the time to go pursue it in depth. A lot of those early germinations of ideas are done as people catch an extra hour here or there, or they just flat out devote an extra hour here or there until they can develop it into a factor that is worthy of taking and seeking a more formalized kind of backing. So we don't do it as a 15% rule, but we do it as a culture.
Jason	You had alluded earlier to additional people being hired sometimes, experts being hired. Can you elaborate on that some?
Intel:	Yes. If you are pursuing a number of opportunities, there is a certain point in time where you say the amount of work that needs to be done to properly pursue a given activity, is going to require more resources, or more people being pulled away from other important projects than is smart. So, what a company will do is hire. If you are hiring, then what you are looking to do is hire people with the education, the skills set and the experience that will help you achieve your goal. So, like any organization we will hire additional people that either have a skill set that we don't have, or they have a skill set that we have, but we just need more of. If you are trying to design two or three generations of microprocessors and you want to get them to market in a certain time frame, then you can either put enough people on it to get it done, or you are going to fail to hit your market window. So you go out and hire more circuit designers, and more electrical engineers, and more people who have the skills that you need to bring that product to market. That is kind of what companies do.
Q17	The next question is concerning the stakeholders. Do they ever balk at the excess resources that go into the skunk works, or the formal programs---anything like that?
R17:	Not in the way that it is described there. The way that a stakeholder is going to get involved, is if you have a skunk work, by its very nature, that is going to try to steal a little bit of resources below the radar screen to go pursue a different idea, but it means that still the bulk of the resources are tied to a given effort or project that is being done. If at a point in time that resource strain hinders the main project from being done, or being done on schedule, or being done to the quality that it needs to be done, then stakeholders will chime in. They won't chime in, in the sense of saying that skunk works thing, they will chime in saying our project is behind schedule, our project is below its target, our project

	is not meeting what it is supposed to do. What will happen often, and you will go through phases on a big complex project, you will go through phases where it is ahead of schedule, behind schedule, things look great, things don't look so great, etc. Typically when things aren't looking great, the people on the team will refocus their attention and energy to try to bring it back to snuff. That is the responsibility of the management over that project. The stakeholders will observe and complain if necessary. Management and the team will refocus. They may in essence put a skunk works thing on hold a little bit as they go into a very heavy and focused time, and they will try to bring that project back either on schedule, or ahead of schedule, depending on what they need. As long as everything is running smoothly, and your project is doing well, is on schedule, and is meeting all of its specifications, you're are not even going to notice that some little skunk work thing is going on. The very nature of a skunk works is that people outside of the core group that are doing something don't know that it is going on. It is not widely publicized. Gordon Moore has this saying, and it is very true in science. Again, it is a company of scientists and engineers, and the approach is that if you are not failing you are not trying hard enough. So you have to know that for all of the various ideas that you are going to at least pursue, there is a high degree of failure in them, because that is how you learn, then you can improve, and ultimately you will be successful. If these things were obvious that it was needed, and obvious on how to solve the problem, somebody would have done that a long time ago.
Q19	On these projects, any project, research and development, how, and how often does the firm determine the number of resources to devote? You have touched on that some.
R19:	I think there are a couple of answers to that. There is the answer that says you are constantly as a management entity reviewing the amount of resources needed or not needed, and readjusting within a bigger group. So you may have a big engineering group, and readjusting within my group. In running Press Relations, I may take somebody who normally is assigned to a given product line, and for a couple of weeks or a month or something, pull them off and do something else, because I need more done on this other thing and that other project that is kind of in a lull. So that happens on a day-to-day basis. On a formalized basis, you typically go through a formal planning process once a year. It is accumulation of a number of different meetings and plans and such. From that, you will get your broad assignment of resources, your budget, and things like that.

	Typically what happens on the bigger projects is that when you started out, while it gets refined year to year, the funding and the expectation is really a multi-year effort, because that is how long it is going to take to get the work done. So you do not go back to kind of zero-based budgeting each year, but you do adjust and fine tune, again, based on whether the opportunity is growing or shrinking, whether the project is ahead of schedule or behind schedule, kind of you will make adjustment. Then on a day-to-day basis, you will do that based on what the manager needs, and where he thinks the best use of his talent is at any moment in time.
Jason	Then you touched on the measures to determine the effectiveness of the allocation of resources. Is this based on you talking about whether or not it was meeting the time line, and things like that. Is there more?
Intel:	There are a hundred things. It really depends on the project, but if you are talking about something as complex as bringing a new microprocessor to market, or bringing a new factory to bear. We just opened a factory yesterday, $2,000,000,000 to build this factory. It is about 18 to 24 months just to get the factory ready to open. This thing has to be 100,000 times cleaner than any surgical operating room. It has hundreds of pieces of equipment that are precision down to levels that are several thousands times finer than the thickness of your hair. It has cleanliness in it that is equivalent to one piece of dirt the size of a pea and 3 cubic miles or air. It has 1000-1200 direct employees who are building the most complex devices ever built by mankind. All of that means there is a lot of measurements and a lot of details that have to happen all along the way to get it open, and once it is open, to have it producing the product that we want to, and quality and yield that we want to.
Q22	Is there any incite on projects, skunk work projects, projects in general that have failed, and why they may have failed, concerning things like organizational design or even limited resources?
R22:	Yes. I can give you one that is a good idea, but did not work out for us, which was about five years or so ago when the internet was very hot. We formed a business in web hosting. Web hosting is these big machines called servers that hold all the material, and when you go out to click on a site on the internet, that is were the ultimate query goes, and the response comes from these machines. These machines are typically complex, pretty expensive, and they improve at a fairly rapid rate, so big companies will tend to host their own. Small companies tend to have a problem because the price of the machine is high. They

	may not be able to afford that. The expertise to keep then running without fail 24 hours a day, every day of the year, may be a level of sophistication that they don't have, and it is not core to their business. Maybe they run a car dealership, or they run a retail outlet, or they run flight reservation service. Running a server and keeping that website up to date and online 24 hours a day, 365 days a year, is something that is necessary for their business, but it is not core in terms of their expertise. So often they will hire that out, and we opened the business to have people to hire us to run their IT department. We have a huge complex IT Department within Intel, so we felt we had some expertise. We sell a lot of our products into these servers, so we felt that we not only knew a bit about them, but also that we could learn from running the business, how to make our products better. So there were all kinds of justification to do it, and we built facilities and invested money to do that. What occurred was that the .com boom went bust, and consequently the people who had these ideas and had these monies to in essence hire these services, went bust with it. The companies that were big enough, and for the most part traditional companies, like a Ford Motor Company, were big enough to run their own, so they did not hire it out, and the companies that weren't were small enough that they went belly up. So we, along with other companies that were pursuing that kind of business, found that we had a lot of resources in terms of people talent, a lot of money in terms of capital tied up, and not much business. In that case you either sell off or close that business, and readjust the resources to a place where you think you have a better opportunity.
Jason	Well that concludes the formal questions. Thank you for your flexibility on some of those. Do you have any parting thoughts?
Intel	What is the class?
Jason	Actually this is a thesis effort concerning putting the entrepreneurial mind-set and innovation, that type of culture, into the Department of Defense.
Intel	I think that one of the challenges that you face in that kind of situation (I'm a military brat growing up, so I have a little bit of understanding of the military) is you have a whole string of dichotomies. The effective ways for military to run often are with tremendous precision and discipline without probing or questioning orders, and without straying and free lancing much from what the strategy is. Yet, at the same time, the mere definition of entrepreneurship tends to push at the very core and edges of everything that tells us traditionally, makes

	a great military operation. So I would look, for example, in business where similar phenomena occurred, especially ones that have been successful, then to see if those structural elements of success are applicable to your circumstance or situation. So, as an example, I would tend to say that our factories, the complexity of the product we are building, the volume of the product we are building, the high capital cost of what we are doing—all of these things will tend to be best utilized with a high degree of discipline, with very little variation from the specifications, etc, etc, etc, because you have to build this very complex thing. If you don't, if you screw it up anywhere along the way, as it goes through its hundreds of manufacturing stuff, this doesn't work. So it has an environment that would tend to, I think in general, map closely to what the larger sense of the military and the defense department would require or need, but at the same time, we are changing our core process technology. The recipe we used to build chips—we are changing it every two years, because we are shrinking to finer and finer dimension. We make a billion devices, and thousands of different products over the course of a year, so there has to be a way to institute change, and also to create an atmosphere of discipline, or innovation with discipline, rather than just discipline alone. Those would be the kinds of places where I would look to see where the defense department might learn and adopt some of the techniques and tools from industry to improve their situation.
Jason	Great! Thank you very much for your time. I will send you that stuff on the e-mail. It should only take you about ten minutes to do, and if you can get it to me within the next week or so that would be great. Also, if you have any other thoughts you can just send me e-mail on it. Thank you again.
Intel	O.K. Good luck. Bye

Appendix H. Kone Interview Transcript

Interviewer: Lieutenant Rochelle Smith

Date: 25 October 2002

Rochelle	I appreciate you taking the time to talk to me, and I will try to be quick. First, who is your supervisor and what is his job title?
Kone:	My supervisor is the Director of Corporate Communications and Industrial Relations.
Rochelle:	Wonderful. I was trying to see who the entrepreneurial people are, as for their rank in the company?
Kone	Well he isn't one of them, and neither am I, but I'm supposed to tell you something about them.
Rochelle:	So you're the one who has been chosen for today?
Kone:	Yes. I've been chosen because I've been in the company for 20 years and spent most of my time traveling around it, meeting people and talking to them, in order to report on what they are doing. I have also, in the process, kind of become the Custodian of Corporate History and Culture, but not because I am an entrepreneur.
Q1:	What caused your company Kone to pursue entrepreneurial ventures or new innovations?
R1:	I'll give you two different kinds of answers to that. What I would see as being one of the interesting entrepreneurial natures of the business is that Kone is over 90 years old. It was founded in 1910, and until 1968 it was basically a little domestic Finnish company. From 1968 until the present, it has grown by leaps and bounds through the acquisition of other, basically elevator companies around the world. So we ended up being a global company, but was made up of companies that had originally been small national companies like ourselves, or in some cases we bought, for example, Westinghouse's European elevator business, which was quite large and part of somebody else's large multi-national operation. What happened was that the small Finnish company did not have the resources, the experienced, or even probably the will to try and integrate all those companies into some kind of consistent way of working. For 30 or so years, that multi-national organization ran as a federation of local companies. What that had to do with entrepreneurship is that basically

	the local managing directors were treated as entrepreneurs within a large company structure. So, they had some requirements in common, but for the most part, they were allowed to keep even the old company name, and they were pretty much told, you run the company, and if you make enough profit you will be rewarded. They were rewarded on a bonus system over their salary, depending on how good their financial result was. They were encouraged to act as local entrepreneurs.
Rochelle:	Was that for the first 30 years?
Kone	This was until very recently. Kone's attempt to manage the whole thing centrally as a harmonized global operation, is really about four or five years old.
Rochelle:	So, especially with Kone, what changed the mind set from one of, "we have all these entrepreneurs, and as long as they make a profit they can do what they want to?" Now we are going to try to manage them?"
Kone	A number of things that basically the global environment changed, for example, in Europe where Kone was doing 2/3 to ¾ of its business, the European union's standardizing of norms and legislation made it possible for companies to sell the same product and the same service across borders, and it became a liability to be doing national-based business against competition that was doing European-wide business. The European-wide product and services were being offered at much greater efficiency and lower cost, than could possibly happen on a country-by-country basis. For example, in the days when I joined Kone we had factories inherited from all these companies that we had bought—in almost every country of any size-because the customers in those countries wanted to be able to go and kick the tires at the factory. They wanted to feel that they could get a local product. That is clearly no longer the case, and in an increasingly global economy, people want a product that they know has proven itself. So many of our customers now are operating across borders; they want the same product, wherever they are ordering it. So, they are not at all interested in all these local differentiation issues that were used as really protectionist measures in the old days. So there have been all these pressures for standardization and globalization, which have undermined the ability of companies such as ours to work as a federation of local entrepreneurs, and they have encouraged the companies to come up with highly streamlined, homogenized approaches to doing business that can be replicated easily, and at low cost, from place to place.

Q2:	So what was the key challenge then for Kone as they moved from one to the next?
R2:	How to maintain the spirit and initiative that the entrepreneurship had created among local company leadership, while taking away some of the natural incentives and rewards that made that happen.
Q4:	So would you say that the organization as it existed before you became the new global Kone was designed for that?
R4:	It ended up being that way. I'm not sure it was designed that way, but it was almost by default, because we inherited this company. The elevator business is only now 150 years old. Basically it dates from the time of the civil war when Elisha Graves Otis invented the safety gear and made it possible for people to ride in elevators, because if the cable breaks the elevator does not fall anymore, etc. That was from 1851, I think. So what happened at that point was because the technology was really very simple- just a motor and some buttons, and it went up and down. Engineers in every country could say, "I can do that", and start an elevator company. Then because people were riding in the elevators, the local government began making safety rules. The safety rules became protectionist rules. We find in the states, even from state to state, the norms and standards are different, and it became very, very difficult. Every place that made laws ended up eventually protecting one local elevator company. So it became natural place for young engineer entrepreneurs to get started, and then they handed the company down to their sons or daughters, and maybe to their grandsons or granddaughters. Then this great consolidation process started, where the Otis's and Westinghouse's, and in Europe the Schingler's and the Kone's and the people began buying up all these little companies because by the third generation two things had set in; one is that the third generation, the grandsons and granddaughters and entrepreneurs usually turn out to be spoiled brats, because they have a good time with their grandparents that they inherited. Then number two, we were getting into a completely new era of technology, and the second half of the 20th century computerization came into the elevator business, and companies that did not invest in that early suddenly found themselves way behind, and the investment that it would have taken to catch up would have drained all of the value out of these little, tiny companies, so instead, the grandchildren or great grandchildren said let's take our money and run, and sold out to the Otis's, and the Westinghouse's that were going around with their pockets full were buying them up. So that climate changed completely.

	On the other hand, there is still a very interesting entrepreneurial part of the industry, which probably will never die, and that is, that the really interesting and profitable part of the elevator industry is the service part—the maintenance of equipment. What happens there-- as opposed to this very heavy investment that is required in the manufacture of new equipment, and the investment in the latest technology, and it's how you get your printed circuit boards, and what kind of control system or software you develop, and things like that--the service business was basically fairly uncomplicated. What happens is that an Otis or Kone trains young men mostly to be elevator mechanics, and they learn first how to grease and oil, then how to replace some parts, and eventually how to troubleshoot even the most complicated system. At some point, almost every one of these mechanics admits to himself ***(tape cut off here so question 5 response is based on Rochelle's notes)***
Q5	What were the expected benefits that compelled your company to strive to be more entrepreneurial?
R5	Kone was the first Finnish company to go international. They were originally not ready to take control of others. Kone had to change its mindset to be a more formal leader. There was no one to tell the company what to do. Kone makes a great deal of its money in service. Kone had loyalty of customers. Their mechanics often become successful entrepreneurs and are bought out by the same company. These mechanics often have little to no formal education.
Correction	***(tape was cut off right before this question and Kone had to be called back)***
Q6	Does your organization have a reserve of human resources available to pursue new opportunities on short notice should they arise?
R6:	To human resources, maybe that's always the case every place, but right now it certainly feels like a situation where we have too few people doing too many things, and every company seems to be doing that. I mean that's the nature of the competitive environment at the moment.
Rochelle	So you don't really have reserve resources--you're running thin for resources?
Kone	No. It is not one of those questions I'd like to answer yes or no. It depends on how you look at it. As I said, we have a hierarchy of

	resources. It seems to me that the accurate answer to that question is that, for example, four years ago, before the stock market began going into its nose dive, every single talented young person in any company, any place in the world, knew he could walk off the job and get a better job the next day, and people were doing that. Nobody had a reserve of any kind. It simply did not exist in industry as far as I can see. I know in Finland for example, Nokia, the telephone mobile phone company, was able to absorb every single graduate engineer, and every single graduate economist from all the universities in the country every year, so nobody had any reserves. We were all desperately struggling to get good people. The situation has changed a bit today. A number of companies have lain off people, and it is a little bit easier to get people, but nobody is hiring people into reserve, as far as I can see. There are trying to keep it as thin as they can because the profit environment is not very strong.
Q8	So when you do have reserve resources, what type of jobs are those people in?
R8:	Again, I am not sure that such a category exists. I am trying very hard to think of what I would imagine reserved resources look like. I can tell you of a situation where things like that that do occur. The elevator industry is by nature quite cyclical, because what we call the new elevator part of the business is the new equipment part of the business, because you can only sell new elevators and escalators if people are building new buildings. Nobody buys them to put in their yard or anything like that. So because the construction industry is cyclical, regarding the installation of new equipment, our cycle is about a year behind the construction industry cycle, because you can't put your elevator in until the building is already going up. What happens is that in boom times you hire as many great installation people as you can, because you can usually get more work than you will actually have resources to do. Then when the bottom falls out of the market, you have all these people with skills that you know you may need in three, four, or five years, but you can't use them right at that time because you have very little new construction. Therefore, you try to put them into parts of the service business, modernization business, where you can keep them going until you need them. The situation is a little bit different than in the states, because in the states you have to hire people out of the union hiring hall. In Europe, the people are on the company's payroll directly. So it is a little bit different, and in Europe it is a little easier to hang on to those people. That's one of the areas where sometimes we will try to keep people on the payroll, although maybe the

	immediate need for them is not very large.
Q11	If you were to do that, what would be the goal for keeping them? Would it be just so they could do construction, or would there be other goals in mind?
R11:	The goal is that these are people with definite skills that are needed both in new elevator installation, and can perhaps be used in things like major modernization projects, and we know that we are going to need them again in a few years, so we are trying to stockpile them in a sense, to have them when the next construction boom comes along, so that we don't find that we are losing jobs because we have no skilled people to do that. You can't just hire somebody off the street and tell him to go and install an elevator. It is a complicated business.
Q14	When is the creative capacity being innovative? If you do have extra people, how much time do they spend being innovative-—a percent of their time, like 15%, or one hour a day?
R14	That's the kind of thing that people like to have to put in their research projects, but it doesn't make any sense in real life. It depends an awful lot what we are talking about. If we are talking about people in the research and development part of our business, then presumably you are spending 80% of the time being creative or innovative, and 20% of the time writing reports. If we are talking about people in the installation part of the business, they are probably not spending too much of their time being very innovative at all. They may come up with some things along the way, but certainly in terms of the time they spend being innovative, I would say it is very, very small. But then, there are other parts of the business that require a lot of it. Those are the troubleshooters, and the major modernization people at the technical end, there are sales people, and some of the people in the management positions who are trying to figure out ways to outsmart the competition. So those people are hopefully spending a lot of time that way. Kone does not have lots and lots of manuals that tell you how to run your business. Most of it is going out there and engaging in the work, and trying to do it better than anybody else, so entrepreneurship in that sense is fairly high. Our creative work is fairly high. In a strange way, the elevator business always was a business that attracted fairly entrepreneurial people because, as I said, you would go out by yourself, or with a partner, and would be faced with a new situation in every building you went into. What's wrong, why is it wrong, what can I do to fix it, or nothing is wrong, but I'd better check the system to make sure that nothing is going to happen and break down before I come back again.

	I have heard time and time again from these people, and they make up more than half of our total workforce of 23,000 people, saying what I really like is the job is always different, and there is nothing routine about it. Every time you go into a new job, you've got to listen to what the people tell you, and see what you can figure out. It attracts people who like to do that, rather than be told by someone this is what you have to do now, please go and do it.
Q19	How would Kone determine the optimum amount of creative capacity, so if you do have the amount of people you want, how would you determine that?
R19	I have never heard anybody say the problem here is that we have too much creative capacity—like people are trying too hard to come up with new things, they should all go back and just kill off a few brain cells, and do things that are a little more their way. I said to you that we are moving in a direction of doing much of our business in a more streamlined and harmonized fashion, so we have kind of been looking for optimal ways of doing certain things, then we are asking people to accept those ways of doing them. I guess we are saying that we have reached a limit, in that we don't want people to reinvent the wheel on everything that we are doing. I can't make too much sense out of the question as to what would be the optimal amount of entrepreneurship. I understand entrepreneur to mean a person who says I am treating this as if it were my own individual company—my little piece of the business, whatever it is, whether cleaning the floors in a factory, or being in charge of the sales team for the whole country. I have never heard anybody say (nor do I think anybody would be likely to) that kind of spirit hurts anywhere. I think everybody would like to have an extremely self-motivated workforce from top to bottom. I don't quite understand where they would want to limit it, except to the extent that they probably would not want people to say, if we have a wheel that is a really high performance wheel, we don't somebody taking a huge chunk of stone and spending a lot of time starting to chunk away at it with a hammer and chisel to make a stone wheel that will never be that good. You do need to accept the tools and methods that have shown to work as the basic things we are working with. We have done a very good job of developing those things, but now we would like our people to take them and treat them as their own tools and go out and be very, very motivated to out-perform the competition.

Rochelle	Thank you for your time. I actually don't have anymore guided questions. I did send you e-mail with some questions that can be done over e-mail, and they are numerical assessment questions, with a 1 to 5 scale, and you can choose. Some of them may not apply, especially with what you have described for the majority workforce. It sounds like they are doing very hands-on individual activities, as opposed to a team, but in a larger sense. Just leave blank those that do not apply.
Kone	With all these things it would be much easier for me because in a company as large as we are, our service people, in India for example, most of them are illiterate. They are really hands-on people, because they are not even able to take a manual home and read through it. At the other end, we have people doing research in very, very advanced technologies, and creating real breakthroughs, and are about as far away from that profile as you can get. So it obviously would be easiest for me to give useful answers if we were talking about a person in this situation in this environment. It is very difficult if you are asking me, as you have often today, how much time does a person spend being creative, I do not know what that means when I am comparing a Ph.D. sitting at his computer with the most advanced three dimensional designed software, comparing that person to an apprentice on an installation site whose main job is to hold things in place while somebody else bolts them together. It is very hard to give useful answers when you have such a range of activities going on.
Rochelle	I'm sorry about that. That has been true with our study, that depending on the industry and the type of work that people are doing, some of our questions are difficult to answer, and we are trying to refine some of them, but we plan on applying them to the Department of Defense, and that is very varied. There are lots of organizations within that who are similar to what you are describing in Kone, where we have a wide variety of skills and types of jobs that are being done, so we are trying to be broad with it, but at times that makes it confusing and we are working on that.
Kone	I would recommend in some ways your breaking it down, because within our company, as within your activities, you could give much more useful, and get much more useful results, I think. For instance, if you said well, what about the people who are doing the work at this level, what about the people who are doing it at a different level, what about your middle managers-how do they do, what about your top technology thinkers-how do they do it, what about your top business managers-how do they do it, what about your ordinary sales people? So try to determine certain levels, because I think the differences are not so much within companies.

	Certainly the differences within Kone are bound to be greater than they are among people doing similar types of jobs in the industry from company to company. So if you really want to know, say, how Kone does something different or better than the other elevator company, then we would have to get very specific about jobs were are talking about.
Rochelle	Thank you for your input, because for the thesis research that I am doing, I'm hoping to have a follow-on where someone else will be continuing my research. Those are the sorts of things I would want to be able to tell this person these are the things to look out for because some of these questions you need to specify more. Some things I'm afraid we missed in our study because the real world is so complex that as we simplify, we miss things.
Kone	As I said, I know looking at the two examples I just gave you, the entrepreneurial quality of those managing directors and presidents of the companies, the subsidiaries from country to country, that's not very typical of some of our competitors, but the notion of the well-trained mechanic going off and starting his own business is endemic in the industry. Whatever big elevator company you go to, you will find that they will complain that they lose a certain percentage of their best field people to their own startups. That's just the nature of the business.
Rochelle	I thank you very much for all of your help and answers that have been very well thought out, even for some difficult questions as far as the clarity of the questions. I appreciate your time, especially since you are not at work, and still working.

Appendix I. Mobil Interview Transcript

Interviewer: Lieutenant Rochelle Smith

Date: 7 November 2002

Rochelle:	My first question is what is the job title of your supervisor, or their position?
Mobil	Vice President, Business and Product Development.
Q1	What caused your company to pursue entrepreneurial ventures or new innovations?
R1	We made a decision to do that as Mobil Oil, probably six or seven years or so ago now, because we needed to differentiate ourselves to the customers, the customers being the motoring public, to give them a reason to want to shop at Mobil versus other choices they may have. One of the initiatives was this concept of speed, which turned out to be the Speedpass initiative. It was one of a couple of major initiatives, but the primary reason was to differentiate ourselves, and to give customers a reason to want to shop with us versus our competitors.
Q2:	Can you describe the key challenge that was faced regarding this venture or innovation?
R2:	Probably getting the entire organization to buy into it, then to actually go out and implement and execute the entire concept once it was developed, because it was a small group of people who had developed it, and those people really were not going to be responsible for implementing and executing. So you then went down to the field organizations, of which there were several. It became the responsibility of theirs to buy into the concept, sell it to the operators that actually run service stations, and additionally ask them to pay whatever the time and cost was to install certain equipment, and to institute the program.
Rochelle	So they had to pay on their own in order to do that. There was a fee involved to participate?
Mobil	A fee is not the right word. Really, there was an equipment investment to be able to accept Speedpass. It was not an ongoing recurring fee. It was just an equipment investment in order to accept Speedpass**.**
Q3:	What were the barriers that had to be overcome to accomplish the challenge?

R3	I think I kind of did that in the last answer, and perhaps they can be put together if you can. I think the barriers were, again, convincing everyone that this made good sense, and therefore, their enthusiasm to sell it to the operators of the individual service stations, and the expense barrier.
Q4:	Would you say that Mobil, as it existed at the time the venture kicked off, Speedpass kicked off, was well designed for Speedpass, or were there changes to the organizational design that were required?
R4	There really weren't true changes to the organization in the sense of having to realign the structure of personnel. Clearly there was probably an individual or two in each one of what we call our field business units. One of their primary objectives and goals was managing the Speedpass brand, but they were not major changes to the organization.
Rochelle	There were just small changes that needed to be made for implementation?
Mobil	From an organizational standpoint, that is correct.
Q5:	What were the expected benefits that compelled Mobil to strive to be more entrepreneurial?
R5	The first one was to differentiate ourselves from our customers. There had been many, many years in the oil industry whereby oil companies were kind going at one another in two major ways. The first one was actually putting the price of gasoline on a sign at the curb, if you remember back then, and today, there are no businesses that do that. You don't really think about it until it is actually presented, but no one does that. You don't drive by a fine restaurant and have a price out there for a lobster dinner. So companies would compete from that standpoint. Companies would also tend to advertise and promote all of the additives and ingredients that their fuel had that perhaps others did not. Really what it came down to was the customers really weren't buying into any of those things anymore, and they realized they could get the product anywhere, and I think to some extent, were convinced that gasoline, at least from a major oil company perspective, or a branded perspective—the Exxons, the Mobil's, the Amcos, the bigger name ones, were all pretty good gas, or they would not be in business. We determined we needed to do a number of things to differentiate

	ourselves in the eyes of the consumer in speed and convenience, and Speedpass fit the bill for both of those. The other element of Speedpass that was a major benefit to us was the ability to begin to understand who our customers were, and evaluate some of their buying patterns, reward our better customers, and entice them to come back. So Speedpass is much, much more about marketing than it is about technology.
Q6	Does your organization have reserve human resources that are available to pursue new opportunities on short notice, should those opportunities arise?
Mobil	Are you going back now again? We have been kind of talking about how this was deployed as a part of Mobil Oil five or six years ago. Is your question along those same lines, or more in today?
Rochelle	It can be either, whichever one applies to you now. We are basically trying to figure out if entrepreneurship is going to work for us, do we have to have group of people who are sitting around thinking up new ideas, or how have other companies or other places done that?
R6	Today we are structured completely differently than we were when this was launched. We are a small organization called Speedpass Network, and we are wholly owned by Exxon Mobil, although we do operate in a separate functioning unit, and we are growing the Speedpass brand with other retailers. For example, all of the McDonald's restaurants, 440 of them in the Chicago area, have been accepting Speedpass for a year. We will be launching Speedpass at a grocery store chain in New England starting in December or January, and we continue to expand to other retail channels that make good sense, and where customers want to be able to have the convenience of using Speedpass at other retailers. So, we do operate separately today in terms of functioning from that standpoint—that is all we do is focus strictly and specifically on Speedpass. Depending on how you define quickly or rapidly, most of what we do requires us to hopefully have some speed to market with it, although I am not sure it is a type of business where you are managing crisis situations. I would not say it is really that. The other answer to your question, should there be some people whose responsibility it is to be thinking about whether it's building a new rocket, or coming up with a new product idea in our business, whatever it is, clearly, I would say you need some people, probably not too many of those people, but I think someone whose responsibility it is to determine

	where you are going to take this business over time, and how you are going to get there.
Rochelle	So you need them, but you don't necessarily have them right now?
Mobil	We do have individuals who are responsible for shaping the future of Speedpass, what our product line will look like, and strategically where we are going to go. We are clearly staffed today to do that. Our organization, as with all organizations, as we add more retailers such as a McDonald's and a grocery chain who accept Speedpass, we will need more individuals to assist and manage the implementation of that. We probably won't need a significant amount of additional people who are actually developing the ideas of where we are going to take the business.
Q7	So right now, what is the nature of the reserve resources you have right now? Where would they be, and what kind of jobs would they be doing right now?
R7	Within our organization we are structurally in long links against five or six business lines. One is product development, which is developing the future of Speedpass; for example, can I use it over the internet some day? Today it is just a little barrel-shaped transponder—should it be a Mickey Mouse transponder? What is our banking relationship along the product lines with credit card companies, and those things? That would be product. Then there is business development, which is what I am responsible for, and that is determining the strategy and how we want to grow this business with retailers or others. We then have a retail services group, and they support all retailers that accept Speedpass today. We have an operations group that kind of supports a lot of the backend type things—we have a 24/7 customer care center, anything to do with operations, really from assistance and technical standpoint. We have a whole marketing organization which provides best practices and support of retailers that accept Speedpass today. It's kind of how we were aligned, and again, we may tweak or change that over time, but currently that is how we are aligned.
Q11	Can you provide examples of the types of goals these resources, or these people are aimed at achieving?

R11	I think the biggest one is just to kind of define the vision for Speedpass in general. Everyone as a team works together to get to that. The major objective is to continue to provide speed and convenience, and a better buying experience for customers. The way in which we do that, by providing products and backend type information to retailers, McDonald's, Exxon, Mobil, can make the buying experience meet those criteria for customers. Let me give you one example. At the grocery store chain that we'll be launching-this will be available to all retailers-you'll be able to wave your wand at the register. Not only will that just have paid for your purchase, that also would have just provided you with any discounts or loyalty points that retailer's program has, in place of, for instance all those cards you carry. Those will be eliminated with Speedpass, multiple credit cards. It will all be embedded for lack of better word, into the wand. Everything we do here is to make the customer's buying experience faster, easier, and better, and to try and increase profits for the retailers that accept Speedpass. Everything, all those business lines that I described to you before, everybody works in unison to meet those two real major objectives.
Rochelle	So for Mobil, you had mentioned that before I was different, so has the firm always had extra people, that if you have a new idea, like Speedpass, you could move them into that.
Mobil	No, and even today, because we are owned by Exxon/Mobil, the organization has just found a way to staff this. We are in the same mode as every corporation in the world, and that is we are reducing the number of people, not increasing them. So no, there are no extra personnel, if you will, lying around. I think it just forces you to determine what's the most important objectives you have as a company, and put the resources behind that, and don't do the other things you are doing that we don't really need to do.
Q14	There are a few more questions that I was going to ask, and some of them might not apply, but I will ask anyway. So when are your creative capacity or your extra people being innovative. This could be in a one hour a day, always, or 10% of their time?
R14	Probably not applicable.
Q16	How was creative capacity or the extra people that you are not sure that you have, but if you didn't have them, how were they brought into the

	company. For instance if you had hired new people specifically to be innovative, or to help with Speedpass, did you hire all of them at once, or did you hire one per year?
R16	It really was on an as-needed basis. I would say we are staffed with about half that are existing employees form Exxon and/or Mobil, and the other half of our staff are from individuals who came from different backgrounds and different organizations. So we actually, in some senses went out and hired the experts, if you will, as opposed to trying to figure it all out on our own.
Q19	How does Mobil determine what the optimum level of people are that you would need in order to have something like Speedpass get off the ground and do well?
R19	That is almost impossible to answer. I think as you put your strategy and vision into place, you then start implementing that strategy and vision, then you clearly have an idea going as to how many people you think you need, and hopefully you are close. We are almost really taking to a new level this whole concept of electronic payments and identification, so there are a lot of parts of our business that we are doing that no one has ever done before. So, I am not sure, in all senses, we know, and I would guess with any other company that you will speak to, particularly like true entrepreneurs who started a business from scratch. We did not really do that. We started a new concept in a new business line, but we did it with the backing and support of a pretty large profitable organization. Some other people you will talk to can probably really give you the blood, sweat, and tears that we would like to say we can, but quite frankly we were backed by a pretty big company.
Rochelle	Actually, that is the last of my questions that I have for interview by phone. I do have a few questions that are numerical assessment with 1 to 5 answering scale, and you would circle one of those. I can e-mail those to you, or we could do them over the phone, whichever you prefer.
Mobil	You can just e-mail them; that would be easier.
Rochelle	O.K., I'll go ahead and do that, then you can send them back to me. If you have any questions or if they don't apply, you can leave those blank, or e-mail me back.
Mobil	O.K. Very good.
Rochelle	Thank you so much for your time. I do expect to finish my thesis in January. If you are interested in seeing my results, or have questions about what I am writing, please feel free to e-mail me, or call—either

	way. Thank you again.
Mobil	Sure, and good luck.

Appendix J. NCR Interview Transcript

Interviewer: Captain Jason Whittle

Date: 21 November 2002

Q1:	What caused the company to pursue entrepreneurial ventures or new innovations?
NCR	What?
Q1	The first question, what caused the company to pursue entrepreneurial ventures or new innovations?
NCR	Are you referring to procurement or what?
Jason	We are referring to the organization as a whole.
R1	Numerous things. Board of Directors, research on best practices
Jason	All right. What was the goal of these?
NCR	To bring best practices in-house.
Q2	Ok. Describe the key challenge that was faced regarding this venture or innovation.
R2	Overcome the "not invented here" and just organizational inertia.
Q3	Ok. Describe barriers that had to be overcome to accomplish the challenge. You touched on that in the last one. Do you want to elaborate?
R3	You must find resources and time.
Q4	Ok. Would you say the organization as it existed at the time the venture kicked off was well designed for the venture—or were changes to the organization design required?
R4	Changes were required.
Jason	In what way? Or, is that constantly evolving?
R4	Pretty well constantly evolving. To make various roles and responsibilities throughout the company to align with new initiatives.

Jason	All right. New initiatives are the best practices and those kinds of things?
NCR	Yes
Q5	What were the expected benefits that compelled your company to strive to be more entrepreneurial?
R5	Profitability.

Appendix K. Shell Interview Transcript

Interviewer: Captain Jason Whittle

Date: 5 December 2002

Jason	How are you? Do you have about 30 minutes?
Shell	Yes. How are you?
Jason:	I'm good. Do you have an e-mail address where I could the short questionnaire to you later, and what is the position and job title of your supervisor?
Shell:	My supervisor's title is Technology Manager.
Q1:	These questions may not be directly applicable, but if you need to qualify them in any way, just verbalize that if you could. Some of the stuff comes from wanting to know about the game changer, but some of them are also general questions. What caused Shell to pursue entrepreneurial ventures or new innovations?
R1:	It's the recognition that innovation is one of the important characteristics of growth in top line, and growth into markets where you are already playing, and growth into markets where you may begin to play, and growth into markets where you may just like to play. Let's say it is the recognition of the need to intend further growth.
Q2:	Describe the key challenge that was faced regarding this venture, or ventures in general, or innovation.
R2	The key challenge is what is called the innovator's dilemma. I think we buy the basic idea that **Christenson** has that in innovation you are generally dealing with acceptability criteria, and those criteria being based upon support of existing modes of operation. Perhaps existing business models and so the difficulty is to be able to maintain the output from the innovators into commercial practice. That's the major total owing innovators and . It is called the value of death, and the value of death is one of the terms used in the literature now. It is one that we do quite a bit of work around.
Q3:	O.K. I'll look into that. Describe the barriers that had to be overcome to accomplish the challenge.
R3:	Thought barriers involve communication. Communication assessing

	what the political landscape is, assessing what the barriers for nurturing might be; in other words, if you have something which cannot be articulated immediately, as bringing value within the current strategic constraints, then you might find that the way to go is to build a kind of a nurturing environment. That is sort of one of the ideas in game changes. We provide a sort of nurturing environment, and we help to provide the basics for political mapping. In other words, to help identify those constituencies which should be brought on board to either address their concerns, or to get their support to address the concerns of others. Then beyond that it is to maintain the energy of innovators even with these barriers. So I would say political mapping and early communication are important ways that we overcome our valley of death barrier.
Q4	Would you say the organization, as it existed at the time the venture kicked off, or the general recognition of the need for innovation, was well designed for that, or were changes to the organization design required?
R4	It is very difficult to generalize about Shell, so I'll just keep my comments to Shell Chemicals. Shell Chemicals is a part of Shell that is about 10% of the revenue stream. It is essentially by-products to hydrocarbons used in fuel. It is fuel's by-product, so that's the reason I have a petrochemicals operation. Just before the design and implementation, of our GameChanger effort, there had been significant divestitures for Shell Chemicals. We chopped off about 40% of our portfolio—those that we call further downstream, and with those product lines that are not fairly close to the oil well, or the refinery, or the refinery equipment called the cracker that produces ethylene to make polyethylene, which is plastics, and things like that. So the environment was in need of nurturing very much, having gone through that somewhat traumatic divestiture exercise.
Q5:	What were the expected benefits that compelled your company to strive to be more entrepreneurial?
R5:	Well, the expected benefits are just a more productive use of your technical and intellectual property development resources towards the end of **Donner and foot hydrome** for innovation to produce viable growth opportunities. By the way, will you send me a draft of your interview?
Q6:	Sure. I'll make a note of that. Got it. Next question is does your organization have a reserve of human resources that are available to pursue new opportunities on short notice, should arise?

R6:	To some extent yes.
Jason:	Do you care to elaborate on the nature of those resources?
Shell:	Well, the way that we operate is to fund in a sort of venture capital, or even angel funding manner. The development of innovative ideas is on the part of both technical and business people who have day jobs, so it is a little like the 3M model of a 15% allowance to all of the finest engineers to pursue innovative projects. The GameChanger approach in Shell allows that, but it knows if we have fought the people who can come to GameChangers for example, for a full year's support. No, we will support various stages. We have a stage gate process of an idea to either fruition, or to the waste bin.
Jason	So these people, is it GameChanger is the excess of the reserve resources?
Shell:	No. What our GameChanger budget supports is some management. We have various parts of the program. We have a manager for the pipeline, which is taking ideas and setting up various stage gates to examine those ideas. We have a way to generate ideas, which is through workshops and through various communications, and that budget is managed. We have the process that I look after, which is externalization, which is looking to identify trends and discontinuities, and things that are going on in the external environment, which could be providing either significant opportunity for us, or significant disrepute threat. Then we have new program called Advance Technology, which is managed, and looks in more detail at a portfolio in emerging technologies for example, **nano** technology or particular **ionic INX solvents**, or things that are being discussed widely in universities, and at conferences. We would try to examine what the potential is for those to provide some means for commercial ideas into our GameChanger portfolio.
Jason	So the game-changer--kind of like you were talking about the 3M 15% model--is an enabler for the existing people within the organization?
Shell	Yes. It is, but the budget is to support the design and efficient deployment of programs, and then for the nurturing of particular projects.
Q8	So the people that you earlier described as excess or reserve human resources, are they in all types of jobs then?

R8	Yes, we get ideas from all over the place.
Q9	The organization, is it a centralized or decentralized organization?
R9:	It is centralized.
Q9	And these people, when they are doing their innovation, their ideas, do they have a separate reporting structure? Do they come to the GameChanger?
R9:	They come to GameChanger for budget support. We have budgets and we have project numbers, and we have ways in which they can tie into our project numbers.
Q11	These people, or the innovation, are they aimed at achieving process or product improvements, new markets, existing markets, or all of that?
Q11:	All of that.
Jason	So everything is fair game?
Shell:	Yes.
Q17	Has Shell always had this GameChanger or 15% type model?
Shell	No. The GameChanging model really was introduced by our exploration and production sector, E&P as we call it, in the middle 1995, 1996. E&P is about 60 or 70% of the firm's revenue, so it is a fairly big budget that they have. That was in recognition of the fact that in some areas of E&P, even though Shell is regarded as a technology leader, we were beginning to lose some of that leadership position. So, it was seen somewhat defensively, but also, in terms of an offensive, the bases of innovation for growth. So it was in the middle 90s where the GameChanger came to being. We have always had very strong technology innovation going on with different models, you know, go away from a very academic model to a purely applications and market-driven model. I would say that our bent is towards technology. We're really a technology and engineering company, and I think what game-changers does, is it provides a little bit more of a grass-roots approach to linking with higher level strategy, so it allows—its like the internet---just one more way that you can bring ideas to market.
Q13	Why or when did the firm implement the creative capacity, or this

	excess capacity, you said 1995, 1996, and it was to defend market position?
R13:	Well yes, it's a number of different reasons. I think it is just a recognition of its need, defending market position, the recognition within a large company that you would need to put in place a way to more rapidly examine emerging ideas, and provide for a channel in which support can rapidly brought to bear on attractive opportunities.
Q14	When are the creative capacity, or these people being innovative, and you talked about the 15%. Is it 15% as 3M does it?
R14:	It varies. We support some people, and 50% is probably the maximum we would support anybody for. It can be as little as 5%. We might support somebody for less than a month, then a year, just to write a proposal, or to visit equitable trade shows and give us a report on some emerging technology. It does vary.
Jason	You had earlier spoken about the innovative ideas coming throughout the company. Does the allocation of how much time they are allowed to be innovative depend on where they are within the organization, or is it based on the idea?
Shell:	It is essentially based on the idea, and our job as program managers is to promote the availability of this channel.
Q15	How was this GameChanger implemented? Was it incrementally or radically, or how was it done, or is it still being done?
R15	It is still being done; in fact, just next week we will be having a coalition meeting which brings together GameChangers from various sectors within the organization, E&P, we have a gas and power area, we have a fuels area, we have our chemicals area. We will all be meeting together in Houston as it turns out. Normally we meet in Europe, but we are meeting in Houston this time. Part of our discussion will be looking at the vision for what is next, what should we be doing differently, and indeed part of the change that we are continually looking at is the fact that the most important innovations that we see in our industry are across sectors; for example, chemicals linking with fuels, fuels linking with E&P, or all three linking together, to bring together some technical where withal to solve a particular technical problem, and perhaps even create a new market.
Q16	With this innovation that is taking place, it is taking people away from the efficiency, or from the day-to-day operations of the organization, so

	as a result, were additional people hired or obtained? How was that compensated?
R16:	No, we don't hire people in specifically for GameChanger. The energy and the petrochemicals business is a pretty competitive business, so you really are making staff additions on the basis of your assets or sales position. It turns out that the barriers to admitting ideas are workload # 1, so people are still having to do their day jobs, and the other one it turns out, is linkage with strategy. So we spend some time with the various business units in our sector. We have product business units, so we try to make sure that we can link up to what their needs are, so indeed, we don't hire new people for this. As they become familiar with the issues faced by the petrochemical industry, **there are groups** to innovate, we find it enhanced.
Q17	Have the stakeholders balked at this inefficiency or the perceived inefficiency of this innovative time?
R17:	It is a continuous struggle, especially in a business like petrochemicals, which is a very competitive business. It is one in which all of the major players are involved, its very capital intensive, so just looking after the assets in the ground takes a lot of people's attention, and as a innovated dilemma its hard to introduce some new stuff into a game that is already hard to play, is attention that we continually face, and will continue to face I would say.
Jason	How do you go against that—on a case-by-case basis?
Shell	Well, we just try to articulate our successes. We try to articulate what value we are creating here, and remind the company about that.
Q18	Has the firm ever—-this is kind of a redundant question after you talked about not hiring and the workload-- but does the firm ever participate in business process re-engineering, or contracted experts, anything like that?
R18	Yes. Shell has a continuous stream of vulture-like consultants circling all of our buildings every day of the year. We've done every type of re-engineering you can think of.
Jason	Has it been successful?
Shell:	Not always. It's expensive. I guess those people find less business here, but yes, we've done re-engineering, we've done quality, we've done managing objectives, we do the lot. We've got diversity till the cows come home.

Q19	How has the firm determined the optimum amount of this innovative capacity?
R19:	I don't think we have.
Jason	So it's a constant?
Shell:	Yes. You know, it depends on what are your aspirations for growth. This is a large global company and even the proposition of growth is viewed differently at different parts of the world. It is viewed differently in Europe than it is here, and is viewed differently in Asia than viewed here, and is viewed differently between different sectors, and it is viewed differently at different times in the economic cycle. So, I don't think you can, in fact, optimize, you've just got to keep that tension going. As long as you have the recognition that innovation is an important driver for growth, and growth at some level is required in order to give you a decent share of the returns, then we are going to continue to do it, but as far as going optimum, I don't think so.
Q20	What measures are used to determine the amount of innovation that is going to take place?
R20	We are still working on this and if we know how to do that, we would probably keep it secret. You know, in some companies you've got fairly straightforward measures, and it depends on how your business plays. Like the drugs companies can spend 15 to 20% sales because they get a patent position, which allows them to have a virtual monopoly for a good number of years. Or in the case of Intel, they spend about the same time, and have been able to gain about an 80% share in some of the microprocessor markets. The oil and petrochemical business has already gone. You know, we were the initial ones in the antitrust deals, so there is not way that we are going to want to get any monopoly position; there is lots of laws against that. So, that's why I say growth is not so easy to articulate in these types of markets, because of the three international oil majors as BP, Shell, and Exxon, we already work in very harsh competition with each other, but by the same token, in many of our businesses we work quite closely together.
Q21	This may be a silly question, but what has been the primary outcome resulting from the additional innovative capacity?
R21:	The primary outcome, I think, is a continued and growing awareness of the value of developing an innovative entrepreneurial culture. That is based on the fact that we do have some successes that we can point to. I cannot tell you about them because our hand of point, we're essentially

	in angel funding of energy capital, so we hand stuff off to a business unit, who then takes the responsibility to commercialize that. We have been able to do that several times now. I think that's the value that is recognized here in terms of, or in the face of very difficult market conditions, in the face of a fairly interesting demographic we tend to be rather more skewed toward the 40 and 50-year-old demographic, than the 20 and 30 year-old demographic in our industry. We have still been able to maintain some output in terms of new ideas for new revenue streams.
Q22	What were some attempts at this innovative capacity that have failed, and why?
R22:	Well, there is several. We do a lot. The idea of stage-gate is one of the best practices in innovation. The idea is that you have a funnel with a wide-open front end where ideas go in, and it very rapidly narrows down. So, you might take 100 ideas to produce one commercial revenue stream. So we do a lot of things. Remember the reasons will generally be technically it doesn't work. Economically you can't get the margins out of this. It is not a good strategic fit. Somebody else has done this, we've found our patent position that you know you are going against. All of those things are part of the innovation process. It is part of the nurturing innovation process to find out if this great idea that you've got is going help you make any money.
Jason	All right, that concludes the phone portion. I will e-mail you a written portion. It just requires you to put in numbers, and it is typically taking people five minutes. If you could get that back to me by sometime early next week that would be great. There is one portion where the thing was designed where you were to circle a number 1 through 5, on your e-mail or on you word document, just bold your choice, unless you choose to print it out and just mail it to me, whatever is easier for you.
Shell:	I'll e-mail it.
Jason	Do you have any parting thoughts or comments?
Shell:	Well, as I say, I am surprised that you are not familiar with stage-gates, because that is the recognized best practice in innovation, seeing that it appears in several different forms. Basically it's the fact that you have various measures to encourage ideas, to generate ideas, to evaluate ideas; then you have a fairly aggressive stage gate whereby you allow some work to be going on at a small scale. It might just a paper project to begin with. It might be just some calculations to begin with, and it

	might be just writing a proposal to begin with. Then it gets through a second stage gate, which might involve buying some equipment, doing some experimental work, doing some market studies, what have you. Then you get to a third stage gate, which is the final stage gate, which is where we would hand this off to a commercial business for commercialization. In the literature, you will see various forms of that. So that is sort of the backbone of our program here, that we find ways to encourage the generation and submission of ideas, then we subject these ideas to a fairly rigorous stage gate process.
Jason	Thank you so much for your help, and I will be sure to get you a draft of this once it comes together in the next couple of months.
Shell	Will it take a couple of months to do it?
Jason	I don't know. I actually have to gather all this information, get everything put together, then analyze it. Then I will give it to you. Do you want a draft of my final thesis effort? I will get this to you. This is the first crack at this kind of thing in the Department of Defense. It is pretty bread and butter foundation.
Shell	What is the objective of doing this in the DOD?
Jason	The DOD is trying to transform and is trying to do things better with less resources, so we are trying to investigate the use of the entrepreneurial mind-set in the Department of Defense, and the use of giving people time to, above and beyond their daily work, be innovative. So, we are asking industry leaders such as Shell what they are doing to overcome these barriers. So we will see how it comes together.
Shell	O.K. Thank you very much.
Jason	Thank you, and have a good day. Bye.

Appendix L. Xerox Interview Transcript

Interviewer: **Captain Jason Whittle**

Date: **21 October 2002**

Q1:	What caused the company to pursue entrepreneurial ventures or new innovations?
R1:	Xerox itself was created for new innovations. The whole basis for the corporation was an innovative process that left its mark on virtually the world. Process work is different because of what Xerox invented a long time ago. Xerox sees its mission, if you like, as continually reinventing how people work, the kinds of tools people work with. We are definitely an innovation driven company.
Jason	Ok
Xerox	Is that enough or do you want me to go on?
Q2	That's a good start. Question 2, Describe the key challenge that was faced regarding this venture or innovation? Or, in light of you answer to question 1, if there are challenges any time you guys step out to reinvent something.
R2:	Well, I think the world has changed. Lots of other companies have been formed and are in direct competition with Xerox. We are not alone. We have a lot of competitors, very competent competitors. I would say that we are in a technological crunch, always to identify what new technologies you need for the future and be the first to market with theses. I would say time to market; speed to marketplace.
Q3:	Ok, and are there any barriers to overcome that challenge, the time to market?
R3:	Pretty open ended question. There are always limitations. You never have enough money. So I would say sometimes you have a strong core business and you want to keep pumping money in that but at the same time you want to invest in the new thing that will transform your business. Finding that balance is hard because really you're making money that will allow you to fund new business. I don't know if it is a barrier or a challenge; finding the right mix between investing in core versus creating new things. We spent over $1billion in R&D last year and will spend over $1billion this year. Core businesses demand a lot of R&D. It's a technology driven business.
Q4	Ok. Question 4, Would you say the organization as it existed at the time the venture kicked off was well designed for the venture—or were

	changes to the organization design required?
R4	That question suggests you are talking about a specific venture. Xerox has formed many companies. In all times companies and subsidiaries and spin-offs have been formed with a specific purpose or objective. I'm not sure I can answer that. Say the question again.
Q4	Would you say the organization as it existed at the time the venture kicked off was well designed for the venture—or were changes to the organization design required?
R4	Well, most of our ventures, our true ventures, have been set up as separate, independent companies. In some ways that implies change because you nurture them outside the core business, outside the core processes. You make them compete with kinds of businesses they will compete with versus the kinds of business we have today. If you are going to start startup companies in silicon valley, you want to set up those firms, the incentives, the structure, then be competitive with Silicon Valley startups. They are going to attract different kinds of people; they are going to have different compensation plans. You want to be relevant to the kinds of business they are in. In some ways, they are very different. For example, if you start up these ventures, you want to motivate employees with a higher component of compensation due to future value of the firm. Option in new companies. Stock options are a component of executive compensation of Xerox. It's not like if I do my job really well I'm going to own 10% of Xerox.
Q5	Ok. Q5, What were the expected benefits that compelled your company to strive to be entrepreneurial?
R5:	Well, I think by forming ventures and spin-offs we hope to move into some areas, faster growth areas. We are looking for getting significant multiples in value if you like. There are certain areas that are hot always in terms of external valuations; they are much higher than traditional companies like Xerox and many of our competition. It's basically to get a higher return. Speed and execution. We expect to be able to move faster, again through ventures. Can I think of anything else? Those are the first two that come to mind.
Jason	If we need more, we can call you back
R5	Oh, there is one more. New ventures, spin-offs, can attract external investment. It helps Xerox, the parent company, balance the risk and return. You obviously give up something when you sell partial ownership, but they also assume some of the risk too. So it's balancing risk and attracting external investment. Leveraging other people's

	money
Q6	Great. Question 6, Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice, should they arise?
R6:	We demonstrated some agility. There is no formalized structure per se. We have been able to in some cases to rally resources around a new venture but there isn't a formal structure. We do have experts in corporate who are experts in negotiation, finance, legal matters; they are resources that help out. But they don't' become dedicated, they are just consultants.
Q7	Ok. So would you say, the next question says, Describe the nature of the reserve resources.
R7	Business development, finance
Jason	So they are experts?
Xerox	Yeah and we have people who specialize in alliances and legal support
Q9 & Q10	Ok. And who do these people report to? Are they centralized, decentralized?
R9 & R10	We have a services department. Not a department. It's quite a hefty group. A business group. Corporate operations group, I think it's called.
Jason	All right. So these, just to reiterate, these specialist or experts are centralized?
Xerox	Yes.
Q1	The next question is concerned at the goals these specialists are aimed at achieving. Is there anything above the obvious? The specialists for finance, or any of these?
R11	They are not dedicated to helping with new ventures. They are there in the overall governance of the business. But they have expertise that is useful in the other areas. Xerox has acquired other companies. We purchased the printing division from Techtronics a few years ago, for example. These internal resources served to help with every aspect, particularly the due diligence when you are spending a billion dollars on an acquisition.

Q12	Ok. This setup with the corporate governance, has it always been in place?
R12	No, it is relatively new. No, it hasn't always been in place. The way it is organized now is relatively recent. Some of the groups have been in other areas in the past. They've been around for a couple of years anyways.
Q14	Ok. I'm skipping questions you've already answered. Within the firm, it's probably hard because you are diversified, but do the personnel, the worker bees, do they have time to be innovative?
R14	It means different things to different people. Certainly in research and development community, it's an expected outcome. Xerox has consistently been in the top 10 US companies in getting patents. If you use patents as a measure of innovation output of our company, I'd say we're pretty good at it. But I think innovation can occur in business process, how you approach customers, how you serve the marketplace. It can occur in many different ways, not just the product side. I think it is encouraged. Difficult to measure. That's why I throw in the patents because that's something I can go look up and track for. People associate patent with innovation. It's hard to nail it down.
Jason	Yes sir. When you say it is encouraged, I assume that means ever since Xerox's inception?
Xerox	I would say that doing things differently is something that management encourages. We are not in the business as usual mode. Xerox has had its share of financial difficulties in the past few years, and competitive pressures, so we are constantly challenged to find better ways to do things. Maybe its pressure. It's not always enough to get 5% improvement on stuff. Sometimes you have to think of an entirely new way of doing something. When the gap to where you want to be is so big.
Q17	The stakeholders within Xerox, do they ever balk at the perceived inefficiency? Maybe in the R&D or the excess capacity in the other organizations that's built in. Is there ever a challenge with that?
R17	Not that I'm aware of. I think the stakeholders, represented by the board, look at our operation and I don't see that as a particular area. The last few years we've focused on becoming leaner and meaner, I think we've put a lot of that behind us.
Q19	Does your firm have a way to determine the optimum amount of creative capacity?
R19	We set the overall R&D level at the top of the company. There are a lot

	of factors that go into that. It's kinda complex. You look at the type of business you are in, the cadence you need, how much you chose to do in house versus acquire externally. It's a very complex process. We do set our overall R&D level which does affect our capacity. Not a simple algorithm. Obviously you look at your competitors, you capabilities, and efficiencies. Two organizations could spend the same amount on R&D and get very different output from that.
Q20	Is this a continuing process?
R20	We revisit annually. We set targets. For all the R&D sub organizations, we set targets. We understand their needs. They always ask for more than we want to give them. Obviously we want to get max profit too. We challenge people to do more with less all the time. But obviously you don't want to damage the business either. We do this annually. It's a rigorous process
Jason	Ok. You alluded to profit. Are there other measures to determine the effectiveness?
Xerox	Of R&D?
Jason	Yes
Q20	Absolutely. But profit is a good one. The amount of profit per R&D dollar. Revenue isn't a good one because you can generate a lot of revenue and lose money. So you want to have profitable revenue or profit per R&D dollar. What companies like to look at is how much revenue is coming from new products versus legacy products. It tells you how fast you are innovating; how fast you are turning over the base. It's not something you always want to do. You also want to get the max value from previous investment too. So simply creating new products for the sake of new products is not the right answer. Effective reuse of technology is something you want to take a look at. That can be measured too.
Q21	Ok. The next question is kind of redundant. It says "What has been the primary outcome resulting from the availability of the additional resources?" I imaging you've alluded to that just saying the R&D.
Xerox	Additional resources, you referring to excess support resources in ventures?
Jason	Generally in this field it's talking about excess human resources that I believe Xerox has in R&D. Mainly in the R&D sector. Is that correct?

R21	In business development in general, I think but you know the benefit from having that is that you have experts to go to and get quick response rather than going out and hiring a firm, and qualify them, disclose them etc etc.
Q22	What are, were, some attempts at creative capacity that failed? I guess that doesn't fit in light of your other answers.
Xerox	Creative capacity, you mean adding…
Jason	Excess human resources.
R22	Well, not all projects we've started we've completed. We've gone certain ways and decided to stop something. There are lots of examples like that. I don't know if that's a failure. I think making the decision early enough to quite is a success rather than spending a lot of money on it then deciding to quit. I don't think we've ever created capacity that sat around and didn't get used.
Jason	Do you have any paring thoughts?
Xerox	I've worked in private sector and public sector, like utilities. I think you see a common pattern. People get scared of stepping out and doing something different. Organizations typically get good at something and there are endless numbers of originations that have trouble moving on to other things. Utility companies tried to be more than utility companies. They thought, "well, we have certain infrastructure and we can become something else." It never worked. And I think it never worked because they always failed to look at the outside, who they were going to compete with and what it takes to be competitive. They've always had a very introspective view of things. Looked at what they know well and tried to do that somewhere else. It's not always possible. If you are in business and you want to expand, you need to acquire new capability. In fact, I had many interactions with the national labs several years ago when they were under pressure to find civilian applications for technology developed for other purposes than originally developed. And that really didn't yield to the extent people would have liked. Kind of a National labs mentality trying to compete with agile high tech companies. They had good capabilities; their technology was very good. But it takes more than that to succeed. They failed to round up the resources they needed. And they never found them in their organizations. They really have to go outside. Eternal cultures can defeat dramatic departures from the norm.

Appendix M. Case Study Protocol

1 Overview of the Case Study Project

1.1 Background of the Project

Organizational slack or slack resources are defined for the purpose of this study as a cushion of excess resources that can be used in a discretionary manner (Bourgeois, 1981). This effort specifically looks at slack human resources, or creative/innovative capacity, that is defined as excess human resources for the purpose of innovation. Research has found that the use of organizational slack enables organizations to better adapt to changing operational environments. Slack utilizing companies are more flexible, efficient, and successful.

Today's operational environment for the Department of Defense is vastly different from any ever seen before. Enemies of the United States are no longer just countries with standing armies, marching in uniforms and carrying flags. There is also a new threat of terrorism on our own soil as well as the threat of nuclear weapons controlled by small extremist countries and rogue forces. To cope with the changing and diverse threats to our country, top Defense officials are calling for an innovative military with a new way of thinking and fighting (Rumsfeld, 2002).

The study of slack resources stems from today's dynamic and complex business environment. For private firms to be competitive, it is crucial that they are efficient, adaptive, and informed. Unnecessary costs cut into the bottom line, hurting a firm's ability to invest in the future, be it process improvements or product improvements.

Poor, or slow, information flow causes firms to be late in their decisions, often missing first-mover advantages or worse, missing the changing market all together.

Recent recessions have forced managers to cut the fat from organizations, attempting to improve short-term profit margins and ultimately, company survivability. But with those cuts went organizational resources that gave companies the ability to be flexible, innovative, and utilize the learning curve (Lawson, 2001). Worse, the cut resources included those that ensure quality and safety. One dramatic example of efficiency gone wrong is the disaster at Three Mile Island nuclear-power plant (Lawson, 2001). "The information necessary to avoid the 1979 accident in Pennsylvania was known but no time was taken to use the available knowledge" (Lawson, 2001).

Sadly, the fat trimming is not unique to private industry. While intentions to protect and efficiently utilize tax revenue by public organizations are well meaning, necessary resources have been removed along with the unnecessary organizational fat.

1.2 Case Study Statement

This case study is the first known study of the use of creative capacity and the Department of Defense. Future studies are currently being designed to follow this effort.

This study is descriptive and seeks to highlight patterns of creative capacity use within industry recognized innovative firms. The objective of this research is to investigate current uses of slack resources by private firms and explore similar uses by the Department of Defense. Attention must be paid to the effects of the slack utilization as

well as slack implementation techniques (process changes and personnel opinions), achieving stakeholder buy-in of slack resources, and optimizing the amount of slack within the organization.

1.3 Rationale

The need for Department of Defense transformation appears to be similar to the need of private firms to adapt to competitive environments. There are many studies in management science that support the idea that flexibility, adaptability, and innovation of organizations is enhanced by the use excess, or slack, resources. It is felt that by looking at industry leaders in innovation and entrepreneurship, best practices can be identified and evaluated for possible DoD implementation.

1.4 Study Propositions

- The use of excess human resources has potentially major benefits for the organizations that use them, such as increased innovation and efficiency.

- The Department of Defense cannot truly transform without the use of creative capacity.

- The Department of Defense must allow a shift in culture to allow for innovation throughout the organizational units.

2 Field Procedures

2.1 Data Collection Plan

The primary method of data collection will be the guided phone interview. If necessary, additional data will be collected through company specific literature and follow up interviews.

The phone interviews will be recorded to ensure accuracy of the data. Transcriptions of the interviews will be included with the research paper. This will enable future research efforts to review the resulting data and separate the data from the interpretations.

Each interview will last approximately thirty minutes, depending on the interviewee's answers. Some of the organizations may have a large amount to contribute to the guided questions, while others may have none.

The questionnaire/guided interview questions are included in Appendix.

Gaining Access to Interviewees

Through the available literature and the opinions of entrepreneurship/innovation experts within the academic community, thirty-three firms were selected as the research cases. These firms will be contacted to determine their willingness to participate and to find the individual or individuals most able to provide the information about the innovation processes and culture within the firm.

Resources

The facilities at the Air Force Institute of Technology include the necessary phone, computer, and research capabilities. Also, a device that records phone conversations was procured by AFIT to capture the phone interviews.

Procedures for Assistance

The advisor for this effort is Major Timothy Reed, United States Air Force. He will serve as the primary contact for every aspect of this effort. In the event that Maj. Reed is unable to provide direction, he will contact other sources of assistance.

Providing for Unanticipated Events

It is expected that some firms will be unwilling or unable to participate. The design of this effort allows for this without a large effect. Also, it is expected that during the phone interviews, interviewees will answer in the negative in response to the question as to whether their firm has excess human resources. In this case, more questions will be asked to determine how the organization remains innovative without creative capacity.

Care will be taken to protect the firms participating in this study. They will be notified through an email of the purpose of this research as well as informed that the interviews will be recorded.

This protocol has been approved by AFRL/HEH . See Appendix P.

Case Study Questions

Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice should they arise? (If necessary explain that we are particularly interested in the capability over and above the resources necessary to meet everyday work requirements).

Describe the nature of the reserve resources

What type of people jobs are the people in?

Who do they report to? (centralized/decentralized)

Is it a separate group, or is the extra capacity imbedded throughout the organization in all work groups?

Can you provide examples of the types of goals these resources are aimed at achieving? (process/product improvements, specific markets, anything)

Has the firm always had an extra capacity?

When/Why did the firm implement creative capacity? (crisis, need to diversify)

When is the creative capacity being innovative? (1 hr/day, always, anytime, 15% of the time)

How was creative capacity implemented? (Incrementally, radically, long period of time, short period of time)

Were additional resources hired/obtained, or were efficiencies gained from existing resources to provide the reserve?

Did stakeholders balk at perceived inefficiency? (Of having more capability than day to day operations required?

How did the firm create creative capacity? Where did the excess capacity come from? (BPR, additional hires, contracted experts)

How did/does the firm determine the optimum amount of creative capacity?

How often does it change? What are the measures used to determine effectiveness?

What has been the primary outcome resulting from the availability of the additional resources?

What are/were some attempts at creative capacity that failed? Why?

A Guide for the Case Study Report

A masters thesis will be defended on or about 15 February. After final revisions, the comprehensive thesis will be available through the Air Force Institute of Technology.

The audience of the report is primarily the Office of Transformation and the Department of Defense. However, it is anticipated that this effort will remain useful for parties outside of the Department of Defense, such as academic organizations.

Each case will be thoroughly documented by the recordings of the interviews. The final report will include an annotated bibliography to enable case replication and to provide the basis of the study.

Appendix N. Entrepreneurial Mindset/Creative Capacity Questionnaire

Name of Company:

Name of Participant:

Phone:

Email:

Position/Job Title of Your Supervisor:

*Q1 What caused the company to pursue entrepreneurial ventures or new innovations?

Q2 Describe the key challenge that was faced regarding this venture or innovation.

*Q3 Describe the barriers that had to be overcome to accomplish the challenge.

Q4 Would you say the organization as it existed at the time the venture kicked off was well designed for the venture—or were changes to the organization design required.

*Q5 What were the expected benefits that compelled your company to strive to be more entrepreneurial?

*Q6 Does your organization have a reserve of human resources that are available to pursue new opportunities on short notice should they arise? (If necessary explain that we are particularly interested in the capability over and above the resources necessary to meet everyday work requirements).

*Q7 Describe the nature of the reserve resources

--What type of people jobs are the people in?

-- Who do they report to? (centralized/decentralized)

--Is it a separate group, or is the extra capacity imbedded throughout the organization in all work groups?

*Q8 Can you provide examples of the types of goals these resources are aimed at achieving? (process/product improvements, specific markets, anything)

Q9 Has the firm always had an extra capacity?

Q 10 When/Why did the firm implement creative capacity? (crisis, need to diversify)

Q11 When is the creative capacity being innovative? (1 hr/day, always, anytime, 15% of the time)

Q12 How was creative capacity implemented? (Incrementally, radically, long period of time, short period of time)

Q13 Were additional resources hired/obtained, or were efficiencies gained from existing resources to provide the reserve?

Q14 Did stakeholders balk at perceived inefficiency? (Of having more capability than day to day operations required?

Q15 How did the firm create creative capacity? Where did the excess capacity come from? (BPR, additional hires, contracted experts)

Q16 How did/does the firm determine the optimum amount of creative capacity?

Q17 How often does it change? What are the measures used to determine effectiveness?

Q18 What has been the primary outcome resulting from the availability of the additional resources?

****What are/were some attempts at creative capacity that failed? Why?

Please assign a numerical rating to each of the following observations on a scale of 1 to 5 with 1 being "The observation is not at all descriptive of our organization" and 5 being "The observation is very descriptive of our organization."

1. Senior managers encourage the ending of existing rules. _____

2. Top management has experience with innovation. _____

3. There is top management sponsorship of innovative pursuits.

4. Individual risk-takers are often recognized whether eventually successful or not. _____

5.There is encouragement for calculated risks _____

6. 'Risk taker' is considered a positive attribute. _____

7. Small and experimental projects are supported. _____

8. People get second chances after mistakes. _____

9. Mistakes are seen as learning experiences. _____

10. It is important to look busy in our organization. _____

11. It is difficult to form teams in our organization. _____

12. There is a concern for job descriptions. _____

13. Defining turf is important. _____

14. Funds are readily available for the pursuit of innovative ideas. _____

15. The organization's budgeting process facilitates funding innovative ideas. _____

16. There are additional rewards/compensation for successful innovation. _____

For this section the scale extremes are presented in the description on opposite sides of the scale. Note that there are no right or wrong answers to the questions below, and that each question is independent of the others. Please indicate by circling the appropriate number the extent to which the following statements reflect your opinion:

1.1) There is wide variation in opinion about what innovation ideas will be acceptable to our company	1 2 3 4 5	Most people understand exactly what innovation ideas are considered desirable by this company
1.2) It isn't clear why many innovation ideas are approved	1 2 3 4 5	It is always crystal clear why innovation ideas are approved
1.3) Our formal reward systems are focused mostly on excellence in running our existing lines of business	1 2 3 4 5	Our formal reward systems are focused mostly on new business development
1.4) The goals for new innovation projects are generally very ambitious, home-run type plays	1 2 3 4 5	The goals for new innovation projects are generally not too ambitious, more "doubles and triples" plays
1.5) Our firm does not have a problem with making significant investment in a business before it shows returns	1 2 3 4 5	Senior managers in our firm resist making significant investment in new business prior to the commencement of a revenue stream
1.6) The approach when it comes to funding is to invest as many funds as are needed ahead of time to get the project started	1 2 3 4 5	The approach when it comes to funding is to try to postpone investments and expenditures for as long as possible

For this section please note your agreement from 1 (strongly disagree) to 5 (strongly agree).
Note that there are no right or wrong answers to the questions below, and that each question is independent of the others.

Please indicate the extent to which you agree or disagree with the following statements:

	strongly disagree				strongly agree
2.1) People are not rigidly held to plan but are encouraged to adapt to unfolding circumstances	1	2	3	4	5
2.2) We can rely on timely intervention from senior management when it is required to move a project forward	1	2	3	4	5
2.3) We are able to identify ahead of time ways to make effective use of our reputation as a lever in our negotiations with stakeholders	1	2	3	4	5
2.4) In gathering support for innovative ventures internally, we tend to focus on creation of commitment from needed supporters rather than pursuing rational arguments to justify the project	1	2	3	4	5
2.5) We are able to identify those places where inertia or disinterest are likely to impede progress	1	2	3	4	5
2.6) Our approach to opposition which refuses to be persuaded is to confront them directly	1	2	3	4	5
2.7) We are able to proactively take actions to cope with growth	1	2	3	4	5
2.8) We are increasingly improving our efficiency	1	2	3	4	5
2.9) Our attention is focused primarily on external rather than internal issues	1	2	3	4	5
2.10) Our communications are primarily with outsiders rather than internal	1	2	3	4	5
2.11) We have plans to and are able to train our customers, suppliers, and /or the branches in order to help them cope with our rapid growth	1	2	3	4	5

	strongly disagree				strongly agree
3.1) We have reserves set aside to allow us to cope with budget and staffing needs	1	2	3	4	5
3.2) People working on new ventures make decisions on the basis of a few core values rather than a large number of rules	1	2	3	4	5
3.3) Our human resource function is focused on developing new talent rather than administering existing personnel	1	2	3	4	5
3.4) New people that come on board are easily assimilated and feel that they can cope very early on	1	2	3	4	5
3.5) We are able to anticipate and staff up with sufficient new people to support the evolution of a new project or venture	1	2	3	4	5

	strongly disagree				strongly agree
4.1) There is a firm policy to frequently revisit the basic assumptions of the business and question their future validity	1	2	3	4	5
4.2) We assume that a significant percentage of our existing business will become obsolete each year	1	2	3	4	5
4.4) New business development occupies a high position in the agenda of the managers	1	2	3	4	5
4.5) Our mindset is one of creative discontent with the status quo	1	2	3	4	5

Appendix O. Question Sources

Following are the citations that are the basis for each question:

Question	***Citation***
6	e.g., Bourgeois, 1981
7	Organizational structure (Bourgeois, 1981), innovation characteristics (Damanpour and Evans, 1984; Ettlie and Reza, 1992; Utterback and Abernathy, 1975; Dewar and Dutton, 1986; Ettlie et al., 1984).
8	e.g., Bourgeois, 1981
9	Damanpour, 1991
10	Damanpour, 1991
11	Gundling, 2000
12	Dewar and Dutton, 1986; Ettlie et al., 1984
13	Hitt and Reed, 2000
14	Nohria and Gulati, 1996
15	Hitt and Reed, 2000
16	Nohria and Gulati, 1996
17	Nohria and Gulati, 1996; Duncan, 1972
18	e.g., Bourgeois, 1981
19	Kuczmarski, 1998

Appendix P. Human Subjects Approval.

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

28 October 2002

MEMORANDUM FOR AFIT/ENV
ATTN: Reed

FROM: AFRL/HEH

SUBJECT: Approval for the Use of Volunteers in Research

1. Human experimentation as described in exempt Protocol Request (03-11) FWR 2003-0011-E, "Instilling an Entrepreneurial Mindset in DOD Organizations ", may begin.

2. In accordance with AFI 40-402, this protocol was reviewed and approved by both the Wright Site Institutional Review Board (WSIRB) Chairman on 16 October 2002, the AFRL Chief of Aerospace Medicine on 28 October 2002. A copy of the meeting minutes showing final approval will be forwarded.

3. Please notify the undersigned of any changes in procedures prior to their implementation. A judgment will be made at that time whether or not a complete WSIRB review is necessary.

Signed 28 October 2002
HELEN JENNINGS
Human Use Administrator

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Vita

Captain Jason A. Whittle graduated from Wayne High School in Huber Heights, Ohio in 1994. He entered undergraduate studies at Florida State University in Tallahassee, Florida where he graduated with a Bachelor of Science degree in Management, Cum Laude, in May 1998. He was commissioned through the Detachment 145 AFROTC at Florida State University.

His first assignment was to the 92d Contracting Squadron, Fairchild AFB, Spokane, Washington as a Contract Management Officer. While stationed at Fairchild, he served as the Lead Mobility Wing Contingency Contracting Officer and lead the Fairchild Top Dollar Team to win the Air Mobility Command "General Military Skills" award. In August 2001, he entered the Graduate School of Engineering and Management at the Air Force Institute of Technology. Upon graduation, he will be assigned to the Air Force Research Laboratory, Detachment 1.

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14. ABSTRACT

The multiple case study methodology was utilized to gather private firms' best practices to utilizing creative capacity and instilling the entrepreneurial mindset. Analysis of these practices resulted in the formation of a basic creative capacity implementation methodology as well as an organizational human resource slack typology. With these tools, Department of Defense organizations will be able to more effectively implement creative capacity to achieve process and product improvements, and ultimately, enhanced capabilities and efficiencies.

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