Essays on Individuals and Organizations

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ABSTRACT

This dissertation focuses on the dynamics of innovative industries; specifically how individual choices and actions impact the performance, founding, and death of firms. While most research examining these outcomes focuses on the role of organizational factors – such as strategy, capabilities, or resources – firms ultimately consist of individuals with different preferences, abilities, and approaches to entrepreneurship and organizing. This work attempts to expand our understanding of firm and industry dynamics by looking to the role of the individuals who make up firms. As the performance of a growing number of firms and entrepreneurial ventures comes to depend on human capital, knowledge and creative work, there is increasing need to understand how these differences between individuals influences firms and industries. This dissertation consists of three essays exploring these relationships.

The first essay, "People and Process, Suits and Innovators: Individuals and Firm Performance," empirically untangles the contributions of organizations and individuals to firm performance. The results indicate that variation among individuals matters far more in organizational performance than is generally assumed. Surprisingly, the analysis also demonstrates that middle managers, rather than innovators, have a particularly large impact on firm performance. The second essay, "The Firm as a Potemkin Village," uses qualitative research on firm founders in the computer game industry, as well as the theoretical implications of the previous papers, to examine the role of firms in industries where individuals are primarily responsible for firm performance. I suggest that firms are often created for reasons of legitimacy, rather than for performance alone. My third paper, "Not in Our Stars, But in Ourselves" examines the tension between socially-embedded and individual factors in the performance of new ventures. Through an examination of over 8,100 career spells and 167 new firms, I find significant effects from both genealogical and individual explanations of new venture performance.

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Contents

1. INTRODUCTION

This dissertation focuses on the dynamics of innovative industries; specifically how individual choices and actions impact the performance, founding, and death of firms. While most research examining these outcomes focuses on the role of organizational factors – such as strategy, capabilities, or resources – firms ultimately consist of individuals with different preferences, abilities, and approaches to entrepreneurship and organizing. This work attempts to expand our understanding of firm and industry dynamics by looking to the role of the individuals who make up firms. As the performance of a growing number of firms and entrepreneurial ventures comes to depend on human capital, knowledge and creative work, there is increasing need to understand how these differences between individuals influences firms and industries.

In *Essays on Individuals and Organizations*, I focus on the role individuals play in the dynamics of innovative industries. While the organizational and strategy literature focuses largely on the systems, strategies, and processes that shape how industries and firms operate, much less attention has been paid to the ways in which individual differences shape firm-level outcomes. Scholars have examined some specific contexts in which individuals play a role, demonstrating that entrepreneurs have a persistent impact on the performance and culture of firms and that top managers directly affected a firm's strategic choices and decisions. Yet the broader impact of individuals on firms remains largely unexplored. I hope to shed new light on the dynamics of firms and industries by comparing them to the underlying movement and choices of individual actors. To that end, the two empirical papers of my dissertation examine the role of individuals in firm performance, founding, and exit.

The first paper, "People and Process, Suits and Innovators: Individuals and Firm Performance," empirically untangles the contributions of organizations and individuals to firm performance. Secondly, the paper disaggregates the impact of various roles on performance, specifically looking at the relative contributions of "suits" (middle managers) and "innovators" (creative managers). Using a unique dataset empirical analysis of over 1,500 products across 602 firms in the computer game industry and drawing from a rich set of covariates, the paper provides one of the first thorough attempts to adjudicate the role of individuals in firm performance. The results indicate that variation among individuals matters far more in organizational performance than is generally assumed. Surprisingly, the analysis also demonstrates that middle managers, rather than innovators, have a particularly large impact on firm performance.

The second essay, "The Firm as a Potemkin Village," uses qualitative research on firm founders in the computer game industry, as well as the theoretical implications of the previous paper, to examine the role of firms in industries where individuals are primarily responsible for firm performance. This creates an interesting dilemma, since theories of the firm expect that firms are more than the sum of their parts, and that firms thus serve a clear performance-related purpose. Based on the evidence from my prior essay, I argue that the persistence of firms is due to an unrecognized implication of the new institutional and ecological perspectives that make firms socially necessary to facilitate and enable individual action. I suggest that firms are often created for reasons of legitimacy, rather than for performance alone.

My third paper, "Not in Our Stars, But in Ourselves" examines the tension between socially-embedded and individual factors in the performance of new ventures. It compares the

explanatory power of various theories of how entrepreneurs influence firm performance, and contrasts these theories and ability-driven explanations of performance. It also broadens the scope of inquiry to include initial team members, not just firm founders. Through an examination of over 8,100 career spells and 167 new firms, I find significant effects from both genealogical and individual explanations of new venture performance.

2. People and Process, Suits and Innovators: Individuals and Firm Performance

Is firm performance driven by people or by process? The strategy and organization literature has historically argued that a good process is the key to good performance. The result is a long tradition of using organizational factors, rather than differences among individual employees, to explain differences in firm performance. For example, routines (Nelson and Winter 1982), firm capabilities (Teece, Pisano, and Shuen 1997), and resources (Barney 1991) all operate at the organizational, not individual, level. Even approaches that explain performance differences from a human capital perspective usually view employees as an aggregate resource (Wright, Dunford, and Snell 2001), and focus on organizational processes for developing human capital rather than individuals firm members (Hitt, Bierman, Shimizu, and Kochhar 2001). And yet, firms ultimately consist of people whose performance can vary widely. This opens the possibility that, especially in industries with high rates of entrepreneurship, or where there are few economies of scale, firm composition – the people who actually make up the firm – may account for much of often widely varying differences in performance among firms. Yet despite the potential importance of individuals in explaining performance differences between firms, there are few prior studies that separate firm performance into compositional differences versus organizational factors, with the exception of those studies examining the specialized cases of top management (Bertrand and Schoar 2003; Lieberson and O'Connor 1972) and entrepreneurship (Gimeno, Folta, Cooper, and Woo 1997; Johnson 2007).

The absence of compositional differences in explaining performance has an additional consequence. It has prevented a thorough understanding of which individuals actually play a role in determining firm performance. It would be reasonable to expect that not all variation among individuals contributes equally to explaining performance differences between firms. Top managers, for example, are generally considered to be important in determining firm performance, as evidenced by many studies on top management teams (Bertrand and Schoar 2003; Hambrick, Cho, and Chen 1996; Hambrick and Mason 1984; Lieberson and O'Connor 1972; Wiersema and Bantel 1992). This impact is based on the expectation that the cognitive and personality differences among the most powerful executives in a firm have an influence over strategies and outcomes (Hambrick and Mason 1984), and so would ultimately explain variation in performance of the firms they lead. In other words, we would expect Apple to behave differently depending on whether Steven Jobs or John Scully was CEO. Much less clear, however, is the impact of variation among the individuals who fill the more numerous and less influential role of middle manager.

Unlike top managers, middle managers are more constrained by existing organizational context, with the effectiveness of managers in product development depending on large part on the structure of the organization itself (Katz and Allen 2004; Larson and Gobeli 1989). Although variation among mid-level managers can affect their subordinates (Bidwell and Burton 2006), at the wider scale of organizational performance, the actions of middle managers are bounded by the nature of the firm (Wooldridge and Floyd 1990). Therefore, we would expect to see that organizational factors, rather than compositional factors, determine much of the impact of middle management on performance. And, in those cases where variation among individuals in mid-level managerial roles does explain firm performance, we would expect managers charged with

creative or innovative tasks to matter more than the "suits," who are given more standardized managerial roles. This is because creative, innovative, and knowledge work is generally expected to be highly variable at the individual level (Brooks Jr 1978; Stephan 1996), as these types of work rely on skills where there is evidence of wide distributions in innate ability and inspiration. We can only speculate on the relative contributions of individual variation of middle managers to firm performance, however, because no studies measure the performance contribution of these two middle manager types across firms.

This paper addresses that gap by determining the relative contribution of organizational and compositional differences on performance with an analysis of the computer game industry. Besides the fact that this industry has features typical of many knowledge-driven industries, games represent a case where the tension between the firm and the individual should be at its most visible. On one hand, the game industry is almost entirely organized around formal, relatively long-lived firms with well-articulated product strategies; yet, on the other hand, a large driver of industry performance should be the innovative output of key individuals. Additionally, success in the game industry relies not just on managers in charge of innovation, but also on project managers capable of organizing dozens of programmers and coordinating budgets that often reach into the tens of millions of dollars. Thus the computer game industry is an important research site for exploring the contrasts between organizational and individual factors in explaining performance differences, as well as the extent to which creative work (as opposed to managerial work) is responsible for any individual impact on performance.

To that end, the paper employs an empirical analysis of over 1,500 products across 602 companies to examine the role of individuals in innovative and managerial roles as a component

in the performance differences between firms. The potentially large role of individuals, however, is more than simply another way to explain performance differences between firms. It also offers a challenge to the expected role of organizational factors in explaining firm performance.

2.1 Organizational Factors, Individual Factors

In a tradition leading back to Weber (1946) and the ideal of the rational bureaucracy incorporating individuals into a world of routines and structure, the intuition that organizational, industrial, and environmental factors – rather than individual differences – are responsible for variations in firm performance is deeply embedded in organizational theory and strategy. And in traditional industries where economies of scale and scope are critical, such as manufacturing, there indeed seems to be little need to take individuals into account to explain performance. Take, for example, Toyota as described by Adler et. al (1999). With a six-layered bureaucracy, cross-trained workers, and clearly delineated departments, Toyota built a manufacturing powerhouse that integrates workers into a complex mechanism to produce cars efficiently. In the Toyota Production System, success is based on routines and organizational processes (Nelson and Winter 1982) multiplying the effects of the individual workers who are ultimately replaceable and interchangeable with others who have received the same extensive training. The result is a consistent and reliable process that does not rely on any individual worker's skills, but rather firm-level processes to hire and train the appropriate individuals for the appropriate roles.

As is the case in the Toyota Production System, differences in ability among individuals are often assumed to be unimportant in large firms. Rather, the overall functioning of the structure of the firm determines performance, with individuals serving as little more than cogs in

the machine. In the words of Teece, Pisano, and Shuen (1997: 525), "the firm is much more than the sum of its parts," suggesting that "to some extent individuals can be moved in and out of organizations, and so long as the internal processes and structures remain in place, performance will not necessarily be impaired." This sentiment is echoed by most theories of firm performance, which conceive of professional managers running formal organizations in which no individual, with the possible exception of a few top executives, are irreplaceable, and in which individual contributions account for little variation in performance.

However, other research traditions implicitly challenge this assumption and give us reason to believe that in many other industries, especially those focusing on knowledge work, compositional factors a critical role in explaining performance differences. This evidence of the impact of compositional differences on firm performance across many industries suggests that we may not be able assume that organizational-level processes are the lowest relevant level of analysis in explaining performance differences between firms. For example, we know individual actors can have a significant impact on the performance of large organizations, and even entire industries. The most common example of this is the entrepreneur, whose individual action may influence entire markets (Schumpeter 1934) and who has a persistent impact on firms long after they are founded (Baron, Hannan, and Burton 1999; Eisenhardt and Schoonhoven 1990).

Outside of entrepreneurship, variation among individuals in innovative capacities seems to have a potentially large impact on firm performance. For example, star scientists who operate within firms and universities have a significant individual effects on the performance of firms in the biotechnology (Zucker, Darby, and Armstrong 2001; Zucker, Darby, and Armstrong 1998) and semiconductor (Torero 1998) industries. Further, the distribution of ability across

innovative roles is highly skewed. Software development exhibits extreme individual differences, as studies have demonstrated that a top computer programmer typically produces the same amount of work as ten to twenty average programmers during any given time period, and with fewer errors (Cusumano 2004; Sackman, Erikson, and Grant 1968). A similar skew is found in scientific research, where Lotka's Law observes that just six percent of publishing scientists are responsible for fifty percent of all publications, a difference due at least in part to varying abilities among scientists (Stephan 1996). In general, there are substantial ranges of variation in performance among individuals in most fields that involve creative and knowledge work (Simonton 2003). We would therefore expect that individuals in innovative roles would contribute to variation in firm performance.

More elusive is the effect of individual managers on firm performance. Recent research on top management teams has shown that CEOs, CFOs, and other top-level executives can have an effect on large firms, although the magnitude of their impact is limited. Bertrand and Schoar (2003) find that these top position explain less than 5% of the variation in firm performance among Fortune 800 companies, compared with between 34% and 72% of the variation explained by firm-level fixed effects. The impact of middle managers, those managers operate in the levels below C-level executives but above line managers (Wooldridge and Floyd 1990), is much less clear. Middle managers with particular personality traits and positions inside the organization play a role in facilitating innovation (Moss Kanter 1982), communication (Allen 1971), and organizational commitment (Bidwell and Burton 2006), but the success of managers is heavily dependent on the structure of the organizations in which they are placed (Katz and Allen 2004). According to this perspective the impact of middle managers on performance is determined by firm structure and culture, rather than individual differences (King and Zeithaml 2001; Westley

1990). Thus, we would expect managers to contribute less than innovators to variation, and that much of the impact of managers on performance would appear as organization-level effects. I will next test this presumed relationship between managers and innovators, and between firms and individuals, in the computer game industry.

2.2 Analysis

2.2.1 Empirical approach

While there are strong theoretical reasons to challenge the idea that variations in firm performance are explained primarily by organizational factors, actually separating individual and firm performance has historically been highly problematic. This is reflected in a literature on firm performance variation that focuses on contributions to firm performance from organizational or industry-wide factors, rather than individuals. Instead, factors such as industry structure (Schmalensee 1985), country-level effects (Makino, Isobe, and Chan 2004), and routines and capabilities (McGahan and Porter 1997; Rumelt 1991) have been important foci of analysis. The exception are a few papers that focus on the role of top managers or entrepreneurs in explaining performance variation (Bertrand and Schoar 2003; Hargadon and Douglas 2001).

In particular, the methods used by Bertrand and Schoar (2003), who focus on top-level managers in their study, offer the best approach to teasing apart the role of individuals and organizations. Bertrand and Schoar examined the role of top managers on Fortune 800 firms using a fixed effect regression to separate out the effects of individual leaders and firms. They found that the combined effects of CEOs, CFOs, and other top managers on Forbes 800 firm performance explains less than 5% of the variation, compared with between 34% and 72% of the variation explained by firm-level fixed effects. This is in-line with most theories of firm performance: in large, established organizations, the top managers, at least, contribute relatively

little to firm performance. However the methodology provided by Bertrand and Schoar allows us to move beyond looking at top managers at large companies, and to instead examine firms more granularly to determine whether differences among individual firm members matter.

Using this approach, we will be able to test the degree to which firms or individuals are responsible for a firm's performance. The basic approach to testing this hypothesis is to estimate the following equation:

$$y_i = \gamma_i + X_i + \lambda_{producer} + \lambda_{designer} + \epsilon_i$$

Where y_i is the dependent variable of interest for a product i, γ_i are firm-level fixed effects, $X_i$are various product-level controls, and ϵ_i is an error term. The terms $\lambda_{producer}$ and $\lambda_{designer}$ are the fixed effects of producers and designers, the lead innovative and managerial roles within a computer game, which will be discussed in more detail shortly. We are interested in how much of the variation in performance is attributable to these fixed effects.

This approach will therefore compare the amount of the variation in performance explained by the individuals occupying two roles in a team to total variation explained by γ_i, which encompasses both firm fixed effects, but also other effects related to the other individuals within the firm, such as management and other team members. Thus, even under ideal conditions where firm effects approach zero for the entire population being studied (which would be unlikely given the expected heterogeneity within an industry sample), γ_i will still not itself be zero. That is because $\lambda_{producer}$ and $\lambda_{designer}$ take into account only two roles out of a team that averages over 40 people, some of which will be reflected in γ_i.

2.3 Empirical Setting: The Game Industry

This analytical approach requires a unique set of data. The dataset must allow the tracking of a wide range of individuals and their jobs longitudinally, something best done with product-level data, with identifiable team members on each project. Firms must use multiple people for the same role and individuals also need to move across multiple firms so that performance is comparable both between and within firms, matching multiple combinations of individual team members and firms over time. Further, it would be useful if the types of roles varied, to encompass both innovative (and therefore more portable and variable) jobs and less-portable traditional managerial jobs that presumably are more tied to firm-specific routines and knowledge. Finally, an appropriate industry would offer a dynamic environment of firms, with opportunities for both new ventures and larger, long-standing organizations.

The video game industry matches all of these requirements and offers a particularly valuable perspective into the world of firms and markets. That is because each game has an identifiable, credited team of creators, including a development team of designers, programmers, and artists. These teams, in turn, work for developers, game programming firms ranging from just a few people to several thousand employees. These firms may produce dozens of games a year. Because accurate credits at both the individual and firm level are available for many games developed within the industry, it is possible to trace precisely both the individuals and firms responsible for innovation and entrepreneurship within the industry.

Now nearly thirty years old, electronic gaming software is a major industry, with over $25.4 billion in software revenues in 2005, and over 144,000 fulltime employees in the United States alone in 2004 (Crandall and Sidak 2006). It also straddles the line between creative

industries and knowledge-intensive industries, combining elements of entertainment and technological innovation. The dual nature of the game industry is best seen through its two key roles, the managerial role of producer and the innovative role of designer.

Producers, despite the similarity in name, have very little in common with the eponymous job in the entertainment world[1], matching more closely the role of project manager in the software industry. A producer "is ultimately responsible for every aspect of the game. It is the producer's job to make sure that the project is completed on time and on budget, while maintaining a commitment to industry standards" (Irish 2005). This includes team management, resource allocation, team communication, and external relations ranging from PR to interfacing with company management.

In fact, the scale of modern game projects rivals most enterprise software efforts, and uses many of the same techniques. Though the size and scope of games vary widely, one game from 2004 may serve as an example of the complexity of the game development process. In that case, the core team consisted of 35 people, who, over the course of 18 months wrote 480,000 lines of code, separated into 740 computer instruction files, with a budget of $7 million (Hardy 2004). Games can easily reach over 3 million lines of code, and cost up to $50 million with hundreds of employees involved, which represents a more significant effort than many business applications. Thus, while innovation and creativity are important in the game industry, the execution of the concept resembles standard software development. It is also critical to note that despite superficial resemblances to Hollywood in areas like job titles, the operation of game companies is much closer to that of other software companies, including incorporation of standard programming techniques, bug testing, and quality assurance.

The second role of interest is that of the designer, who invents game ideas and is in charge of guiding the development team to make his vision a reality. In the words of one guidebook to the industry, "the game designer is the center of creativity in the game industry. From the designer's vision emerges the entertainment, in the form of game play and story... the game designer needs to be a Renaissance man or woman—they must be able to understand people and story and character, but also to understand logic and sequence and interaction in a very precise way." (Baldwin 2006: 37) Designers often start their careers as programmers, and are usually very involved in the day-to-day technical work involved in building a game. While there are a handful of famous game designers, the vast majority is unknown, and, in interviews, even other game designers were not able to recall the names of designers of some of the best-selling games of the past few years.

Between them, designers and producers are responsible for the overall execution of a game. The average game design team in the sample has 45 people, and often several dozen more temporary workers, such as voice actors and beta testers. There may be several designers and producers on each project. The designers fill the lead innovative roles, and the producers, the managerial roles. Having both of these job descriptions allows us to examine the effects of individual differences by job function: innovative roles where we would expect individual variation to be quite high (designers) and managerial roles where presumably variation in performance is less (producers).

These individuals do not operate independently; they are part of firms known as game developers. Game developers are almost always organizations as well as firms; less than 1% of all games with identifiable revenues were the work of lone individuals, and less than 2.5% of all

games credited fewer than five people. The demographics of the 602 firms that appear in the sample used for the analysis are given in Table 1 below. As can be seen in the table, game developers exhibit the characteristics we would expect to see in firms in most industries. For example, these firms have average lifespans that exceed a decade, and, on average, over 140 uniquely identified individuals have participated in each firm's core teams during the life of the firm, though the actual number of employees is likely much larger than the number credited.

INSERT TABLE 1 ABOUT HERE

In addition to game developers, there is an additional role that firms play in the game industry, that of game publishers. Publishers fund game development, and also distribute and market end products for a share of the revenue. Some game developers also operate as publishers, such as Electronic Arts, but the role is often separated into two different companies. There are many publishers, 398 of which have published games with identifiable revenues in the sample. Since publishers have little impact on the day-to-day process of game development, they are not dealt with in detail in this study, although potential effects are controlled for in later analyses.

Additionally, while there are several subsets of the video game market, I have chosen to focus specifically on one segment, PC games, as opposed to console games like those that run on the Nintendo, Xbox, or Sony systems. There are a number of advantages to examining PC games, which make up about 15% of all games sales in recent years. First, as compared to the console game industry, barriers to entry are quite small, as the PC is an open platform, and there are no requirements imposed by manufacturers, as there are with console games. Therefore, we would expect to see the widest diversity of organizational forms in this submarket. Secondly, PC

games have tended to be the innovation leader in the game space, since PC technical characteristics were decisively ahead of consoles through 2006 – almost all major game genres have begun on the PC first. Finally, consoles tend to be limited to the technical frontiers of a particular system, making high graphics and sound quality a priority, while PC games have traditionally had successful games that run the gamut from sophisticated 3-D worlds to static puzzle-solving mysteries, again making it easier to observe a range of potential organizations.

2.4 The Dataset

For this analysis, I used a unique dataset, the MobyGames database. An internet repository of game information, MobyGames lists their goal as: "*To meticulously catalog all relevant information about electronic games on a game-by-game basis, and then offer up that information through flexible queries and data mining. In layman's terms, it's a huge game database.*" MobyGames has information on over 34,000 games, all entered by users of the site on a volunteer basis, according to a detailed set of coding instuctions. To ensure accuracy, MobyGames requires peer review for all data entered into the database before such data is accepted. Though the database is not complete, in that there is not full information for all games, the data are of high quality and normalized to well-established standards established by MobyGames. The dependent variable data come from additional sources, as discussed later.

The full dataset on the PC games industry covers twenty-five years from 1981 to 2006 and contains 5,794 games with full credits and normalized titles. As will be discussed, the data are further matched with two sources of performance information – revenue and critical reception. Since performance data was limited to commercial games sold between 1994 to 2006,

this culled the sample somewhat: 1,970 credited games had revenue information, and 2,117 credited games had critical reception information. These games involved a substantial number of individuals in the development process. Core team[2] sizes ranging from 1 to 395, with a mean of 45 people in the core team for games which have both credits and performance information

In order to differentiate between firm and individual effects, the analysis includes only those individual designers and producers who created games for more than one organization. Additionally, to differentiate between various individual effects, the analysis only includes designers and producers who worked with other combinations of designers and producers, rather than repeatedly being part of the same team. Dropping games with individuals that did not meet those criteria resulted in a final sample of 1,536 games with critical reception information and 1,507 games using revenue information. This ultimately allowed me to identify fixed effects on revenue for 412 individual designers and 706 individual producers, and fixed effects on critical reception for 441 designers and 700 producers. While designers and producers analyzed for fixed effects will obviously tend to have a longer industry tenure and more games to their credit than the average individual who is not part of the fixed effects analysis, their project history is generally not significantly different. However, the limit of the analysis to only those individuals that move between firms is a potential cause of concern because of recent research that has discovered that, under some conditions, skills are not portable between firms (Groysberg and Nanda 2001; Huckman and Pisano 2006). Comparisons between the sample group and the general population, which can be seen in Table 2, gives us some confidence that the sampled designers and producers remain representative. Of all of the dependent variables, only the game ratings for designers differ significantly between the two groups, and there by about 1 rating

point out of 100, while revenue and rating for producers and revenue for designers shows no significant variation.

INSERT TABLE 2 ABOUT HERE

2.4.1 VARIABLES

Using the data on individual games, we will use a fixed effect model to separate out the extent to which project success is attributable to individual designers and producers, as opposed to all other factors, including that of firms (Bertrand and Schoar 2003). There are two separate dependent variables, as well as a wide variety of controls used in the analysis.

DEPENDENT VARIABLES

Revenue Between 1995 and 2006, research company NPD Funworld tracked the sales data of every PC game sold through US retail channels for most major retailers, and projected revenues for the rest. This dataset was matched with the MobyGames dataset, and a total of $8.2B worth of revenue was identifiably linked with games in the database. As PC games are, in part, a hit-driven industry (average revenue was $3.2M, but the best-selling PC game of all time, *The Sims*, sold $260M, more than twice its closest competitor), I used the more normally-distributed log of revenue (lrevenue) for my analysis.

Rating Games are often reviewed by third-party critics from specialized magazines and websites. These critics assign scores to each game using a variety of systems. I used the Game Rankings database of 36,792 reviews from reputable magazines and websites as my source of ratings information. Each review was normalized on a 1%-100% scale, with 100% being the

highest. Ratings were only used when two or more separate ratings were available for an individual game.

INSERT TABLE 3 ABOUT HERE

Rating and lrevenue are only moderately correlated (.42). Measuring both rating and revenue allows me to control for a number of factors that might affect one outcome and not the other. For example, name recognition or marketing spending may affect the revenue generated by a game, but would generally have a more modest affect on critical reception. Similarly, the critical reception of a game may not be an indicator of mass-market success, while revenue obviously is.

I excluded from my analysis all expansion packs, which are value-added games that will only operate with the original software package, and that add features or additional gameplay elements. Since the performance of expansion packs on the market are circumscribed by the sales of the games on which they expand, they are not easily comparable. I also did not include "casual games" which consist of card games and puzzle games, "adult"-oriented titles, and educational games, as they are generally considered to represent separate markets from the standard PC games industry.

CONTROL VARIABLES

In order to isolate the effects of individuals and firms, I controlled for a number of factors:

Team Size Core team size is a good estimate of cost and effort associated with a game, as personnel costs are the primary expense of most development companies (Rosmarin 2006). Additionally, a large core team size would indicate a more challenging managerial environment,

with more need for coordination among multiple individuals. The median team size for games with known revenue or rank is 45.

Year The market for games can vary from year to year, as both the economy and related markets, such as video game consoles, vary. Year controls for the release date of each game in the United States, or, for games that launch in multiple countries, the worldwide release date.

Genre Games can be published in a number of genres, ranging from business simulations to "shoot-em-up" arcade games. These genres may attract different audiences and thus have different market receptions. Since designers and producers could specialize in particular types of games, I control for five separate genres and the combinations thereof[3]. These genres are coded by individuals entering them into MobyGames, and go through at least one peer review before being accepted.

Publisher In addition to developers, game publishing firms play an important role in the PC game industry. Though the financial effects of publisher funding is captured by team size, there could potentially be an effect where larger publishers, with more resources, have better ability to develop top titles. I control for whether a game was published by one of the largest ten publishers (controls based on past publisher performance yielded similar results).

Sequel and **Licensed** Two additional game-level characteristics are whether a game is the sequel of a previous game, and whether it includes licensed content. Licensed content refers to intellectual property from an outside source (such as a movie or television program) that has been incorporated into the game. Sequels and licensed content could offer additional name recognition to games, thus boasting their appeal relative to new or unlicensed games.

2.5 RESULTS

The results in Tables 4 and 5 show the F-tests and Adjusted R^2 for four models. The first model includes only the control variables, the second model adds firm-level fixed effects, the third adds designer fixed effects, and the fourth model adds producer fixed effects. The first row gives the number of games in each sample. The rows labeled *Company*, *Designers*, and *Producers* give the F-statistic for the joint significance of the company, designer, and producer fixed effects respectively, with the p-value below in parentheses. The last two rows report the F-statistic and Adjusted R^2 for each model.

INSERT TABLE 4 ABOUT HERE

INSERT TABLE 5 ABOUT HERE

The analysis shows that behind the veil of the firm, variation in individual managers and innovators has a both large and significant effect on the success of individual projects when looking at both revenue and ratings . Adding individual designers to the model incorporating firms increased the adjusted R^2 for ratings by over .05 and revenue by over .10. The impact of producers proved much more significant, increasing adjusted R^2 by around .14 for ratings and revenue. In total, the individuals in just these two roles accounted for 25% of the variation in revenues and 19% of the variation in rating for the products for which they were responsible. Additionally, the individuals with the managerial role of producer explained more of the variation in performance than the individuals who filled the innovative role of designer.

Firm-level effects are also significant and account for as much variation as the two individual roles tested. However, the firm-level effects likely overstate the importance of firms relative to individuals because they incorporate all additional team members for each game (on average, over 40 different individuals) as well as the effects of people not given in the credits, such as marketers and company leaders, in addition to other factors which may have been left out of the controls. Firm-level effects also would encompass dyadic effects created by the teamwork between lead designers and lead producers as well as team effects more broadly, that are really the result of groups of individuals achieving a synergy where they are more than the sum of their parts. Thus, while some variations in revenue and ratings likely remains attributable to firm-level effects, the variations in the performance of individuals for these two roles alone is at least as important. This finding was robust even when firm age and size were taken into account by creating dummy variables for firms over 5 years of age; for firms that were over one standard deviation larger than average; and for firms that were both older than 5 years and larger than average.

Since some games are blockbusters or flops with revenues far above or below the mean, I also performed a robustness check on the revenue results by removing the top ten percent and bottom ten percent of games by revenue. These results (Table 6) further demonstrate the role of managers over firm-level effects or innovators. With blockbusters and flops removed, the effect of firms in explaining performance variation drops to 20%, for designers it drops to 7%, and for managers it increases sharply to 27%. Table 7 offers a summary of all the results.

INSERT TABLE 6 ABOUT HERE

INSERT TABLE 7 ABOUT HERE

There are a number of limitations to this study. First, the game industry may serve as a special case, with its low capital requirements and relatively fluid employment systems making it more suited to individual achievement than other industries. However, the game industry does echo aspects of other highly innovative industries where firms remain the dominant form of organizing – such as software, web services, and biotechnology – and which might serve as future models for study. Also, the fact that managerial producers explained more of the variation in performance than innovative designers indicates that the importance of individuals is not limited to innovative roles, and so is likely not purely an artifact of creative industries. A second limitation is that, in order to conduct the fixed effect analysis, the sample only includes individuals who moved between companies; these individuals may be more uniquely productive, and therefore have a greater affect on performance, than those who decided to stay within the organization. Alternately, by virtue of moving, these individuals may instead be much less productive than the average (Groysberg and Nanda 2001; Huckman and Pisano 2006). In both these cases, though, the initial demographic features described in Table 2 do offer some reassurance. Additionally, as has been noted, team and dyadic effects are not included in this study, opening the possibility that it might be small groups, rather than individuals, that affect performance. In discussions with game company founders, particular teams did not seem to be the driving force behind variations in performance, and teams were often rotated, but the possibility cannot be ruled out. Even if this were the case, however, teams would represent a level of analysis not currently used in explaining firm performance.

2.6 Discussion and Implications

These results exceed by a large margin the threshold of the performance derived from individuals that we would expect to see from traditional views of the firm where organizational and environmental, rather than compositional, factors that drive performance. Especially when the potential for the over-inflation of firm-level effects are taken into account, it is unclear how significant firm-level processes actually are in explaining performance, but they are, at most, on the same scale as the role played by just two individuals within the product team. The effects of individuals in this case also greatly exceed those found in Bertrand and Schoar (2003) for top-level executives. Far from being interchangable, individuals uniquely contribute to the success or failure of a firm.

Additionally, the relative contribution of the two roles to firm-level variation is also unexpected. Even in a young industry that rewards creative and innovative products, innovative roles explain far less variation in firm performance than do managers. This is surprising for two reasons. First, we would expect that individual variation in innovative roles would be greater than that of more standardized managerial roles. Second, given the research tradition on the importance of organizational factors to facilitate the success of middle managers (Westley 1990; Wooldridge and Floyd 1990), the finding that individual managers account for more variation in performance than firm-level factors in some occasions is particularly intriguing. These two results – that individuals explain much of the performance difference between firms and that managerial roles have more impact on performance than innovative ones – challenge long-held assumptions about firm performance.

2.6.1 Implications for Suits vs. Innovators

The first intriguing finding is the relative importance of individual managers over individual innovators within organizations. Rather than acting as cogs in the machine, dwarfed by organizational level effects, the effect of managers on firm performance was actually larger than that of organizational factors, when the top and bottom earning products were removed. This effect was robust even when firm size and age were taken into account, implying that individual managerial differences play an outsized role in firm performance. Though this finding might seem surprisingly at the scale of firms and industries, it is supported by intrafirm-level research on the role of middle managers in the innovation process.

Recent research on the role of individuals and groups in industries as diverse as consulting (Hargadon and Bechky 2006) and comic books (Taylor and Greve 2006) supports a longer literature on project management (see Brown, (1995)) that has demonstrated the complex interaction between individuals and teams in successful innovation. The finding that managers have significantly more impact on firm performance than individual innovators aligns with this tradition. It suggests that high-performing innovators alone are not enough to generate performance variation; rather, it is the role of individual managers to integrate and coordinate the innovative work of others.

There are a number of ways in which this might practically occur within the game industry. For example, good managers will be able to whittle down a designer's product ideas into a realistic project plan, while a less capable manager working with a more capable designer may be unable to translate a better design into reality. Or, it may be that certain managers are good at facilitating the sort of collective creativity that results in high-quality products (Hargadon and Bechky 2006), while others are less capable of making their teams more than the

sum of their parts. Regardless of the particular mechanism, it suggests that the oft-overlooked middle manager may play a far greater role in industry-wide innovation than is typically acknowledged. And the large role of managers raises a second question, why do these extremely productive individuals choose to remain inside firms, rather than act as free agents?

2.6.2 Implications for Theories of the Firm

All current theories of the firm rely on organizational, rather than individual, factors to explain performance, though the details of which organizational factors matter vary from theory to theory. For example, Blau (1966) and Thomson (1967) have argued that firms offer special efficiencies in coordination and control, while economists such as Coase (1937) and Williamson (1985) have postulated that organizations arise when individuals would face too much uncertainty and opportunism to use free market contracts. According to these views of the firm, if individuals, rather than organizational factors, largely determine firm performance differences, individuals should tend to operate more as free agents, rather than become long-term employees of established firms. But free agency is rare among designers and producers in the game industry, who instead operate as employees (Rollings and Adams 2003). And yet firms contribute relatively little to performance.

Perhaps individuals remain part of firms not because individual firms enhance performance, but rather because firms as a category might be required for coordination among employees. Within the game industry, however, there is ample evidence that firms are not strictly required for coordination, even for complex projects. A parallel market, that of customer-driven modifications to commercial games (called "mods") demonstrates that

individuals can operate independently of firms. Motivated individuals and teams have created tens of thousands of mods over the last twenty years, resulting in some mods that are more professional and popular than the original games themselves. Postigo (2007) identified 39 large mods for the top selling action games of 2004, finding that one representative mod development team consisted of 27 people from seven countries who programmed for about 15 to 20 hours a week for over a year and a half. These mods are coordinated without the benefit of firms, without contracts, and often without any personal contact between team members. This strongly suggests that firms are not strictly required in order to produce computer game products.

If conventional performance-based rationales for the existence of firms are not convincing in explaining the results of this study, an alternative role of the firm is possible: that, in some cases, firms can be socially necessary to facilitate individual action, rather than directly increasing performance through strategy, routines, or resources. This view draws a distinction between the firm as a public and visible player in an industry, and the functional or productive organization that we assume a firm contains. These two entities need not always be the same. Broadway (Uzzi and Spiro 2005) and Hollywood (Bechky 2006), both have functional organizations but not firms, since they depend on individual free agents brought together on a project. Similarly, the reverse case might be true. In many industries the firm may merely serve to indicate, sometimes falsely, to that outside world that an organization exists, rather than as a source of organizational capability itself.

This approach not been previously been directly invoked in the literature, but it is a natural implication the work of Hannan and Freeman (1984) on the forces that underlie the existence of firms. Hannan and Freeman challenged the idea that market efficiency is the sole

reason that firms are organized, instead firms have a social advantage over individuals. Firms routinize individual action, smoothing out individual differences and ensuring that an organization will have lower performance variance than a randomly drawn free agent. Similarly, firms can rationally explain their actions, making consistent arguments using appropriate rules and procedures. For example, firms can demonstrate to employees that they offer predictable career paths, to investors that they have formal management processes for money being spent, and to governments that they are appropriately certified to do business.

Those theories imply that while individuals may be the relevant productive units in an industry, appearing to operate as firms they may still need to wear the garb of organizations in order to do business with other organizations. In many industries, therefore, new firms may be created in a self-perpetuating cycle – they arise not in order to maximize productivity, but rather as a response to an environment which demands their creation in order for a business venture to be taken seriously. Since this study cannot discount all firm effects, more research is needed to definitively demonstrate that firms are operating in this social role, rather than a purely productive one. However, the comparatively large impact of individual differences over organizational factors in firm performance strongly suggest that firms may be serving a purpose beyond mere performance.

2.7 Conclusions

While any population of firms is ultimately heterogeneous at some level of analysis, the general assumption has been that variations in firm performance are largely the result of processes, rather than people. This paper argues that the performance of organizations may

actually vary greatly as the individuals within the firms vary. Further, it is the individuals who fill the role of middle managers – the "suits" – rather than the creative innovators that best explain variation in firm performance.

While these findings may vary across industries, and even within industries, they suggest that scholars should pay more attention to the individual makeup of organizations, rather than focusing solely on organizational-level characteristics. Additionally, this study also challenges the assumption that firms are formed solely for reasons of performance, instead suggesting that firms may sometimes serve social, as well as productive, functions. Finally, this paper underlines the importance of middle managers, who are critical to firm performance even in highly innovative industries, and suggests the need for further research into the mechanisms by which middle managers influence firm performance.

END NOTES

[1] This blurring was sometimes purposeful in the early days of the game industry, when it aspired to the luster of Hollywood. For example, the term "producer" to describe the role of product manager was first used in 1982 by Trip Hawkins, founder of Electronic Arts, who had previously worked as an early in employee of Apple. Despite no experience in films, he choose to use terms from the film industry, in a case of what one industry analyst called "Hollywood envy." (Crawford 1995)

[2] I use the concept of core team so as to include only those credited individuals who are involved throughout the development of a typical product. This excludes specialized roles such as testers, researchers, voice actors, and movie production crew that are limited to a subset of games. The core team includes designers, producers, programmers, artists, and management. Full teams range from 1 to 1,485 in size, mean 55.93, SD of 80.

[3] The genres are: action-adventure, racing and driving, sports, role-playing games (RPGs), and simulation-strategy games. Individual games can be coded with multiple genres, such as a game that includes both role-playing and sports elements.

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TABLES

Table 1:Game Developer Company Demographics

Companies	N	N Acquired	Mean Founding Date	Mean Lifespan✧	Mean # of Games	Mean Percent Credited	Mean Unique Credited Workers/Firm⋆
Operating	332	61	1994.2	12.8	4.3	0.72	174
Exited	270	57	1992.5	8.9	4.5	0.77	112
Total	602	69	1993.5	11.1	4.4	0.74	146
(SD)			(6.4)	(6.7)	(7.3)	(.26)	(191)

SD given in parentheses below totals

✧ Lifespan is right-truncated for firms still operating.

⋆ Determined by counting the number of unique core team individuals for credited games only.

Table 2: Means for sampled Individuals with Fixed Effects Compared with All Individuals

(SD in parentheses)

	N Games	Rating/ Game	Log(Revenue)/ Game
All Designers (N=3805)	4.2 (4.8)	0.73 (.12)	6.15 (.72)
Sample Designers (N=531)	7.5* (6.5)	0.74* (.10)	6.19 (.65)

	N Games	Rating/ Game	Log(Revenue)/ Game
All Producers (N=2827)	5.7 (6.0)	0.71 (.12)	6.10 (.72)
Sample Producers (N=826)	9.3* (7.1)	0.71 (.10)	6.11 (.61)

Note: Sample Designers and Producers include only those with both rating and revenue information.

* $p < .05$

Table 3: Descriptive Statistics for Dependent Variables for Games with Credits

Variable	Obs	Mean	Std. Dev.	Min	Max
Revenue	1970	3576009	1.06e+07	25003	2.61e+08
lrevenue	1970	13.6488	1.729752	10.12675	19.37981
Rating	2117	.6979901	.1449379	.06	1

Table 4: Fixed Effect F-Test Results for Ratings

Results given are the F-statistic, the p value of the F-statistic is given in parentheses.

	Model 1	Model 2	Model 3	Model 4
	Controls	All Firm-Level and Controls	Model 2+ Designer FE	Model 3+ Producer FE
N	1536	1536	1536	1536
Firm		2.09*** (.000)	1.98*** (.000)	2.05** (.003)
Designer			1.33** (.001)	1.71* (.016)
Producers				1.86* (.007)
F-statistic	7.99*** (.000)	2.52*** (.000)	2.08*** (.000)	2.51*** (.000)
Adjusted R^2	.1373	.4001	.4556	.5918

* p <.05
** p <.01
*** p <.001

Table 5: Fixed Effect F-Test Results for Revenue

Results given are the F-statistic, the p value of the F-statistic is given in parentheses.

	Model 1	Model 2	Model 3	Model 4
	Controls	All Firm-Level and Controls	Model 2+ Designer FE	Model 3+ Producer FE
N	1507	1507	1507	1507
Firm		2.12*** (.000)	1.97*** (.000)	1.99** (.001)
Designer			1.75*** (.000)	2.57*** (.000)
Producers				2.26*** (.000)
F-statistic	24.1*** (.000)	3.14*** (.000)	2.88*** (.000)	3.80*** (.000)
Adjusted R^2	.2341	.4832	.5872	.729

* $p < .05$
** $p < .01$
*** $p < .001$

Table 6: Fixed Effect F-Test Results for Revenue, Subtracting the Top and Bottom 10%

Results given are the F-statistic, the p value of the F-statistic is given in parentheses.

	Model 1	Model 2	Model 3	Model 4
	Controls	All Firm-Level and Controls	Model 2+ Designer FE	Model 3+ Producer FE
N	1207	1207	1207	1207
Firm		2.02*** (.000)	1.49*** (.000)	2.29*** (.000)
Designer			1.26** (.002)	2.43*** (.000)
Producers				2.26*** (.000)
F-statistic	10.71*** (.000)	2.01*** (.000)	1.87*** (.000)	3.1*** (.000)
Adjusted R^2	.1387	.3387	.4038	.6759

* p <.05
** p <.01
*** p <.001

Table 7: Summary of Fixed Effects

	Revenue (N=1507)		*Rating (N=1536)*		*Trimmed Revenue (N=1207)*	
	F-statistic (p-value)	Contribution t to Adjusted R^2	F-statistic (p-value)	Contribution t to Adjusted R^2	F-statistic (p-value)	Contribution t to Adjusted R^2
Controls		0.23		0.137		0.139
Firm	1.99*** (.001)	0.249	2.05** (.003)	0.263	2.29*** (<.001)	0.2
Designer	2.57*** (<.001)	0.104	1.71* (.016)	0.056	2.43*** (<.001)	0.065
Producer	2.26*** (<.001)	0.142	1.86** (.007)	0.136	2.26*** (<.001)	0.272
Model Total	3.80*** (<.001)	0.729	2.51*** (<.001)	0.591	3.10*** (<.001)	0.676

* p <.05
** p <.01
*** p <.001

3. The Firm as a Potemkin Village: Compositional Performance, Social Pressure, and Firm Formation

The organizational literature generally assumes that the performance differences between firms are explained by organizational factors, rather than by the individuals within firms. This perspective has a long history, appearing in the foundational texts of economics, sociology, and management in forms that include Adam Smith's pin factories (1895), Weber's rational bureaucracies (1946), and Taylor's scientific management (1911). Even today, the primacy of organizational-level effects over individual-level variation in determining firm performance is so widely held that the matter is rarely explicitly discussed. Most theories of firm performance – including those that emphasize organizational routines (Nelson and Winter 1982), firm capabilities (Teece, Pisano, and Shuen 1997), and resources (Barney 1991) – aim to explain which organizational-level factors drive performance, with significantly less emphasis on the role of individuals. However, a growing body of literature suggests that, especially in the increasing number of industries that rely on creative and knowledge work, individual ability is both highly skewed (Brooks Jr 1978; Stephan 1996) and has the potential to impact firm performance (Simonton 2003; Zucker and Darby 1996). The importance of individual variation challenges the assumption that firms' performance differences are due to organizational factors, since individual performance may vary by orders of magnitude in industries such as software development or biotechnology, while firms are generally structured very similarly to each other. This leads to the question of whether firm-level variation in performance derives more from compositional differences (whether one firm includes more talented individuals than another) than from differences in organizational factors (such as routines, structure, and culture), a topic

covered in my previous paper, "People and Process, Suits and Innovators: Individuals and Firm Performance." And this question suggests another in turn: if in some industries we find that organizational factors do not significantly increase firm performance over the sum of its individual members, why do we see firms at all?

Despite the importance of these questions for understanding the roles of firms, there are no prior studies that evaluate the contribution of organizational-level processes compared to those of individuals on performance, with the exception of a few studies examining the specialized cases of leadership and entrepreneurship. This paper determines the relative contribution of organizations and individuals on performance by analyzing an industry – computer gaming – where we would expect high levels of variance in individual talent, but where firms remain the dominant method of organizing. The computer game industry offers two advantages as a subject of study. Detailed data is available at the individual level, and computer game firms operate in ways representative of many knowledge-based industries. This paper employs two methods to look at the role of individuals. The first, drawing on the previous paper "People and Process, Suits and Innovators" uses an empirical analysis of over 1,500 products across 602 companies to decompose performance variation to the level of individuals and suggest that the assumption that organizational factors are responsible for variations in performance is often incorrect. The second method uses a survey of 2,700 individuals in the game industry to examine individual choices in firm formation and membership. The results raise the question about why people operate within firms at all. I suggest that an unrecognized implication of new institutional (DiMaggio and Powell 1983) and ecological (Hannan and Freeman 1984) theory leads entrepreneurs establish firms as a Potemkin village to allow them to act in industries with existing firm populations. Firms are therefore often set up to give the

appearance of a productive organization in much the way that General Grigorii Potemkin set up the pasteboard facades of towns in newly conquered lands to give the visiting Catherine the Great the illusion of a thriving local economy.

3.1 Assumptions about Firms and Individuals

In a tradition leading back to Weber (1946) and the ideal of the rational bureaucracy incorporating individuals into a world of routines and structure, the intuition that organizational factors, and not organizational composition, are responsible for variations in firm performance is deeply embedded in organizational theory. While the exact organizational mechanisms that cause the firm's performance to be greater than the performance of its individual members are debated, the fact that the performance of firms relies on organizational, rather than individual, factors underlies all theories of firm performance. For example, Blau (1966) and Thomson (1967) have argued that firms offer special efficiencies in coordination and control, while economists such as Coase (1937) and Williamson (1985) have postulated that organizations arise when individuals would face too much uncertainty and opportunism to use free market contracts. Even with these differences among scholars, the common thread among all of these approaches is that they treat the capabilities of the firm as something that is explained by the routines, structure, and knowledge of the organization itself, rather than the aggregate individual abilities of members of the firm.

Industries where economies of scale and scope are critical, such as manufacturing, offer compelling examples of this perspective. Take, for example, Toyota as described by Adler et. al

(1999). With a six-layered bureaucracy, cross-trained workers, and clearly delineated departments, Toyota built a manufacturing powerhouse that integrates workers into a complex mechanism to produce cars efficiently. In the Toyota Production System, success is based on routines and organizational processes (Nelson and Winter 1982) multiplying the effects of the individual workers who are ultimately replaceable and interchangeable with others who have received the same extensive training. The result is a consistent and reliable process that does not rely on any individual worker's skills. Beyond the Toyota Production System, differences in ability among individuals are often assumed to be unimportant in large firms. Rather, the overall functioning of the structure of the firm determines performance, with individuals serving as little more than cogs in the machine. In the words of Teece, Pisano, and Shuen (1997: 525), "the firm is much more than the sum of its parts," suggesting that "to some extent individuals can be moved in and out of organizations, and so long as the internal processes and structures remain in place, performance will not necessarily be impaired." This sentiment is echoed by most theories of firm performance, which conceive of professional managers running formal organizations in which no individual, with the possible exception of a few top executives, are irreplaceable, and in which individual contributions are obscured.

However, two other streams of research challenge this assumption and suggest that in many other industries, especially those focusing on knowledge work, organizational factors may play little or no role in the performance of firms. The first reason to doubt organizational factors are paramount is that we know individual actors can have a significant impact on the performance of large organizations, even in markets where firms are clearly the dominant organizational form. The most common example of this is the entrepreneur, who has a long-term impact on the firms he or she founds (Baron, Hannan, and Burton 1999; Eisenhardt and

Schoonhoven 1990). Even outside of entrepreneurship, there are hints that certain individuals play a more critical role in firm performance than is generally acknowledged. For example, star scientists who operate within firms and universities have a significant individual impact on the performance of firms (Zucker, Darby, and Armstrong 2001; Zucker, Darby, and Armstrong 1998) . Further, the distribution of ability across individuals is uneven. Areas such as software development (Brooks Jr 1978; Cusumano 2004) and scientific research (Stephan 1996), exhibit wide differences. This evidence of the impact of individual-level differences on firm performance across many industries suggests that we may not be able assume that organizational-level processes and efficiencies are the sole reason for the existence of firms.

These potentially extreme performance differences among individuals could mean one of two things: either firms remain more than the sum of their parts despite variations among individual employees or else that large individual differences mean that organizational-level contributions to performance are relatively minimal. The economic literature generally suggests that the first option is correct, since firms would only exist if they played an important role in performance. Thus, when firms are present in knowledge-based industries these firms must also be more than the sum of their parts, otherwise these industries would be organized around free agents. There are indeed creative industries, such as Broadway (Uzzi and Spiro 2005) and Hollywood (Bechky 2006), that depend on individual free agents brought together on a project basis, rather than on formal organizations. Production organized around free agents occurs in other fields as well, sometimes without even the benefit of explicit contracts, such as the case of construction contracting. Yet the existence of a handful of industries where firms are not the basic method of organizing seems to be the clear exception to the prevailing firm-based structure. And since there are industries where firms do not play a central role, firms must only

exist when they serve an efficient purpose, beyond that of individuals. Accordingly, Williamson (1985) argues that the continuum of market-organized industries using free agents and firm-based industries tends to be thick in the tails, with few instances of coexistence of both economic organizational strategies in the same market. Therefore, if we observe firms in an industry, we would expect that the firms are greater than the sum of their individual members, or why would the individuals join in firms otherwise?

I argue that this assumption is not always correct, and that there are alternative reasons for the existence of firms, beyond mere productive efficiency. Firms can instead be socially necessary to facilitate individual action, and they do so in a way that often makes their performance no more than the sum of their individual members. This view has not been previously addressed in the literature, but it is an unrecognized implication of the foundational theories of both new institutional (DiMaggio and Powell 1983) and ecological thinking (Hannan and Freeman 1984) on the forces that underlie the existence of firms. Those theories imply that while individuals may be the relevant productive units in an industry, they may still need to wear the garb of organizations in order to do business with other organizations. New firms therefore, are created in a self-perpetuating cycle – they arise not in order to maximize functionality, but rather as a response to an environment which demands their creation in order for a business venture to be taken seriously. They are Potemkin Villages, each built to appear as organizations that are more than the sum of their parts, even when they are not.

The next section of the paper will further develop the theory that underlies the creation of firms in environments that depend more on individual, rather than firm-level, contributions to performance. I will then test this theory by separating individual and firm-level contributions to

performance in the computer game industry. If, in this industry where firms are the method of organizing, observable individual contributions do account for large amounts of variations in performance, it would offer a challenge to the widely-held, yet untested, assumption that firms are more than the sum of their individual parts.

3.2 Potemkin Villages and Conforming to Differentiate

Let us consider how an entrepreneur with an idea for a new product innovation goes about entering a market. To make the matter concrete, assume that the product can be easily modularized and that all of the production and development can be allocated via contract; in short, assume that the product would be amenable to development and sale through free agents. Note that whether founding a firm or not, the entrepreneur relies on a team of other individuals to accomplish his or her goal; the alternatives are simply either to employ those individuals inside an organization or to contract with free agents as needed to acquire needed expertise and labor. If, in this hypothetical case, economic efficiency was all that mattered, contracting with free agents would make logical sense, at it would avoid the additional costs and administrative overhead associated with founding a firm. And yet, if this entrepreneur is starting his project in an industry populated by other firms, in almost all cases our intuition would be the opposite – we would expect to see the entrepreneur operate through a firm, rather than as an individual. This intuition finds a theoretical foundation in both the new institutional and ecological traditions.

Before examining these theoretical approaches, it is worth noting that entrepreneurship research demonstrates that the road to organizational formation can be long (Katz and Gartner 1988) and that few nascent entrepreneurs actually succeed in creating firms (Carter, Gartner, and

Reynolds 1996). Additionally, some scholars challenge whether organizational formation is an appropriate way to define entrepreneurship (Shane and Venkataraman 2000). Yet organizational founding has been observed to be a key goal of entrepreneurs (Aldrich 1999), and it is the fact that successful entrepreneurs found organizations that is of importance for our discussion, not the fact that many fail in the process.

The first reason an individual might create an organization even when it does not contribute to performance is the most obvious: organizations have a legal standing that makes them advantageous for managing risk. This explanation is lacking, however, since if individuals only formed organizations for legal reasons, we would expect that we would see the creation of organizations as legal entities only, such as single-member limited liability corporations that can effectively shield individuals from tax and liability concerns without the additional overhead of establishing a formal organization (Jones Jr 1999). Yet single-member corporations are not the dominant organizational form for most industries. This is because the existence of a firm as a pure legal entity does not offer the same level of comfort to stakeholders – be they employees, lenders, investors, suppliers, or customers – as a formal organization. These outside entities would hesitate to place trust in mere legal fiction, because their concerns are neither legal nor even strictly economic but are instead based on establishing that their potential partners are going to conform to the roles expected of firms, including reliability and persistence. The same expectation of reliability and persistence may be important to the individuals who would choose to work on a project; they may only be comfortable working as employees within a firm for the perceived stability of firms, as well as the benefits that firms can acquire from third parties, such as health care.

This expectation, then, highlights the second reason that individuals would form firms: firms are a requirement for acceptance in a world of organizations. The importance of this fact on the evolution of industries is a consequence of a number of literatures, but is demonstrated most clearly in the tradition of new institutionalism. Generally, new institutionalism has tended to concentrate on understanding why so many firms look the same across industries (DiMaggio and Powell 1983). The theory states that isomorphism is achieved through outside pressure, response to uncertainty, and environmental factors. The resulting research tradition has demonstrated the existence of isomorphism and diffusion of forms across industries (Burns and Wholey 1993; Fligstein 1991). However, just as new institutionalism predicts isomorphism in response to environmental pressures and uncertainty, so too, would it help explain why we find so few industries in which individuals co-exist with, or even supplant, firms. When new entrants attempt to enter an industry, they are subject to these institutional pressures and act to create isomorphic firms in response.

The new institutional tradition, however, has focused on populations of firms, rather than the ways in which individual firms might act in the face of institutional pressures. A more workable framework based on similar premises, but which encompasses firm-level action, can be found in Hannan and Freeman's (1984) challenge of the idea that market efficiency is the sole reason that firms are organized. Hannan and Freeman suggest that organizations offer two advantages over individuals: reliability and accountability. Organizations are reliable precisely because they routinize firm action, smoothing out individual differences and ensuring that an organization will have lower performance variance than a randomly drawn free agent. A firm that appears to be reliable to outside observers would also appear to be more than the sum of its individual parts. That is because reliable firms embed their capabilities in routines, rather than

people, because routines endure in an organization while individuals do not. Toyota's routines allow them to efficiently produce quality cars in plants ranging from Tennessee to Tokyo, despite different and changing workforces.

Similarly, organizations are accountable because they can rationally explain their actions, making consistent arguments using appropriate rules and procedures. For example, firms can demonstrate to employees that they offer predictable career paths, to investors that they have formal management processes for money being spent, and to governments that they are appropriately certified to do business. Again, this leads to the creation of firm-level routines that are productive when they are adapted to the environment, but may not be productive when environments change.

Extending Hannan and Freeman's reasoning provides a way of understanding why firms may exist even when they are not always more than the sum of, or perhaps even detract from, their individual members. By being a part of the category of firms, these individuals achieve the status of being reliable and accountable, fitting into the established category that is critical in order to be taken seriously (Zuckerman 1999). This may involve individuals invoking the concept of an organization, even when an organization does not exist. One entrepreneur interviewed in this study described this process as "pushing the line between what is real and what you want to make real," as he explained how he implied the existence of entire departments to potential partners, without directly claiming that the then-imaginary groups had been established. A second company founder described a case in which a company (later sold for $620 million) hired out-of-work actors to play the part of a project team during an office visit by business partners in a successful effort to demonstrate that the firm was properly organized and

legitimate. While this might be an extreme example of using a firm as a Potemkin Village, the desire to do what was needed to appear reliable and accountable was echoed by many firm founders.

An emerging literature on how entrepreneurs actively seek to build legitimacy demonstrates that entrepreneurs are very conscious of their need to establish themselves as reliable and accountable is supported (Zimmerman and Zeitz 2002). For example, recent work by Zott (2007) explores how entrepreneurs use symbolic actions (such as having an office in an impressive building) to prove legitimacy to stakeholders, and therefore gain access to more resources. While the study of entrepreneurial legitimacy is still "in its infancy" (Zimmerman and Zeitz 2002:414) and this literature has not addressed the issues of firm formation itself, it suggests that successful firm founders actively seek methods to make their efforts appear legitimate, even if those efforts themselves do not directly relate to the main thrust of their business effort.

The pressure to create firms even when they are not adding to the productive capacity of the constituent individuals can be seen from the perspective of outside institutions, as well as entrepreneurs. First, firms in a particular market may be most comfortable dealing with other firms, whether as customers or as service providers. Indeed, other players in a market may entirely lack the capabilities required to deal with non-firm entities. One example of this is the fact that most standard application and registration forms for everything from conferences to requests for proposal require a title and a company name in order to be processed, putting those who are not part of a formal organization at a disadvantage. A related case is that of government contractors, which must have a variety of features available only to organizations; such as a

unique Dun and Bradstreet number, a special code that identifies companies that do business with the government, and a Central Contractor Registration listing that is required by law for all potential contractors. Beyond these practical considerations is the fact that justification to third-parties will present an ongoing challenge to non-firms: consider, for example, that an entrepreneur who attempts to sell products without a business card featuring a company name will face real skepticism about the possibility of a long-term business relationship.

At the same time, the entrepreneurs themselves often face uncertainty as to the best way to enter the industry in a productive way. Unlike the idealized world of Williamson, there is no clear "market" to join in most cases, simply a universe of firms with which an individual must do business. Furthermore, individuals are unlikely to care exactly about how they choose to enter a market, whether by starting a firm or by acting as a free agent, since organizing is secondary to the goal of actually making a profit from their business concepts. Individuals may thus find themselves without clear examples of organizational forms, except for those that they themselves have experienced or seen enacted elsewhere (Aldrich 1999). Thus, an emulative response from individuals may recreate existing organizational forms. As the entrepreneur who started a computer game company early this decade explained when asked why he did not start a freelance-based operation:

> We never really saw it as an option. That was rarely seen as a model of success. We all pattern ourselves, we see something and duplicate it. There wasn't a whole lot of that thing going on. Anyone who was working out of their house was seen as a chickenshit operation, not to be taken seriously. What kind of multimillion dollar contract are you going to get working out of your basement?

The requirements to appear both accountable and reliable pressures entrepreneurs to design an organization to be isomorphic to its market from the very beginning, creating a Potemkin village that is a mirror image of existing, legitimized forms. Additionally, since an organization that appears as a mere shell will not satisfy these requirements, the founders will have the incentive to "cover their tracks" by ensuring the firm they create will appear to be a functioning organization, rather than a simple collection of individuals. Creating this organization is likely not the primary goal of entrepreneurs, rather it is a means to an end. Entrepreneurs need to organize in order to gain access to the resources they need to proceed. They will conform to the requirements of an organization so that they can differentiate themselves in other ways--the equivalent of wearing a suit to a job interview (Phillips and Zuckerman 2007). The organization is a means, not an end itself. Firms, with their associated costs in entrepreneurial time and administrative overhead, thus act as middleman in each transaction, laundering the identity of individual members, in return for a portion of the resources that would otherwise go to the individual.

3.2.1 The Sum of their Parts

Firms that act as Potemkin Villages challenge two basic assumptions about the natures of firms. The first assumption is that the firms we observe in a market represent an organizationally efficient response to the economic conditions of the market. In contrast, these firms may, instead, be created to imitate other firms. The second assumption is that the existence of a firm means that it is the organization, and not its individual members, that is the key productive unit. We would instead expect some proportion of organizations in many industries to be no more

than the sum of the productive abilities of their individuals, though this fact would be purposefully obscured to ensure that the firms seems legitimate. Thus, to return to Williamson's (1985) continuum of firms and markets, the fact that the sequence is thick in the tails may have more to do with institutional pressures than efficiency.

This sort of pressure is acknowledged by firm founders, who understand the fact that the act of having a firm itself is a critical success factor, even if a small group of individuals is responsible for much of the work. One entrepreneur who founded a 120-person company told the author that although "I really am the core of the company and from there it goes out to the people who are my arms and legs," having a company is critical, since "when [game publishers] invest 10 or 20 million dollars in a product, they need to make sure that the company is well put together, that it has all its fingers and toes." Like many other founders the author spoke with, this entrepreneur viewed his company as a tool by which he, and a select group of productive individuals, could act in a world of firms.

Further, some of these firms would persist long after the individuals who created the firm as a cover for individual action leave or change roles. This is because over the early life of the firm, it acquires the reputation for the performance of its individual members, making the firm appear both accountable and reliable, even after the original individuals have left. Additionally, the organization becomes institutionalized itself, acquiring a character and methods of its own (Selznick 1996), just as the Walt Disney Company became its own organization, persisting long after Walt Disney himself was dead. I argue that this implies that in any given industry we would expect to see that firms are more heterogeneous than is currently assumed, including a mix of firms effectively hiding individual contributions, firms started as covers for individual

action that have become functional themselves, and firms that indeed operate as more than the sum of their parts. This means that the degree to which performance is embedded in the routines of the firm or in the abilities of individuals will vary greatly, both within industries and between them. There is certain to be a sliding scale, where some industries are indeed dominated entirely by firms that are more than the sum of their parts (perhaps in capital intensive industries such as auto manufacturing) and others have mostly firms that act to hide individual action while relying on individual achievement as the main engine of performance.

This expected heterogeneity, even within industries, makes it difficult to identify a case where organizational-level effects have no impact on firm performance. But, as I have argued, the current assumption that organizational factors are more important than composition factors requires reconsideration. I instead hypothesize that in an industry where firms are the primary method of organizing, we will see that much of the performance of firms is actually explained by individual differences. I will test this hypothesis by examining the computer game industry.

3.3. Analysis

3.3.1 Empirical approach

While there are strong theoretical reasons to challenge the idea that variations in firm performance are explained by differences among organizational factors alone, actually separating individual and firm performance has historically been highly problematic. This paper uses mixed methods to examine whether firms are more than the sum of their parts in the video game industry, described in detail in "People and Process, Suits and Innovators". The decomposition of performance variation to the individual level suggests that compositional factors, rather than organizational factors, may be largely responsible for explaining performance variance. A game-

industry survey provides evidence as to particular forces that favor the existence of firms, even in cases where compositional factors drive performance.

3.3.2 Decomposition of Variance

The ideal experiment would be to take a sample of individuals and then test their performance inside and outside of firms, but this test is nearly impossible to conduct. Another ideal test, summing the performance of individuals in an organization and then looking for any unexplained extra performance, is similarly difficult. The approach taken by Bertrand and Schoar (2003) is probably the closest to the ideal. Bertrand and Schoar examined the role of top managers on Fortune 800 firms using a fixed effect regression to separate out the effects of individual leaders and firms. They found that the combined effects of CEOs, CFOs, and other top managers on Forbes 800 firm performance explains less than 5% of the variation, compared with between 34% and 72% of the variation explained by firm-level fixed effects. This is in-line with most theories of the firm: in large, established organizations, the top managers, at least, contribute relatively little to firm performance. However the methodology provided by Bertrand and Schoar allows us to move beyond looking at top managers at large companies, and to instead examine firms more granularly to determine whether differences among individual firm members matter.

Using this approach, we will be able to test the degree to which firms or individuals are responsible for a firm's performance. If individuals consistently account for large amounts of the variation in project success, it suggests that performance of firms is not generally explained

by organizational factors. The basic approach to testing this hypothesis is to estimate the following equation:

$$y_i = \gamma_i + X_i + \lambda_{producer} + \lambda_{designer} + \epsilon_i$$

Where y_i is the dependent variable of interest for a product i, γ_i are firm-level fixed effects, $X_i$are various product-level controls, and ϵ_i is an error term. The terms $\lambda_{producer}$ and $\lambda_{designer}$ are the fixed effects of producers and designers, the lead creative and managerial roles within a computer game, which will be discussed in more detail shortly. We are interested in how much of the variation in performance is attributable to these fixed effects.

This approach will therefore compare the amount of the variation in performance explained by the individuals occupying two roles in a team to total variation explained by γ_i, which encompasses both firm fixed effects, but also other effects related to the other individuals within the firm, such as management and other team members. Thus, even under ideal conditions where firm effects approach zero for the entire population being studied (which would be unlikely given the expected heterogeneity within an industry sample), γ_i will still not itself be zero. That is because $\lambda_{producer}$ and $\lambda_{designer}$ take into account only two roles out of a team that averages over 40 people, some of which will be reflected in γ_i.

This portion of the study draws from the same data and analysis as the previous paper, "People and Process, Suits and Innovators: Individuals and Firm Performance."

3.3.3 SURVEY

The second portion of the research draws on a survey conducted of the attendees of the Game Developers Conference in 2008. The survey consisted of two parts. The first was an annual industry salary survey conducted by *Game Developer Magazine*, and sent to slightly over 18,000 attendees of the Game Developer Summit and members of the Gamasutra gaming industry site (exact numbers are difficult to determine because of the way the email invitations were sent). Prompted in part by a prize drawing for conference tickets, 2,749 individuals responded, a response rate of approximately 15%. A second, optional survey was also administered that was designed specifically for this study. For privacy reasons, the survey required that individuals go to a second site to enter information, and did not offer a prize. This naturally caused a drop-off in responses. In all, 795 people responded to this second survey, or approximately 29% of those that took the original survey. Detailed analysis of potential response biases are in progress at the time of this draft.

3.4 RESULTS

The results in Table 1 shows the F-tests and Adjusted R^2 for three models comparing the contribution of designers and producers to firm performance, drawn from "Firms and Individuals, Suits and Innovators".

[INSERT TABLE 1 ABOUT HERE]

The analysis shows that behind the veil of the firm, variation in individual managers and innovators has a both large and significant effect on the success of individual projects when looking at both revenue and ratings . Adding individual designers to the model incorporating

firms increased the adjusted R^2 for ratings by over .05 and revenue by over .10. The impact of producers proved even more significant, increasing adjusted R^2 by around .14 for ratings and revenue. In total, the individuals in just these two roles accounted for 25% of the variation in revenues and 19% of the variation in rating for the products for which they were responsible. With the top and bottom 10% of games by revenue removed, the effect of firms in explaining performance variation drops to 20%, for designers it drops to 7%, and for producers it increases sharply to 27%.

Firm-level effects are also significant and account for as much variation as the two individual roles tested, except in the case where flops and top performers are removed. However, the firm-level effects likely overstate the importance of firms relative to individuals because they incorporate all additional team members for each game (on average, over 40 different individuals) as well as the effects of people not given in the credits, such as marketers and company leaders, in addition to other factors which may have been left out of the controls. Firm-level effects also would encompass dyadic effects created by the teamwork between lead designers and lead producers as well as team effects more broadly, that are really the result of groups of individuals achieving a synergy where they are more than the sum of their parts. Thus, while some variations in revenue and ratings might still be attributable to firm-level effects, the variations in the performance of individuals for these two roles alone is at least as important.

And yet, instead of operating as free agents, individuals remain with firms that, with very few exceptions (Rollings and Adams 2003) conceal their individual impact, and which deal with funding organizations, publishers, and marketers on their behalf. It may be the case that individuals are not truly aware their own significance, or at least cannot prove it, without the

kind of detailed longitudinal data used in this study. Successes are claimed by many, while the blame for failures is often blurred, or, in the words of the old proverb, "victory has many fathers, defeat is an orphan." Indeed, as can be seen in Table 3, surveyed individuals reported relatively weak connections between performance and reward.

[INSERT TAB LE 3 ABOUT HERE]

[INSERT TAB LE 4 ABOUT HERE]

[INSERT TAB LE 5 ABOUT HERE]

Further, the salary survey of the game industry demonstrates the difficulty of attributing success to particular individuals. As can be seen in Tables 4 and 5, variations in compensation are not particularly extreme, and do not seem to reflect the full variation of abilities indicated in this study. Producers, for example, reported bonuses that accounted for less than 9% of their total salary on average, with only 10% of producers reporting either a share of royalties or profits Yet even those designers and producers who are acknowledged to be particularly good at their jobs remain within firms. If composition is so critical to firm performance, the question becomes why these individuals choose firms over free agency.

3.5 Discussion

These results exceed by a large margin the threshold of the performance derived from individuals that we would expect to see from traditional views of the firm where it is organizational, rather than compositional, factors that drive performance. Especially when the potential for the over-inflation of firm-level effects are taken into account, it is unclear how significant firm-level processes actually are in explaining performance, but they are, at most, on

the same scale as the role played by just two individuals within the product team. The effects of individuals in this case also greatly exceed those found in Bertrand and Schoar (2003) for top-level executives. Far from being replaceable, individuals uniquely contribute to the success or failure of a firm.

I have argued that the reason even talented individuals remain within firms is the advantages of conforming to the expectations of outside institutions, but are two alternative explanations to consider. First, it could be the case that individuals remain part of firms not because individual firms enhance performance, but rather because firms as a category might be required for coordination among employees. Within the game industry, however, there is ample evidence that firms are not strictly required for coordination, even for complex projects. A parallel market, that of customer-driven modifications to commercial games (called "mods") demonstrates that individuals can operate independently of firms. Motivated individuals and teams have created tens of thousands of mods over the last twenty years, resulting in some mods that are more professional and popular than the original games themselves. Postigo (2007) identified 39 large mods for the top selling action games of 2004, finding that one representative mod development team consisted of 27 people from seven countries who programmed for about 15 to 20 hours a week for over a year and a half. These mods are coordinated without the benefit of firms, without contracts, and often without any personal contact between team members. This strongly suggests that firms are not strictly required in order to produce computer game products.

If firms are not required for coordination, it is still possible that individuals need to be part of firms for reasons unrelated to performance. The analogy would be similar to that of a baseball team, where the way that the team is organized is unlikely to in any way add to the

performance of individual players. Yet, even the best player would not be able to operate on his own, since the competition itself is team-based. Teams exist not because team organization matters, but because that is the way the game is played. In the same way, it may be that firms are required for any one of a number of mundane reasons, from acquiring healthcare to providing a feeling of stability to individual employees. But the fact that individuals might need to be part of a firm to get these benefits does not mean that firms themselves are relevant to performance. Instead, it is the underlying assumption that firms provide reliability and accountability over individuals that makes them important in the eyes of third parties. To be clear, the fact that firms do not add to performance does not mean that every employee could succeed as a free agent. Many industries might work like baseball, where if individuals want to participate, they need to be part of an organization for underlying reasons that have nothing to do with performance.

There are a number of limitations to this study. First, the game industry may serve as a special case, with its low capital requirements and relatively fluid employment systems making it more suited to individual achievement than other industries. However, the game industry does echo aspects of other highly innovative industries where firms remain the dominant form of organizing – such as software, web services, and biotechnology – and which might serve as future models for study. Second, in order to conduct the fixed effect analysis, the sample only includes individuals who moved between companies; these individuals may be more uniquely productive, and therefore have a greater affect on performance, than those who decided to stay within the organization, though the initial demographic features described in Table 2 do offer some reassurance. Additionally, as has been noted, team and dyadic effects are not included in this study, opening the possibility that it might be small groups, rather than individuals, that affect performance. In discussions with game company founders, particular teams did not seem

to be the driving force behind variations in performance, and teams were often rotated, but the possibility cannot be ruled out.

3.6 Conclusions

While any population of firms is ultimately heterogeneous at some level of analysis, the general assumption has been that firms exceed the performance of their individual employees by incorporating them into a structure of organizational routines, knowledge, and strategy. This analysis argues that the nature of organizations may actually vary greatly as the individuals within the firms vary. Further, as a consequence of the need to prove reliability and accountability, firms may simply serve as Potemkin villages, designed to give the appearance of conformity on things that do not ultimately matter to performance (Phillips and Zuckerman 2007), rather than to fulfill a specific organizational function. The fact that these organizations are designed to mediate between productive individuals and the industry in which they are embedded has significance beyond just theories of the firm. As Stinchcombe (1965) showed, firms are shaped by the initial conditions of founding, and these conditions can have effects that last the length of the organizations (Hannan, Burton, and Baron 2002).

The implications of populations of firms acting as Potemkin Villages requires additional study focusing on the long-term differences between firms that are more reliant on individuals and those that function more as an organization with interchangeable parts. Future research will also help in understanding the spectrum of firm types within different industries, and how these types might change as the industry evolves. Scholars who examine the role of firms within industries should take into account that even though something looks like a productive firm and is built like a productive firm, it may not be a productive firm after all, but rather an organization

created in response to pressures to conform to a world where individuals are not viewed as reliable or accountable enough to operate independently.

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TABLES

Table 1: Summary of Fixed Effects for Designer and Producer

	Revenue (N=1507)		*Rating (N=1536)*		*Trimmed Revenue (N=1207)*	
	F-statistic (p-value)	Contribution t to Adjusted R^2	F-statistic (p-value)	Contribution t to Adjusted R^2	F-statistic (p-value)	Contribution t to Adjusted R^2
Controls		0.23		0.137		0.139
Firm	1.99*** (.001)	0.249	2.05** (.003)	0.263	2.29*** (<.001)	0.2
Designer	2.57*** (<.001)	0.104	1.71* (.016)	0.056	2.43*** (<.001)	0.065
Producer	2.26*** (<.001)	0.142	1.86** (.007)	0.136	2.26*** (<.001)	0.272
Model Total	3.80*** (<.001)	0.729	2.51*** (<.001)	0.591	3.10*** (<.001)	0.676

* $p < .05$

** $p < .01$

*** $p < .001$

Table 3: Perceived Pay and Performance Links

	1 Strongly Disagree	2	3	4 Neutral	5	6	7 Strongly Agree	Mean	N
My compensation is ultimately tied to the financial results generated by the games I work on	107	108	93	126	134	91	73	3.870219	732
Managers in the game industry generally know the degree to which each team member contributes to the success of each game	31	104	114	144	170	136	31	4.164383	730
In general, compensation ultimately reflects the degree to which each team member contributes to the success of the games they work on	84	108	154	166	135	65	18	3.584932	730

Table 4: Producer Pay

Tenure in Industry	N	Percent W2	Mean Salary	Additional Pay	Mean % Additional Pay	Additional Pay Type					
						Annual Bonus	Project bonus	Royalties	Stock	Profit share	Pension
1 to 2	8	100%	64,375 (14,126)	88%	5% (6%)	25%	25%	13%	13%	25%	75%
3 to 6	38	100%	66,316 (19,467)	74%	7% (18%)	37%	13%	5%	37%	8%	29%
7 to 10	30	100%	86,333 (16,696)	73%	12% (25%)	47%	13%	23%	37%	13%	33%
11 to 15	22	100%	86,818 (23,919)	86%	9% (17%)	50%	9%	5%	45%	9%	50%
16 to 20	9	89%	85,278 (29,803)	78%	7% (9%)	44%	22%	0%	33%	0%	11%
Total	108	99%	77,593 (22,371)	78%	9% (19%)	43%	14%	10%	36%	10%	37%

Table 5: Designer Pay

Tenure in Industry	N	Percent W2	Mean Salary	Additional Pay	Mean % Additional Pay	Additional Pay Type					
						Annual Bonus	Project bonus	Royalties	Stock	Profit share	Pension
Less than 1	15	100%	48,167 (12,659)	93%	3% (6%)	27%	27%	20%	13%	20%	33%
1 to 2	68	96%	45,441 (16,600)	82%	9% (25%)	29%	32%	15%	26%	7%	47%
3 to 6	86	93%	54,767 (19,564)	79%	14% (31%)	26%	28%	23%	28%	14%	37%
7 to 10	35	100%	72,643 (28,581)	80%	21% (38%)	17%	31%	17%	37%	14%	49%
11 to 15	21	100%	77,262 (17,427)	90%	19% (32%)	48%	48%	33%	33%	19%	52%
16 to 20	3	100%	87,500 (5,000)	100%	14% (25%)	33%	0%	0%	33%	67%	67%
Total	229	96%	56,714 (22,765)	82%	13% (29%)	28%	31%	20%	28%	14%	43%

4. Not in the Stars but in Ourselves: Social and Individual Explanations of New Venture Performance

Entrepreneurship is a subject of acute interest to organization scholars. Not only are entrepreneurs responsible for new firms, new innovations, and the creative destruction that follows; they also represent a valuable window into the processes that create and shape organizations. A growing research tradition links various aspects of entrepreneurs' human capital and previous organizational affiliations to the fates of the organizations they create (Beckman, 2006; Boeker, 1988; Burton, Sørensen, & Beckman, 2002; Eisenhardt & Schoonhoven, 1990; Hannan, Burton, & Baron, 1996; Phillips, 2002; Shane & Cable, 2002; Shane & Khurana, 2003; Shane & Stuart, 2002; Stuart & Ding, 2006). Contrary to the original Schumpeterian (1934) view of entrepreneurship as the ultimate act of individual agency in changing existing systems, the organizational research tradition instead views the individual as highly embedded and constrained by the social and organizational context in which they operate. While there is ample support for the importance of career history in entrepreneurship, this tight focus on the role of organizational history alone creates two problems. First, it removes much of the individual ability of the entrepreneur from consideration, making the new venture a necessary continuation of existing structures, when individual performance differences and styles may instead provide the opportunity for entrepreneurs to break from existing industry structures. Secondly, studies of the highly embedded entrepreneur places undue focus on the founder themselves, as the primary carrier of social and organizational information for new ventures. This narrow focus on a few individuals ignores the vital role of the first employees of the firm, and creates a rather arbitrary distinction between "who matters" and who does not in the

performance of new firms. It is rare, after all, for entrepreneurial firms to consist only of entrepreneurs, yet little research looks beyond entrepreneurs and top managers to the other early employees that play a role in the success or failure of new firms. By focusing solely on entrepreneurs, theories that attempt to link new venture performance to entrepreneurial human capital or demographics miss the contribution of these other individuals.

This paper attempts to address both of these gaps. First, it will compare the explanatory power of various socially-embedded theories of how entrepreneurs influence firm performance, and will contrast these theories and individual-level explanations of performance. Secondly, it will broaden the scope of inquiry to include initial team members, not just firm founders. The attraction and selection of these first employees is one of the earliest, and most important, works of the entrepreneur (Hannan, Burton, & Baron, 1996), and serves as a visible indicator of founders' entrepreneurial strategy. More than that, however, it is these individuals who will be responsible for the work that makes the firm successful, and from whose ranks the firm will often gain its key executives, managers, and researchers in the future – for better or for worse. Entrepreneurs, no matter how heroic, cannot fill every important role and many may be merely the public initiators of ideas, with other, less well-identified, individuals actually responsible for performance. Extending our knowledge of the factors of new firm performance beyond entrepreneurs to all founding employees is critical in testing theories that link entrepreneurial performance to individuals, whether through social processes or historic individual ability.

4.1 The Literature on Entrepreneurship, Career History, and New Venture Performance

Since Stinchcombe's (1965) insight that organizations are permanently influenced by their founding, a strong connection has been found between initial founding conditions and the eventual performance of organizations across a wide variety of studies (Agarwal, Echambadi, Franco, & Sarkar, 2004; Hannan, Burton, & Baron, 1996; Johnson, 2007; Shane & Stuart, 2002). The explanations for why firms are sensitive to founding conditions vary widely. One particularly venerable tradition focuses on how observable characteristics of the entrepreneurs themselves – their demographic and psychological traits – affect the performance of firms. Generally, attempts to explain the performance of new ventures through psychological factors have had limited value (Brockhaus & Horwitz, 2004; Herron & Robinson, 1993). Demographic measures such as educational attainment and family background, on the other hand, seems predictive of who might become an entrepreneur, but less useful in determining entrepreneurial performance (Roberts, 1991; Shane & Venkataraman, 2000).

A more fruitful line of inquiry has emerged from scholars of organizations, who examine the way organizational endowments pass from existing firms to new ventures through the medium of entrepreneurs, and therefore have a lasting impact on the newly created firms. In this view, the fates of new ventures remain intertwined with the firms that have spawned them. A variety of links between career history and new venture performance have been identified. Broadly, these factors can be divided into learning-based explanations, which examine how experiences from career history can affect future venture performance; genealogical explanations, which are specific to the firms that the entrepreneur came from; and team-based explanations, which focus on the mix of founders and their relationships. Critically, regardless of theoretical approach, all the studies consider founders alone, or founders and other top managers,

as the critical individuals in new organizations, leaving the vast majority of founding employees out of any analysis.

Scholars that examine learning-based explanations argue that the link between new venture performance and career history is dependent on the similarities between career experience and founding experience. For example, Chandler (1996) found the success of new ventures was related to the degree to which entrepreneurs were performing similar tasks in a similar environment to one that they had previously experienced. Additionally, the literature on serial entrepreneurs suggests that both previous founding experience and industry experience tend to increase the success of newly formed companies (Eesley & Roberts, 2006; Gompers, Kovner, & Lerner, 2006). Other work, however, has demonstrated that career history has an influence on the fates of new ventures beyond learning alone. This growing body of literature highlights the critical nature of these previous affiliations themselves on new venture performance.

One way in which career history affects new ventures is as a signaling mechanism. New ventures often suffer from a lack of legitimacy, which makes it hard to raise capital and perform other basic functions that require the assistance of third parties (Aldrich & Fiol, 1994). The way that stakeholders mitigate their concerns is by using past organizational affiliations to judge the quality of a potential innovation or new venture (Burton, Sørensen, & Beckman, 2002; Gulati & Higgins, 2003) In addition to this use of past affiliations, the previous social ties of individual founders serve as an important mechanism in connecting with potential sources of funding and reducing information asymmetry (Shane & Cable, 2002; Shane & Stuart, 2002).

A second direct tie between previous affiliation and future performance is that previous firms serve as a source of the routines and capabilities that are used by founders in their new organizations (Agarwal, Echambadi, Franco, & Sarkar, 2004; Beckman, 2006; Helfat & Lieberman, 2002; Phillips, 2002; Shane & Stuart, 2002). Phillips (2002) demonstrates a number of links between the routines of parent firms and the performance of new ventures, including that the nature and quantity of routines transferred has an effect on the success of future firms. For example, founders affiliated with failed firms are more likely to have unsuccessful new ventures, since the routines transferred are less likely to be of high quality.

Beyond the genealogy of individual founders, the mixes of individuals and skills on a founding team also have an effect on future firm performance. A number of scholars have identified that founding teams that have worked together are more likely to build successful ventures (Eisenhardt & Schoonhoven, 1990; Ensley, Pearson, & Amason, 2002). Further, the diversity of individuals on the founding team seems to lead to success, thus findings that larger founding teams are more likely to succeed (Eisenhardt & Schoonhoven, 1990) and that higher levels of functional diversity on founding teams is similarly important (Beckman, Burton, & O'Reilly, 2007).

Missing from all of these hypothesized connections between the past history of founders and firm performance is potentially the most critical of all – the actual underlying ability of the founders themselves. Ability is usually defined quite broadly to encompass any number of difficult-to-measure traits that are associated with entrepreneurial performance. In the words of Amit, Glosten, and Muller (1990), ability is an entrepreneur's "talent, skills, experience, ingenuity, leadership, etc." in combining resources, building ventures, and meeting customer

demand. Measuring previous job ability is notoriously difficult, so such measures need to either be derived from fixed effects or else proxied with salaries or other metrics (Andersson, Haltiwanger, & Freedman, 2006; Eesley, 2009).

Yet ability lies at the heart of studies of factors that lead to success in entrepreneurship, even if it is rarely directly measured. For example, part of the importance of prior affiliations is that they help to provide some sort of signal of ability to outside sources, such as venture capital firms (Burton, Sørensen, & Beckman, 2002; Gompers, Lerner, & Scharfstein, 2005; Shane & Cable, 2002; Shane & Stuart, 2002). However, the question of whether previously demonstrated ability actually affects the future performance of firms remains open. In this paper, I will use a granular measure of past project performance to attempt to understand the role of underlying ability in new venture performance, and the extent to which ability supersedes other explanations that link new firm performance to career history. But merely accounting for past individual ability still fails to provide a complete picture of the linkages between career history and new venture performance. Individual entrepreneurs may recognize their career history deficiencies in one or more areas identified by scholars, and may choose to fill that gap by hiring appropriate team members. Data on initial teams is often lacking however, but one industry, the electronic game industry, offers both data on teams and an opportunity to examine a context where entrepreneurship is common.

4.2 Entrepreneurship and Individuals in the Game Industry

Now nearly thirty years old, electronic gaming software is a major industry, with over $25.4 billion in software revenues in 2005, and over 144,000 fulltime employees in the United States alone in 2004 (Crandall and Sidak 2006). It also straddles the line between creative

industries and knowledge-intensive industries, combining elements of entertainment and technological innovation. In fact, the scale of modern game projects rivals most enterprise software efforts, and uses many of the same techniques. Though the size and scope of games vary widely, one game from 2004 may serve as an example of the complexity of the game development process. In that case, the core team consisted of 35 people, who, over the course of 18 months wrote 480,000 lines of code, separated into 740 computer instruction files, with a budget of $7 million (Hardy 2004). Games can easily reach over 3 million lines of code, and cost up to $50 million with hundreds of employees involved, which represents a more significant effort than many business applications. Thus, while innovation and creativity are important in the game industry, the execution of the concept resembles standard software development, including incorporation of standard programming techniques, bug testing, and quality assurance.

The industry is organized around firms known as game developers, each of which will have a number of teams working on individual game projects. Game developers handle the design, conception, programming, art, quality assurance, and packaging aspects of game development. Individuals working at game developers have specific roles that are similar industry wide: producers act as project managers, designers are in charge of creative vision, programmers write underlying code, modellers develop "art assets," and so on. These roles represent separate career paths, although movement between certain tracks (most notably from programmer to designer or producer) does occur (Duffy, 2007). In addition to game developers, there is an additional role that firms play in the game industry, that of game publishers. Publishers fund game development, and also distribute and market end products for a share of the revenue.

Additionally, while there are several subsets of the video game market, I have chosen to focus specifically on one segment, PC games, as opposed to console games like those that run on the Nintendo, Xbox, or Sony systems. There are a number of advantages to examining PC games, which make up about 15% of all games sales in recent years. First, as compared to the console game industry, barriers to entry are quite small, as the PC is an open platform, and there are no requirements imposed by manufacturers, as there are with console games. Therefore, we would expect to see the widest diversity of organizational approaches in this submarket. Secondly, PC games have tended to be the innovation leader in the game space, since PC technical characteristics were decisively ahead of consoles through 2006 – almost all major game genres have begun on the PC first. Finally, consoles tend to be limited to the technical frontiers of a particular system, making high graphics and sound quality a priority, while PC games have traditionally had successful games that run the gamut from sophisticated 3-D worlds to static puzzle-solving mysteries, again making it easier to observe a range of potential organizations.

As might be expected of a fast-moving industry where creative fulfillment, as well as economic returns, play a role; individuals in the game industry seem highly interested in entrepreneurship, making it a useful area for study. In order to develop a qualitative context of the entrepreneurial environment, I conducted a survey of career histories that ran in conjunction with an annual salary survey of the game industry (Duffy, 2007), the largest such analysis of game industry employees, and one which includes prizes and incentives to participate. A total of 796 individuals answered the survey, a response rate of 29% of the respondents to the main salary survey. An accurate response rate for the salary survey is impossible to determine, given

that the survey was widely advertised through many of the primary media outlets of the game industry. Thus, there are obviously selection issues in determining the representativeness of the samples for both surveys, so the responses should be considered as qualitative background, rather than completely representative.

As background they are, however, illustrative of the industry context for entrepreneurship. Using a scale of entrepreneurial organizing developed for the Panel Survey of Entrepreneurial Dynamics (Reynolds, 2006), the survey inquired as to whether individuals had ever engaged in various types of entrepreneurial activity (See Table 1). Over 60% had thought about starting a business, 25% had saved money to start a new venture, and 15% had devoted themselves full-time to a new venture. Approximately 10% had achieved positive cash flow, and 10% had hired employees. Interestingly, these activities were not always as highly correlated as might be expected; suggesting highly individual approaches to starting businesses (see Table 2).

[Insert Table 1 about here]

[Insert Table 2 about here]

For all the self-identified entrepreneurs in the survey, I asked questions about revenue and company growth, as well as the initial selection of partners and choices of first employees. At total of 72 respondents had not only started a business, but had received revenues as a result. These ventures illustrate the importance of examining initial teams, as many initial hires were

used to solve problems that founders did not have the human capital to address, in addition to providing labor.

Initial hires were often chosen to fill perceived gaps. For example, the use of founder affiliations to add legitimacy to new ventures has been examined by a variety of scholars (Burton, Sørensen, & Beckman, 2002; Shane & Cable, 2002; Shane & Stuart, 2002; Zimmerman & Zeitz, 2002). Yet, in the case where founders may not provide outside legitimacy, new hires might instead fill that role. One founder in the survey, who started a company that currently generates over $5 million in revenue, suggested that creating legitimacy was a key to early hiring:

> In the first few months (pre-publisher contract) we hired a senior designer and a senior programmer from the previous company... Again we were especially looking for experienced talent in key areas, who would add to our credibility in pitching publishers.

Other entrepreneurs mentioned hiring to fill gaps in experience, or for "contacts," or even for "financial help." Some mentioned that they wanted people who were fun to work with, or with whom they "gelled as a team." That was in addition to the need for these individuals to actually perform the labor required to create a game. For many respondents, both past performance and expected future productivity were all factors in hiring.

At the same time, founder strategies were constrained by practicalities: limited social networks, limited funds, and limited legitimacy. This led to some typical admissions among founders, who hired "low experience people, because that's all we could afford" or "art students

from a local digital art college [because] they work free and are eager." Responses by founders also addressed their own ability to hire: looking for those people "crazy enough to work with me" or choosing to bring on college friends, since they were their only contacts. Alternately, some companies hired whoever was at hand because they needed help quickly. As a result, a wide variety of constraints were also evident in the survey answers, representing a range of compromises.

All of these options represent the strategic choices entrepreneurs make in navigating the tripartite tension between resources, perceived needs, and their own ability to determine what those needs should be. The hiring of particular individual team members was designed to both build products and also to fill gaps in the founding team, but they also represented cost-benefit calculations about the types of investments that founders were willing to make. As such, the selection of the initial team is a powerful, underused tool to understand the nature and effects of founder strategy, as well as to test existing theories of career history and entrepreneurial performance.

4.3 Hypotheses

Drawing on the literature on entrepreneurial performance and career histories, there are a variety of potential ways in which prior affiliations of founders and teams might influence future performance. From the genealogical explanations linking careers to new ventures, two mechanisms have been proposed for how past career experience leads to potential investment – a critical factor in new firm performance. The first is that prior interactions with funders

increase the likelihood of future funding (Shane & Cable, 2002; Shane & Khurana, 2003; Shane & Stuart, 2002). The second is that prior affiliation serves as a signal of quality which is used to make venture decisions (Burton, Sørensen, & Beckman, 2002; Gompers, Kovner, & Lerner, 2006; Gompers, Lerner, & Scharfstein, 2005; Phillips, 2002). Both of these genealogical mechanisms are about how key individuals can indicate the quality of their new ventures. Given that founders are the most visible individuals in new companies, we would expect that these mechanisms will apply mostly to them, and not to their teams.

> *H1. Increased past funder interactions and prior status affiliation among founders will increase firm performance. Increased past funder interaction and prior status affiliations among team members will have a lesser effect.*

Genealogy also plays a key role in the origins of routines and capabilities. Phillips (2002) demonstrated that founders who come from failed companies are more likely to fail themselves, due to the lack of suitability of the routines and capabilities they have been endowed with. When team members are included in the analysis, a key question becomes whether routines and capabilities come from founders or initial employees. Since it is the initial team members that are performing the work, it may be that these individuals are more responsible for inculcating routine, for better or for worse.

> *H2. Team members from failed firms will decrease firm performance more than firm founders from failed firms.*

From the literature on entrepreneurial learning, we would expect that previous experience in the tasks associated with the new venture would be helpful for both entrepreneurs and initial

team members (Bruderl, Preisendorfer, & Ziegler, 1992; Chandler, 1996). On the other hand, functional diversity among founders is linked with venture performance (Beckman, Burton, & O'Reilly, 2007; Eisenhardt & Schoonhoven, 1990; Ensley, Pearson, & Amason, 2002; Goll & Rasheed, 2005). Thus, prior experience needs to be leavened with diversity of experience. Since this combination of experience and diversity would be of value across the entire team, we would expect that task experience and functional diversity apply to both founders and initial teams.

H3. High task experience combined with high functional diversity among both founders and initial team members will increase new venture performance.

Finally, we look at the remaining linkage between past history and future venture performance: ability. Though it might at first seem natural that past ability is predictive of new venture performance, there is no particular reason to expect this to be the case. This is especially true because it is not clear that the human capital developed by individuals in their old organization are transferrable to the tasks required of an entrepreneur in a new firm. Raising capital, hiring, and budget management, for example, are all likely to be novel to a first-time entrepreneur, but more critical to venture performance than any project-level work they have previously done. It is more likely, instead, that the past performance of the initial team will be predictive of entrepreneurial performance. This is because a successful founder may be able to reduce task novelty for her team, thus allowing them to perform more as they have in the past.

H3. High past performance of initial teams will increase new venture performance more than high past performance of founders.

4.4 METHODS AND MEASURES

To test these hypotheses, I used a unique dataset, the MobyGames database. An internet repository of game information, MobyGames lists their goal as: "To meticulously catalog all relevant information about electronic games on a game-by-game basis, and then offer up that information through flexible queries and data mining. In layman's terms, it's a huge game database." MobyGames has information on over 34,000 games, all entered by users of the site on a volunteer basis, according to a detailed set of coding instructions. To ensure accuracy, MobyGames requires peer review for all data entered into the database before such data is accepted. Though the database is not complete, in that there is not full information for all games, the data are of high quality and normalized to well-established standards established by MobyGames.

Using the PC Games portion of MobyGames, I identified a total of 5,794 PC games with credit information featuring normalized titles. Using the credits I generated a set of 112,111 career spells that were associated with 56,673 individuals and 1,552 companies. Since the PC Game industry is well-documented, a number of sources exist for further information on companies, including founders and firm start and end dates. MobyGames is the primary source for such information, though, in addition, the archives of long-running magazine Computer Gaming World and a second game site, Home of the Underdogs, was used for missing data, or to confirm additional information. Information on company status and official founders were identified for 731 firms. These datasets were matched with performance data to create a subset of companies where founder information, team information, and adequate performance data was available.

4.4.1 Dependent Variable: Performance

Definitions of entrepreneurial performance vary widely. A large literature focuses on venture formation itself, examining the factors that lead to new organizations being created, including spawning from existing firms (Dobrev & Barnett, 2005; Gompers, Lerner, & Scharfstein, 2005) and the environmental factors that affect firm creation (Hannan & Freeman, 1977; Haveman, 1995; Haveman & Cohen, 1994). When examining the performance of firms after formation, easily observable events are most commonly used proxies for performance, especially initial public offerings (IPOs) (Beckman, Burton, & O'Reilly, 2007; Gulati & Higgins, 2003; Shane & Stuart, 2002; Stuart & Sorenson, 2003) and successful venture capital funding (Amit, Glosten, & Muller, 1990; Beckman, Burton, & O'Reilly, 2007; Shane & Cable, 2002). A few longitudinal studies use revenue for new firms (Eisenhardt & Schoonhoven, 1990; Hannan, Burton, & Baron, 1996), though these studies often measure revenue across industries or markets, making them somewhat difficult to generalize. In contrast to examining particular success criteria, many organizational scholars instead focus on firm survival as the dependent variable of interest (Agarwal, Echambadi, Franco, & Sarkar, 2004; Hannan & Freeman, 1977; Hannan & Freeman, 1984; Phillips, 2002). This proliferation of dependent variables in studying entrepreneurial performance can make accurately comparing the impact of various factors on new ventures difficult, especially as not every industry has equal dependence on IPOs or venture financing. For this study, I instead use average product revenue, with controls for expected costs.

Between 1995 and 2006, research company NPD Funworld tracked the sales data of every PC game sold through US retail channels for most major retailers, and projected revenues for the rest. This dataset was matched with the MobyGames dataset, and a total of $8.2B worth of revenue was identifiably linked with games in the database. Since the financial database only

covers information from 1995 to 2006, complete revenue information was not available for all firms. A total of 240 new ventures had revenue information on at least two games. Of these, 167 new ventures had both average performance data, and information on previous average performance of teams (see Table 3). This data is what is used for the analysis Additionally, as PC games are, in part, a hit-driven industry (average revenue was $3.2M, but the best-selling PC game of all time, The Sims, sold $260M, more than twice its closest competitor), I used the much more normally-distributed log of revenue for my analysis.

[Insert Table 3]

In addition to revenue, games are often reviewed by third-party critics from specialized magazines and websites. These critics assign scores to each game using a variety of systems. I used the Game Rankings database of 36,792 reviews from reputable magazines and websites as my source of ratings information. Each review was normalized on a 1%-100% scale, with 100% being the highest. Ratings were only used when two or more separate ratings were available for an individual game. Rating and lrevenue are only moderately correlated (.42).

I excluded from my analysis all expansion packs, which are value-added games that will only operate with the original software package, and that add features or additional gameplay elements. Since the performance of expansion packs on the market are circumscribed by the sales of the games on which they expand, they are not easily comparable. I also did not include "casual games" which consist of card games and puzzle games, "adult"-oriented titles, and educational games, as they are generally considered to represent separate markets from the standard PC games industry.

4.4.2 CONTROLS

Team Size. Core team size is a good estimate of cost and effort associated with a game, as personnel costs are the primary expense of most development companies (Rosmarin 2006). Additionally, a large core team size would indicate a more challenging managerial environment, with more need for coordination among multiple individuals. The median team size for games with known revenue or rank is 45.

Year. The market for games can vary from year to year, as both the economy and related markets, such as video game consoles, vary. Year controls were used for the release date of each game in the United States, or, for games that launch in multiple countries, the worldwide release date. Since there was no substantial difference in the results between individual year controls or controls for three-year periods, three-year periods were used as they were more parsimonious.

Genre. Games can be published in a number of genres, ranging from business simulations to "shoot-em-up" arcade games. Though genre choice is a result of firm strategy, they may also attract different audiences and thus have different market receptions. I code for games that are in the strategy, simulation, or role-playing game genre. These genres are coded by individuals entering them into MobyGames, and go through at least one peer review before being accepted.

Licensed content. Licensed content refers to intellectual property from an outside source (such as a movie or television program) that has been incorporated into the game. Licensed content could offer additional name recognition to games, thus boasting their appeal relative to unlicensed games.

Number of Developers and Founders. The number of individual founders and individual team members at founding were controlled for as well.

Number of Previous Companies. The average of the number of prior companies for which the founders or teams had worked is of interest in its own right, but for the purposes of this papers serves as a control for the industry experience of the founders or team, which is not being directly examined.

Founding Experience. I measured founding experience by looking at the number of start-ups previously founded by the founders of the new company. The founding experience is the average number of previous start-ups across all founders.

4.4.2 Independent Variables

Funder Interaction. In the game industry, publishers act as the funding organizations. They agree to pay for the development and marketing of games in return for a large share of the profit, in a way analogous to how VC firms operate. To measure previous funder interactions, I tracked the number of publishers that individual founders or team members had previously worked with on previous games. I then used the maximum number of publisher contacts to capture the publisher networks of founders and team members.

Status Affiliation. I experimented with a number of different measurements to indicate status, all yielded similar results. The one used in this paper is a dummy variable indicating that an individual's previous career spell had averaged in the top 10% of all game ratings. That is, that

the individual had worked on some of the best-regarded games during their previous career spell. The status affiliation is the average of the dummy across the founders or team.

*Experience*Diversity.* To measure task experience, I examined the job titles of founders and initial team members. Job titles are organized into 18 categories, including production, marketing, writing, design, and art. For the first game of a new company, I calculated the percentage of previous jobs that the founder or team member had held that were in the same category as the one for which they were credited for the first game. Task experience is the average of such percentages across either the founders or the initial team. Diversity is measured by the number of job categories, on average held by founders or team members prior to joining the new organization. I then interact these two variables.

Failed Firm Affiliation. An individual is identified as coming from a failed firm if they had worked on the final game in a firm that had been identified as exiting the PC games business. The failed firm affiliation is the average of a dummy variable indicating failed firm affiliation across the founders or team.

Previous Ability. Previous ability is indicated by the past average performance of the games on which each individual has worked. Though my previous essay has argued that individuals bear responsibility for a large portion of the performance of projects upon which they have participated, this is obviously an imperfect measure, given that there are a number of team members on each product. However, participating on successful projects indicates both the ability of the individual, and also the fact that the individual was, presumably, selected to participate on a potentially successful project, acting as a second indicator of ability. For each individual, average past revenue of previous games is calculated. Results were robust for varying

requirements for the proportion of the team that had a past revenue history. The mean of average past revenue for the initial team or founders is used to indicate previous ability.

Multiple regression was used to test the hypotheses using the 167 new firms with identifiable information.

4.5 Results

The results can be seen in Table 4. The first hypothesis, that past founder affiliations that are linked with funding would have more influence on new venture performance than team affiliations, is partially supported. Specifically, Model 2 shows support for the impact of previous funder interactions for founders, though previous company status was not significant. Interestingly, the sign of previous funder interactions was negative, suggesting that increased publisher interactions actually hurt new venture performance. I suspect that this is because some founders moved between publishers because they had bad experiences with previous publishing partners, thus, the positive benefit of publisher experience was mitigated by signals that a given individual might be difficult to work with from a publishers' perspective.

[Insert Table 4 About Here]

Model 3 shows support for the second hypothesis, that inheritance of endowments, such as routines, from failed companies is more likely to affect performance of new ventures where those endowments are transmitted by initial teams, rather than firm founders. There was no evidence for the third hypothesis, since no effect was found from previous task similarity, diversity, or the interactions between the two.

The strongest support was for the role of past ability in determining future outcomes, the fourth hypothesis. A more limited sample that included past founder performance did not find founder past performance significant. The results indicate that individual team members with the best track records continued to perform well in new ventures, despite the fact that the start-up environment is often different from that of established companies.

There are several limitations to this study. First, despite efforts to separate them, it is possible that the variables might be conflating social and performance measures. Past performance, for example, may be indicative of a matching process between individuals and firms based on some unobservable characteristic, rather than a true indicator of individual ability. Secondly, histories of game companies are relatively short, with a mean of six games per firm, which might not measure long term success. Future studies will examine firm failure in an attempt to gain more purchase on this issue. Finally, this analysis only includes firms that have achieved some success: at least two published games with identifiable revenue. By truncating firms with one game, as well as firms that failed to form at all, a potential bias is introduced. However, focusing on venture performance, rather than survival, should mitigate some of this concern.

4.6 Conclusion

Founding conditions have a lifelong impact on firms (eg, Agarwal, Echambadi, Franco, & Sarkar, 2004; Hannan, Burton, & Baron, 1996; Johnson, 2007; Shane & Stuart, 2002), but discussions of individual impacts on founding conditions have been rather arbitrarily limited to formal founders or top managers. This paper demonstrates that the qualities of the initial hires brought into a new organization can, in some cases, have a larger effect on future firm

performance than the founders themselves. Future efforts to examine the impact of individuals in entrepreneurship should consider expanding their scope to include these critical first hires.

Additionally, though a substantial amount of research shows that the career histories of entrepreneurs can have an impact on new venture performance (eg Beckman, 2006; Boeker, 1988; Burton, Sørensen, & Beckman, 2002; Eisenhardt & Schoonhoven, 1990; Hannan, Burton, & Baron, 1996; Phillips, 2002; Shane & Cable, 2002; Shane & Khurana, 2003; Shane & Stuart, 2002; Stuart & Ding, 2006), the extent to which underlying ability explains much of this influence has been unclear. This paper demonstrates that past ability of initial team members is a good predictor of future success, though the past ability of entrepreneurs themselves is less predictive.

Generally, this paper supports the view that new venture performance is not purely fated "in the stars" based on past affiliations, but that it can be much more a result of proven past ability. An expanded view of who has an impact on new ventures is called for, as is more attention to ability, as well as history.

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TABLES

Table 1 Survey of business creation activities

(n=796)

a. Seriously thought about starting your business	0.608
b. Looked for facilities/equipment for your potential new business	0.301
c. Initiated savings to invest in a new business	0.242
d. Invested your own money in the new firm	0.197
e. Organized a start-up team	0.278
f. Written a business plan or other design document for your own business	0.348
g. Bought facilities/equipment for your own business	0.193
h. Sought financial support for your own business	0.157
i. License, patent, permits applied for your own business	0.115
j. Developed first model or prototype for your own business	0.267
k. Received money from sales for your own business	0.127
l. Achieved positive monthly cash flow for your own business	0.098
m. Devoted yourself full-time to your new business	0.147
n. Received financial support for your own business	0.067
o. Created a new legal entity for your own business	0.150
p. Hired employees to work for wages or a salary for your own business	0.095

Table 2: Correlations among business opportunities

	A	b	c	d	e	f	g	h	I	j	k	l	m	n	O
b	0.48	1.00													
c	0.44	0.54	1.00												
d	0.38	0.60	0.61	1.00											
e	0.41	0.54	0.46	0.53	1.00										
f	0.48	0.58	0.45	0.46	0.53	1.00									
g	0.34	0.58	0.51	0.69	0.47	0.44	1.00								
h	0.31	0.51	0.44	0.49	0.51	0.47	0.48	1.00							
i	0.28	0.49	0.42	0.58	0.43	0.40	0.60	0.52	1.00						
j	0.40	0.54	0.42	0.56	0.53	0.53	0.52	0.48	0.49	1.00					
k	0.28	0.43	0.36	0.57	0.34	0.35	0.58	0.36	0.46	0.44	1.00				
l	0.22	0.39	0.33	0.51	0.33	0.35	0.59	0.31	0.41	0.40	0.68	1.00			
m	0.28	0.49	0.38	0.56	0.46	0.40	0.62	0.46	0.49	0.51	0.62	0.68	1.00		
n	0.20	0.40	0.31	0.44	0.38	0.32	0.42	0.51	0.43	0.37	0.43	0.40	0.50	1.00	
o	0.32	0.52	0.50	0.67	0.54	0.48	0.62	0.55	0.62	0.53	0.54	0.48	0.63	0.53	1.00
p	0.24	0.47	0.38	0.56	0.42	0.36	0.59	0.45	0.57	0.44	0.56	0.61	0.58	0.53	0.64

a. Seriously thought about starting your business
b. Looked for facilities/equipment for your potential new business
c. Initiated savings to invest in a new business
d. Invested your own money in the new firm
e. Organized a start-up team
f. Written a business plan or other design document for your own business
g. Bought facilities/equipment for your own business
h. Sought financial support for your own business
i. License, patent, permits applied for your own business
j. Developed first model or prototype for your own business
k. Received money from sales for your own business
l. Achieved positive monthly cash flow for your own business
m. Devoted yourself full-time to your new business
n. Received financial support for your own business
o. Created a new legal entity for your own business
p. Hired employees to work for wages or a salary for your own business

Table 3: Descriptive Statistics

Log(Avg. Revenue)	6.22
	(0.60)
Games	6.10
	(5.08)
% Strategy or Simulation	0.42
	(0.37)
% RPG	0.06
	(0.13)
% Licensed	0.15
	(0.20)
Date of First Game	1998.8
	(3.59)
Avg. Core Team Size	50.36
	(26.96)
Founder N	1.96
	(1.05)
Initial Team N	48.17
	(40.08)
Fndr Prev. Firms	2.24
	(1.59)
Dev. Prev Firms	2.77
	(1.40)
Fndr Category Exp.	0.18
	(0.35)
Team Category Exp.	0.27
	(0.18)
Fndr Prior Foundings	0.07
	(0.28)
Fnder Max Pubs	1.63
	(1.87)
Team Max Pubs	6.30
	(5.01)
Fndr Top 10% Rated	0.05
	(0.23)
Team Top 10% Rated	0.07
	(0.26)
Fndr From Failed Co.	0.12
	(0.29)
Team From Failed Co.	0.10
	(0.15)
Fndr Previous Categories	1.01
	(1.14)
Team Previous Categories	0.80
	(0.42)
Team Worked Together	.102
	(.114)
Team Trailing Revenue	6.26
	(0.62)
Observations	168

Table 4: Regression Models

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model[1]	(7) Model
Founder N	-0.07*	-0.06	-0.06	-0.07*	-0.08**	-0.04	-0.06
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Initial Team N	0.00	-0.00	-0.00	0.00	-0.00	0.00*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fndr Prev. Firms	0.03	0.08**	0.04	0.03	0.03	0.07	0.09**
	(0.03)	(0.04)	(0.03)	(0.03)	(0.02)	(0.05)	(0.04)
Team Prev. Firms	0.08***	0.09***	0.09***	0.08**	0.05*	0.03	0.07**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Fndr Category Exp.	-0.01	-0.08	0.02	-0.01	-0.03	0.08	-0.06
	(0.10)	(0.09)	(0.12)	(0.11)	(0.08)	(0.19)	(0.10)
Fnder Max Pubs		-0.07**					-0.06*
		(0.04)					(0.04)
Team Max Pubs		0.01					-0.00
		(0.01)					(0.01)
Fndr Top 10% Rated		0.16					0.14
		(0.16)					(0.13)
Team Top 10% Rated		0.23*					0.07
		(0.13)					(0.13)
Fndr From Failed Co.			0.07				0.03
			(0.16)				(0.14)
Team From Failed Co.			-0.69**				-0.59*
			(0.33)				(0.30)
Fndr Categories*Similarity				-0.02			-0.03
				(0.05)			(0.04)
Team Categories*Similarity				0.04			0.15
				(0.22)			(0.21)
Team Trailing Revenue					0.33***	0.33***	0.32***
					(0.07)	(0.12)	(0.08)
Fndr Trailing Revenue						0.17	
						(0.10)	
Constant	5.27***	5.21***	5.26***	5.27***	3.39***	2.26***	3.43***
	(0.19)	(0.18)	(0.19)	(0.19)	(0.47)	(0.75)	(0.48)
Observations	168	168	168	168	168	68	168
R-squared	0.30	0.33	0.33	0.30	0.38	0.54	0.42
Adj. R-squared	0.25	0.26	0.26	0.24	0.33	0.41	0.33
F test	6.215	5.835	5.416	5.290	8.245	5.820	6.107
Prob > F	7.01e-09	9.09e-10	2.40e-08	3.97e-08	0	1.11e-06	0

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

All models include controls for year, genre, and average number of developers per game.

1. Note that this model contains only a subset of observations, since previous performance information for founders is limited.

5. CONCLUSION

The three essays in this dissertation represent attempts to "bring the individual back in" to discussions about organizations. I have argued that individual differences explain significant amounts of performance differences, that organizations are sometimes designed to conceal the role of individual activity, and that a wider view of individuals and their ability contribute to understanding entrepreneurship. None of this displaces the importance of the social structures and environmental conditions in which individuals are embedded, but it does suggest that individual action is not so constrained in organizations that it can be ignored.

The great advances in organizational forms at the turn of the 20th century allowed for organizations that were more than the sum of their parts, especially in manufacturing and other heavy industries (Chandler, 1977). Individuals became replaceable parts within the machines of these hierarchical, structured organizations. But, with new technologies and the increasing prevalence of knowledge work, where creativity and specific knowledge trump the assembly line, new ways of organizing are possible (Lakhani, Jeppesen, & Lohse, 2008; Malone, 2004). With these changes, the role of individual differences in explaining differences in performance, strategy, and organizational outcomes is therefore only likely to grow. This dissertation suggests that individual differences already play a large role in explaining how firms succeed or fail, and, I hope, helps lay some groundwork for understanding how organizations might enable individual achievement, as well as constrain and channel it.