

Personal Statement

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Overview

I am a scholar who does research at the intersection of strategy and organization theory. Specifically, I study organizational architecture in dynamic markets, a topic that has become increasingly central to strategy and organization theory as scholars have explored high-technology companies in depth over the past few decades. By organizational architecture I mean the collection of processes and structures (e.g., networks, rules, roles) that shape organizational performance. My ultimate goal is to understand how different architectures allow some organizations to perform better than others in dynamic markets.

I use a combination of case comparison and simulation modeling methodologies. The two methods are complementary in that comparative case studies provide a rich phenomenological understanding needed to produce fresh new theories, while simulation is useful for exploring counterfactual possibilities to develop deeper and more robust theories when additional data is too difficult to obtain. Using this powerful combination of inductive methods, I attempt to contribute theoretical insights about the organizational architectures that enable managers to execute heterogeneous opportunities like innovative products. To date, I have pursued these goals in two main streams of research.

Research

1st Stream: Innovative Technology Collaborations

My first research stream focuses on a specific organizational architecture – technology collaborations – and their capacity to generate technological innovations. Technology collaborations are strategic alliances focused on the joint development of innovations across organizational boundaries. This “collaborative innovation” mode is prevalent in dynamic and interdependent industries where it is responsible for multiple breakthrough technologies, products, and platforms. Examples include the prominent technological collaborations between Intel & Microsoft and Apple & Google that produced technologies underlying the Wintel and iPhone platforms. Building on my dissertation, this stream uses an inductive, multiple case study of technology collaborations in the computer and communications industry. The sample consists of 8 collaborations among 10 major corporations, including some international firms, who are known leaders in their product markets (e.g., semiconductors, systems, software). Tracking these collaborations for three years enabled rich data collection (e.g., over 100 interviews, thousands of pages of data), including a robust multi-factor measure of innovation performance. I highlight four papers from this stream below.

In “Rotating Leadership and Collaborative Innovation: Recombination Processes in Symbiotic Relationships” (*Administrative Science Quarterly*, 56: 159-201, 2011), we explore the processes by which some technological collaborations generate very successful technical innovations with commercial

success while others do not. Unexpectedly, we find that two collaborative processes – consensus and domineering leadership – that might appear useful actually led to less innovation. Instead, more innovative collaborations used a rotating leadership process. This process involves taking turns leading collaborative innovation in discrete phases, and enables partners to access complementary capabilities, mobilize diverse participants, and broadly explore the space of innovations. To our knowledge, this is the first paper to describe the micro-processes of recombination that underlie collaborative innovation. In so doing, it contributes to literature on the organization of innovation. This paper also contributes to network theory by showing how “symbiotic relationships” between complementary partners can combine longevity and mutual adaptation. It has already begun to have an impact with 25 citations on Google Scholar. Moreover, this paper is the winner of the Academy of Management’s Technology Innovation Management (TIM) division Best Paper Award (2009) and winner of the All-Academy of Management Newman Award for Best Paper from a Dissertation (2009). More recently, the published paper received 2nd place for the European Business School best paper award in Innovation Management (2012) and the Honorable Mention Award for Granovetter Prize for best article in Economic Sociology in the American Sociology Association (2012).

In a related paper, “Network Agency Problems: Reconceptualizing the Brokerage Position as a Barrier to Innovative Embedded Relationships,” (working paper being revised for Academy of Management Journal), I explore the initial conditions of successful technological collaborations. Prior research suggests that networks are often path-dependent, and encourages managers to leverage existing boundary spanning ties to facilitate new tie formation that will enable rich, innovative interactions. By contrast, I find that the presence of prior ties makes it difficult for new ties to form and innovations to emerge. Managers of more innovative relationships intervene by “pruning” networks of existing ties across organizational boundaries. That is, they break prior ties, and reconnect the cross-organizational network in order to generate innovative collaborations. This paper contributes to network theory by identifying the emergence of critical network agency problems (misaligned incentives and inferior network knowledge) that derive from brokerage positions. It contributes to innovation research by showing how rewiring ties is conducive to innovation. A prior version of this paper won the Academy of Management’s Organization and Management Theory (OMT) division Best Paper Award in 2008.

Finally, in a new paper project, I use inductive, multiple case methods to explore why some organizational groups (i.e., three or more partners) are more effective at collaboration than others. While prior research on business groups and triadic alliances suggests that multiplex interorganizational relationships generate a number of costs and benefits of collaborating in groups, it does not describe how partners actually create effective group collaborations under these multiplex conditions. This gap is consequential for strategy and organization in dynamic and interdependent environments like the computer industry where the decision to form triads with prominent partners like Microsoft is a very real dilemma many partners face. In my new paper titled “Innovative Triad or Three Separate Dyads? Group Processes, Multiplex Relationships, and Collaborative Innovation” (in preparation for submission to Administrative Science Quarterly), I exploit a natural experiment to compare five cases of potential collaborative triads – two partners who are considering triads with the same prominent third – that I found in my dissertation and subsequently collected data. The goal is to generate insights about

different multiparty collaboration processes used by partners to pursue innovative objectives. In contrast to prior research that frames the discrete interaction choice as “either a triad or three separate dyads,” I find that organizations using a dynamic process I call “group cycling” (where different dyadic combinations are pursued in sequence around a triad) can generate innovative outcomes. The main contribution is to network and organizational theory, which is so far lacking extensive theory about why some collaborative organizational groups are more productive than others.

To recap, this stream of research explores the technology collaboration architecture and its capacity to generate innovations. With comparative case studies of technological collaborations and modeling, I contribute to literature on the organization of innovation with insights about recombination processes that shape collaborative innovation, to network theory with new ideas about agency problems that make boundary spanning networks difficult to change, to research about networked platform industries with ideas linking synchrony, network structure, and intentional coordination, and to research about organizational group collaborations.

2nd Stream: Organizational Structure in Dynamic Environments

In the second stream, I investigate how the structural elements of organizational architecture shape performance in dynamic markets, and how organizations could develop an appropriate amount of structure as they build their first architectures. As in my first stream, I combine both comparative case studies and computational modeling to generate theoretical insights, and address problems with both theoretical and practical relevance.

In “Optimal Structure, Market Dynamism, and the Strategy of Simple Rules” ([Administrative Science Quarterly](#), 54: 413-452, 2009), we explore a fundamental dilemma that emerges in numerous research literatures and that real managers face: balancing efficiency and flexibility within their organizational architectures. Specifically, we investigate the optimal amount of organizational structure in dynamic markets. Building on diverse empirical research supporting an inverted U-shaped relationship between the amount of structure and performance, we have three primary findings: a surprising asymmetric skew (it is better to err on the side of too much than too little structure), significant performance differences depending upon specific dimensions of market dynamism (i.e., velocity, complexity, ambiguity, and unpredictability), and an unexpected robustness of strategy based on simple rules. The main theoretical contributions are to strategy and organizations theory: we sharpen the boundary conditions between the strategic logics of positioning vs. opportunity (positioning and opportunity are most appropriate in predictable and unpredictable markets, respectively) and clarify the structural challenges faced by entrepreneurial vs. established organizations as they adapt to different environments (entrepreneurial organizations should seek to add structure in all markets, while established organizations face a choice to either target predictable markets or devote attention to managing a dissipating equilibrium of structure in unpredictable markets). This paper is beginning to have significant impact on research about organization structure, environment, and performance with over 150 citations on Google Scholar.

In a second paper, “Learning Sequences: Their Emergence, Evolution, and Effect” (Academy of Management Journal, 55(3): 611-641, 2011), we step back to understand how organizations might learn an optimal organizational architecture. This inductive, multiple case study uses the globalization of new high-tech ventures who are developing rules about internationalization (e.g., entering countries like Finland, Singapore, etc.) as a research context. A major contribution is detailing how different sequences of learning mechanisms (e.g., improvisation, trial-and-error learning, vicarious learning) shape what is learned. We find that organizations which use internally focused learning sequences improve short-run performance, while those who rely on externally focused learning sequences can affect true structural improvement. A broader contribution of this paper is to research on organizational learning and structure: we show that the most appropriate learning mechanisms for developing new organizational structures depends on whether the main objective is to affect lasting structural change or immediate financial impact.

Finally, in a new project I develop deeper linkages between organization architecture and strategic management. Taken together, the prior two papers explore how organizational architecture shapes performance in dynamic markets and how that architecture might be developed. An important next question for the strategy literature is how organizational architecture can yield sustained competitive advantage when there is imitation of “best practice” knowledge and organizational structures (e.g., rules and routines). In a new paper titled “Organizational Architecture and Dynamic Capabilities: Network Microfoundations of Competitive Advantage in Dynamic Markets” (in preparation for submission to Strategic Management Journal), I extend my prior “simple rules” model to include employee networks, interaction mechanisms (i.e., transfer, collaboration, and recombination), and imitative spillovers of rules. I find that, while all three mechanisms improve performance, these advantages are generally unsustainable because competitors eventually imitate most or all of the rules. However, the combination of transfer and recombination produces a sustainable advantage by using enough combinations of widely distributed rules so that the focal organization performs better than competitors who occasionally copy some of their rules. I also find that the sustainability and magnitude of the advantage depends on complexity and unpredictability, two critical dimensions of market dynamism. Overall, this working paper contributes to strategy with new theory describing how organizational architectures shape competitive advantage in dynamic markets.

To recap, this second stream focuses on organizational structure and performance in dynamic markets. I contribute to literatures on organizational structure with new theory about optimal structure, dependencies on dimensions of market dynamism, and performance robustness, to learning theory with ideas about sequences that produce new structures, and to research on competitive advantage with new ideas about organizational architecture and network micro-mechanisms that shape whether advantage is sustainable or not.

3rd Stream: Entrepreneurial Innovation on Mobile Application Platforms

I have also begun a major new project exploring how new entrepreneurial ventures innovate and compete in ecosystem architectures supported by mobile application platforms (e.g., Apple’s iPhone and Google’s Android). Examples of popular, innovative apps include Angry Birds, Shazam, and

Goodreader; these ecosystems have generated billions in revenue for the platform-owners and application developing firms. My research in this area focuses on studies using both comparative case and large sample panel data, respectively.

In the first area of research, I am conducting an inductive, multiple case study to develop theory about how new ventures innovate in ecosystems. Although prior research emphasizes that entrepreneurial firms have a unique capacity to innovate, and that technological platforms create strong inducements for new venture formation, the literature rarely examines how entrepreneurial firms actually develop innovations, especially the unique processes that are conducive to innovation in entrepreneurial ecosystems. Instead, most entrepreneurship literature is related to gaining resources, survival, and IPO outcomes and not, surprisingly, innovation. The research is a multiple case study of new application-focused ventures in Silicon Valley; it uses a matched sample design to understand why some ventures create more innovative and commercially successful applications than others. I began this project with data collection in 2010 and am wrapping up data collection now. While tentative, in the first paper I will likely explore unique roles that pairs of founders take on to manage recombination efforts, and transform initial imitative development into highly innovative products. The intended contribution is to organization theory and entrepreneurship where despite some popular accounts of the importance of different founders roles (e.g., Jobs and Woz, etc.), venture team research has tended to focus on broad structural features of entrepreneurial teams (e.g., administrative intensity, background heterogeneity, strong vs. weak ties) and not specific role structures. The study will also contribute to innovation research to discover if recombinant search processes are fundamentally different in resource-constrained ventures in ecosystems, as opposed to large, established firms where most recombinant search research has been conducted.

The second area of research uses a large sample of longitudinal data to understanding a broader set of strategy-focused questions about entrepreneurship. My main collaborator here is Pai-Ling Yin, an economics-trained expert on platform strategy who is also faculty member in MIT TIES group (and formerly the HBS Strategy unit). In ongoing data collection beginning in 2010, we have been scraping daily data related to mobile apps and the ventures that produce them on five major platforms: Apple's iTunes AppStore and Google's Android Marketplace, as well as the equivalent data for Nokia, RIM and Microsoft's platforms. This "scrape data" is large (e.g., 150k ventures with 600k apps on iTunes) and multi-varied, including rich time-varying product-level information across all categories (e.g., games, productivity, exercise, etc.) such as size in megabytes, versions/updates, and descriptions; it also includes various time-varying performance metrics of these products (e.g., download and gross revenue rank, customer star-ratings and comments, etc.). We are supplementing this with an online survey sent to all 150k ventures on the Apple platform (First wave sent on August 15th) to gather data about Top Management Team demographics, backgrounds, experience, and inter-relationships; employee and revenue growth, funding sources, equity splits, and board composition; organizational features such as culture strength, autonomy, and task interdependence; technological competencies in relevant areas (e.g., gyroscope, video processing, etc.); and information about other companies including alliance partners, named competitors, and imitative targets. To our knowledge, this might be one of the largest and most comprehensive databases about innovative high-tech entrepreneurship.

Of course, this extensive data is only as good as the questions we seek to answer. Our goal is to focus on basic strategy questions related to entrepreneurial firms that have been difficult to answer because existing databases lack measures or enough inter-temporal variation to do so. While initial results are only beginning to emerge, these questions include: why do some ventures produce “killer apps” (highly popular, innovative products) while others don’t? Why do some ventures diversify across application categories more than others, and what effect does this have on innovation and growth in the ecosystem? Why explains the decision by some firms to “multi-home” a given application (e.g., rewrite an Apple app for the Google-Android platform)? Do the innovation processes of single-individual firms look different than moderately sized ventures? Why do some ventures imitate effectively (i.e., produce popular innovations based on others’ apps) while others don’t? Does the network structure of prominent rivals in a given niche or application category shape which strategies work and whether innovations are produced in the ecosystem? I am fortunate to collaborate with Pai-Ling Yin, an expert in econometrics and panel data, on some of these questions, as well as a small army of interested graduate and undergraduate RAs. Given the multiple opportunities that are available, I continue to search for appropriate faculty and student collaborators for this research.

Methods Contribution

In addition to my theoretical work, I became interested in how different inductive methodologies (e.g., simulation vs. comparative case) complemented each other during theory development. This interest led to a companion paper “Developing Theory Through Simulation Methods” (Academy of Management Review, 32(2): 480-499, 2007) aimed at clarifying the role of simulation methods in theory development. We argue that simulation is a particularly useful method for exploring and extending basic theories developed through inductive, field-based research and formal modeling, especially when those theories involve nonlinearities and dynamic processes. We also contrast computational approaches (e.g., stochastic process models vs. NK vs. system dynamics) and outline a roadmap for conducting high quality simulation research. To my knowledge, this is the first paper which clearly describes how non-simulation scholars can consume simulation research, and assists simulation scholars in positioning their contributions for this broader organizations audience. This paper is used in multiple PhD seminars, and has had significant scholarly impact with over 300 citations on Google scholar.

Teaching, Community, and Service

My teaching focuses on MBA and PhD courses. For three years, I taught 15.912: Technology Strategy, which I took over from Rebecca Henderson. Teaching Technology Strategy to MBAs is a rewarding experience that complements my research with new examples and questions. Last year, I taught a revamped 15.912: Strategic Management of Innovation and Entrepreneurship in the newly designed TIES curriculum where I focused broadly on innovation and entrepreneurial strategic management. (The goal of this new curriculum is to develop multiple, shorter and smaller courses in the Technology Innovation, Entrepreneurship, and Strategic Management areas.) My new course occupies an important role in the curriculum, since it is the capstone course in the Entrepreneurship and Innovation track for MBAs, although Sloan Fellows (similar to an executive MBA program) and other experienced students can also enroll. Both these courses are popular with students; I consistently score above the MIT

Average for Class and Professor Ratings. I also teach 15.990: PhD Seminar in Strategy and Innovation which surveys the main theoretical traditions in these areas, balancing some classic and some new papers in our readings and discussions – the course is popular with registering students drawn from MIT, HBS, and BU. I also try to be an active contributor to MIT Sloan’s BPS area, having previously co-organized the BPS Junior Faculty Conference and the Strategy Group’s seminar.

Summary

Overall, my research focuses on organizational architecture and its effects on performance outcomes like technological innovation that are relevant in dynamic markets. Using comparative case and simulation methods, my main contributions are theoretical insights about dynamic processes related to architecture including (1) how partners manage the collaborative innovation architecture with rotating leadership, network pruning, and synchronization processes that are relevant in dynamic and interdependent industries and (2) how organizations manage an evolving amount of structure in their architectures and its relation to optimal performance and sustainable advantage.

I am fortunate that after five years as a faculty member my research is starting to have an impact on other scholars. This includes over 500 citations on Google Scholar, but perhaps more importantly a seemingly real impact on the conversation about how to conduct research using simulation methods about organizational architecture, as well as how to develop high quality qualitative research about innovative and entrepreneurial architectures in dynamic markets like the computer industry. I was recently honored to receive the Academy of Management Technology Innovation Management Division’s Emerging Scholar Award, which is given to one “emerging scholar who has already achieved a solid publication record and whose scholarly contributions show great promise to become influential or path breaking in the TIM domain.” I was truly humbled to receive this award, and hope that I can continue to produce work that others find useful.