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**Navigating Complexity in an Internet of Things Era:
A Case Study of Entrepreneurial Leadership in a Silicon Valley IoT Startup**

A DISSERTATION SUBMITTED TO THE FACULTY OF THE SCHOOL OF
EDUCATION OF THE UNIVERSITY OF ST. THOMAS

ST. PAUL, MINNESOTA

By

Bradley K. Canham

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF EDUCATION

April 4, 2023

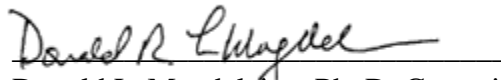
UNIVERSITY OF ST. THOMAS, MINNESOTA

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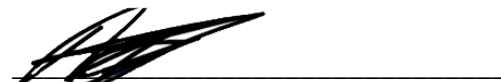
We certify that we have read this dissertation and approved it as adequate in scope and quality.

We have found that it is complete and satisfactory in all respects, and that any and all revisions required by the final examining committee have been made.

Dissertation Committee



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DEDICATION

This study is dedicated to entrepreneurs. Your passion for creating the future in the face of uncertainty is inspiring. Thank you for trusting me with your stories.

ABSTRACT

Research into the inner-workings of high-tech startups in the field of leadership within the United States is needed. The accelerating impact of technology on society is clear. The Internet of Things (IoT) is a primary technology of an emergent era, the Fourth Industrial Revolution (Industry 4.0). Silicon Valley startups germinate many of these Industry 4.0 IoT technologies. The current understanding of leadership in IoT startups is often based on media reports, recounting villains and heroes. This is not that. This is a qualitative, normative case study based on the researcher's insider status at an IoT startup. Insider case study research into leadership of this type is sparse. Based on a review of the literature, multiple one-on-one interviews were conducted with leaders in an IoT startup. An additional 12 interviews were conducted with leaders in the IoT startup field. This study asks: What does it take to lead an IoT startup in Silicon Valley? The data supported the use of Goffman's (1959b) dramaturgy as an analytical tool for leadership. The leadership at IoT Inc. took on prescribed roles in formal and informal settings. Bourdieu's (2020) social capital, habitus, and field concepts are also supported for analyzing IoT startups. The individuals at IoT Inc. used social capital, and exhibited habitus based on experiences and expertise while interacting with the IoT field. Chia's (2013) process-orientation and application of knowledge types like *techne*, *metis*, and *phronesis* is supported. Leaders in the case study exhibited complexity-based leadership when pursuing opportunities in an environment of constrained resources. The data demonstrated that entrepreneurial leaders with accumulated social capital and habitus, who understand the dramaturgical context of an emergent technology field, can use forms of expert pragmatic knowledge to navigate the complexity in pursuit of a vision.

Keywords: entrepreneurship, IoT, case study, complexity, leadership

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INTRODUCTION AND RETROSPECTIVE

There is a fundamental distinction between the reward for taking a known risk and that for assuming a risk whose value itself is not known. It is so fundamental, indeed, that ... a known risk will not lead to any reward or special payment at all.

(Frank Knight, 1921, *Risk, Uncertainty, and Profit*)

Evolution of a High-Tech Career

Buffeted by rising winds of change in the world, the word *uncertainty* reverberated ever louder during my research into an Internet of Things (IoT) startup in Silicon Valley. If it was told in the manner of an epic sea tale, this period was as a multitude of ships scattered and spun by a raging storm in an endless night creased with lightning. The world weathered lockdowns amidst social, economic, technological, and political upheavals. Seeking a recognizable path in a sea of uncertainty, we peered into the dark and ourselves. The world sailed past signs warning “Here be monsters” into the grip of a postmodern interregnum. As the broader era unfolded, I researched the nature of leadership while onboarding an IoT startup with my colleagues and we attempted to navigate the emergent IoT field of the Fourth Industrial Revolution.

Yet, despite all the drama, bills still needed to get paid. It is with this pragmatic perspective in mind that I often felt the research provided a unique vantage point. It linked the past to the tumultuous present, near-future, as well as well-trod theories to my career trajectory and the need to get things done. At a basic level, I am curious. I conceived of doing this dissertation at the tail end of bringing an Internet-based technology startup to fruition. At that time, I was increasingly curious about the next version of the Internet—the IoT. Shortly thereafter, and as is a characteristic of startups, an old friend presented an opportunity to join an IoT startup in a leadership role. I made the move.

But first a little historical perspective. I began my work career in my family's small-town retail business, which is now gone. Decades ago, boys from the high school hauled the brick building's contents into the back lot where it was sold in a live auction. At the time, a simultaneous unraveling was disrupting century-old rhythms in small rural communities across the United States; Walmart's domination of retail stores, globalized competition, technological shifts, and a flight to cities by young people seeking opportunity and the future (Alexander, 2017). In 2003, after 115 years, the building was sold.

I appreciate the past. However, I am, perhaps like my immigrant great-grandfather who started the business, more curious about the future. In my office is a stenographic cylinder with my great-grandfather's voice engraved into its beeswax, yet I have not sought a means to listen to it. He fled a famine in Sweden in 1882, leaving his family for the uncertainty and opportunity of America. As the decades unfurled, and the American arm of his family branched into the future, the connection to the hometown in Linneryd, Sweden, faded.

I grew up in the house where he settled. His son, my grandfather, flew a Swedish flag at that house, but this signifier of identity clung less and less to subsequent generations. My children know nothing of their Swedish cousins. In parallel to my great-grandfather's voyage and break from his own family, the joke in my immediate family is nobody knows what I do for a living. The startups I navigate across technological seas and the new shores I find myself on are all a bit of a mystery to them. This dissertation too recounts confronting the fundamental uncertainty, and mystery, of entrepreneurship. What can I say? Entrepreneurs' maps are incomplete; we fabricate them as we move forward from possibilities to probabilities to opportunities.

Key Learnings and the Experience of Finding Them

Somewhere along this doctoral journey, I heard if an education does not transform a person it is not a full education. I can say I have learned during this research project, and I believe it has been transformative. During the doctoral journey, I have embraced the transformation to the best of my abilities. I have experienced sudden dunks into uncertainty shaking me to the core of my identity. At such times, personally and professionally submerged and overwhelmed, I wove threads of persistence, expertise, and connection to weave a self-rescue rope. I gripped and grappled with new ideas, technologies, and novel situational challenges along this voyage.

My long fascination with technology and career in technology-oriented businesses has, at times, reminded me of the William Gibson quote, “The future is already here, it’s just not very evenly distributed” (Chatterton & Newmarch, 2017, p. 1). In the 1970s, I was thrilled by the subspace ‘Communicators’ of the black and white television series *Star Trek*. In the early 1980s, I played an early dial-up game in a small room located in the math and science section of the high school (Toppo, 2021). The game combined a phone dial-up to a local university, a local floppy disk computer program, and a dot matrix printer. Players guided a party of characters on an adventure, similar to the wide-ranging and imaginative *Dungeons & Dragons* game that consumed my snow days and weekends.

Also in the 1980s, I was passed an AT&T phone hack, a series of codes enabling free long-distance phone calls from pay phones nearly anywhere in the world. I was too poor to own a computer, but I interacted with friends who had early Apple® Macintosh computers as well as early portable computers which connected online via phone modems. In the early 1990s, at a job in a mortgage company my colleagues and I experienced the guilty pleasure of a local network

containing information about celebrities' assets (I recall that Farah Fawcett owned several high-end cars) via terminals connected to the company's database.

Shortly thereafter, as a hard news journalist (politics, crime, etc.) at an Associated Press (AP) newspaper, I banged out news articles on a cursor-driven green screen, a cathode ray tube (CRT) terminal on a local computer network. These local journalism stories were, in turn, supplemented by images from around the world supplied by a phone-based modem connected to a special AP terminal. I became increasingly fascinated by these near real-time images, and in the flow of press releases mailed to the newspaper, I noticed a growing shift towards technology news. I traveled to Sioux City and purchased a Gateway® 486 computer from the cow computer company that had launched in a South Dakota barn, (Knight, 2022). I subscribed to the Internet service America Online (AOL). At that time, fewer than four million people subscribed to online services (Yin, 1993). At this point in my life, it is more than 40 years since I first experienced an remote connection with a computer.

My experience of the unevenly distributed future continues. The IoT startup and case study of this dissertation, where I was an inside researcher has ended. Instead, I am with another Silicon Valley startup, focused on the IoT's technological bedfellow, artificial intelligence (AI). On occasion, I reflect in amazement at the new technological shores I routinely find myself standing on.

What is behind the leadership, people, and processes of these pockets of the technological future as they energetically bubble up into the entrepreneurial present? As a marketing professional in these entrepreneurial endeavors, the technology and its relevance can be difficult to explain to those outside the field. The unique characteristics of startups associated with these technologies are doubly so. On the face of it, a high-tech startup organization is substantively

different than an immigrant's faded family legacy. The sensory details of a retail store, like the pencil markings on a yellowed inventory booklet, have been replaced by digital code. Some things, however, have not changed. They all involve technologies, locations, people, and their visions, as well as the uncertainties, involving aspirations for the future.

As my dissertation wraps up, I am reminded of other choices and journeys. I retain an appetite for risk-taking. The lure of the untrodden path and its risks is sweet and persistent. The nexus of emergent technologies and people lead to intriguing new places. My career within technology companies reminds me of the introduction to the *Star Trek* show from the 1960s - a continuing journey, "To explore strange new worlds ..." (Johnson & Roddenberry, 1966). In my mind, it is also reminiscent of my great-grandfather's sea voyage to America in the 1880s.

When I consider the past 25 years, my varied career in high-tech marketing has evolved with the dynamic growth and changes of the high-tech industry itself. I have worked in several high-tech organizations ranging in size from Fortune 500 firms, mid-sized firms, and team-based startups to sole proprietorships, each in its way extending digitalization transformation. In those roles, I participated in the launch of new digital products to the public including Microsoft's Windows 95, helped to build the Internet's infrastructure of fiber cable as part of a telecommunications firm. At other firms, college students' unfettered access to those same Internet pipes were throttled and monitored for breaks and slowdowns.

My leadership titles have included: manager, vice-president, CEO, co-founder, and owner. Despite variations in size, it's invariably surprising to witness how things work after joining—or founding—a high-tech firm. Carefully constructed plans and the most recent business models often ride shotgun to decisions based on leadership power or technical hunches. Seemingly prudent admonishments to listen to the customer when introducing new technology

are flipped over by pointing out that the customer does not know what the new technology is, how to use it, or why they should care. In this context, my long background in discerning what and how to communicate in these technological environments is valuable. I felt that was also the case in learning how high-tech entrepreneurial leadership in the new field of IoT operates. Informed by my research, I managed to see things from a new perspective which I hopefully can share with the reader in the following pages.

But the stories of the high-tech business space are similar in many respects to other businesses and eras. Money matters. Careers do not always go as planned. Carefully crafted narratives, like this one, often are not the straight lines they appear to be. Only from a certain distance do lives, careers, and technologies appear to steadily progress like hardy branches of evolution. When viewed up close, individual paths twist, double back, cross, and break. They accumulate, slough off, shrivel, and accelerate—at times, incredibly, all at once.

I have laid people off and been laid off. I have accumulated individual stock equity awards with an eye toward an early road to retirement and watched them become worthless. And I have experienced the opposite, rewards that seemingly come from nowhere. Moreover, within the context of these high-tech organizations, I have witnessed and made decisions with new ethical, cultural, and social implications. During my high-tech career, fundamental terms like freedom, power, and change have taken on new meanings. The creative destruction of high-tech capitalism embracing and discarding new ways of recognizing opportunities, competing, and succeeding occurs faster than ever.

Over time, aspects of my high-tech career progression include standard linear trajectories, for example, moving from boot disks software on floppy disks in the 1990s to wireless data flowing at the speed of light, back-of-the-napkin math to the morphing algorithms of AI, clunky

login processes to the persistent surveillance of a human heart rate and bodily location constantly captured – and reported. Other aspects, like the entangled quantum qubits of the new physics, are random, appearing suddenly, but with great impacts, such as social media memes assuming a normative quality only in the rear-view mirror. At IoT Inc., my career has intersected with the next wave in high-tech, the IoT, at a high-tech Silicon Valley firm with an international marketplace. Again, the path is one of building business and social momentum while navigating the complex micro and macro forces of change, power, and freedom inside the company and out.

The promise of IoT, like the Internet before it, includes new nonlinear qualities, business models, ways of seeing, and likely more than a few random, but impactful surprises along the way. How was this journey's success or failure measured? How did my fellow leaders balance and maneuver between the new, unforeseen, and often competing, business and ethical forces presented? The central consideration of this research is how, and what does this continuing mission into the high-tech near future reveal about the evolution of entrepreneurial leadership into the IoT?

Navigational Guidance

The story of this complex entrepreneurial experience is presented as a voyage and to help take the reader through it I indulge in a nautical theme. In Chapter One I review the scholarly literature which serves as an academic foundation for the analytic and methodological approach to this study. The literature review places the IoT case study in a historical context, touches on concepts informing entrepreneurship, and describes the technology at the core of the startup. In the review of the social space studied, I reference Erving Goffman and the concept of dramaturgy, as well as Bourdieu's concepts of social capital, habitus, and field within the context of the analysis of leadership. I have acknowledged, but largely positioned the research outside

entrepreneurship's commonly referenced operational models, many stemming from the Internet era, like *Crossing the Chasm*, to provide a more complete perspective informing the analysis of the case study. I have expanded the perspective with complexity theorists, like Wheatley and Bohm. I have also referenced scholars researching new lines of business and organizational theory like Nonaka and Chia who participate in a process-oriented body of inquiry broadly informing this research.

In Chapter Two, the qualitative normative case study approach is defined, reviewed, and defended as is my role as a participant researcher into leadership at IoT Inc. During the qualitative research, a series of interviews were conducted and observatory notes, as well as digital and print artifacts, were used to iterate on themes as they emerged. Flyvbjerg's research into phronesis as well as Detienne and Vernant's definitive study of another pragmatic form of knowledge, metis, are described within the context of the study. In Chapter Three, the details of the methodology, including LaMagdeleine's leadership imagination framing, are described.

In Chapter Four the backgrounds of the individual crew members who, like Jason and the Argonauts, sign on to IoT Inc. for a journey into the unknown. Their backgrounds, and how they relate to the wider entrepreneurial IoT field are presented. In presenting these historical backgrounds, the habitus of the core team members as well as their relationships with technological entrepreneurship portray the evolution of careers and technology alike. Their stories are often told in their own words. Moreover, common rules of the road when joining entrepreneurial IoT situations are presented involving Bourdieu's concept of social capital as well as Granovetter's strength of weak ties in networked relations. The chapter concludes with the key role of visions in Silicon Valley startups, including the nature of visions in the IoT Inc. startup, and their impact on core team members.

In Chapter Five, the IoT Inc. startup launches into a new chapter of its existence pivoting from a business-to-consumer (B2C) company to a business-to-business (B2B) effort. As is detailed in the data presented, IoT Inc.'s organizational pivot occurs over a period and is fraught with social and technological implications. Goffman's dramaturgy and Bourdieu's habitus orient the reader as the story unfolds the who, what, why, and where of the front stage and backstage meetings, actions, and events. As the drama unfolds conflicts arise, constraints and principles clash, and individuals on the core team make decisions impacting IoT Inc. as well as their personal lives and careers. The data reveals that different perspectives inform a collective sense of what is happening, or not happening, as funding and deals are planned and pursued. Unsurprisingly, all does not go as planned, and yet patterns emerge as IoT Inc. connects with the wider IoT marketplace and field.

As an entrepreneurial pursuit, IoT Inc. was, by definition, a risky venture. Chapters Five and Six describe key scenes involving how various forms of expertise are employed to navigate uncertainty and complexity. The actions within these Goffmanesque mini-dramas – Monday morning meetings, the pivot, a trip to Barcelona - are reviewed considering an ensuing turn of events that were, paradoxically, both surprising and not at all surprising. Deliberations into the path forward and how those deliberations occurred revealed the power structures and well as individual preferences for different knowledge types, *techne*, *episteme*, *mētis*, *phronesis*, and *arete*. A discussion about how the habitus of entrepreneurial leaders is influenced by these cognitive structures, how they interacted within IoT Inc., and how future IoT entrepreneurial ventures are impacted by them is raised.

The final Chapter Seven summarizes the arguments the data highlighted. It also explores the data provided within the context of navigating complexity and events as they have unfolded

up to the present day. In a sense, the Epilogue provides a full-circle view by updating the reader about the present-day status of core team members and the IoT Inc. startup. The dissertation's implications and conclusions sections point to areas of further study. In short, the implications support LaMagdeleine's approach to leadership research in an IoT entrepreneurial setting, including the use of metaphors drawn from quantum physics. It is also suggested that an increased awareness of habitus and the use of, and preferences for, various knowledge types within core leadership teams navigating complex entrepreneurial environments, as an area of future research.

CHAPTER 1: REVIEW OF LITERATURE

“Such a portentous and mysterious monster roused all my curiosity.”

(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

Leadership is a young discipline with an old face. It has at least 110 definitions (Rost, 1991). Like Melville’s great sea leviathan, the topic of leadership seems to be everywhere, yet no one can track it down. Previously, the study of leadership often centered on the context of the times and the leaders who arose (Bogardus, 1934; Northouse, 2013; Toma et al., 2020).

My leadership studies at the University of St. Thomas occurred while I was in leadership positions at technology startups in the Midwest and Silicon Valley. The resulting dissertation is informed by the traditional scholarship on leadership while also pointing to newer leadership research informed by the complexity and advent of the Fourth Industrial Era (Industry 4.0) (Uhl-Bien et al., 2007).

To further situate the reader, the following chapter contains two sections, each with an analytical framework designed to work together to understand the case study presented and analyzed in Chapters 3-6. Additionally, several chapters and sections include historical reviews to contextualize the aim of this dissertation, which is to provide an enriched understanding of leadership. Therefore, this dissertation touches on a variety of topics relevant to the case study and its analysis, such as entrepreneurship, sociology, technology, physics, and leadership. The histories presented are of necessity comparatively brief. Each topic deserves its moment in the sun, however, the spotlight in this dissertation is reserved for leadership.

The first section of this chapter reviews histories and theories of entrepreneurship and technology within the context of the IoT Inc. case study. The second section focuses on the literature used to analyze leadership occurring at IoT Inc.

Applying traditional definitions of leadership to digital entrepreneurship creates paradoxes. Traditional leadership often presumes replacing uncertainty with its opposites - stability, and certainty. And yet, entrepreneurship is defined by its fundamental uncertainty (Knight, 1921; Sarasvathy, 2009). Fortunately, there are additional perspectives on entrepreneurship and leadership, as well as how they interrelate. They are both young sciences and a single definition of entrepreneurship and leadership continues to elude scholars. Recent scholarly debates in both fields involve lines of research centered on complexity and emergence.

In my personal experiences involving entrepreneurial leadership, a strict definition of leadership is less relevant than a pragmatic orientation attuned to leadership as a process. In this sense, leadership centers on *becoming* rather than *being*, as pragmatic interests dictate, and situations arise. This investigation into the seeming paradox of leadership in entrepreneurial settings reminds me of how paradoxes and the dispositions of the experts who live them unveil broader insights into fields like Silicon Valley.

As an analogy, I offer a slight digression into my first encounter with a friend who is an architect. Initially, his curious, seemingly paradoxical, manner of speaking about locations and structures caught my attention. Later, I realized his manner of speaking reflected a uniquely architectural disposition, a *habitus*, wherein the seemingly empty spaces within and around structures informed his perspective and speech, as much as, if not more than, the material structures themselves. In short, his language rendered the visible more visible by speaking of empty spaces. Chia (2002) described the invisible forms of knowledge used by experts as the tacit dimension of a largely hidden cognition order.

The paradox, which sharpened rather than dulled, my understanding of my friend and the topics of his expertise, has stuck with me. In effect, his disposition used a concept rife with

uncertainty – space - to create understanding and support pragmatic results. In subsequent years, I have encountered similar, seeming paradoxical means involving experts in fields who render their expertise simultaneously inside and outside the expected lines. The process-oriented areas of judgment, attention, and disposition, in other words, *becoming*, more than the reified knowledge of a field, is the provenance of expertise. In turn, these process areas, filled with contradictory organizational guidelines and signals, require experts who don't simply navigate paradoxes, but exhibit characteristics of paradoxes and the ability to use paradoxes. Paradoxically, the *virtuoso's* inner disposition requires the application of expertise beyond the predefined frame for expertise in their field. Experts push past the boundaries to where the language is still being invented.

For instance, novice nurses adhere closely to the guidelines of medical protocols to manage patient care. By contrast, expert nurses use their 'best judgment' to disposition care. Experts notice and pick up on signals beyond the guidelines, as exemplified by a nurse who senses hesitation in a patient's voice during an annual check-up call. Despite a medical clinic's pressure to efficiently manage time, an expert nurse provides space for the patient to tearfully describe symptoms similar to post-partum depression. The expert nurse deftly maneuvers through the clinic's rigid scheduling of appointments in physicians' calendars. The expert nurse discerns the patient's depression, records it, and supports the patient by creating an appointment for the next day. Through tears, the struggling mother sighs with relief and says thank you. What is the language for such expertise combining compassion, expertise, intuition, medical insights, and system navigation?

My intellectual pursuit of leadership and its paradoxes similarly reflects my disposition to branch into seemingly unrelated topics and return, hopefully, with flashes of illuminated

understanding. Understandably, this can also lead to less productive type branching which I have sought to minimize. I leave the net result to the reader's final judgment. I am a wanderer by nature, and where I have wandered too far leading the reader astray, I apologize in advance.

The exploration that follows is not rendered as a list, nor a loud proclamation. Instead, the leadership dynamics of entrepreneurial startups involved my curiosity about visible as well as quiet, nuanced, and invisible, yet consistently substantial, expert actors and forces. By way of contrast, the popular titles of leadership books in the entrepreneurial marketplace are, perhaps of necessity, rendered visibly, loudly, and as concretely as possible. I am referring to declarative book titles like 'The Top 10 Slippery-Principles of Fishmonger Leadership' (a pseudonym). Instead, my leadership scholarship seeks to render an active, yet elusive type of informed attention initially described here as a *knowing*, a bit more visible. But, before this paradoxical attempt to describe the invisible, I review the scholarly literature in the hopes of providing the reader a rather more solid buttress from which to view this seemingly enigmatic perspective.

Thus, in the first section, entrepreneurial literature, especially as associated with technological change, is described. Moreover, a historical context is provided for understanding entrepreneurial research involving innovative technologies. Then, with broader historical eras in mind, the trajectory of the specific Bluetooth networking technology involved in this case study is elaborated and contextualized. Concepts of leadership follow, traditional and emergent, reviewed alongside the high-tech context of the case study.

In the next section, the analytical framing is presented: dramaturgy as built within the symbolic interactionism and Chicago School tradition (Goffman, 1959b); Bourdieu's habitus, social capital, fields encapsulating the social environment in the case study (Bourdieu, 1977; Bourdieu, 2020; Bourdieu, 2021); Flyvbjerg's (2001) phronesis and case study approach, serving

as practical and visible scaffolding alongside phronesis's equally pragmatic but decidedly less reflective companion, metis, as described by Scott (2020) and Chia (1996, 2009, 2017). Chia also places these analytical perspectives firmly into an entrepreneurial frame informed by the emergence and process orientation of quantum physics (1996, 2002). Finally, LaMagdeleine (2016) ties Goffman, Bourdieu, and Flyvbjerg to a case study approach, drawing the case study context specifically to an outcome centered on the analysis of leadership.

Informed as it is by technological and social aspects, tasking the reader with understanding a historical journey into the presented case study as well as a complex analytical framework, is a big ask. It is necessary for capturing the complex and elusive nature of the case study. Capturing the true nature of a transforming, border-crossing entity, like an emergent entrepreneurial startup, requires a *binding* capacity at least as complex as the entity (Scott, 2020). In this case, the net constructed is composed of the data of the case study interwoven within the analytical framework of ideas.

In this case, the reward is tied to the journey, not just along a linear path, but in an unfolding experience. The hope is that along the way the reader's understanding of the essentials and insights at the core of the case study will resolve satisfactorily somewhere along a continuum on the distant shore of the final page. If some measure of this is accomplished, I humbly propose the reader's voyage will reveal as well as mirror the journey and lived experience of leadership in a high-tech startup.

History and Relevant Literature

Firstly, I begin with a review of high-tech entrepreneurship within a historical context of eras and revolutions. The Imagination Era began in 2018 replacing the Industrial Era. The Fourth Industrial Revolution (Industry 4.0) also began in 2018 marking the end of the Industrial Era.

The Industrial Era began in the 1750s. It replaced the Agricultural Era which began around 10,000 BC.

Few people are aware that we are living in a new Imagination Era. They are aware Industry 4.0's innovative technologies are transforming Western society on an unprecedented scale. Even so, the patterns and forms of previous historical revolutions and eras continue to persist. A new era does not simply replace the previous one. Like accretions in a geographic landscape, the social and material components of previous eras undergird, infuse, and at times, continue to dominate the current organizational, leadership, and entrepreneurial landscape.

For instance, in entrepreneurship, despite the availability of methods to cross chasms, fail fast, or agilely iterate, three-quarters of IoT projects fail (Cisco Systems Inc, 2017). Moreover, the survey reported this is largely due to “human factors, like culture, organization, and leadership” (2017, para. 5). In other words, bringing IoT products in to fruition is no more successful than in past eras. In a sense, the technology advances, but people remain the same. The people and leaders in startups are central to the situation. Entrepreneurial failures are common (Venkataraman et al., 1990) but that is not an excuse for complacency when a major aspect of the economic and social future is in question.

There are often multiple reasons why startups fail (CB Insights, 2018), and currently IoT projects usually fail (Shedletsky, 2000). Although the term IoT is suggestive of technology, a survey of 1,845 IoT projects indicated nearly three-quarters fail (Beecham Research, 2020; Cisco Systems Inc, 2017), and often human factors, including culture and leadership are major elements (Delaney et al., 2017) in that accounting. And yet, when IoT is successful, however, the benefits are clear. For example, by reducing the building time of a custom Harley-Davidson motorcycle from 18 months to two weeks (Kranz, 2017). This is an important context in the

emerging story of how IoT and IoT entrepreneurial leaders pursue success or failure as a majority do (CB Insights, 2018), during the relative infancy of a market valued at \$3.9 trillion by 2025 (Jalali et al., 2017).

Notably, these small firms have a strong impact on the economy (Delmar et al., 2013) with 99 percent of United States firms composed of fewer than 99 employees (Headd & Kirchhoff, 2009). The importance of these firms is such that governmental policymakers have an ongoing interest in ensuring innovative firms and entrepreneurial activities are included in planning (Delmar et al., 2013; McNeill, 2017). Efforts to support entrepreneurship are globally considered core to urban planning and economic health (Florida, 2003; Hartley et al., 2018) and increasingly in rural areas (Merrell, et al., 2022).

Researchers point to the copious evidence that innovation-driven economies drive growth (Hartley et al., 2018) to include job creation, noting small startup firms create most of the new jobs in the United States (Kirchhoff, 1994). In turn, Silicon Valley's high-tech entrepreneurial urban innovation is viewed as an eminently exportable model used worldwide by urban decision-makers as a path to economic and cultural renewal (McNeill, 2017). Even so, others point out the exported Silicon Valley model is itself, not static. Silicon Valley leadership culture is in flux, said Pulitzer prize-winning journalist Charles Duhigg as there is a "basic tension within Silicon Valley right now. Is it all about the genius inventor or is it about the teams, the organization that's larger than any one person, that pushes through success?" (Wood, 2019, para. 5). Moreover, others argue the celebration of innovation at Silicon Valley firms masks the social values being destroyed by entrepreneurial activities to include toxic business, social, and environmental impacts (Lundmark & Westelius, 2019). Even so, as McNeill (2017) noted, "there is little counter-critique to the start-up ideology within urban policy forums" (p. 235).

In general, the innovations entrepreneurial endeavors bring to the economy are important to the overall strength and structure of an economy (Kirzner, 1999; Schumpeter, 1961; Shane & Venkataraman, 2000). Further, entrepreneurship is described as filling critical gaps by embodying technical knowledge in products and services (Arrow, 1962), filling inefficiencies in economies (Kirzner, 1999), and delivering innovation into capitalist society (Schumpeter, 1961).

Yet, regarding entrepreneurship as a theoretical framework, “Data are difficult to obtain, and theory is underdeveloped” (Shane & Venkataraman, 2000, p. 219). Notably, in the past two decades, digital entrepreneurship has played a dominant role in delivering entrepreneurial innovation, as well as within society, acting as a key driver in the broader knowledge-based economy (de Geus, 1998; Drucker, 2001).

Concomitant with stories of entrepreneurial innovation, leadership in entrepreneurial technology firms continues to intrigue researchers. On the one hand, some entrepreneurial leaders appear to have an intuitive sense for navigating their firms towards the common measures of entrepreneurial success—a fast acquisition by a larger firm, or a public stock launch for millions or billions of dollars. In the same breath, some of these leaders are described as alternately brilliant or nightmarish. On the other hand, some entrepreneurial leaders cite self-discipline, or the discipline of specific methodologies, for business planning to describe their success. Others point to luck or chance.

In general, however, little has been written from an insider perspective about how IoT startup leaders navigate within their firms, or the tools they use, during key events. Moreover, the logic of practice, according to Bourdieu (1977) is obscured when academic research attempts to dwell *on* rather than *in*, especially when the practice orientation is on the action, not the explanation (Chia, 2009). As such, my insider role in the case study research explored and

sought to illuminate the experiences of entrepreneurial leaders and their decisions, actions, and environment from an inside perspective in the IoT industry.

It could be argued, some entrepreneurial leaders have a talent for using traditional methods which describe a path forward for the organization while others succeed with a difficult-to-measure gut instinct. Entrepreneurial leadership may be grounded in both, combining cognition with attention or instinct. Or leadership may align less on the person and more on the purpose, by structuring a firm along strategic lines, such as focusing all efforts on trending strategic credos, for example, failing fast, crossing chasms, lean, agile, and customers first. These efforts perhaps help bind the startup together similar to how multinational companies are increasingly held together by strategy rather than ownership (Drucker, 2001).

However, entrepreneurial ventures, in general, remain prone to failure and IoT projects are no exception. As such, entrepreneurial leadership will invariably test the edges of known methods and start to look for new models to meet the challenges of the moment. Past approaches to leadership success in a startup include the founder's dilemma (Wasserman, 2008). In this approach, the success or failure of an entrepreneurial endeavor hinges on the founder's choice between riches and relinquishing control of the firm, or being a king and retaining control, but forgoing riches (Wasserman, 2008). The qualities an entrepreneurial leader brings to a startup are often different from those needed to manage a commercial business and venture capitalists consider firing the founder normal (Bains, 2007).

Another perspective suggests a founder's unique capability to fit their vision to an evolving customer-driven marketplace via an architected Lean system (Blanks, 2007) or an Agile product development methodology. A commonly referenced entrepreneurship book, *Crossing the Chasm*, describes a path for team-based leadership aligning a new venture's product to

market forces (Moore, 2014). As often as not, slices of each of these methods and approaches—and combinations of all or none—are used willy-nilly as needed to navigate a permanent digital whitewater (Kipp, 2005). Is this due to a lack of discipline? Or, in noting Blanks’s entrepreneurial dictum “No business plan survives first contact with a customer” a prudent approach (Blanks, 2010, para. 10)? Unfortunately, research is lacking in determining what IoT-specific entrepreneurial models, theories, and instincts are utilized by IoT entrepreneurial leaders to increase the odds of success in the entrepreneurial experience (Shane & Venkataraman, 2000).

The common points of failure for Internet-era startups, constrained resources, time pressures, funding problems, team issues, and environmental conditions continue within IoT startup environments. In addition, the norms of the IoT field are immature and unstable—the marketplace, product, and players - as are the field’s technology and cultural standards. High-tech IoT startups, especially, are dynamic unfolding environments where orienting on any single safe area—customers, product, technology marketplace, sales, leadership—is not a guarantee it’s barely an orientation.

And yet, even when spinning against the current of startup forces, upstream and backward, entrepreneurial directionality occurred at IoT Inc. Oftentimes, from surprising forces or chance occurrences only understood from an insider perspective or in retrospect. In retrospect, entrepreneurs recognize certain meetings or decision points are “critical to the long-term shaping” (Lichtenstein, 2014, p. 407) of a startup. In other words, when they look back entrepreneurs traced back specific generators which initiate wider patterns. Patterns emerged from the complexity and then receded, reemerging later at a different scale. The case study that follows goes into detail about those instances and circumstances.

As such, uncertainty remains at the core of entrepreneurial actions (McKelvie et al., 2011; Schumpeter, 1961) including at IoT Inc. In this respect questions arise, could it be that the cultivation of entrepreneurial experience and expertise in the digital era is more powerful than the methods and perspectives inherited from previous eras? In this light, a burgeoning line of entrepreneurial research describes a seemingly intuitive radar for the opportunity as it arises, or effectuation rather than cause-and-effect logic (Chandler et al., 2011, p. 375). In some instances, effectuation, rather than planning, served as reason enough for understanding success, failure, movement, or decisions at IoT Inc.

Industrial Eras 1.0 to 3.0: Middle Ages to the Present

Entrepreneurship occurs within a larger social-economic context, and in this section, I present a brief history of economic eras. My review is prefaced with an acknowledgment of the complexity of describing entire eras of human history. The reasons for touching on semantic nuances are two-fold, one, an acknowledgment of complexities involved in defining an era, and two, the open nature of the factors informing the language of the recently coined era the Fourth Industrial Revolution (Industry 4.0), the case study is ostensibly embedded in.

With those provisos noted, in contrast to the closed system predictability of previous eras, many aspects of the Industry 4.0 era are fundamentally emergent and unpredictable. Therefore, like my personal narrative notes, the language for discussions of this near-future era is relatively improvisational. As de Geus (1998) cautioned, labels for economic eras are helpful, but until we develop a new language much of the real meaning of a new era is “not yet digested” (p. 199). As will be seen in the data, even the term IoT was half-heartedly accepted by interview participants who spent significant time in the IoT field.

I ground my historical definitions of eras based on changing economic factors, with an emphasis on the role of technology. In this review, critical production factors (CPFs), such as labor, resources, capital, or knowledge, serve as guides for a perspective on economic eras. As de Geus (1998) noted, terms like Capitalist Era, New Economy, Information Age, and Knowledge Society are derived by distinguishing the dominant CPF of the period in question (p. 199). Further, the use of CPFs is informed by their material and social aspects which Marx used to describe humans as producers (Callinicos, 2011).

Critical Production Factors of Eras

Starting 1,000 years ago, de Geus (1998) noted in a “primitive Western world” the CPFs were “land and natural resources” used for “producing goods to sustain the population” (p. 198). The long ascent of the Capitalist Era occurred between the 1500s and 1960s, when capital as CPF produced goods and services above “immediate needs for consumption” (p. 198). Moreover, during this era, technology accelerated the speed and impacts of CPF adjustments.

For example, due to technological advancements, in the late 1700s land and resources were overtaken by access to labor as the dominant CPF (Fogel et al., 2015). This was due to the acceptance of Adam Smith’s laissez-faire economic policy, which increased access to capital, especially in the 16th and 17th centuries. In turn, improved capital flows promoted purchasing of early mechanization technologies, such as the steam engine and the mechanical loom. Thus, this early shift from craft production to mass machine-based production, or industrialization, required increased labor. It was this convergence of several causal forces alongside others, rather than one force which explained a “turning point and also a take-off” (Hartwell, 2017, p. 59) for the First Industrial Revolution. In summation, the technologies which optimized economic operations, like bigger merchant ships and more capable machines, increasingly meant the capital needed to

create mass production technologies, which had a higher value than the exploited natural resources or the labor operating the technologies (Braudel, 1992, p. 365).

The expansion of capital continued into the late 1800s ushering in the Second Industrial Revolution (Landes, 1969) of interchangeable parts, the standardized assembly line of Henry Ford, and increasing uses of electrical energy in economic life. Economic processes and organizational models, during this era, were increasingly attached to machine-like efficiency models attuned to running on an infrastructure based on steel, oil, and railroads. Large-scale factory management principles were “rational, calculable, and controllable” (de Geus, 1998, p. 19) employing the principles of Fordism and Taylorism.

Increased productivity and infrastructure resulted in lowered prices for goods and significantly improved living standards in industrialized countries, but also social and economic disturbances (Wells, 1889, p. 114). On the one hand, a deficient harvest in any one of the countries of Europe no longer resulted in starvation as wheat was accessible by railroad and steamships connected to the “combined production and consumption of the world” (p. 334). Wells (1889) noted, “the days of famines for the people of all such countries has passed forever” (p. 335).

On the other hand, by 1914 and the subsequent cataclysm of World War I, “the dangers of the Second Industrial Revolution” revealed that “the power to bring unlimited prosperity could also bring unlimited misery” (Mokyr, 1990, p. 147). Moreover, while the Second Industrial Revolution ended in 1914, the Capitalist Era continued its deep global integration of financial markets, goods, and technologies (Bordo et al., 1999) as well as penetration of sociopolitical structures (Harvey, 2007) in the decades that followed.

Fueled by increasing access to global capital and markets, early stirrings of the Third Industrial Revolution were underway. By the 1960s a shift from mechanical to digital manufacturing, automation, computers, and early electronics gained momentum and in the 1980s the Digital Revolution blossomed. Over the next decade, a “new convergence of communication and energy” (Rifkin, 2011, p. 2) was creating a powerful new infrastructure. The use of computer technology, based on integrated circuit boards, and microprocessors alongside the invention of the World Wide Web in 1989 by Tim Berners-Lee began driving one of the “most exciting social, cultural, and political transformations in history” (Schmidt & Cohen, 2013, p. 4).

The traditional, hierarchical, and centralized organizational, economic, political, and business practices of the First and Second Industrial Revolutions would be subsumed by the open and distributed business practices of the Third Industrial Revolution (Rifkin, 2011). It was argued that easy capital credit and debt, as well as cheap oil and resulting climate change, are leftover facets of the Second Industrial Revolution (Klein, 2015; Rifkin, 2011). These facets are finally tipping into an endgame (Rifkin, 2011, p. 15). De Geus (1998) carried the argument further, declaring that because capital is no longer scarce by the late 1980s, “The Capitalist Era had finished!” (p. 199). Others argued the Capitalist Era was thriving because of the sociopolitical factors increasing the geographic mobility of capital which had morphed into a neoliberal ideology (Harvey, 2007, p. 92).

In either case, the notion that knowledge had “displaced capital as the scarce production factor—the key to commercial success” (de Geus, 1998, p. 199) had taken root as a CPF in the Third Industrial Revolution. Specifically, the CPF of the era shifted to knowledge workers (de Geus, 1998; Drucker, 2001) described as “those who have access to knowledge and know how to use it” (de Geus, 1998, p. 199). Moreover, the knowledge anchoring the source of modern

economic growth (Mokyr, 2002, p. 2) was useful knowledge (Kuznets, 1971) and emphasized the central role of technology (Drucker, 2001; Kuznets, 1971; Mokyr, 2002).

In general, most people are engaged with the socio-technological factors of the current Knowledge Economy and the Third Industrial Revolution. Worldwide Internet use and mobile-phone subscribers are over six billion and information and technology are engaged in a feedback loop of exponential growth (Schmidt & Cohen, 2013). The Third Industrial Revolution is accelerating the speed and power of technology. In turn, the impacts of technology and technological devices are shaping modern life in new ways.

Notably, the key to the transformative power of the Knowledge Economy is the unprecedented speed with which it is creating new technologies, like the IoT (Schmidt & Cohen, 2013). These modern technologies, in turn, accelerate technological development in a feedback loop giving rise to Industry 4.0, a new economic age. Industry 4.0 is distinguished from previous eras by how fast it is penetrating the infrastructure of businesses and governments (World Economic Forum, 2020). In the following section, this complex and fast-moving era is discussed in more detail.

Industry 4.0 and The Internet of Things (IoT)

As an emerging era, the perspectives on and definitions of Industry 4.0, remain in flux (van Tulder et al., 2018, p. 1). It is argued the IoT is evolving toward ecosystems of connected processes and outcome-based business models in an Outcome Economy (Sinclair, 2017, p. 75). A McKinsey report described Industry 4.0 as cyber-physical systems integrating economically disruptive computation, networking, and physical technologies and processes (Manyika et al., 2013).

Industry 4.0 embodies a blurring of boundaries between companies argued Götz and Jankowska (2017). It involves all aspects of a connected enterprise in an “ecosystem of humans, machines, and organizations (van Tulder et al., 2018, p. 385). Therefore, collaborative clusters based on mutual trust, norms, and values, are the answer to Industry 4.0 requirements and challenges (Götz & Jankowska, 2017, p. 1633). In contrast, Rifkin (2011) did not employ the term Industry 4.0. Instead, he emphasized a paradigm shift within the Third Industrial Revolution from market capitalism to a collaborative commons.

In his preface describing the beginnings of the First Industrial era, historian Ronald Hartwell reminds “Any term used to represent a complex historical process runs a semantic hazard when it becomes common currency” (Hartwell, 2017, p. viii.). However, rather than a semantic hedge in avoidance of a settled definition of Industry 4.0, the continually emergent and unsettled character in the case study is suggestive of the boundary-shifting nature of the era. In contrast to traditional eras, with characteristics oriented around clear definitions of control, hierarchy, and equilibrium, several of the key characteristics of Industry 4.0 reflect characteristics with indeterminant open definitions, which are disruptive and transformative (van Tulder et al., 2018, p. 1).

These characteristics include organizational decentralization (Bartlett & Ghoshal, 2002) complexity, exponential growth, speed, unpredictability, and change (van Tulder et al., 2018). Further exemplifying this indeterminacy, IoT, a key Industry 4.0 technology “has not yet been consistently defined in academic literature” (Oberländer et al., 2018, p. 3), due to a lack of standardization and the ongoing emergence of associated IoT technologies. Notably, the Oberländer et al. (2018) review of the literature offers 16 different definitions of IoT.

In such a context, how do the leaders in an entrepreneurial IoT startup firm describe, much less navigate, the complexity of the emerging Industry 4.0 era? Do traditional organizational predictive models from earlier eras, or forms of attention to opportunity, work in an inherently disruptive Industry 4.0 context? The case study seeks to provide insights into these questions as well as the lived experience of Industry 4.0 entrepreneurial leadership.

The convergence of knowledge work and its impact on the technological-social context of entrepreneurship points to digital entrepreneurship (Nambisan, 2017) as an emergent field of research. However, despite its contemporary significance, existing research on digital entrepreneurs is largely neglected (Nambisan, 2017, p. 1030). Moreover, Orlikowski and Scott (2008) note that over 95% of articles in leading management journals do not consider the role and influence of technology in organizational life. And yet, how organizations and leaders will navigate the changes delivered by these near-horizon technologies, such as AI, the IoT, and automation, is vitally important (Vogel et al., 2018). However, the specific context of a case study on leadership in an IoT startup operating in the Industry 4.0 era is so new, references in the digital entrepreneurship literature are virtually absent.

Models of leadership and organizational design have emerged from these previous eras (Bolman & Deal, 2013) such as the top-down mentality of the Second Industrial Revolution. By contrast, the role of an IoT startup leader, models of leadership, and organizational design in Industry 4.0 are not well defined. There is a virtual absence of literature about IoT startup leadership, who they are, what they say and do, and how they act and think. The case study provides an in-depth analysis of those and other factors. In doing so, it helps to fill that gap by exploring the new organizational and leadership issues raised in the IoT field of the Industry 4.0 era.

What is Silicon Valley and the Internet of Things (IoT)?

This section provides a brief review defining the IoT, as it is in the context of the case study. Further, it raises aspects of the issue by framing tensions between the traditional organizational and leadership models, and those models framed to leaders operating within an entrepreneurial IoT startup context. An argument for the neoclassical entrepreneurial tradition is described, then countered with an argument for a digital entrepreneurship approach to navigating the new era.

In this section, brief definitions of Silicon Valley and the IoT are provided. On the one hand, Silicon Valley is a broadly referenced place and ethos in popular culture as well as participants in the high-tech entrepreneurial field. Silicon Valley is at the epicenter of entrepreneurial tech due to an emphasis on “speedy scale-ups” (Flyvbjerg, 2021, p. 15). In short, Silicon Valley tech scale-ups are differentiated from general tech startups because they excel at addressing the question “How can we do things more modular and faster, now?” (Flyvbjerg, 2021, p. 31).

On the other hand, the IoT is less generally understood. While an increasingly ubiquitous technological layer in modern societies, it is also an emergent and taken-for-granted phenomenon not well differentiated from the connected Internet to which people have become accustomed (Woodhead et al., 2018). In short, the IoT broadly encompasses a new technological, business, and social phenomenon associated with an exponentially broadened dispersion of digitally connected things into previously non-connected environments.

As described here, Silicon Valley accords with the commonly understood region of 35 cities around the San Francisco Bay in California. These cities, San Jose, Menlo Park, Palo Alto, and others, have a history of successful startup outcomes, especially involving technological

innovations, many times higher than other areas (Guzman & Stern, 2015). In general, regions with robust entrepreneurial activity and outcomes are associated with the presence of research institutions. In Silicon Valley, these include Stanford, University of California (UC) Berkeley; Lawrence Livermore; Caltech; University of California, Los Angeles (UCLA); and UC Irvine (Guzman & Stern, 2015).

Silicon Valley is also an ethos and energy. Turner (2006) argued Silicon Valley culture stemmed from a counterculture reaction to the cold war and the defense industry which was encapsulated by *Whole Earth Network* of the 1960s and 70s. Drawn by a promise to recapture their humanity, the members of the network sought control over personal technologies and the transformation of consciousness. In doing so, they set in motion a deep-seated ideology privileging “disruption over sustainability, sharing economies over union labor, personalized access over public health, data over meaning, and security over freedom” (Levina & Hasinoff, 2017, p. 489).

Moreover, Turner argued the Silicon Valley ethos is a reproach to the manufacturing model and hierarchical mode of the Second Industrial Revolution (Turner, 2006). Instead, Silicon Valley favors deregulated economic structures and network adaptability, imbued with a libertarian outlook and neoliberal basis, geared to extreme individualism and the empowerment of management, and the decline of unions (Castells, 2000b). In turn, Silicon Valley valorizes data and algorithmic solutions to personal and social issues (Levina & Hasinoff, 2017). Critics argue the unregulated data and algorithmic favored by Silicon Valley ethos result in a surveillance capitalism, in which consumers are consumed, fragmented, and repackaged for resale (Zuboff, 2019). Ferrary and Granovetter (2009) posited that Silicon Valley provides a network of venture capital relations sustaining the entrepreneurial resiliency of technology. They

went on to say that Silicon Valley exists as a “robust complex network of innovation” (2009, p. 331) with entrepreneurial social capital associated with the development of the Internet and held by institutional firms, like Cisco.

As noted earlier, IoT has several definitions, but there is broad agreement that it is a transformative and disruptive technology within the Industry 4.0 era. Technically speaking, the IoT is simply the next stage of the Internet (Kranz, 2017; Sinclair, 2017). As Kranz (2017) described the Internet’s first stage “connected people to networks, data, each other, and processes” (p. 12). The second stage of the Internet, or IoT, connects everything to everything (Kranz, 2017) with up to one trillion connected things by 2025 (Manyika et al., 2013, p. 5).

Stories about IoT connectivity and its impacts on the world have resulted in hype (Kranz, 2017; Sinclair, 2017). And yet, in a McKinsey report, identifying the 12 Industry 4.0 technologies that matter (Manyika et al., 2013, p. 5), IoT, at \$36 trillion, is described as having the largest economic value impact by 2025. As a reference point, the global gross domestic product (GDP) in 2017 was \$127 trillion (*Real GDP (Purchasing Power Parity) - the World Factbook*, n.d.). In an encompassing superlative used to describe the IoT, it is the future (Kranz, 2017).

Bluetooth Gateway: The Emergence of a Category

In this section, I describe the factors involving the relatively new conception of Bluetooth® gateways pursued as a commercial category arising in the IoT. Firstly, I offer an apology. Although Bluetooth is a relatively young technology, its history is detailed and worthy of a much longer review. This section, however, is neither detailed nor comprehensive. Hopefully, the references will serve those seeking a fuller historical accounting. Instead, this

truncated overview plays the major chords involving the emergence of a new category—Bluetooth gateways—as the entrepreneurial innovation of the case study firm IoT Inc.

Technological Innovation Writ Large

To lay the groundwork for this discussion, an observation by Gordon Moore in 1965 predicted doubling the number of transistors on an integrated circuit board every year. Known as Moore's Law, this observation is commonly asserted to describe the evolution of computing power (Yoo, 2015). Also, in the early 1980s, Bob Metcalfe first described Metcalfe's Law which is cited to justify adding additional network interconnections. Metcalfe's Law states, as the size of a network grows, the number of potential connections increases faster than the number of nodes (Yoo, 2015).

Despite ongoing criticism of these laws (Briscoe et al., 2006; Odlyzko & Tilly, 2005), these complementary concepts (Yoo, 2015) are widely cited as foundational, driving the digital economy. As such, they serve as a general backdrop describing change due to innovation in the digital era, including the emergence of a Bluetooth gateway as a category. However, as convenient as they are, these theories of dramatic digital growth do not capture the full breadth and depth of the landscape wherein this case study took place. Notably, Moore's Law is not the first paradigm describing exponential growth. Instead, it is the fifth paradigm according to futurist Ray Kurzweil (2001). He goes on to say that paradigmatic changes began in the 1890s. Each forecasts an exponential growth in computing power and, in turn, the acceleration of technological evolution (Kurzweil, 2001).

The point is, though laws like Moore's and Metcalfe's are a convenient shorthand, they dramatically underestimate an understanding of the rate of technological evolution. In short, the underestimation stems from a linear intuitive perspective (Kurzweil, 2001). The heuristic is these

laws forecast the doubling of technological evolution every year or two (Kurzweil, 2001).

However, this doubling mental model narrows the reality of technological change into a convenient oversimplification, which, for the span of this case study, the reader is encouraged to gently set aside. An evolutionary perspective, centered on acceleration, is suggested as an alternative.

In short, innovative technologies accelerate the creation of additional technologies forming acceleration feedback loops (Kurzweil, 2001). From this historical exponential view (Kurzweil, 2001) the rate of rapid growth occurs, not on a linear basis predicated on a doubling perspective, but on an exponentially accelerating basis. Accordingly, the emergence of Bluetooth gateways reflects intertwining technological developments, each accelerating the other, generating this specific category within the field of IoT.

Bluetooth: A Short History

Central to this case study is an innovation at IoT Inc. challenging the common perception that Bluetooth is exclusively a short-range radio wave technology. Short-range radio applications, like garage door openers, were in use in the 1970s using inductor-capacitor (aka, L-C tuned circuit) oscillator transmitters and supergenerative receivers (Bensky, 2019). Since that time, ongoing developments in technology, including circuit miniaturization, digital replacements of analog modulation techniques, amplification and efficiency enhancements in componentry, and the spectrum frequencies in use have spread the use of these wireless applications (Bensky, 2019).

Short-range wireless technology, like Bluetooth, is often differentiated from longer-range options for connectivity, such as cellular and others. Bluetooth operates at a radio wave frequency of 2.4 to 2.485 gigahertz (GHz) within the 300-megahertz (MHz) to 3 GHz ultra-high

frequency (UHF) category. Comparatively, the alternative short-range frequency options include radio frequency identification (RFID) at 100 kilohertz (kHz) to 2.4 GHz; Zigbee®, with 16 channels in the 2.4 GHz industrial-scientific-medical (ISM) reserved band worldwide, 13 channels in the 915 MHz band in North America, and one channel in the 868 MHz band in Europe (Al-Anbagi et al., 2014); and wireless local area networks (WLAN) also known as wireless fidelity (Wi-Fi), 2.4 GHz and 5 GHz bands; as well as others.

These wavelength specifications for wireless options are standardized by governing associations and enforced by regulators. However, and as relevant to this case study, the resulting range and power characteristics of these comparable wireless radio options, Wi-Fi, Zigbee, Bluetooth, and others, are less prescribed. They are relative (Bensky, 2019). At this point, and to differentiate innovation at IoT Inc., a standard short-range is defined as centimeters up to several hundred meters and low-power outputs are several microwatts up to 100 milliwatts (Bensky, 2019, p. 2).

Bluetooth at Ericsson

In a similar spirit, a short Bluetooth origin story is offered to ground the technology's previous development, to inform, and offer a contrast with, a subsequent innovation at IoT Inc. The brief history is meant to reinforce the point that innovation is not magic. It is informed by its history, most often unfolding as continuous and incremental modifications (Kiel, 1984).

With that in mind, the historical early development of Bluetooth is credited to Nils Rydbeck of Telefonaktiebolaget LM Ericsson [commonly known as Ericsson], a 145-year-old Swedish provider of information and communication technology (Arfwedson & Sneddon, 1999). In 1985, Nils Rydbeck, PhD. began leading research and development at an Ericsson business subsidiary in Lund, Sweden (Karlsson & Lugn, n.d.). Notably, Lund was a skunkworks

(Nobelius, 2003) located in a treeless area 700 miles north of Ericsson’s headquarters in Stockholm, Sweden. Devoted to research, the Lund unit was separated from Ericsson headquarters “to give the business a chance to survive” (Nobelius, 2003, p. 8).

By 1989, Rydbeck had conceptualized the progenitor of Bluetooth, a short-link radio technology. Also, an inventor at the Lund lab, Johan Ullman, presented wireless headset patents issued on June 12, 1989, and July 24, 1992, to the European Patent Office (Ayres, 2021). In turn, a 1994 project at Lund was initiated to replace cables (often proprietary) between phones and phone accessories with an open wireless connection. The project stemmed from a subsystem in a larger concept project called Multi-Communicator (Nobelius, 2003). The project was shelved, but the cable replacement project, known as MC Link, continued (Haartsen, * 2018).

Shortly thereafter, Jacobus “Jaap” C. Haartsen, Ph.D. moved to Lund and was tasked by Rydbeck to further develop the short-range technology. According to Haartsen (2018), the Lund culture supported innovation and was less driven by commercialization. Rydbeck had “created an ideal environment for young engineers to play around with different ideas and technologies” (Haartsen, 2018, p. 661). Haartsen is credited with laying the foundation for Bluetooth technology starting in 1994 while at Ericsson (*NIHF Inductee Jaap C. Haartsen Invented Bluetooth Wireless Technology*, 2023). Of note, Haartsen is listed as the inventor of an early Bluetooth patent US. 6590928B1, first filed on September 17, 1997 (Justia Patents, 1997).

In 1996, three companies, Intel, Ericsson, and Nokia, initially met to plan for a short-range radio technology standard to “support connectivity and collaboration between products and industries” (*Origin of the Name / Bluetooth® Technology Website*, n.d.). During the meeting, Intel engineer, Jim Kardach, suggested “Bluetooth” as a temporary code name (*Origin of the Name / Bluetooth® Technology Website*, n.d.). The codename, said Kardach, was a “stroke of

inspiration” (Kardach, 2019) that stuck after alternatives, RadioWire, and personal area networking (PAN) had trademark problems (Gentes, 2017; Kardach, 2008). The term Bluetooth is taken from the 10th century King Harald “Blåtand” (meaning blue tooth) Gormson, who, approximately to the years 958–985, united Denmark as a Christian country and conquered Norway (Britannica & Editors of Encyclopaedia, 2023). The Bluetooth logo is a bind rune of King Harald’s initials, merging the Younger Futhark runes (Hagall) (ᚷ) and (Bjarkan) (ᚱ) (*Origin of the Name / Bluetooth® Technology Website*, n.d.).

Founded in May 1998, the standardization of Bluetooth is administered by the non-profit Bluetooth Special Interest Group (SIG). The Bluetooth SIG began in February 1998 with IBM and Ericsson as founding signatories and member companies Intel, Nokia, and Toshiba; 3Com, Lucent, Microsoft, and Motorola joined in December 1999 (Haartsen & Mattisson, 2000). Headquartered in Kirkland, Washington, the Bluetooth SIG is a standards development organization and does not make or sell Bluetooth-enabled products. It administers the standards for Bluetooth and branding. It also licenses Bluetooth technology and trademarks to manufacturers globally.

Ad Hoc Networks

As a short-range alternative to wired connections, the Bluetooth air interface was envisioned to replace cables for products used by “travelling business people ... enabling them to leave cords and connectors at home” (Haartsen & Mattisson, 2000, p. 1651). As such, Bluetooth connectivity was designed to enable an ad hoc network. Rather than a more permanent and hierarchically structured network, a Bluetooth ad hoc network connects peer-to-peer devices, says Haartsen and Mattisson (2000), such as via a phone and a phone headset:

Bluetooth is based on peer connectivity: a device carrying a Bluetooth radio can make a connection to any other device carrying a Bluetooth radio. There is no wired infrastructure with base stations or access points that can support the call setup or can provide low-power modes. (2000, p. 1654)

Traced to a Department of Defense development effort in 1972, the concept of ad hoc networks was "... packet-switched networking to mobile battlefield elements in an infrastructureless, hostile environment" where "soldiers, tanks, aircraft, etc." (Ramanathan & Redi, 2002, p. 20) form the nodes in a network. The term ad hoc network, as well as its commercial potential, was proposed in two conference papers and was adopted by the Institute of Electrical and Electronics Engineers (IEEE) 802.11 sub-committee in 1994 (Ramanathan & Redi, 2002).

In short, as originally conceived by the inventors of Bluetooth, a Bluetooth network (also known as a piconet) is a wireless ad hoc network (Toh, 2001) wherein Bluetooth sensor devices connect exclusively to other Bluetooth sensor devices that are within range. Moreover, the sensors employing peer-to-peer connectivity explicitly exclude base stations or access points (Haartsen & Mattisson, 2000, p. 1654). In other words, conceptualized as an ad hoc network, Bluetooth was designed to not rely on a pre-existing infrastructure, such as routers in wired networks, nor access points in managed (infrastructure) wireless networks. Specifically, Bluetooth network ad hoc connections are made by the Bluetooth network sensors; there are no networking functions (Haartsen & Mattisson, 2000).

Ad hoc networks, like Bluetooth, were designed as an alternative to networks dependent on infrastructure such as routers and access points. Infrastructure networks often cover the entirety of a local or geographic region and are usually classified as local area networks (LAN)

and wide area networks (WAN) (Al-Anbagi et al., 2014). By contrast, Bluetooth's origins describe a short-range, ad hoc personal area network (PAN) connecting peer-to-peer Bluetooth-enabled devices, such as a Bluetooth-enabled phone with a Bluetooth-enabled headset. In this type of solution architecture, a Bluetooth mediating device, such as a gateway, is fundamentally irrelevant.

In contrast to ad hoc networks, infrastructure node networks, which are often wired, are characterized by fixed base stations, a static backbone network topology, stable connectivity, a benign environment (Ramanathan & Redi, 2002, p. 21), and a need for detailed base station planning. In general, an infrastructure network interconnects as a network, internally and externally, via mediating devices. A mediating device, such as a router, access point (AP), or gateway, also connects externally to other networks, such as the Internet (essentially a network of networks). As an infrastructure mode network increases in scale, more mediating devices, such as routers and gateways, are needed to manage the exponential increase in network overhead (Ramanathan & Redi, 2002). Notably, the innovation at IoT Inc. involves a Bluetooth gateway that bridges the characteristics of Bluetooth ad hoc networks with infrastructure network capabilities.

A Maturing Bluetooth IoT

Until recent years, the elements with which a Bluetooth gateway would interact within a commercially available and useable Bluetooth IoT network infrastructure have been lacking. Most notably, those lacking elements included the Bluetooth Low Energy 4.0 and Bluetooth 5 version standards, widespread smartphone use, and the maturity of the Internet's capacity to provide IoT services (like the cloud). Bluetooth hobbyists and tinkerers have described and experimented with building aspects of the Bluetooth IoT. However, commercializing the

components required for a full Bluetooth IoT infrastructure, such as a Bluetooth gateway, is less the providence of a tinkerer's curiosity and more the entrepreneur's capacity to align innovation motivation and resources.

Smartphones and Bluetooth

In 2001, the first Bluetooth-enabled phone available for purchase, the Ericsson T36, used Bluetooth version 1.0a (Hildenbrand & Maring, 2019). In contrast to the most recent Bluetooth 5 standard, Bluetooth 1.0 was noticeably slow and unreliable. For example, the Bluetooth 1.0 maximum data rate of 732.2 kilobytes per second (kps) contrasts with the Bluetooth 5 two megabytes per second (2Mbps). Moreover, Bluetooth version 1.0's maximum range was 33 feet versus up to 800 feet for the Bluetooth 5 version released in December 2016 (Hildenbrand & Maring, 2019). Bluetooth's initial throughput and distance constraints limited its viability as a broader IoT networking technology.

Moreover, at the start of the 21st century consumer awareness of Bluetooth was low. The consumer market for mobile Bluetooth applications, such as health trackers, was just beginning to gain traction in the early 2010s. In part, this was linked to the gradual pace of smartphone adoption. While common today, in 2011, just 35% of American adults owned smartphones (Smith, 2020a). By 2015, 64% owned smartphones thus facilitating a more widespread development and use of mobile Bluetooth connectivity and applications. The connection of a Bluetooth device to a smartphone is how many people were first introduced to Bluetooth.

The Bluetooth link between devices and increasingly ubiquitous smartphones brought the concept of IoT to mass consumer awareness. However, though a vision of the IoT had captured the imagination of the world (Zachariah et al., 2015, p. 1) as well as raised billions in investment funding, people had not deeply considered how IoT things should connect to the Internet. The

title of the Zachariah et al. (2015) article, *The Internet of Things has a gateway problem* succinctly describes the problem the innovation at IoT Inc. sought to address.

Firstly, unlike the Internet, the IoT lacks unified global standards. In contrast to Wi-Fi and cellular connectivity, which connect to the globally standardized and interconnected Internet Protocols (IP) of the Internet, standardized IoT connectivity does not exist (Zachariah et al., 2015). And while Bluetooth is a connectivity standard *per se*, it is just one of many IoT connectivity standards. Moreover, Bluetooth network connectivity itself was isolated to a single application. As a result, each type of IoT device deployed required a unique gateway with application-specific hardware and software architecture (Zachariah et al., 2015, Figure 1). This device-specific approach is like requiring “a new web browser for each website” (Zachariah et al., 2015, para. 1). As such, without application-agnostic IoT gateways connecting to the Internet, the growth potential of IoT devices was hampered. Secondly, another major barrier to the IoT’s evolution was nearly 85 percent of existing IoT devices “were not designed to connect to the Internet” (Subramanian et al., 2015, p. 2). At that time, neither an IoT connectivity standard nor a general capability for devices to connect as IoT devices were in place.

As a potential solution, the “increasingly ubiquitous presence” (Zachariah et al., 2015, para. 1) of Bluetooth as a proposed gateway architecture for connecting IoT peripherals to the Internet was proposed. A Bluetooth IoT gateway architecture using Bluetooth and connecting IoT devices to the Internet via smartphones and Wi-Fi was proposed using the smartphones that people already carry (Zachariah et al., 2015, para. 11). In short, smartphones would act as a crowd-sourced, general-purpose IoT gateway connecting Bluetooth IoT devices to the Internet. However, using smartphones as worldwide IoT gateway architecture was problematic. The smartphone-as-Bluetooth IoT gateway architecture presented challenges of reliability,

trustworthiness, standardization, as well as “usability, availability, incentives, security, privacy, and deployability” (Zachariah et al., 2015, para. 8).

At the time of this research, the Bluetooth SIG offered guidance on Bluetooth gateways, but there is no standardized IoT Bluetooth gateway architecture. The IoT gateway problem remains and is a heavily contested space involving cellular, Bluetooth, and other connectivity options. As the next section notes, the gateway choice for linking a major system like the IoT represents a vast opportunity.

Bluetooth Gateways

In this section, the previous historical review of Bluetooth technology is tied to the commercial drivers at IoT Inc.

In general, gateways provide technical compatibility, linking components so they work together as an integrated system (David & Bunn, 1988). Moreover, gateway innovations, especially those occurring early in the diffusion of innovative technology, have historically had far-reaching implications on the evolution of network technologies. The outsized influence of gateway innovations is exemplified by historical winner-takes-all competitions over standardization. The battles between alternating and direct current (AC/DC) electricity standardization and Betamax and VHS video tape are examples. These competitions demonstrate how gateway innovations tip the scale and have unintended consequences within the dynamics of emergent and complex networks (David & Bunn, 1988).

The outcome of a contest between gateway innovations is hard to predict. Invisible market forces, visible management decisions, imposed standards, and technological excellence cannot be counted on as the deciding factors. Instead, the installed base of users and adherents appears to increasingly weigh where capital investments are made in network topology (David &

Bunn, 1988). At IoT Inc., the worldwide acceptance and standardization of Bluetooth were cited by the CEO as key factors of the startup's commercial potential (Francis, personal communication, November 19, 2020).

Speculation about the convergence of Bluetooth with the Internet, via a gateway, appeared not long after the formal recognition of Bluetooth (Bigioi et al., 2001; Johansson et al., 2001; Keramane, 2000; Lee & Lee, 2000; Rouhana & Horlait, 2002). At that time, however, the speculation faced a reality of immature Bluetooth capabilities, IoT marketplaces, and architectures. Notably, the original conception of the Bluetooth standard had no required capacity for a connection to another network, such as a Wi-Fi network or the Internet (Haartsen & Mattisson, 2000). In effect, the original Bluetooth standard didn't support the need for a Bluetooth gateway.

Due to their ad hoc design, Bluetooth networks were reactive and thus useful in specific situations (Ramanathan & Redi, 2002). In the early 2000s, Bluetooth gateways were application specific. Each networked Bluetooth product [for example, a system of Bluetooth-enabled light-emitting diode (LED) light strips] required a Bluetooth gateway built exclusively for that manufacturer's LED system. In this example, the LED system manufacturer would need to create the LED light strips, the Bluetooth gateways connecting the network, and the network. In short, building a Bluetooth-enabled product was supported by the standard, but involved investing in the creation of a complex system. Moreover, these early Bluetooth networks were challenged by short ranges, scalability, limited power sources, quality of service, and security (Ramanathan & Redi, 2002).

However, as the technologies and commercial opportunities of the IoT field accelerated, the need for Bluetooth networks, and the Bluetooth gateways required to support them,

increased. By 2015, several Bluetooth gateway start-ups, including IoT Inc., were emerging and innovating to address the limitations of Bluetooth networks. At a major business-to-consumer (B2C) technology event in 2016, IoT Inc. was recognized for its innovations in the Bluetooth gateway category. The innovations involved long-range (100s of meters) Bluetooth connectivity, and instead of one-to-one or a few simultaneous Bluetooth connections, connections numbering in the dozens (in active mode) and hundreds (in passive mode). At the B2C award ceremony, IoT Inc.'s CEO and founder Francis offered his vision of a Bluetooth gateway with the ability to change industries and the lives of people. According to Francis, the ability to increase the range of connections and the number of connections placed Bluetooth gateways at the center of a Bluetooth-enabled IoT. The constraints limiting Bluetooth's networking position in a maturing IoT, said Francis, were core to IoT Inc.'s identity. IoT Inc. said Francis "was built to solve these problems" (Francis, personal communication, November 19, 2020).

By 2020 the Bluetooth SIG created its first version of a *Bluetooth Internet Gateway (BIG) Study Guide* (Bluetooth SIG & Woolley, 2021). A year later, a Bluetooth gateway was described as a key component of an IoT solution architecture (Bluetooth SIG, 2022). Moreover, the Bluetooth SIG 2022 description was more than technical, it was a solution architecture description. As such, the solution architecture combined multiple viewpoints, including business, information, and technical (Burton, 2008).

However, despite increasing recognition of the Bluetooth gateway within an emergent IoT field by consumer, commercial, and industry stakeholders, standardization of the Bluetooth gateway category was far from settled. The Bluetooth SIG had "no formal standards relating to gateways" (Bluetooth SIG & Woolley, 2021, p. 6) as they do not fall within its charter. Moreover, as the Bluetooth SIG noted even the language remained contested; "definitions of the

term ‘gateway’ vary, largely according to the context in which the term is used” (Bluetooth SIG & Woolley, 2021, p. 4). In other words, per the caution, as the new Industry 4.0 era emerged the real meaning of its new language was not yet digested (de Geus, 1998, p. 199).

In summary, interest in Bluetooth networking, beyond its early ad hoc capabilities, has existed since the early days of Bluetooth. However, the Bluetooth gateway category is new, not standardized, and is a departure from earlier discussions about Bluetooth networking. Moreover, Bluetooth gateway innovations are part of a broader contest for the development of a unified IoT network infrastructure. And finally, with its potential to serve as a core component of an emergent IoT infrastructure and marketplace, a Bluetooth gateway is an enticing entrepreneurial opportunity.

As noted previously, Marx described the dual material [technical] and social aspects of eras (Callinicos, 2011). As such, a technical description of the Bluetooth innovations involved in the IoT Inc. case study has been offered. However, this is not a technical review. It is a leadership case study. Therefore, going forward additional technical descriptions are offered where they are needed to inform the leadership focus of the case study. For now, the reader’s attention is directed away from this necessary, albeit curtailed material understanding of Bluetooth, and towards the social.

Dilemmas of Entrepreneurial Leadership

“There are some enterprises in which a careful disorderliness is the true method.”
(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

This insider case study explored key events at the Silicon Valley IoT startup where I worked. Specifically, the crux of the research was how leaders at an IoT startup navigated the complexity of the IoT field to commercialize an IoT product. At the time, the core team at IoT

Inc. referred to a method used for bringing products to market described in *Crossing the Chasm* (Moore, 2014). The B2B version of the chasm-crossing was the IoT startup's second go-to-market effort. The case study is grounded in the dilemmas faced and actions taken by IoT Inc.'s leadership. One of the questions I sought to answer was did the chasm-crossing framework form the basis of leadership decisions, and if not, what else is going on?

The research was intended to show how IoT entrepreneurial leadership actions and decisions occurred in the IoT field. Specifically, I explored the lived experiences of individuals with an ownership stake, such as stock equity, working at IoT Inc. Through observations and interviews, I collected insights to understand how leadership decisions and actions were approached in IoT startups and the early stage of the IoT industry. I was curious to learn if and how entrepreneurial IoT leaders facing the complexity of an emergent IoT field, related to, or used existing models in their decisions and actions. At the dawn of a new Industry 4.0 era, did these IoT leaders simply go along with the known entrepreneurial models used during the Internet age, like *Crossing the Chasm* (Moore, 2014), or the Entrepreneurial Operating System EOS® (Wickman & Paton, 2014), and hope for the best? I was also curious about how the metaphors of preceding eras, like the assembly line logic of the First Industrial Era, might come into play. In what measure do the unique qualities of the IoT affect the use of older methods, metaphors, and other things informing how and why decisions are made?

To Follow the Plan or Not to Follow the Plan

In short, like many startups, the general plan at IoT Inc. was to profitably commercialize a product and enrich the founder and equity stake owners. Moreover, the stated high-level goal of IoT Inc. was to evolve into a unicorn (a startup valued at one billion dollars). The Internet was evolving towards the IoT, and the IoT Inc. startup sought to position its product at the core of an

emerging IoT infrastructure and economy. By merging the digital world with the things of everyday life, the team at IoT Inc. was nominally aware their efforts were a factor in reshaping the fabric of society.

In a new industry, like the IoT, examples of startup success are few. Interest in methods, models, or formulas promising to improve chances of success is high. Entrepreneurial planning models are part of an entrepreneur's constant search for any advantage to achieve goals. Given the high stakes of entrepreneurial efforts, there is a constant stream of podcasts, books, influencers, and methods promising to crack the code of IoT startup success. Moreover, detailed dissections of startup successes and failures are common and ongoing between and amongst IoT entrepreneurs. The discussions and repertoire of stories help build the language of the new era and act as the social glue for the IoT field. The innovations that promise to, or are, changing the world are reviewed, rebuffed, and refined. The discussions are multitudinous and encompassing, including the material world, the technology, artifacts, institutions, and objects of the IoT, as well as the immaterial world in the form of social and subjective experiences and visions. Many of these discussions involve the actions of leaders at high-tech Silicon Valley startups, the paths they missed, followed, abandoned, and created.

Attention to Opportunity

“It is not down in any map; true places never are.”
(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

After sailing across an open expanse, the opportunity to maneuver into a rocky port was a welcome, but also fraught experience for Latin sailors of the ancient world. To avoid floundering, turning to port required the crew to expertly align the ship's internal components, sails, and rudder, with external conditions like the wind and tide. When all was at the ready, and

the opportune moment arose, the crew and captain called out ‘Ob portus!’ a contraction of “towards port!” (White & Hertz, 2022, p. 555).

In this sense, the IoT sea is vast and evolving quickly and simultaneously in all directions. While a strategic vision in pursuit of a goal, such as chasm-crossing, was offered as a journey from here to there, the experience of an IoT startup was more like a Goldberg Machine. The planned move from point A to point Z meant remaining open to a plethora of changes, such as added information, market accelerations, supply slowdowns, as well as unexpected diversions or regulatory reversals. Plans were influenced by, adjacent, seemingly disconnected factors, including product changes, personal circumstances, and partners. Ongoing changes to technology standards, marketing targets, sales efforts, regulatory requirements, customer demands, operational choices, cash flow, and funding influenced the process.

In short, the use of a model, such as a chasm-crossing was influenced by the complexity of the IoT startup and field. Moreover, its value as a metaphor, essentially suggesting a journey from point A to point B, might not be as applicable to the complexity of an emergent IoT marketplace. Moreover, a better understanding of the processes of digital venture creation, especially those attributes from emerging ventures, is in “high demand, but so far underdeveloped” (Von Briel et al., 2018, p. 279). Other entrepreneurial methodologies offering guidance for the IoT suggest focusing on evolving business models, such as an outcomes-based approach (Sinclair, 2017), or on economic structures such as a zero-marginal cost-based approach (Rifkin, 2014).

Whatever the method offered, entrepreneurship remains infused with uncertainty (Schumpeter, 1961). But the entrepreneurial IoT field has perhaps a distinctive style of uncertainty when compared to previous eras. IoT entrepreneurs continue to use the methods and

models of previous eras, including the Internet era, and there are few well-researched case studies of how an IoT firm succeeds or fails.

At IoT Inc., Moore's model of crossing the chasm was referenced to focus the startup's limited resources on a specific market. The model is a strategic roadmap, especially for new innovative technology firms. In many ways at IoT Inc. however, the model was used only as a convenient metaphor. After all, the model hinged on a cause-and-effect mapping of startup resources to a well-understood vertical market to optimize an opportunity for success. However, the map is not the terrain. Plans change. The IoT field is new and complex, and the Bluetooth gateway category was not well defined. The research goes into detail about the terrain and the changes encountered by the IoT Inc. core team during their journey into the emergence and complexity of the IoT.

Furthermore, during this journey key questions emerged that weren't on any map at IoT Inc. How did leaders contribute to company culture and the vision? How did power move in the IoT Inc. startup, who won and who lost? Comparatively, what roles did maps and models play compared to the expertise, power, vision, and culture at work at IoT Inc. situated in a dynamic emergent IoT environment?

Organizational Models and IoT Leadership Perspectives

The organization at the core of the case study, IoT Inc., involved overlapping complexities of organizational, social, and technical leadership. Leadership, in all its permutations, was central to the journey described. With that in mind, the following section briefly reviews the four frames—structural, human resources, political, and symbolic—of organizational design from the work of Bolman and Deal (2013). Moreover, also provided are

contrasting perspectives on the Bolman and Deal framing, emphasizing a correspondence between innovative technology startups and new perspectives on leadership.

Indeed, noted Bolman and Deal (2013), interest in new organizational designs has been spurred by the obsolescence of structures due to dramatic changes in technology and business. Mental models of organizational design, stated Bolman and Deal (2013), simultaneously guide our decision-making and blind us to our errors. Moreover, even modest changes in a mental model may have a dramatic impact on how people respond to issues (Bolman & Deal, 2013).

According to Bolman and Deal (2013), the structural frame is the oldest and most popular organizational frame and is based on two theoretical roots. The first root is the maximization of efficiency as described by the principles of scientific management (Taylor, 2003), specialization, the span of control, authority, and delegation of responsibility often used in large organizations and factory environments. This fit and efficiency perspective is also necessary for a small IoT startup when navigating uncertainties “as the competitive landscape shifts” (Delmar et al., 2013, p. 3). However, in their struggle for survival, IoT startups aren’t solely predicated on efficiency. They may often be a place of extravagant waste as they explore and abandon paths wrought by new forms of entrepreneurial uncertainty brought about by new digital technologies (Nambisan, 2017).

The second theoretical root of the structural frame is based on sociologist Max Weber’s maximization of norms of rationality (Bolman & Deal, 2013). It was informed by the large hierarchies and bureaucratic organizational models emphasizing specialization and a division of labor. By contrast, according to Nambisan (2017), an IoT startup is a small team where the interrelations of entrepreneurs and technology render outcomes and processes less bounded. He said digital entrepreneurship “shift(s) away from discrete, impermeable, and stable boundaries”

(p. 1029). As such, even common boundaries in a startup, like a job title or department processes, have “increasingly porous and fluid boundaries” (p. 1030).

The human resources frame of Bolman and Deal (2013) emphasizes human needs and is built on Maslow’s hierarchy of needs theory. Entrepreneurship requires entrepreneurs who are motivated to act in the face of uncertainty (McMullen & Shepherd, 2006). The characteristics of entrepreneurial action, as well as their willingness to bear uncertainty, are featured by prominent entrepreneurial theorists (Knight, 1921; Schumpeter, 1961). Moreover, due to global change and turbulence, the needs of traditional organizations are under stress.

A line of research exploring the entrepreneur’s need to exploit an opportunity underscores differences in entrepreneurial perceiving (Eckhardt & Shane, 2003; Farsi et al., 2019; Shane & Venkataraman, 2000), such as higher levels of optimism, self-efficacy, internal locus of control, tolerance for ambiguity, and need for achievement. By contrast, it is also argued that the individual-opportunity nexus focuses too much on the needs of founders (Nambisan, 2017). Nambisan (2017) went on to say that the distributed and collective nature of digital entrepreneurship changes an entrepreneur’s beliefs, actions, and behaviors. Pointing to a gap in the research, Nambisan said digital artifacts (crowdsourcing platforms, websites, etc.) blur and distribute entrepreneurial agency so that human need is shaped by and fused within an “architecture of participation” (p. 8). He suggested that distributed digital entrepreneurial collectives, such as those at an IoT startup, are actors whose needs are entangled with their editable digital products, as “embodiments of narratives” (p. 12).

The political frame in Bolman and Deal (2013) described organizations in terms of political relationships and the use of power. Foundational perspectives on power and politics are informed by theorists, including Foucault who noted “power produces, it produces reality”

(Foucault, 1991, p. 195), and Gamson (1956), who described partisan relationships involving control and antagonism. As the individuals in an IoT startup participate in the creation of the firm and the emerging IoT field, identifying sources of power, as noted by Bolman and Deal (2013) is key to understanding leadership.

Entrepreneurial innovation is the emergence of new opportunities, according to Garud et al. (2014). Garud et al. (2014) reviewed entrepreneurial research and how relational, temporal, and performative facets form an entrepreneur's narrative toolkit. Entrepreneurs use this narrative as a source of power to exploit opportunities. While acting in the permanent whitewater (Kipp, 2005) of entrepreneurial uncertainty, an entrepreneur's narrative includes texts like funding and sales pitches, business plans, and press releases, as well as actions, such as speaking at a conference or aligning a product innovation with the market (Garud et al., 2014).

These narratives establish the credibility of an entrepreneur's identity, as well as a path to exploit an opportunity within a collective field. Discussions of entrepreneurial cognitive capabilities suggest access to multiple knowledge modes—heuristic, intuition, abductive, and analytical—serve as a source of power by increasing alertness to opportunities and the ability to act on them (Shepherd & Patzelt, 2018).

Symbols, stories, and meaning serve as suppositions for the Bolman and Deal (2013) symbolic frame, with culture as a kind of superglue holding an organization together. New Silicon Valley startups compile their organizational forms, diverse cultural elements, and symbols (Perkmann & Spicer, 2014). Typically, these compilations are taken from multiple sources in the societal landscape and formed into an organizational bricolage (Perkmann & Spicer, 2014). For example, a picture of China-born, American martial arts movie star, Bruce Lee, hung in IoT Inc.'s main conference room, could serve as an anchoring cultural artifact. IoT

Inc. members were in China, the Silicon Valley headquarters, and in virtual offices in the U.S. Recognized as an iconic warrior worldwide, the picture of Bruce Lee with its text stating cultural values - integrity, knowledge, and character – could serve as a symbolic touchpoint.

It is noted that while symbolic bricolage is used to form an organization, bricolage is constrained by an organization's values. Leaders served as the primary decision-makers creating the culture (Perkmann & Spicer, 2014). Passed forward as origin stories, symbols, and the way things are done, values create an organizational anchor. Based on practical issues, startups shape their organization values by assembling forms (Perkmann & Spicer, 2014, p. 1785) copied from other startup firms. In turn, a startup's values are distanced from other organizations by invoking differentiating forms (Perkmann & Spicer, 2014). For example, an IoT startup's core values may be differentiated by only selling IoT devices that it also builds, and not licensing its IoT technology for use in other devices.

In short, Bolman and Deal's organizational frames continue to provide a basis for understanding organizations. Moreover, Bolman and Deal, and others also recognize a need to add to and update these frames due to the digital technologies of the emerging era. The complexity at the core of the relationship between entrepreneurship, technology, and organizational frames is further explored in the following section.

Complexity and Social Dynamics

“No science can be more secure than the unconscious metaphysics which tacitly it presupposes.”
(Whitehead, 1933, *Adventures of Ideas*)

To this point, the review has saturated the discussion with technology, while increasingly emphasizing the entrepreneurial and leadership landscape, its history, impacts, and implications. Going forward, a transformative shift is explored as technology permeates, serves as a

transformative catalyst, and adds complexity to the landscape. To that end, the concept of complexity, as related to leadership, social theory, and pragmatic entrepreneurial actions is described.

The rise and power of social networks such as Facebook, Twitter, LinkedIn, and others are widely known. Less well understood are ways to conceptualize and grasp the rapid intertwining of technological and social networks and their long-term impacts. The need to constantly adapt to the complexity of the new knowledge-based era requires new ways of conceiving organizations and leadership (Uhl-Bien et al., 2007).

In this context, the perspectives of quantum physicists grappling with the underpinnings of reality via concepts like embeddedness, nonlinearity, emergence, fractals, networks, and systems thinking offer relevant perspectives for considering leadership in IoT startups. For example, the physicist Fritjof Capra described networks as the “critical form of organization in all sections of society” (Capra, 2004, p. 149). He goes on to argue social networks are autopoietic (Capra, 2004, p. 83). Autopoiesis was first introduced as a biological concept describing the capacity of an entity to reproduce itself and then extended to general systems theory, mathematics, cognitive theory, the law, and other areas (Maula, 2000; Rogowski, 2015). In short, autopoiesis describes a self-generating living network “undergoing continual structural changes” even as it maintains its “weblike pattern of organization” (Capra, 2004, p. 34). In this context, the ongoing changes occurring at IoT Inc., and other startups can be viewed through an autopoietic lens.

Similarly, the concept of emergence is being studied across many disciplines, including leadership (Lichtenstein, 2014). Broadly speaking emergence is a process theory describing the creation of order with new properties and structures in a complex system (Lichtenstein, 2014, p.

1). The emergence concept is applied within research on fractals, autopoiesis, complex adaptive systems, and dissipative structures.

By way of application to an IoT startup, the concept of a network effect is a term used in business describing how a firm's embeddedness in a network expands its capacity to pursue opportunity (Uzzi, 1996). Moreover, Capra further argues for the expansion of internal aspects, including perception and the "expansion of the concept of cognition" (Capra, 2004, p. 34) related to the organic structuring of social networks to include autopoietic exchanges between actors in a field.

In a similar light, the maverick quantum physicist David Bohm argued for an expansion in the relationship of networks, actors, and objects in the form of holistic metaphysics (Nichol, 2005). In doing so, Bohm referenced the evolving nature of an ink drop placed in a tube of glycerin. The ink drop could be dispersed into the glycerin, but if the glycerin were spun the ink drop would reconsolidate as a visible object. He used the ink's enfoldment into the glycerin and unfoldment into an object as a metaphor to explain an implicate order (the glycerin), generative order (the spinning), and the explicate order (the ink drop). Bohm called the continuous enfoldment and unfoldment the holomovement. He pointed to the nature of holograms where "the entire object is contained in an interference pattern" (Nichol, 2005, p. 192) to further explain the concept. Even when describing the holomovement's parts, Bohm's (1980) metaphysical construct was holistic:

Ultimately, the entire universe (with all its "particles," including those constituting human beings, their laboratories, observing instruments, etc.) has to be understood as a single undivided whole, in which analysis into separately and independently existent parts has no fundamental status. (Bohm, 1980, p. 221)

Bohm's metaphysics argued the encompassing implicate order contained the explicate order of structures of objects as embedded patterns. He also argued that the implicate order was creative, acting as a generative order, enabling "a possibility to create new structures and new orders" (Peruš, 1995, para. 32) according to quantum physicist Basil Hiley who coauthored a book with Bohm (Bohm & Hiley, 2006). Bohm, said Hiley, argued the generative order had "features in common with fractals (sic) as the self-similarity" (Peruš, 1995, para. 32). Simply put, the mathematical theory of fractals invented by B. B. Mandelbrot "*generate(s)* shapes, figures, forms and processes" (emphasis in the original) (Bohm & Peat, 2000, p. 152).

The generative aspect of fractals involves a generator, or base figure, to which changes are made in random iterations of scale, direction, shape, and more. As a mathematical theory, the unlimited complexity of fractals is closer to nature's creativity than to traditional geometry. Therefore, argued Bohm it is a better starting point for considering the processes happening within physics and biology (Bohm, & Peat, 2000).

The generative order said Bohm extends beyond mathematics and "is of potential relevance to all areas of experience" (Bohm & Peat, 2000, p. 157). It is, he argued, analogous to the stages in the creative processes of artists like Matisse, Bach, and Beethoven. The generative essence of creativity is a holistic process, according to Bohm, involving an artist's entire being, including, musculature, vision, literary and social values, internal and external perceptions, history, training, historical knowledge of music and painting, and more (Bohm & Peat, 2000, p. 157).

In a social sense, people are wired to read the fractals of complex ecosystems and use them for efficient information exchange (Coward & Salingaros, 2004, p. 109). In cities, fractal paths are informed by repeating patterns at varying scales, such as occurs in medieval Rome's

pedestrian networks, buildings, and ornamental details on the buildings. The resulting “fractal loading ... implies the coexistence of different but related things at different levels of scale” (Coward & Salingaros, 2004, p. 109). Invisible but critical knowledge is acquired by experts via tacit knowledge processes as it is needed. Immersion in the fractally-loaded environment optimizes this exchange of information. Notably, it provides access to relevant patterns as they are needed (2004).

Information exchange is also at the heart of Granovetter's strength of weak ties concept (1973). People in a business network use social actions and techniques to interact and exchange information. In short, actors in Granovetter's (1973) network routinely leveraged seemingly casual business network connections to exchange information in the core processes of pursuing employment and deals within business networks.

Further, highlighting a need for “entrepreneurial imagination” (Chia, 1996, p. 409) Chia directed attention to understanding the knowledge structures infused within complex networks in entrepreneurial and entrepreneurial education settings. Entrepreneurial imagination is informed more by knowledge structure flows and processes, and less by discrete entities (Chia, 2013). In short, it reflects a commitment to a view of reality in line with Heraclitus's becoming rather than Parmenides's being (Chia, 2013). On the one hand, Chia argues the rational instrumentality of episteme and techne (craft skills) form the basis of what is commonly taught in business schools and privileged in organizations (2013). On the other hand, it is the dispositional knowing (memory without language) and phronesis (practical wisdom), and metis (cunning intelligence) that are required to feel one's way through to successful outcomes (Chia, 2009, 2013, 2017; Nonaka et al., 2014).

Further, the work of cognitive scientist Saras Sarasvathy points in this direction by emphasizing an effectuation process used by expert entrepreneurs, rather than a predictive, cause-and-effect model (Sarasvathy, 2009). Considered a process theory, effectuation has continued to gain attention in entrepreneurial research, as well as entrepreneurial education as a theory-rich complement to experientially styled education programs (Chandler et al., 2011). Five entrepreneurial principles are denoted in effectuation: patchwork quilt (e.g., use existing means); affordable loss (e.g., commit based on what you can afford to lose rather than planning for expected returns); bird-in-hand (e.g. focus on those willing to commit something); lemonade (e.g. leverage surprises); pilot-in-the-plane (e.g. focus on what can be controlled and acted on) (Cavarretta & Furr, 2013, p. 23). As a pragmatic approach to entrepreneurial practice, effectuation seeks to address uncertainty by taking actions to shape the future rather than placing a bet based on abstracted planning (Sarasvathy & Dew, 2008, p. 728).

A convergence of process movements, in philosophy by William James (1890/2007), social science by Alfred Whitehead (1933), and quantum physics by David Bohm (1980), and others have launched a line of research in management and organizational theory predicated on a continually changing, living network ontology (Chia, 2013; Nonaka et al., 2008). Further, Chia (2013) argues social science theorists with a process orientation including Foucault (1994), Goffman (1959b), and Bourdieu (2021), in turn, have centered relational thinking, in their constructionist analysis of social practices (Chia, 2013).

In short, this process alternative to science's positivistic bias presents an unfolding, relational construct of reality. The extension of Bohm's research from within quantum physics to social fields, including leadership studies, is also especially relevant (Jaworski, 2011; Senge et al., 2005; Wheatley, 2011). Bohm's concept of dialogue involves a group experiencing a free-

flowing stream of viewpoints continually questioning underlying assumptions. As the group attends to a holistic process of thinking together rather than the content, group decisions, or matters of leadership, the conditions for a paradigm shift may arise (Ellinor, 2005). Ellinor argues that Bohmian dialogues are a process approach to change and transformation within complex environments but concedes their slow pace is a challenge for organizations (Ellinor, 2005). Similarly, physicist and entrepreneur William Bygrave contrasted the problems created by relying on predictive sciences for entrepreneurship with the benefits of using complexity theory informed by quantum physics for entrepreneurial thinking (Churchill & Bygrave, 1989, 1990).

At the beginning of this section, I highlighted the need to keep the differences between predictive and complex adaptive network paradigms in mind to understand the IoT Inc. case study. I also argued these paradigms played a role in previous sections focusing on technology, the models and metaphors used by entrepreneurs, and the emergent IoT field. This broader framing doesn't conclude on a specific point.

However, when I consider my own experience as an entrepreneurial leader at IoT Inc., who stood with a foot in each paradigm, I hope this framing helps inform the reader's understanding. As an entrepreneurial leader who faced daunting challenges at IoT Inc. I can report that whatever is lying around gets used, to include diverse ways of seeing the world.

Situating Digital Entrepreneurship Within a Historical Background

Several of the previous sections position the research at a juncture between the past and the present and near future of technological change. This section continues and expands in that vein by briefly describing a tension in the definition of entrepreneurial action (McMullen & Shepherd, 2006) between neoclassical predictive models (Robbins, 1932; Schumpeter, 1961), equilibrium-oriented theorists (Kirzner, 1999) and digital entrepreneurial research (Nambisan,

2017; Shepherd & Majchrzak, 2022; Srinivasan & Venkatraman, 2018). The preliminary analysis narrative of the case study presented is situated within both scholarly perspectives on entrepreneurial action.

In short, equilibrium theory describes economic activity as a predictive science of human behavior. Robbins (1932) famously summarized it as the relationship “between ends and scarce means which have alternative uses” (1932, p. 75). In Robbins’ (1932) deterministic model of market behavior, the maximization of economic processes is rationally attributable to market actors using perfect information. Schumpeter’s (1961) perspective on perfect information is nuanced but described the economy as if it were a relatively closed system (McMullen & Shepherd, 2006). According to McMullen and Shepherd (2006), Schumpeter’s entrepreneurs merely interface with the economy via other aspects of the culture, like science, literature, and politics. Further, while Schumpeter’s (1961) entrepreneur disrupts equilibrium by introducing radical innovation, Kirzner’s (1999) entrepreneurship begins in disequilibrium and moves the economy toward equilibrium (McMullen & Shepherd, 2006).

In doing so, Kirzner’s (1999) factors of entrepreneurialism revealed gaps of disequilibrium shaping the tendency of markets toward equilibrium. This equilibrium perspective oriented around uncertainty, described by Schumpeter (1961), Robbins (1932), Kirzner (1999), and others is a key theoretical perspective. Moreover, business strategists preferred it well into the 1980s (Ghemawat, 2022) and it continues to inform the literature.

More recent research has noted that a deterministic approach assumes relatively stable and fixed boundaries around entrepreneurial opportunities associated with executing well-defined business plans (Brinckmann et al., 2010; Gruber et al., 2013; Honig & Karlsson, 2004). In recent times, many startups highlight their disruptive and unpredictable nature, and yet,

paradoxically, many of the entrepreneurial business models in use lean on entrepreneurship's predictive historical roots. For example, the IoT startup leader's efforts to use a *Crossing the Chasm* (Moore, 2014) model, would seem to fit a predictive view of entrepreneurial action. Recent entrepreneurial research increasingly argues that equilibrium models are incomplete (Shane & Venkataraman, 2000). They hold "limited insights on entrepreneurial actions, behaviors, and success in the digitized world" (Nambisan, 2017, p. 6).

Moreover, in neoclassical theorists' efforts to create a predictive science, they favored perfect information models and worked to eliminate the individual entrepreneur as a factor. For example, Schumpeter is reluctant to speculate (McMullen & Shepherd, 2006) on the different motivations of entrepreneurs. In contrast, the psychological examination of entrepreneurs, including individualized models of cognition, knowledge, and attention to opportunity is described by McMullen and Shepherd (2006) as an important strategic action. Managers notice and exploit opportunities based on knowledge structures (Shepherd et al., 2017, p. 627) through which the interpretation of a firm's environment occurs.

Moreover, Nambisan (2017) noted new ways of evaluating entrepreneurial processes and success as well as "alternative theories and conceptualizations" (p. 1034) are needed to understand the fluid boundaries associated with digital entrepreneurship. In this light, the digital nature of IoT, data gathered from the entrepreneurs who comprise the IoT Inc. case study, and the emergent Industry 4.0 era, all suggest this less-bounded perspective on entrepreneurship should inform the research into IoT startup leaders.

Further, another line of recent research argued the pervasive nature of technology had created an inherent inseparability between the social and the technical (Orlikowski & Scott, 2008). This blurring of boundaries is not well recognized in previous organizational research

theory, there is no consensus on the character and direction of the transformation, and “a lack of solid organizational knowledge to explain empirical patterns” (Orlikowski & Scott, 2008, p. 447). As a result, Orlikowski and Scott, and others argued organizational scholars should study the factors at the nexus of social and technical change. Orlikowski and Scott further argued the separation of technology, work, and organizations in the literature of organizations contradicted organizational practice. To explore this gap in the literature, Orlikowski argued discrete mental models should be juxtaposed with the pervasive technology framework (Orlikowski, 1992; Orlikowski & Scott, 2008; Scott & Orlikowski, 2013).

Further, it is argued organizational models recognizing blurred boundaries are integral to an IoT startup operating in the context of digital entrepreneurship (Nambisan, 2017). Noting that despite its pervasiveness in organizations, technology was largely missing in action from organization studies literature, Orlikowski and Scott (2008) recommended lines of future research touching on leadership, including how power shaped the design of technologies.

In effect, the relevant literature progressively moved from a deterministic and atomistic Newtonian paradigm toward the network paradigm using concepts from quantum physics to describe the transformative shift. An emerging stream of management literature is describing the softening of boundaries between people and technology in networks (Cecez-Kecmanovic et al., 2014; Leonardi, 2013; Orlikowski & Scott, 2008). Orlikowski and Scott point to the “reciprocal and emergent process of interaction” (Orlikowski & Scott, 2008, p. 439) between actors and things co-evolving, in a web ontology (p. 439).

In turn lines of research on networks, social and technological, informs the literature across disciplines. Fritjof Capra described network effects in physics, biology, and sociology noting “networks have become the most prominent social phenomenon of our time” (Capra,

2004, p. 107). An approach to sociology was offered “based on information networks powered by microelectronics-based information technologies” (Castells, 2000a, p. 695).

This chapter described the classical, neo-classical, and digital perspectives on entrepreneurship theory and action. The technological innovation at the center of the case study was noted and placed within a historical context. I responded to the literature noting the blurring of boundaries in the IoT by demonstrating how Orlikowski’s line of research applies to the entwining of social and technical networks in this case study. Further led by Bohm’s crossover work between quantum physics and social sciences, a frame for analyzing leadership in environments of complexity was positioned.

As a preview, I relayed how the leadership analysis at an IoT startup is framed in Goffman’s dramaturgical model and Bourdieu’s concepts of habitus, social capital, and fields. Flyvbjerg’s argument for social science based on phronesis was recognized and applied to the dispositions of leaders in an IoT startup. Chia’s work further extended the application of knowledge types like phronesis, metis, and techne to the concept of entrepreneurial imagination. The next chapter further defines and defends the theory used for my analysis in this case study.

CHAPTER 2: RELEVANT ANALYTIC THEORY

“Is it not curious, that so vast a being as the whale should see the world through so small an eye,
and hear the thunder through an ear which is smaller than a hare's?”
(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

This section reviews a second set of lenses, the analytical theories used to understand the data gathered on the leadership of the IoT Inc. startup. With a gentle reminder of the analogy of the architect’s language of the invisible describing visible spaces, the focus of the two broad lenses is an informed contextual and theoretical prism, fitted to and focused on the case study.

As such, what follows is a review of theoretical perspectives arrayed to further illuminate the technological and entrepreneurial theory and history just presented. This, the second set of analytical lenses, dives deeper into sociology and leadership as a means for further framing the case study subject, IoT Inc. Finally, by the end of this section, and with the two analytical perspectives in mind adding illumination as well as concentrated visibility, the narrative of IoT Inc., its data, actors, actions, and their movements is presented.

First, I used a symbolic interaction approach which prioritizes interactions among individuals. Specifically, the Chicago School approach to symbolic interactionism is grounded in empiricism (Denzin, 1992). As such, the research leverages Goffman’s dramaturgy (1959b) to understand the everyday practices of the leadership group and semiotic triangles (1974) for discussing how associated scripts are interpreted. Also, Goffman’s moral career (1959) was used to understand how differences shape status, roles, and rewards within the group. Bourdieu’s work on social capital, habitus, and fields served to describe the wider development of the IoT environment as the place of the IoT Inc. within it. Where there is no overlap with interactionism, such as interactions of meaning-making within a wider IoT work community, this study employed a Communities of Practice lens (Lave & Wenger, 1991). Further, when facing the

limits of technical science in the face of increasing uncertainties, Nonaka et al., (2014) posited a need to “return to ancient forms of knowledge” (p. 367) such as phronesis, techne, and metis in organizational studies. In that spirit, a series of knowledge types served as lenses to inform and construct an understanding of the IoT Inc. leadership group.

The study used Bent Flyvbjerg’s phronesis to uncover structures of power and ethical values. Flyvbjerg contrasted phronesis to techne (craft knowledge) and episteme (scientific knowledge). Episteme and techne are distinguished from other forms of knowledge relevant to the case study, in that they may be “written, recorded, validated and protected by a firm” (Baumard, 1999, p. 22). Baumard’s (1994) approach to uncovering tacit knowledge in organizations uses a framework consisting of techne, episteme, metis, and phronesis. An archeological view of knowledge, *The Order of Things* (Foucault, 1994), described the current privileged layer, episteme, as logical positivism, and thus it informed the use case.

As a bookend to the ethics-oriented phronesis, the study references metis “the underbelly of phronesis” (Nonaka et al., 2014, p. 374). The review of metis informed the use of practical action-oriented knowledge in the case study (Baumard, 1994; Detienne & Vernant, 1989; Nonaka et al., 2014; Scott, 2020). In startups, metis can be positioned adjacent to the practical wisdom of phronesis (Chia, 2017). Organizations seeking to solve problems in unpredictable circumstances can result in the practice of oblique and clandestine management via metistic processes (Baumard, 1994). An argument is forwarded that the expedient practicality, but sometimes dubious techniques of metis (Nonaka et al., 2014) are a key, but poorly understood form of social capital in the IoT Inc. case study. Chia (2017) cast doubts on the comprehensive value of the representational and abstracted cognition of Aristotelian episteme while noting it is privileged over techne, metis, and phronesis.

Scott (2020) highlighted the indispensable behind-the-scenes role of metis when individuals confront powerful systems. On the one hand, the high modernist ethos employed rationally abstracted maps and attempted to apply them to people as accepted normality. On the other hand, without the behind-the-scenes metis of individuals subject to these prescriptive structures, these high modernist schemes invariably collapse (Scott, 2020). Baumard (1994) also highlights how informal metistic processes are “always in the background of the problem-solving processes engaged by organizations” (para. 12). Individuals in a highly contextual and rapidly unfolding environment, like IoT Inc., are immersed in circumstances like lovers in each other’s arms (Chia, 2009, p. 6).

Such highly contingent circumstances privilege dispositions imbued with metis and wayfinding rather than predetermined maps. Moreover, in the Silicon Valley tech field speed is at a premium (Flyvbjerg, 2021). It is in environments of contextualized immediacy, that an individual’s mastery and metis meet (Kumar, 2021, p. 263). Metis is an ambiguous, streetwise, and vigilant form of polymorphous knowledge and improvisational expertise, according to Holford, who goes on to say:

Mètis, ‘with all the weight of acquired experience that it carries . . . and . . . thought that is dense, rich and compressed’, rises above the level of mere competence – the level of analytical capacity and decision processes found in most existing artificial intelligence-based automated systems – to a higher level that is able to recognize patterns quickly and act out intuitive insights (Détienne & Vernant, 1991, p. 8; Dreyfus, 1996; Dreyfus & Dreyfus, 2005) Such quick actions are associated to the use of heuristics or ‘rules of thumb’ acquired through practice within a specific context (Baumard, 1999; Scott, 1998). (Holford, 2020b, p. 11)

Moreover, where the management structures of larger firms are capable of a phronetic basis to capture the practical wisdom of innovation (Nonaka et al., 2008), phronesis has less to offer small entrepreneurial endeavors lacking robust structural continuity. The choice between metis or phronesis as a management style in entrepreneurial settings is a consequence of Bourdieu's habitus informed by prior experiences (Chia, 2009). Moreover, phronesis, not metis, is core to Nonaka's concept of ba (Nonaka & Konno, 1998). Ba described a unique space for advancing from knowledge creation in firms to value creation (Nonaka & Konno, 1998). And yet, in the case study, a Ba space served as a physical, virtual (email video call), and/or mental (ideas, experiences) platform for IoT Inc.'s long journey. It is differentiated from ordinary interactions by its focus on the process of creating and integrating knowledge creation. In this case, the metis of a startup IoT Inc., had the opportunity to cohere into phronesis with the support of an early, structurally robust customer in a co-created ba space. Thus, at IoT Inc. and a large customer, the metis and phronesis of individual habitus are explored.

The knowledge type, techne, and its variations are also referenced to account for the technical and business skills of the group (Roochnik, 2010). Roochnik's descriptions of techne1 and techne2 (2010) differentiate forms of technic expertise. Techne1 is indicative of mathematically inclined skills and emphasizes a craft person's results, such as whether a boat builder's new ship floats or sinks. The skills and results of techne2 are less defined and more associated with a surgeon's or salesperson's skills. The results of a craft person with techne2 expertise do not necessarily determine the practitioner's skill level. For example, regardless of a surgeon's skills, patients die. Also, even highly skilled salespeople do not secure every deal they engage in. The technic variations are useful when considering distinct types of craft skills and how they are viewed at IoT Inc.

Roochnik also relates *techne* to the never-ending pursuit of *arete*, or excellence (2010). In the context of IoT Inc., the individuals exhibit expertise, pursue a vision, and are perfecting a craft. They are also frustrated when they cannot fully express their expertise while in the pursuit of excellence. *Arete* reconciles the separation of art and technology, as notably described in Pirsig's metaphysics of quality project (Pirsig, 1992). Further, the pursuit of *arete* helps to understand the aspirational nature of the visions held by IoT Inc. leadership.

Specifically, aspirational rationality is historically recognized in economics and is uniquely applicable to an action orientation in non-Euclidean spaces (Guney et al., 2018, p. 4). Notably, the aspirational rationality at work in IoT Inc. is tied to the behavioral theory of the firm in situations of Knightian uncertainty (Augier & Mahnke, 1998; Guney et al., 2018). In short, aspirations and the unbounded nature of aspirational rationality removes constraints to the imagination needed for navigating within a complex entrepreneurial environment.

Although a pragmatic perspective informed IoT Inc. the pursuit of the vision at IoT Inc. was guided by aspirational rationality. In turn, dramaturgical moments at IoT Inc. highlighted the power differences when individual *habitus* clashed with principles guided by aspirational rationality. Sarasvathy argues the expertise of entrepreneurs uniquely combines bounded rationality as well as an inversion of a causal approach (Read & Sarasvathy, 2005). By comparison, the bounded rationality perspective is “driven by the search for alternatives that are good enough rather than optimal” (Augier & Mahnke, 1998, p. 8).

Although a good enough approach might apply to strategic actions at IoT Inc., the goals of strategic choices, such as annual revenue expectations, were informed by aspirational rationality. Wheatley would say the inflexible goals and principles of the aspirational vision did not support strategy at IoT Inc. but did provide organizational intent and identity (2011, p. 39).

The differences between the two perspectives played out at IoT Inc., caused conflict, and revealed power effects. The two perspectives argue Augier and Mahnke (1998), would cause tension, in part, because they removed a shared sense of time:

... decision makers taking part in the firm's adaptation may judge issue-urgency, hastiness of action, slow motion, or hesitating behavior of other decision makers differently from their own judgment. Although decision-makers involved in the firm's adaptation live in the same moment of time, individual perception of duration of that moment is subjective and thus differs. (p. 10)

On the one hand, bounded rationality limits options to what is known and, in effect, places choices and goals on an agreed timeline. On the other hand, "the creation of new aspirations depends ... also on the negotiation of degrees of disbelief" (Augier & Mahnke, 1998, p. 12). In the case of IoT Inc., these negotiations of disbelief between a startup team and the CEO's vision for the firm included matters of time, resources, and messaging, as well as how, when, and where to pursue opportunities.

In the context of IoT Inc.'s dramaturgy, the aspirations were sacrosanct, so the negotiations played out during strategy discussions. In that context, differences in belief regarding the CEO's annual sales revenue aspirations and a sales leader's belief in the product's sales readiness were evident. The creation of aspirational rationality, though not rational, is not random, but rather a systemic pattern (Guney et al., 2018, p. 1). On the one hand, it creates room for navigational options informed by entrepreneurial imagination. On the other hand, where the reflective quality of aspirational rationality is sparse or absent, some of its implications center on the effects of power (Guney et al., 2018, p. 15).

A Brief Leadership Theory Review

“Consider all this; and then turn to this green, gentle, and most docile earth; consider them both, the sea and the land; and do you not find a strange analogy to something in yourself?”
(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

There is no universal definition of leadership (Northouse, 2013). Leadership does have the following central components, according to Northouse (2013), including it is a process, influences and occurs in groups, and involves common goals. The major approaches to leadership theory include trait theory, also known as the Great Man theory of leadership, which differs from other approaches in its exclusive focus on the leader rather than the followers or the situation. Power and influence theories focus on the use of power by effective leaders. Typical of these theories is the emphasis on power shifts during interactions between leaders and followers. Social exchange leadership explains how power is used within social exchanges and relationships to meet group goals.

Transformational leadership is also a part of the power approach to leadership and goes beyond meeting the basic needs of followers (Northouse, 2013). Instead, exemplar leaders like Jesus of Nazareth, Martin Luther King, and George Washington engage followers with values like peace, love, and understanding to raise their morality and motivation. Symbolic leadership encourages followers to develop shared meanings to create organizational culture (Northouse, 2013). Symbolic leadership is associated with leaders who create meaning for groups in moments of chaos, such as the Vietnamese monk Thích Quảng Đức, who burned himself to symbolically protest the persecution of Buddhists by the South Vietnamese government.

Leadership in an entrepreneurial IoT startup environment requires flexibility and situational awareness to achieve goals. Situational leadership provides various kinds of leadership for different situations (Northouse, 2013). Situational leadership works through

understanding the development level of followers (Northouse, 2013) and remaining flexible, adapting behavior to face contingencies in the environment. Entrepreneurial examples of situational leaders, include Bill Gates, Steve Jobs, and Richard Branson who exhibited situational awareness and adapted their leadership behavior as needed. Situational leadership serves as the theoretical grounding for the IoT startup case study.

Constructing a Social Space

In this section, a framework for analyzing the social space in this research is described. How social space is constructed and how agents and groups navigate the social space is provided. The primary concepts reviewed are Goffman's (1959b) symbolic interactionist dramaturgy, Bourdieu's (1986, 2021) habitus, social capital, and field, Flyvbjerg's (2001) phronesis, and Scott's (2020) metis.

Bourdieu's Constructivist Structuralism

As applied to leadership research into IoT Inc., LaMagdeleine argued Bourdieu's theoretical structures enabled the analysis of specific fields, dispositions, and feel for the game by actors in the field, as well as social spaces (LaMagdeleine, 2016). Importantly, and relative to the analysis of leadership at IoT Inc., Bourdieu's constructivist structuralism helped to reveal the relational nature of how power acted, was used, and applied within the IoT field (Bourdieu, 1989).

Bourdieu Social Capital, Habitus, and Fields

Bourdieu (1989) was interested in the dynamics of how power constructed social life and was transferred over time through social constructions. In three major conceptual categories - social capital, habitus, and fields – Bourdieu pursued how the relationship individuals had with social spaces affected their freedom. He used these theories to explain how individuals and social

groups intentionally strategized and employed power to navigate and enhance their positions in social spaces. According to Bourdieu, social space is composed of agents exhibiting habitus, or dispositions, and their positions in social spaces. People acquire a habitus, a set of dispositions, points of view, habits, and the sense of one's place based on their experiences (Bourdieu, 1989).

A person's habitus enabled the navigation of, and positioning in, social spaces. Social positions were based on the embodied volume, structure, and weight of various accumulated capitals, as well as a space of relationships between positions in a field (Bourdieu, 1989). In turn, capital and habitus inform and are informed by fields. Fields are comprised of a distinctive set of assumptions, protocols, and roles (LaMagdeleine, 2016, p. 70). For example, the field of policing tends to exhibit recognizable characteristics across locations. Similarly, the field of high-tech entrepreneurship is informed by the "enactment of entrepreneurial habitus" (De Clercq & Voronov, 2009, p. 395) which served to legitimize entrepreneurs in a social space. Incumbent members of entrepreneurship required newcomers to the field, such as the IoT field, to demonstrate a paradoxical capacity. Newcomers must meet an expectation of stability by fitting in, as well as change, by standing out. In short, social legitimacy in the entrepreneurial field is conferred, for example, by fitting in via locating an IoT startup at a recognized Silicon Valley startup address and basing its innovation on a known IoT connectivity option, such as Bluetooth. Simultaneously, the entrepreneur must stand out, for example, by promising to disrupt normal business practices by delivering innovative Bluetooth capabilities (De Clercq & Voronov, 2009).

Bourdieu described four primary types of capital, or power, as they amount to the same thing (1986): cultural disposition, social networks, symbolic prestige, and economic resources. In Bourdieu's own words:

The Forms of Capital: ... capital can present as ... as *economic capital*, which is immediately and directly convertible into money and may be institutionalized in the form of property rights; as *cultural capital*, which is convertible, on certain conditions, into economic capital and may be institutionalized in the form of educational qualifications; and as *social capital*, made up of social obligations (“connections”), which is convertible, in certain conditions, into economic capital and may be institutionalized in the form of a title of nobility. (Bourdieu, 1986, p. 243)

Capital is a form of accumulated labor embodied within agents or groups as a force. It enables the use of social energy in the form of living labor (Bourdieu, 1986). According to Bourdieu, the relative weight and structure of an agent’s capital are what make the games of society more than matters of chance. The capital accumulated by agents persists and takes time to accumulate and contained the potential to produce profits. Capital distribution structured the social world so that not everything is equally possible or impossible by setting up durable social structures that form parameters for failure and success (Bourdieu, 1986).

Explorations of Bourdieu’s capital in entrepreneurial research have tended to focus on one or two forms of capital (Stringfellow & Shaw, 2009). They argued this approach failed to account for Bourdieu’s perspective on the intersecting, transformable essence of capital’s forms. It may be noted that all four forms of Bourdieu’s (1986) capital are relevant in understanding the habitus of IoT Inc.

Bourdieu acknowledged Granovetter’s (1973) strength of weak ties which described how agents embedded in social networks consciously use social capital to create trust. However, Bourdieu (2005) criticized Granovetter for ignoring the underlying structural constraints of social fields at work on agents. As such, in the framework used here, Granovetter’s strength of

weak ties concept served as an operation of entrepreneurial social capital (Stringfellow & Shaw, 2009). Granovetter's strong ties had more emotional effects and happen more often, as with family and friends. Weak ties are individuals a person contacted on an occasional basis. A strength of the weak ties is the additional capacity for new and innovative network interactions they provide. Strong ties often include a closed triad wherein the connected individuals already share much of the same social capital in the form of contacts and ideas (Granovetter, 1973).

Bourdieu (1989) described symbolic capital as forms of capital recognized by others as legitimate, such as a college degree and "more or less synonymous with: standing, good name, honour, fame, prestige, and reputation" (p. 37). However, within an entrepreneurial context, the attainment of symbolic capital may be more strongly associated with an entrepreneur's reputation (Stringfellow & Shaw, 2009).

There is also specific capital specific to participation in a business field (Bourdieu, 2021, such as symbolic capital like brands, seniority, reputation, and other markers denoting differentiation. In a business context, specific capital also includes technological capital. A business enterprise is said to contain a field of forces attributable to positions such as marketing, sales, accounting, and others "confronting each over any decision" (Bourdieu, 2021, p. 113) with the social capital they wield.

Bourdieu's (2021) concept of habitus provided a lens for thinking about social actions. Habitus is the embodied social capital of agents in a field rendered as an agent's "system of dispositions" (p. 283) expressed for example as knowledge of a language or a culture. Moreover, habitus can take the form of the apparatus of a system, such as banking, to include the system's institutionalized rules and non-institutionalized modes (Bourdieu, 2020). In this case, an incumbent technology institution's review of IoT technologies and companies is a habitus

forming within an emergent IoT field. Moreover, according to Bourdieu, the formation of a field involved a struggle to define the social capital needed to participate in and constitute the field.

Bourdieu described a practical sense within an individual's habitus, wherein common-sense choices are made vis-a-vis external structures without conscious thought (Mesny, 2002). In this sense, as Chia (2009) said, an agent's intake of the information is related to its relevance and practical usefulness at the time:

Both metic intelligence and phronesis, to use the words of Pierre Bourdieu, are a consequence of habitus; a style, demeanour, and culturally-mediated set of predispositions inscribed onto material bodies that result in a propensity to act in a manner congruent with the demands of a shifting social situations (Chia, 2009, p. 22).

Furthermore, it may be noted that whether a process is true, the pragmatic and improvisational characteristic accorded with Bourdieu's (2020) description of doxa as "an absence of truth that happens to work" (p. 67). The sales process involved the salespeople and clients as buying and selling agents, and the social space within which they are located (Bourdieu, 2005). As an agent of economic necessity, salespeople inject a dose of reality as quickly as possible regarding the economic logic of the product and any other factors associated with building revenues. Bourdieu (2005) explained the bluntness of salespeople as a function of managing the tempo of the exchange. At the same time, because the sales function's self-interest is a highly significant and universally understood motivating factor of the sales function role, trust is equally important. Thus, salespeople are in a double bind according to Bourdieu (2005). On the one hand, they are tempted to push things by exploiting a client's impatience or lack of knowledge and promoting the pleasure principle or benefits of the product. On the other hand,

they are placed in check by the reality principle in as much as a sale that is not a “fit between the product and purchaser” (Bourdieu, 2005, p. 171) harms the purchaser, firm, and salesperson.

Bourdieu (2005) describes the vital role of salespeople, “By drawing on an ethical and emotional complicity, linked to an affinity of habitus, the salespeople can combine the authority of the expert and the closeness of the advisor or confidant ...” (p. 170). Salespeople, says Bourdieu, are agents of economic necessity (2005, p. 152). They place their client in the position of adopting, in this case, IoT Inc.’s point of view, regarding the economic necessity, or financial terms of a deal. At IoT Inc., Bourdieu (2005) would say, prospects and clients identify its salesperson as IoT Inc. personified.

Moreover, a salesperson said Bourdieu (2005), works happily when their dispositional fit produces harmony between the salesperson and client. This happy sales work extended within firms where the salesperson’s disposition is a fit for their remuneration, how the product is promoted in the marketplace, and the specialists who provide the product. Salespeople, says Bourdieu, contribute crucially to the production of the product by transforming the definition of the situation (Bourdieu, 2005). Salespeople, says Bourdieu, guide the discourse around the product from anxious mistrust to total trust. The discourse around the product is represented by the salesperson as an embodied faith and a personal warranty. In short, the salesperson must be seen to represent the truth of the product to build trust.

The relationship between habitus and field is primordial, according to Bourdieu (2021). Fields are made up of agents’ and institutions’ social positions and the relations between the positions. Moreover, fields are differentiated from systems in that the boundaries of fields are open, and the boundaries of systems are not. The positions, relations as well as characteristics of a field’s boundaries may be articulated, but they are not static. The nature of fields is always

called into question (Bourdieu, 2021, p. 286) by agents and institutions because of power—how is it defined? Who has it? —is always an issue in the social world. Participants in fields, thus, compete to define the authority, competencies and legitimizing factors of a field in ongoing power struggles. In this context, Bourdieu describes habitus as the accumulated experience enabling agents' economy of action in their positions as they struggle in a field.

Capitalism's emerging business fields also impose a necessity including violent domination of and between individuals and economic mechanisms (Bourdieu, 2021). The violence of capitalism is generally not direct but rather operates through intermediary mechanisms and is euphemized (Bourdieu, 2021). For example, rather than an employer having the right to cut off an employee's hand, the employer wields the power to dismiss an employee via an at-will employment contract (Bourdieu, 2021).

Having noted the usefulness of Bourdieu's capital, habitus, and field, too much of a focus on a field-level structure may prove cumbersome for understanding the role of micro-level entrepreneurial behavior (Chell, 2008; De Clercq & Voronov, 2009). Therefore, in turning to the overall leadership analysis framework, LaMagdeleine (2016) also argues for the addition of Goffman's (1959b) micro-interactionist dramaturgy and Flyvbjerg's (2001) case study approach informed by phronesis. We now turn to LaMagdeleine's (2016) definition of the concepts underlying a taxonomic approach to the leadership imagination.

Symbolic Interactionist (Chicago) Tradition

At the heart of this case study was a question: What does it take to lead an IoT startup firm at the dawn of Industry 4.0? As noted, to pursue this question I served as both researcher and participant in an IoT startup. From that interaction, I derived data. However, data cannot

interpret itself. With that in mind, a means to attend to the data via the symbolic interactionist tradition is described.

The symbolic interactionist approach arose out of the Chicago School sociological tradition begun in the 1920s under Robert E. Park (Becker, 1996). The Chicago School was, in part, a counterreaction to the quantitative approach favored by the establishment journal *American Sociological Association*. In 1961, Howard Becker became the editor of a sociology journal, *Social Problems*, favoring the work of qualitative Chicago-style research (Becker, 1996). Qualitative research in the Chicago tradition emphasizes the applicability of social science research grounded in pragmatic everyday life and case studies (Bogdan & Biklen, 2016). Rather than emphasizing the finding of facts the qualitative perspective seeks to better understand human behavior and experience (Bogdan & Biklen, 2016, p. 40) to include the researcher's perspective.

In 1937, University of Chicago sociologist Herbert Blumer coined the term symbolic interactionist. The symbolic interactionist theoretical framework emphasized micro-social interactions and a pragmatic orientation (Lal, 1995). In short, micro-social interactions looked at everyday interactions in the construction of the self as the basis of sociological analysis (Collins, 1994). Pragmatism is core to the theory of symbolic interaction, and this research is aligned with William James's emphasis on truths that work towards ongoing actions for individuals (Denzin, 1992) as well as Dewey's cultural criticism. Importantly, in support of the dynamic quality of pragmatism's emphasis on the tangible, both James and Dewey proposed that the concrete and the abstract suffuse one another (Winther, 2014, p. 17) and reification of their distinctiveness as abstractions should be guarded against. In other words, the pragmatism of James and Dewey

continually pointed to a worker's identity as an ongoing transaction within a work environment rather than an interpretation (Holford, 2020b).

In emphasizing the value of a symbolic interactionist approach, Becker (1998) said the imagery a social researcher brings to a social science research topic is often a preconceived stereotype, based as it often is on the researcher's outsider perspective. By contrast, the symbolic interactionism tradition focused on the construction of social reality via meaning-making, interactions, and change based on experience (Lal, 1995). This construction included the "actor's point of view as well as the nature of the situation in which collective action is constructed" (Lal, 1995, p. 1). Moreover, the analysis of documents and artifacts mitigated mistaking the sociologist for the actor (Lal, 1995) and highlighted symbolic interactionists' recognition of objective reality.

Further, the symbolic interactionist approach is well suited to studying micro-interactions. The micro-interactionist approach includes the effects of structures, history, ideologies, and power relations on the experiences of interacting individuals (Denzin, 1992). The approach also supports the analysis of interaction ritual chains (Collins, 2004). I approached my dramaturgical analysis with the idea that the social reality was constructed within the micro-interactions of the small group social reality at IoT Inc.

Goffman's Dramaturgical Interactionism: Goffman and Understanding Small Teams

Goffman's (Collins, 1994) symbolic interactionist lens provided an effective means for understanding leadership dynamics in a small team entrepreneurial setting. Goffman's perspective on symbolic interactionism was informed by the pragmatism of William James. James argued individuals had as many selves as they had social relationships (Denzin, 1992). Goffman built on the perspective of James but aligned with Mead who argued the self was not

mentalistic but rather a social object that could be scientifically studied (Denzin, 1992).

Specifically, rather than James' interpretation of an individual's stream of experience, Mead emphasized the study of the act (Denzin, 1992).

Understanding social structure as a dramaturgy defined the social dynamics of various settings Goffman referred to as frames (Collins, 1994). The dramaturgical metaphor is suggestive of a stage where the actors in the setting assume roles, don costumes, and speak lines. Goffman extended the stage metaphor to include a front stage and backstage (Collins, 1994). The front stage is where the actor is embedded in a scene of action and a role. The maintenance of the division between the front stage and backstage allows actors to control the frame. For example, a salesperson performing a negotiation in a front-stage meeting with a customer may use their manager's office for a backstage. Backstage, the salesperson can adjust their persona (such as the sales script) to manage interacting with a customer for the next step in a sale during a front-stage performance (Kivisto & Pittman, 2013).

This is an aspect of impression management noted Goffman (1967a), where the social life of individuals is managed to manipulate the perceptions of other social actors. More than just a manipulation, role management is an aspect of sincerity and belief based on the individual's decision to believe in the role (Kivisto & Pittman, 2013). For example, as a researcher in entrepreneurial settings, I could ask how a person's belief in their entrepreneurial persona was impacted by their belief in the entrepreneurial organization.

Dramaturgy of Small Teams

Further, in a dramaturgical context, the success of a role is determined by the collective feedback from fellow actors in the setting. Actors in the frame track their fellow actors even when nothing is happening (Collins, 1994). This emphasizes Goffman's (1959b) view that the

physical aspect of social life is more fundamental than the conversational. The dramaturgical scripts, though, are vital to interpersonal interaction (Kivisto & Pittman, 2013), especially in a commercial setting like a startup where language is more formalized. There, power dynamics are revealed by the formal scripts. For example, there may be specific ways that managers wish employees to talk. In the case of an entrepreneurial setting sales interactions with customers may also reveal scripts used to control the negotiations.

Semiotic Triangles, Interpreting Actors' Scripts

These Goffmanesque actor scripts may be further analyzed using a semiotic triangle (Ogden et al., 1923). The semiotic triangle is used to understand the meaning embedded in referent symbols such as words. The three aspects of the triangle include the actor's internal representation of the referent, the symbol used to refer to the referent, and the referent itself. The referent refers to the object, part of the quality of the word. Goffman's (1959a) conception of a moral career is focused on the roles individuals play as they move through a social strand in their life. The concept has two sides, the keenly felt notion of self and the official position which is the part known by the public as a kind of institution (Goffman, 1959a). The focus is the moral aspect of the career, where changes in the person's sense of self and their perceptions of judging others are at play.

Phronesis: Bent Flyvbjerg on Practical Wisdom

Flyvbjerg (2001) drew on several Aristotelian intellectual virtues to highlight the concept of phronesis by contrasting it with episteme' and techne. Phronesis concerns the analysis of values and whether they are good or bad for people as the source for action. Flyvbjerg (2001) highlighted Aristotle's emphasis on the use of phronetic deliberation on that which is variable (p. 112) in human affairs. Inquiries into variability are apt for understanding entrepreneurial social

contexts and tensions involving power and values. Further, Flyvbjerg (2001) made explicit the link between phronesis and power by emphasizing the processual question of “How is power exercised” (p. 118) raised by Foucault. This dynamic ‘How?’ alludes to Flyvbjerg’s notion that phronesis is a deliberation about values in the context of doing or praxis.

Phronesis’s interrogation of power relations asks about outcomes such as: Who gains and who loses? What kind of power? Is change possible, and if so what kind? These questions signal the explicit phronetic relation to values and power at the core of the analysis. A central question of phronesis, stated Flyvbjerg (2001), “What should we do?” (p. 136), points to narrative inquiries at the level of the actor and the structure, and the relation between them. These narratives identify humans as story-telling animals and help us make sense of our experiences.

The phronetic effort is a pursuit of reality emphasizing practical action rather than discourse or theory, according to Flyvbjerg (2001). Discourses transfer and produce power but can also weaken and conceal power. Discourse is a tactical element (p. 124) operating in the field of force relations (Flyvbjerg, 2001). Moreover, the real relationship between rationality and power is an example of a blind spot hidden by society, in a regime of truth. When a truth is produced by power relations, a researcher of entrepreneurial leadership asks: What is going on here?

Flyvbjerg and the Power-Truth Dynamics of Entrepreneurial Teams

Flyvbjerg (2001) relayed the interwoven relationship between power, rationality, and truth, agreeing with Foucault, wherein the status of truth is “the question for the West” (p. 125). According to Flyvbjerg, Foucault portrayed the West’s emphasis on logical positivism, or episteme, as the current archeological layer of pure science and legitimate truth in *The Order of Things* (Foucault, 1994). And yet, Foucault did not link techne as applied science to episteme.

Instead, Foucault linked *techne* to goals. Flyvbjerg (2001) interpreted this as practical values, and ultimately *phronesis*. Foucault rarely spoke of *phronesis*, acknowledged Flyvbjerg (2001), but described Socrates and Aristotle, and their attendant knowledge types as pragmatic tools to use (2001, p. 111). This is in keeping with the Foucauldian spirit of making and unmaking human practices and affairs. Flyvbjerg referred to power as force relations that are exercised but not possessed, and not centralized (Flyvbjerg, 2001). Ultimately, said Foucault (1978), power is “the name one attributes to a complex strategical situation in a particular society” (p. 93). In this regard, noted Flyvbjerg (2001) of Foucault, process not structure, a strategy not sovereignty, and answering the question How? power occurs informs the analytics of power and leads to *phronesis*.

Metis: Wiley Intelligence

There is no doubt that *metis* is a type of intelligence and thought ... it implies a complex but very coherent body of mental attitudes and intellectual behavior which combine flair, wisdom, forethought, subtlety of mind, deception, resourcefulness, vigilance, opportunism, various skills, and experience acquired over the years. It is applied to situations which are transient, shifting, disconcerting and ambiguous, situations which do not lend themselves to precise measurement, exact calculation, or rigorous logic (Detienne & Vernant, 1991, p. 1).

Philosophers and scholars have argued that Aristotelian *episteme* is privileged over other forms of knowledge, such as *techne*, *metis*, and *phronesis* (Chia, 2017; Chia & Holt, 2009, pp. 105-108; Dunne, 2005; Flyvbjerg, 2001; Foucault, 1994). The repression of *metis* within the modern, digital workplace can be traced to Plato (Holford, 2020a). Scott (2020) details the concept of *metis*, as practical “knowledge embedded in local experience” (p. 311) applied as

resistance by people when they are subjected to abstract grids and maps formed to make the opaque aspects of social spaces and structures legible to those in power.

Historically, *metis* is prevalent wherever power produces reality via abstracted maps overlaid on previously private realms (Scott, 2020). Scott (2020) relays Foucault's "Where there is power, there is resistance" (Foucault, 1990, p. 95) to describe why people employed *metis* to outmaneuver those with power. People do so indirectly via a variety of tricks based on local context and knowledge (Detienne & Vernant, 1991; Scott, 2020). Notably, it is the complexities of liberal political economies that enabled *metis*-laden resistance (Scott, 2020).

Many human activities requiring a feel to master require *metis*, including sailing, where hand-eye coordination and the capacity to read waves are acquired only through practice. However, *metis*, and the mastery it engenders, are increasingly repressed in digital organizations by reliance on *episteme* and *techne*, according to Holford (2020a). The over-reliance on *techne* and *episteme* has thus reduced the capacity for contextual expertise. *Metis* is not separate from other forms of knowledge. It is entangled in a network of knowledge types (Kumar, 2021); acquired via internalization of *episteme* and *techne*, situational knowledge, social practice and dialogue, and individual practice within lived contexts (Holford, 2020a). When *metis* is overlaid with other knowledge forms it produces polymorphous knowledge (Holford, 2020a).

The improvisational and embodied ability to know, in boxing, fencing (Scott, 2020), and complex video games (Fraser, 2011), which rules of thumb to use and when, as well as specialists dealing with fraught life-or-death situations, firefighters, emergency room doctors, are exemplary of *metis* (Scott, 2020).

Metis and *phronesis* share an orientation to practicality, but the emphasis is different. Where *phronesis* leads with ethical reflection to pragmatic action, *metis* leads with action to

achieve pragmatic results, regardless of ethics, as in the case of a soccer player deceiving an opponent to score a goal (Kumar, 2021).

It is in this vein, that the work of Detienne and Vernant (1991) described metis as a form of shadowy cognition “alien to truth” (p. 4) and separate from episteme. Metis is, they noted, often passed over by academics because its free-flowing, changeable nature resists reasoning. Instead, it is relegated to routine, chancy inspiration, and charlatanism. In this way, metis remains under the surface in the form of practical actions derived from experience where flair, forethought, deception, vigilance, and opportunism, are used to engender otherwise unstable objects with formidable powers for navigating transient, shifting, disconcerting, and ambiguous situations (Detienne & Vernant, 1991, p. 3). Metis presides then in situations where “merchants, like conjurors, make a great deal of money out of nothing” (Detienne & Vernant, 1991, p. 48), navigators steer ships against the tides, and salespeople turn a prospect’s own words into a trap. Broadly similar, but never identical, high-stakes activities, such as politics and negotiations, where players seek to shape the behavior of others to their ends, are also metis-laden skills (Scott, 2020, p. 315).

As Scott (2020) stated, the rules of episteme and techne cannot explain insights leading to scientific innovations. Innovative insights may instead require metis. By contrast, assembling the cause-and-effect proof of the innovation, or the product, required the accepted universal logic of techne. Techne is designed to master mathematical chance, such as described in economics. By contrast, “invention and entrepreneurial activity” (Scott, 2020, p. 322) are outside the reach of techne—uncertainty cannot be bracketed—and the experienced intuition, the becoming nature of metis is trusted to muddle through. Thus, metis is leveraged where gaps exist between current

capabilities and goals, as in “discovering a mathematical theorem requires genius and metis” (Holford, 2020b, p. 264).

When agents are experienced in the practice of business strategy, it is argued that this furtive, discretionary form of knowledge allows its exponents to escape puzzling and ambiguous situations (Baumard, 1999). Baumard (1994) describes metis as “A fourth dimension of knowledge” (para. 8) or awareness that is clandestine, versed in obliquity. Situations can be read and anticipated based on the merest hints and small happenings. Sherlock-Holmes-like, the response to the riddles of entrepreneurial situations and paradoxes, is not a deduction from clues but imaginative leaps between snippets of data wrested from unlikely and murky places (Baumard, 1994).

The metis practitioner obliquely approaches confrontations with overwhelming powers and faces likely failure, yet via twists, multiplicity, and alert cunning achieves the goal (Detienne & Vernant, 1991). Nor do practitioners of metis document their techniques. Often, they are at a complete loss to explain them (Scott, 2020). They ingest the local environment to rapidly solve problems in dynamic ways, typically by combining unrelated things, and then they move on. The only test of metis is practical success (Scott, 2020). Did the tiller navigate between Scylla and Charybdis? Was the salesperson’s quota reached? Did the startup achieve its funding?

Several scholarly analytical strands are now laid out and overlaid on the IoT Inc. case study. The positioning of the analytical framework as described by LaMagdeleine (2016) to understand leadership in the context of the IoT Inc. case study intertwined and tightened to the data. A broad Silicon Valley startup social context was highlighted via Bourdieu’s concepts of habitus, social capital, and field. Previews of how it occurs used Goffman’s dramaturgy to explain the symbolic interactions of players, their scripts, and props, at IoT Inc.

An emphasis on the blurring of social and technological boundaries was described and the Silicon Valley setting was noted. An argument for the pragmatic nature of the case study and its relationship to, and the value of, Flyvbjerg's case study approach, ethical reflection, and phronesis, was formed for the reader. Further, the non-reflective emphasis on entrepreneurial action was presented by Scott (2020) in the concept of metis. The broader case for a shift in perspective was further made within the leadership work as supported by the work of scholars like Capra (2004), Wheatley (2011), Bohm (Nichol, 2005), and as well as others who leverage insights informed by quantum physics and complexity theories within a social context (Chia, 1996; Churchill & Bygrave, 1990; Jaworski, 2011; Senge et al., 2005). The next chapter describes and defends the methodological approach of my research.

CHAPTER 3: METHODOLOGY

“Real strength never impairs beauty or harmony, but it often bestows it; and in everything imposingly beautiful, strength has much to do with the magic.”
(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

In this chapter, I present and defend my methodological approach. In short, a qualitative approach was used to present a normative case study. The case study investigated the pragmatic actions and decisions of a small leadership team at IoT Inc., a Silicon Valley start-up seeking to navigate within a high-tech entrepreneurial marketplace. The product offered is a new category in the IoT marketplace, a long-range Bluetooth gateway.

My role at IoT Inc. placed me as an inside researcher within the context of leadership at IoT Inc. As a participant and inside researcher, I used my researcher’s perspective to frame a close understanding of the context, decisions, and actions in the startup. This reflective approach provided insights into what happened at IoT Inc. which relied on Goffman’s (1959b) dramaturgical perspective. Moreover, the case study methodology is consistent with the qualitative approach emphasized by Flyvbjerg’s (2001) phronetic social science and LaMagdeleine’s (2016) leadership imagination. Moreover, as described below, Becker and Goffman’s symbolic interactions as informed by the pragmatism of the Chicago School tradition are defined and used (Denzin, 1992).

Interpretive Framework: A Dramaturgical Approach to IoT Leadership

The basic question of the case study was: what is it like to lead a Silicon Valley IoT startup in the early 21st century? The works of Flyvbjerg (2001), LaMagdeleine (2016), and Chia (2017) offer guidance in this regard. Flyvbjerg invigorated a contextual qualitative approach to social science. In doing so he emphasized phronetic social science’s use of case study research. The normative case study approach, including the insider research model, interprets and analyzes

the actions and decisions of the individuals involved. In turn, LaMagdeleine (2016) argues for Flyvbjerg's case study and phronesis for constructing an understanding of leadership in organizations.

Moreover, building on the work of Flyvbjerg and others, a normative case study approach centers on a methodology to illuminate values (Thacher, 2006). It also accords with calls to distinguish between phronesis and metis in organizational and entrepreneurial research environments (Baumard, 1994; Baumard, 1996; Baumard, 1999; Chia & Holt, 2009; Holford, 2020b; Mackay et al., 2014; Nonaka et al., 2008). As explicated by Thacher (2006), normative sociological research does not assume a detached researcher but emphasizes an ethical reflection on what is and what ought. Where phronetic analysis alone pursues a reflexive view based on ethics, the metis analysis acknowledges not all actions exhibit an ethical perspective. They are actions taken, with perhaps a view to achieving, but without an ethical beginning, middle, or end. Thacher's normative model ties a description of such actions to a value-based evaluation.

LaMagdeleine (2016) constructed a framework based on Goffman's (1959b) dramaturgy, and Bourdieu's (2020) habitus, field, and social capital, to pursue a leadership imagination analysis. To pursue the analysis, I used Goffman's dramaturgy framework to interpret the scripts, settings, and performances of actors in their roles as well as the characteristics of frontstage and backstage environments. Although theatrical metaphors involving entrepreneurs had been the topic of some academic interest (Anderson, 2005) a review of the literature revealed the use of Goffman's dramaturgy to analyze entrepreneurial environments is relatively rare. Yusuf (2011) described the capacity of entrepreneurs to employ charisma in the performance of pitches to investors to achieve funding in a dramaturgical analysis. And Lowe et al. (2011) used Goffman's (1959b) framework to understand Korean entrepreneurs' dramaturgical performative choices as

an aspect of wayfinding adjustments made to work successfully in the United Kingdom. The work of Anderson (2005) delved more deeply into the theoretical as well as methodological use of Goffman in an entrepreneurial context. Anderson described the theatricality of the entrepreneurial process. According to Anderson, a corresponding meaning within the word entrepreneur is ‘going between’ which serves as both a noun and verb. Anderson, therefore, argued entrepreneurship “... is the performance of the process of becoming” which is “... transitive, transitory and ephemeral” (p. 7). In this sense, the word entrepreneur participates in the definitional ambiguity of *metis*. Anderson further pointed to the dual meanings held within the performance component of Goffman’s emphasis, coupling the artificial staging notion with the French root, *parfournir*, of performance which also “loosely means to accomplish” (p. 9).

Finally, Chia and Rasche (2010) argued the embodied nature of Goffman’s dramaturgical analysis in organizations is “strategy as practice” (p. 725). It emphasized what subjects do as performances, such as shaking hands, rather than a view that strategy is something an organization possesses. In that sense, Goffman’s (1959b) dramaturgy provided frames for the material social practices in which actors perform strategy, according to Chia and Rasche (2010).

The organizational theory scholarship of Chia (2017) was especially helpful in connecting Goffman’s (1959b) performative aspects of the case study and Bourdieu’s (2020) social structures with process-oriented knowledge frameworks at work in entrepreneurship. Specifically, while acknowledging the dramaturgical context of entrepreneurship, Chia (2017) aligns Flyvbjerg’s (2001) *phronesis* with Scott’s (2020) *metis* as a matter of choice based on an overall pragmatic orientation within startups. In short, where LaMagdeleine (2016) provides a fundamental framework for the analysis of the leadership imagination, Chia (1996) highlights the knowledge structures and process orientation of the entrepreneurial imagination. In this way, the

performative actions of IoT leaders may be further analyzed based on the types of knowledge informing their habitus, social capital, and the IoT field.

Case Study Research

Flyvbjerg Social Science

Case studies that are close to real-life situations, as this was, help researchers learn how to research, according to Flyvbjerg (2001). The analysis benefited by framing the analysis via a phronetic lens, asking the processual How? and the structural Why? questions suggested by Flyvbjerg as a context-dependent case study method. Flyvbjerg stated case study analysis is preferable in social sciences, especially those close to real-life situations. Further, as noted earlier, the digital entrepreneur space is rife with narrative, which makes the IoT startup an apt venue for a case study attuned by a phronetic analytical lens (Flyvbjerg et al., 2012). Flyvbjerg suggested case studies are well suited to capture the rich ambiguity of narratives, such as may be encountered in an entrepreneurial environment.

Moreover, since the case study occurs within the context of a juncture between historical eras, phronetic social science is engaged to challenge power structures and empower change (Flyvbjerg et al., 2012). In other words, while case study research focuses on the quality of what is happening, Flyvbjerg's phronetic approach raises questions about what should happen. Case studies can unearth context-dependent knowledge involving experts which can help non-expert students develop competence and create an awareness of issues, according to Flyvbjerg. In this way, a case study involving IoT Inc. may serve as an exemplar in the nascent field of qualitative IoT entrepreneurial case research.

With that noted, case studies are often used to research a collection of people who form a group, (Bogdan & Biklen, 2016) such as a leadership team in an IoT startup. As described by

Bogdan and Biklen (2016), a case study informs research, via a detailed examination of one setting, subject, depository of documents, or one event. Flyvbjerg et al. (2012) noted case study events include the sequences and actions of a story, unfolding and interacting at multiple levels—the linear facts, relations, emotions, and the analysis of narrative connections.

The events at the center of this research included an insider perspective on how leaders at an IoT startup navigate several critical moments of an IoT product. Conducting this detailed examination of the key facets in a case study—a place, a group of people, and an activity—fits the frame of the IoT startup. The research was constructed in a funneling structure initially casting a net to collect data and then “making decisions about where to go with the study” (Bogdan & Biklen, 2016, p. 57). The data collection and research activities were used to help narrow the analysis as it developed a focus. With that noted, while the case study was open to unexpected inputs, it focused on leadership within an IoT startup and that was the direction of the data gathering.

LaMagdeleine on Leadership

In describing tips for qualitative research in a leadership case study, LaMagdeleine (2016) emphasized the researcher’s embeddedness within the daily micro-interactions of the organization and the collection of first-hand data. The immersive case study approach to leadership was oriented around pivotal events and organizational troubles faced by leadership at IoT Inc. In general, these troubles involved a pivot in the market orientation, the timing of product development, and sales to a key reference client. In the tradition of the Chicago School, fieldwork of this nature is open and ongoing, continually revisiting data in search of emergent metaphors, and themes (LaMagdeleine, 2016). Undergirded by Durkheim’s functional taxonomy, LaMagdeleine pointed to Bogdan and Biklen’s (2016) continuous comparative

approach to expand upon and explore initial analytical insights. As the exploration of emerging metaphors and analogies draws out the often exotic and non-linear nature of power dynamics and the parameters of legitimate discourse, the capacity for a taxonomic leadership analysis emerges. Employing this leadership imagination against dilemmas in the organization revealed the structure, power, and ethical factors which “become clear enough to diagram” (LaMagdeleine, 2016, p. 80), and, in turn, these taxonomic truths rendered further insights.

According to LaMagdeleine (2016), the actual operational metaphors and forces at play in organizations are often not visible nor well understood by organizations. In the analysis of IoT Inc., metaphors were continually created, abandoned, and adjusted to describe the actions and decisions of leadership. In the end, the focus rested on metaphors which held the import of the data most robustly. With that in mind, these metaphors were reviewed with participants during interviews, and attention was paid to metaphors employed by participants to describe their experiences. It is in the context of uncovering and analyzing the metaphors and context-specific organizational stories in an organization, according to LaMagdeleine, that leadership activities may be understood as interactions within a wider context.

Research Strategy

In organizing the structure of the research, a qualitative approach was taken. Startups are messy complicated places. In this sense, understanding the quality of what is rather than what ought to be was pursued (Becker, 1996). Where qualitative research and symbolic interactionism methodologies emphasized the construction of accepted social reality, symbolic interactionism also opened the door to an enriched study of social outsiders and stigma. In a search to understand the nuances of social construction, Chicago symbolic interactionist Anselm Strauss developed grounded theory (Glaser & Strauss, 2017). In seeking a method to understand social

situations beyond an overly simplified bifurcation between norms and deviants, the grounded theory provided a sensitizing orientation (Bogdan & Biklen, 2016).

Extensive field notes were gathered to understand subjective states occurring during the research (Bogdan & Biklen, 2016). The grounded theory approach to qualitative research accords with the earliest traditions of the Chicago school symbolic interactionist tradition traced to Max Weber's interest in *verstehen* (understanding). In the 1820s, Weber sought to understand the social shift from traditional to modern society through individuals' interactions with ways of thinking involving interactions with and constructions of symbolic meaning. In turn, Georg Simmel, George Herbert Mead, and Charles Horton Cooley extended Weber's approach taking root in the Chicago School tradition, throughout the middle of the 20th century (Becker, 1996).

It bears repeating that my role as a researcher began while I was on the inside working at IoT Inc. This perspective accords with Becker (2009) who highlighted the time-intensive, iterative nature, and subjectivity of the researcher's perspective. Becker described a rich variety of qualitative methods and modes, including personal journals, observations, artifacts, and surveys, as well as attentiveness to hunches, impressions, and environments. The qualitative and immersive approach to qualitative research makes it possible to ask new questions and uncover what is happening in organizations rather than what everybody knows (Becker, 2009).

It takes time to understand an organization. Getting to know a place takes at least a year according to Goffman (Pettit, 2011), and involves a researcher's personality and body. To be clear, my research work at IoT Inc. was in plain view of my colleagues. I made no secret of my doctoral studies but for the most part, my colleagues, as was I, were immersed in the day-to-day struggles of achieving results at IoT Inc. They didn't pay it much attention.

I often read and authored papers while I was traveling by plane to various IoT Inc.-related events. I had developed the habit of thinking about IoT Inc. as I was reading doctoral program books related to leadership studies and writing my insight onto sticky notes attached to the pages of the book. Writing about IoT Inc. became part of my routine as I worked through the leadership doctoral program during my 34 months of work at IoT Inc. Once while others slept during an international flight an airline attendant jokingly asked me if I was writing a love letter. When I joined IoT Inc. I was already in the habit of writing and thinking about leadership and my experience, from a researcher's perspective. With that said, I lived the experience of IoT Inc. while doing the research, not in a separate context, but in the context of a layer of thought mutually deepening and broadening my perspective on the research and the experience.

Data Collection and Analysis

On the one hand, my role included participating directly in the inner leadership workings of the organization. Moreover, the research aligned with my role at IoT Inc. where notetaking was normal, though not required. During meetings, airline flights, and various business-related trips my previous professional disposition as a journalist included musings, memos, and notes. In fact, in my communications-intensive role at IoT Inc., it was expected that I would act as an informal secretary whether capturing discussions during meetings or gathering insights during events and interactions with stakeholders. As a result, I generated a significant amount of memos and data.

On the other hand, a nuanced interpretation would also place my role as a participant and researcher within certain lanes at IoT Inc. and outside others. My inside view was substantial, but it was not complete. Moreover, I approached these raw data notes in the following months having departed IoT Inc. with a fresh perspective. In turn, I wrote the observer's comments and

organized the notes into various themes. In October 2020 a few of these themes included paradox spotting, loosely held commitments, truth hunting, rituals and inversion dinners, pragmatism and what is real, information flows, and power.

These themes evolved iteratively as follow-up interviews were conducted and reviews of the data continued. Additional themes in late 2020 included open dialogues, bets on the future, being on the same page, whole product versus nonrecurring engineering approach, internal still points and external core things, the physics of envisioning the future, fields of foxes' hedgehogs and octopus, truth hunting, and pragmatism and probabilities. Themes that emerged during the interviews included money as an anchor line, building webs of integration, pivot as evolutionary branching, the power of access points, evangelizing innovative ideas, narrating into existence, shared executive consciousness, metonymies as keyholes into the culture, use of varying forms of knowledge, and navigating complexity. The themes that emerged were organized and analyzed based on the individuals involved, specific periods, and the impact on the IoT startup.

I served as a leader in IoT Inc., a Silicon Valley startup, and in the course of that work was able to adopt the fly-on-the-wall posture to uncover the workings of the organization. As Bourdieu (2005) noted, the struggle of “the firm as a field” (p. 205) is difficult to understand from outside the firm. With that said the notes, artifacts, and data gathered during the research helped to create a buffer between my direct experience and the subsequent analysis.

In subsequent chapters, a standard reoccurring meeting at IoT Inc. referred to as the Monday morning meeting is analyzed and discussed in detail. The analysis includes specific meetings, composites of these meetings, as well as variations such as on-site, remote, quarterly, and yearly meetings. The analysis of Monday morning meetings as a composite view looks at the setting, roles, and actions of the leadership team at IoT Inc. as they navigate various issues. The

composite Monday morning meeting broadly consists of pre-meeting, meeting, and post-meeting aspects. Each of these aspects of the Monday morning meeting is analyzed. The analysis of IoT Inc. leadership at the Monday morning meetings is based on a social capital and dramaturgical view (Bourdieu, 2020; Goffman, 1959b; LaMagdeleine, 2016).

As I was an insider at IoT Inc. I was able to use my notes on formal activities (the what, the why...) conducted within IoT Inc. as well as a personal journal in which I reflected on the activities and nuances of the interactions at IoT Inc. Moreover, I reviewed artifacts (emails, mission statements, public digital documents, internal documents) within the context of leadership emergent factors at the IoT startup.

In choosing to research the social world of IoT Inc. where I was involved, it was helpful to confront the situation as a dramatization. This research perspective enables a dialectical approach to the scholarly knowledge, and inside practical knowledge, I have of the circumstances. Bourdieu notes this break from knowledge derived from the inside experience is then reconstituted as synthesized knowledge “obtained by means of this break” (Calhoun, 2003, p. 283).

As an embedded leader in the IoT startup, as well as an observational researcher I was able to use multiple modes. Moreover, as a qualitative researcher, I adapted to the research environment by reviewing the research environment through various lenses and perspectives. I reviewed the environment from the vantage point of multiple people and perspectives as I built on ideas, made comparisons, pursued leads over time, and iterated on previous conclusions. As such, I adopted a bricolage (Maxwell, 2013, p. 42) research style, as first described by sociologist Claude Levi-Strauss adapting tools and materials at hand to conduct the research.

Primary interviews were conducted with the five main actors in IoT Inc. during the research period. At least two interviews were conducted with each of the primary interview participants. The interviews helped to broaden my understanding of the context of the participants' introduction to and perspective on the IoT field and IoT Inc. The interviews were also oriented around the shared context of IoT Inc. and the specific situations and moments that occurred. While specific areas of interest were discussed in the interviews the discussions were conducted as explorations with the participants. In short, the discussion involved give and take and participants were invited to address questions and to ask questions in a mutual exploration of the topics, situations, and context. In this way, I was able to triangulate the accuracy of certain situations, gain new perspectives and ideas related to IoT Inc., and also understand multiple differing perspectives on situations. In short, the interviews were designed to gather multiple perspectives rather than justify a pre-existing perspective. With that said, as a researcher, I acknowledge my closeness to the situation at IoT Inc. colored my perspective and my interactions with the primary interview participants.

Additional interviews involving individuals who had interacted with IoT Inc. during that time also occurred. These additional interviews were conducted with individuals in leadership roles at IoT-related organizations, to include individuals in leadership roles in adjacent organizations in the IoT field. In all these interviews, at least two interviews were conducted. The interviews ranged from 45 minutes to 90 minutes in length with an average length of 74 minutes. In a few cases, additional interviews were conducted as subsequent material and insights were uncovered. This process continued until data saturation and redundancy were evident. The interviews were conducted via video conferencing technology and the conversations were recorded.

Per the approach to understanding context-specific case study data, the interview data were analyzed for patterns or themes, metonymies, and metaphors. As these themes emerged, they were folded into additional interviews. The iterative process of reviewing the interview data revealed emergent themes and relationships between themes.

Mind mapping software was used to consider the relationships between themes and theoretical perspectives and data subjects. In keeping with the high-tech orientation of the case study, the mind-mapping program Noda was used to construct a mind-map in a 3-dimensional virtual environment by using an Oculus® 2 virtual reality headset and hand trackers. The Noda program allowed the researcher to interact with emergent themes and relationships while immersed in a 3-dimension environment.

The virtual environment of Noda mind-mapping involved building virtual 3-dimensional objects and relational connections between 3-dimensional objects (balls, squares, diamonds) to include various lines, colors, labels, and other sound and visual characteristics. Once the mind map was constructed within the virtual 3-dimensional room the immersed researcher viewed the construct from a distance (a bit like viewing a wall mobile of a model solar system). The researcher was also able to venture virtually inside the constructed theoretical model. This interactive mind-mapping exercise gave rise to holistic insights that further informed the research.

Validity and Generalizability

The participants in the study had a deep knowledge of the situation and circumstances and readily provided data during the interviews. In some cases, their perspectives on circumstances were similar and in other cases, their perspectives significantly differed. As such, I relied on a critical realism paradigm to analyze the data (Maxwell, 2013).

Critical realism combines ontological realism and epistemological constructivism. At one level, epistemological constructivism posits our knowledge of reality is constructed (though incompletely) via active, empirical, social, and personal perspectives and experiences. At another level, ontological realism is the view that an actual world exists independent of personal beliefs and perceptions. A third level of reality involves the real, the inherent properties of objects or structures that act causally, producing empirically experienced events (Fletcher, 2017). Critical realism seeks to reference these causal properties and their empirical effects to explain social events (Fletcher, 2017). In my context as an inside researcher, this framing provided a means for understanding various perspectives and helping address my own biases. Although not perfect, it also offered a means to understand the complex and changing circumstances at IoT Inc. In the end, the use of critical realism applied to data grounds the research in the context being explored (Charmaz, 2014).

While gathering participant accounts of events in which I was also a participant, it was helpful to consider the variety of alternative perspectives from the standpoint of critical realism. In other words, whether my perspective of the experience accorded with theirs, their description of experiences reflected a reality as valid as others, including my own, no matter how differently interpreted (Maxwell, 2013). Thus, the critical realism approach provided room for analyzing various versions of objective truth, as well as the subjective reality of participants. For example, while everyone at IoT Inc. agreed to the ‘objective’ truth that a trip to Barcelona occurred, the interpretation of what the Barcelona event may have meant to the firm had room for interpretation.

Critical realism provided a variety of methods that are helpful when researching social situations involving information systems (Mingers et al., 2013). In particular, the information

systems of Western societies tend to be invisible - until they become visible by their absence - such as when they stop working. Then, the construction of meaning embedded in the interactions of technology and people, their sociomateriality, becomes evident. For example, at IoT Inc. group dynamics differed when poor-quality audio during a Zoom video interfered with an individual's capability to meaningfully participate in a discussion. When the Zoom information system powering this social interaction failed, the impact on the social dynamics was subtle and dramatic. As poor-quality audio rendered speech unintelligible, everyone was reminded remote participants were not in the office, and as such not as readily available, while in-office participants were more available.

Critical realism pragmatically combines constructivism and realism. When used in qualitative research it can identify contextual phenomena as well as the mechanisms of complex interactions (such as participant availability) occurring within social and technological case study research (Maxwell, 2013). Additionally, Rigoni's (2002) postmodern perspective set the stage for probing and challenging Enlightenment-described truths during the research.

Ethics and Confidentiality

Interviews were conducted via Internet video platforms. I conducted the interviews alone with the participants on a one-to-one basis. I conducted most of the interviews from my home office with the door locked. One interview was conducted from within a closed-door conference room at a high school after hours. The audio portion of the interviews was recorded on a handheld recording device. The recording device does not have wireless connectivity capabilities. The audio from the interviews was stored on the recording device and transferred to my home computer via the recording device's built-in USB. The video aspect of the interviews was not recorded.

Participants were invited to participate in the interviews by email accompanied by a content form approved by the University of St. Thomas. Before the interviews, participants signed the consent form and sent it to the researcher. At the beginning of each interview, a discussion regarding the particulars of the consent form was initiated and participants were encouraged to ask questions and seek clarification. Participants were also asked if they agreed to have the audio portion of the interview recorded and transcribed.

When the interviews were completed the audio portion of the interview was uploaded from the audio recording device directly to my password-protected online transcription service. I relistened to the audio of each interview while simultaneously reviewing the transcribed version of the audio to match the audio and transcription to verify accuracy. I then downloaded the verified transcriptions to my home computer. After downloading the verified transcriptions to my home office, I deleted the online audio file and transcribed files from my online transcription account. The files on my home computer will be deleted upon the completion of my dissertation. My home computer is password protected and only I have access to it.

Participants and the names of organizations were given pseudonyms throughout the research. The confidentiality of the research enabled participants to speak freely regarding the inside story at IoT Inc. Some of the participants in the study worked at IoT Inc. during their interviews, and others had moved on from the organization. Participants were informed that there was some risk to their professional status based on their participation in the research. The individuals included in the research agreed to take the risk to participate in the research by reading and signing Informed Consent documents approved by the University of St. Thomas. At the beginning of the interviews, I engaged the participants in conversations and asked questions about their understanding of the risks of participation. They were informed that if they verbally

agreed the interview would proceed and if they did not agree or understand the risks the interview would not occur without penalty or consequence. The pseudonyms were created to minimize the risk to the participants' professional reputations whether they were directly involved with IoT Inc. or in the wider startup or business field.

Participants were assigned randomly coded labels in the online transcriptions, downloaded transcriptions, as well as the single set of paper copies I printed on my home printer. The paper copies of the transcripts are maintained in a single binder in my home office in a secured area which I will retain indefinitely.

Brief Introduction of IoT Inc.

In the following chapters, you will read about a Silicon Valley IoT startup. I'm mindful that it is in many respects IoT Inc. fits into a general pattern of high-tech Silicon Valley startups. If we break down the Silicon Valley startup sobriquet, IoT Inc. is like other high-tech Silicon Valley startups. In short, it is an effort to commercialize a rapidly evolving technological innovation, in this case, long-range Bluetooth connectivity with a network capability.

The path forward for IoT Inc., like other Silicon Valley startups, is one in which surprises are the norm. The wider marketplace is nascent and emergent, influenced by a multitude of factors: worldwide trade and regulations, media announcements, the funding environment, as well as technological innovations, competitions, and rates of adoption. In this way, a principle of entrepreneurship, uncertainty, is core to IoT Inc. as it is to other Silicon Valley startups. Several aspects of IoT Inc. – technology, marketplace, people – needed to be created and were uncertain. The technological innovation at the core of IoT Inc. occurred within a rapidly evolving IoT marketplace. Moreover, IoT Inc.'s technological innovation was an outgrowth of a series of previous technological innovations.

The founder of IoT Inc., Francis, demonstrated and experienced several characteristics common to other Silicon Valley startups. Based on his years in a technical role at ‘Big Networks Inc.’ (a pseudonym) Francis was part of the fabric of the Silicon Valley technological innovation community. For example, the development of IoT Inc. involved a longer period of exploration and incubation as well as aha moments. Francis had the experience of creating and selling a previous Silicon Valley startup which he applied to IoT Inc. Silicon Valley startups are often part of a wider support network and Francis had mentors who helped guide his development of IoT Inc.

The economic capital at IoT Inc. included a funding process common to Silicon Valley startups. The funding amounts increased and were depleted, as the maturity of the technological innovation and the company progressed toward commercialization. Initially, the funding involved Francis’s time and resources. Then a smaller amount of funding was brought in via a crowd-funded process. In this case, the crowdfunding amounted to perhaps \$100,000. Next, a series of progressively larger funding rounds – A, B, C – were carried out as the product went through the commercialization process and the company was constructed.

IoT Inc. rented office space located at a Silicon Valley address, ‘Silicon Valley Boulevard’ (a pseudonym), in a beige, three-story office building that housed several other early-stage companies. The building was surrounded by a broader area of buildings in an office park in an area with other technology startups. IoT Inc.’s office space was located on the ground floor of the office building. It had a front lobby with a receptionist desk, however, there was no receptionist. Instead, the desk was used as a storage area for boxes of printed marketing material. The office space had three offices with doors, an accessible area with nine beige-walled cubicles, and an enclosed conference room. Initially, IoT Inc. shared its office space with a lawyer. The

office space served as a multi-use space for shipping, product assembly, sales, operations, and management.

Initially, a few of the employees of Francis's previous startup "sort of followed me over" to the IoT Inc. startup, according to Francis (personal communication, November 19, 2020).

Francis, the founder of IoT Inc., had a technical background and was named on the patents central to the differentiating capabilities of the products at IoT Inc. Like other high-tech Silicon Valley startups IoT Inc. included a small core leadership team, in this case playing the following roles: the technical founder; the operations person, a jack-of-all-trades and trusted advisor to the founder; the sales leader; and the marketing person. As was common at other Silicon Valley startups, the team was predominantly male. In the following chapters, you'll read about how these characteristics of funding, place, and personnel form the capital - social, economic, cultural, and technological - at IoT Inc. in detail.

Additional Resources

I had additional resources, besides conducting interviews with the leaders at IoT Inc. I have a robust professional network and access to a body of approximately 11,000 IoT practitioners via a personal relationship with the founder of an international IoT organization. This founder signaled a willingness to contact these members via email with inquiries. This provided an option to request an interview with other IoT startup leaders either in-person or via phone or video phone, to pursue certain threads of the research. I pursued an iterative intelligence curve method, wherein as I gained understanding I asked and engaged in ever more in-depth levels of conversation with IoT leaders.

The research covered approximately 34 months at IoT Inc. during which the organization underwent substantive changes. Among other items, these changes included a pivot from a B2C

to a B2B organization, the loss of several key personnel, the selection of a target market, efforts around funding, and the development of a key client relationship. Ultimately, the IoT Inc. startup consolidated in several primary ways and went into a holding pattern that continues to this day.

CHAPTER 4: THE BIRTH OF IOT INC.

“With other men, perhaps, such things would not have been inducements; but as for me, I am tormented with an everlasting itch for things remote. I love to sail forbidden seas, and land on barbarous coasts.”

(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

This chapter examines the birth of IoT Inc., as told through the stories of the crew within a qualitative research approach. These stories reveal some of the common characteristics of joining a startup as well as patterns unique to IoT Inc. As I argued in Chapter Three a grounded research strategy provides insight into the roles (Goffman, 1959b), dispositions, and characteristics of IoT Inc.’s world (Bourdieu, 2020) as well as its actions and values (Flyvbjerg, 2001). In this chapter, the reader will get to know IoT Inc. and its crew in detail.

The details also trace the origins of themes at IoT Inc. and their relationship to the habitus and expertise of leaders at IoT Inc., as well as the role of IoT Inc.’s social and material networks and how they intertwine. The details in the data demonstrate the importance of the themes at IoT Inc., for example, the importance of the vision, as well as how these themes arise and influence IoT Inc. and its leaders.

Put simply, this chapter examines what the crew brings to IoT Inc. as it forms. It examines what they bring and how that creates IoT Inc. which then interacts with the IoT field. As the members of IoT Inc. interact and make efforts to navigate the complexity of the IoT field, basic truths about the nature of its members, the startup, and the emergent IoT field are revealed and explored. This chapter’s narrative sets the stage for understanding how leadership flows into and shapes subsequent events - the Pivot, Monday morning meetings, and the Barcelona event – which are detailed in Chapters Five and Six.

The IoT Inc. startup is currently over seven years old. The research covers a period when the individuals and technology at IoT Inc. coalesced around key events. As a reminder, and as

was described in Chapter One, the language of the IoT field continued to unfold during the research. For those who have spent their careers in the technology sector, the recent changes in the language are characteristic of the IoT field. An interview participant, who previously led a ‘Top Four Strategy Consulting’ (a pseudonym) firm, described insights into the language, technology, and market perspective of the emerging IoT field this way:

The good news about being at a Top Four Strategy Consulting firm is when we asked people questions, they would open up their kimonos and tell us everything...in 2008 we were looking at great insights from over 200 companies, including the big guys, Cisco, Hewlett Packard, and everybody else... how they view this era of hyper-connectivity.

We didn’t call it ‘IoT’ for God’s sake...It was ‘here we go again’ whether it’s machine-to-machine or fixed wireless. They’re gonna jump on the bandwagon...it all got lumped into this digital transformation journey. We did about half a billion in revenues in 10 years in the technology strategy practice at the Top Four Strategy Consulting firm, a speed that’s about 20X normal.

It was really about being able to look at [technological strategy] opportunities with a holistic mindset.... the holistic thought process around IoT means you walk in almost a Zen state that says ‘I have no bias. I’m going to look at this situation objectively and pragmatically.’ I’m not going to walk in and say, ‘Hey I’m going to only use Oracle or AT&T Wireless.’...You can’t do that. the world doesn’t work that way. (Former leader Top Four Strategy Consulting, December 11, 2020)

As noted, at that time the imagined future of the IoT field, its language, market approach, and technology, were mutually intertwined and in flux. Similarly, the imagined future of the

technology at the core of IoT Inc. - long-range, multi-connected Bluetooth connectivity – was also in flux. At the same time as the language and technologies of the broader IoT field were unfolding, a similar set of processes were being created at IoT Inc. With that said, the interviewee's data emphasizes connecting the IoT's emergent characteristics with a pragmatic reality – revenues. At least at the time of this writing, however, while people remain accustomed to the rapid digitization of their lives, a widespread Bluetooth network layer swarming with a multitude of personal and shared IoT devices embedded in everyday life has not yet happened.

At the time of this research, the development of early IoT networks was underway. The types of networks powered by IoT Inc. are at the core of modern life, but largely invisible. People interact and are subject to these hidden-in-plain-sight networks in schools, fitness centers, manufacturing plants, office building washrooms, ventilation systems, and airports. The backstage systems of modern life are quietly being interpenetrated by the IoT. Many are facilitated by Bluetooth, the technology at the heart of IoT Inc.

For those who had a role in navigating IoT Inc. to where it is today, having experienced the uncertainty and excitement of discovery, witnessing the continuance of IoT Inc. is a bit like seeing a ship on the horizon that one had a part in the christening. More than a distant symbol of the technology-infused future painted in the rosy glow of a vision, we experienced the full variety of weather common to a Silicon Valley startup – the gut-wrenching economic, career, and competitive storms; the thrill as the sails fill with funding, won deals and new opportunities; as well as the exhaustion of grinding as we collectively pulled on roughhewed oars to propel a partially constructed startup through the doldrums.

This chapter tells the story of the IoT Inc. voyage informed by historical artifacts and documents as well as personal accounts and lived experiences. The history of the technological

and social context served as a stage for the following analysis. Moreover, the histories and the actions of the individuals at IoT Inc. informed the story that unfolded. As such the story is meant to truly unfold, not merely as a linear list of events, but as a richly emergent process. In this way, the IoT Inc. story has a fractal quality, with the dispositions of individuals involved spiraling up and out to the wider emergent IoT field. In turn, characteristics of the IoT field reverberated back to and through the people at IoT Inc.

With that said, the story begins with the people signing on to join IoT Inc. and its journey. Like the story of Jason and the Argonauts, at center stage is the central figure and captain of this ship, Francis the CEO, and his vision for IoT Inc. As is described below, the crew signs on to follow Francis and importantly is motivated by the vision he offers. However, as much as they're motivated by the vision, they also find the realization of the vision is much further off. The work is grinding, and the path is unclear. As much as they love the vision and appreciate Francis for providing it, they also hate the distance between the visionary narrative Francis promotes and the disappointment and trials of the reality they face.

In the following section, the origin stories of the argonauts and what they bring to IoT Inc. are described.

IoT Inc. and Its Core Leadership: Key Actors and Their Origin Accounts

In Goffman's (1959b) dramaturgy actors perform according to socially constructed roles. The members of a small group, such as at IoT Inc., reinforce and enforce performative actions and dialogues as part of the team's entrepreneurial mission. During the time of the pivot from a business-to-consumer to a business-to-business marketplace, this team was at the core of IoT Inc.

Francis the Pragmatic Physicist

Francis, the CEO, was a slightly built man in his 40's. He enjoyed playing the role of the visionary and would often remain in his spare office for much of a workday. English is not his first language. When he spoke it was common for him to repeat the last thing he said as if describing what he had just said to himself. Francis was also a man of thought and habit. He would regularly walk a mile or two in the afternoon during the workday. At times he appeared so lost in thought that he wasn't aware of nearby cars passing dangerously close by on the business park streets where the Silicon Valley office was located.

Francis's interest in science and technology began in his middle school years when he demonstrated an early aptitude for science. Notably, he won a math competition as a middle school student. In turn, said Francis, the school allowed him to "go directly to high school" (Francis, personal communication, November 19, 2020). Moreover, he was not required to take examinations anymore so he "didn't have to study like the other kids" (personal communication, November 19, 2020).

Left with time to fill on his own, Francis found himself in the school library reading Einstein's theories on special and general theories of relativity. He said he "Just bumped into Einstein's book and was hooked by that" and began studying physics. "I spent a lot of time learning that thing. And even dreaming of making some crazy theory myself" (Francis, personal communication, November 19, 2020).

He subsequently attended university to study physics. However early in his college physics studies, Francis said he "already knew what they were teaching three or four years ago" (personal communication, November 19, 2020). Moreover, he came to understand that to "become very successful in physics you have to be successful in that one thing and forget about

all the other.” Realizing he had many interests, such as “for biology, for engineering, for literature” and not a single passion for physics, Francis focused on graduating quickly. He also described a pragmatic, rather than theoretical physics orientation. Francis said he wanted to “Go to society and do something useful” (personal communication, November 19, 2020).

In short, Francis started as a young man with significant math skills and an “internal urge to do new things” (Francis, personal communications, March 10, 2021). He excelled enough at school to the point where the teachers let him do his own thing. His own thing was studying Einstein’s physics. He went to college to study physics. However, he was disillusioned with the single focus necessary to excel in physics. He had wider interests. He decided to graduate as quickly as possible and contribute something practical.

Vail: A Hard-Working Musician

Vail was in his mid-50s, routinely worked long hours, and didn’t sleep well. He was congenial and often ended conversations with the phrase “Let me know how I can help” (Vail, personal communication, n.d.). He was eminently helpful, the go-to person for finding things as he had been at IoT Inc. longer than anyone besides Francis. With light brown hair and a ready smile, he was a Silicon Valley native with memories of riding his bike through orange groves long ago replaced by office buildings.

When Vail was five his parents moved into a house with a piano. According to Vail, he began taking piano lessons and by first grade, he was accompanying the children’s choir on the piano at school. As Vail describes it, he began his career performing “At a pretty young age...I was a piano player, keyboardist as well as a woodwind player.... Clarinet in the band and marching bands and all that kind of stuff” (Vail, personal communication, March 18, 2021)

Vail pursued his interest in music in college graduating with an undergraduate and a master's degree in music composition from a university in Silicon Valley. After he graduated, Vail went to work for a music company. In his mid-20s Vail started on phone support and within a year was managing worldwide technical support and a team of 17 people. He stayed with the music company until his early 30s.

Following his time at the music company, Vail began a series of roles in early-stage companies in Silicon Valley. Over the next three decades, he'd typically enter a company as one of the early employees. Over time, said Vail, he joined these early startup companies as the head of operations:

There was a lot of doing a little bit of everything, in terms of setting up the company, I've done that multiple times. At 'Startup-to-IPO Co.' (a pseudonym), I'm sure you're familiar with that name. I was employee number two. It was before they even had office space when I started with the company. Most of my startups were early. (Vail, personal communication, March 18, 2021)

In short, Vail described his Operations role in startups as a catchall role in which he set up the structures for the company:

That's my area of expertise. I'm kind of a generalist. I can come in and set up all aspects of the business. And I always like to joke that I've done everything in the company except for the engineering...that's usually my value pitch as I try to get involved in early-stage stuff. (Vail, personal communication, March 18, 2021)

Francis once described Vail as a "Swiss army knife" when commenting on his ability to take on multiple roles (Francis, personal communication, n.d.). On the one hand, Vail accepted

the value associated with the designation. On the other hand, Vail also expressed resentment because it resulted in having multiple roles added to his workload.

At IoT Inc., Vail used the term body language to describe Francis's unexpressed sentiments. Often these sentiments involved personnel issues and the use of resources at IoT Inc. Vail said his early exposure to music helped develop his body language skill and had served him well in his startup career.

That would be something that I spent a lot of time on, focusing on people. Just being aware of... there's a lot of non-verbal communication that goes on. People don't always ... tell you what they're thinking. Sometimes there's a little bit of that [what they are thinking] mixed in with what [they] want to hear. I've got a pretty good discernment meter. Not for everything, but I think, in general, I tend to have a pretty good sense of where people are coming from.

I think that's from early on in my career. I recognized I'd basically 'paid attention' for lack of a better description...spent a lot of time paying attention to human behavior.... When you're playing music with a group, you're constantly paying attention to what's going on around you ... and that [became] a bit of a heightened sense. (Vail, personal communication, March 18, 2021).

Vail's sensitivity to a situation and ability to read it, described as 'body language' played a key role at IoT Inc. i.e., Vail, what was Francis's body language on the funding request? Body language was the term used for feedback internally at IoT Inc. regarding Francis's perspective on matters like personnel and funding issues initially. Over time the term was also used to describe Vail's 'read' on the external relationship between IoT Inc. and longtime partners and customers, like Acme Worldwide.

Vail's description suggests that the development of an attentive sensitivity to the embodied responses by individuals in a low-resource, high-demand startup environment is pragmatic: "Because everybody's stressed. Everybody's doing too much. There's not enough resources or not enough money. Everybody's a little bit of an exposed nerve" (Vail, personal communication, March 18, 2021). In this sense, Vail paid attention to patterns of information exchange happening internally at IoT Inc. as well as externally to the firm. In turn, he facilitated a feedback loop inside IoT Inc. between Francis and the rest of the team as well as between IoT Inc. and its environment. Creating a shared context for emerging relationships to advance knowledge is a phronetic ability (Nonaka et al., 2014, p. 369).

On the one hand, Vail was described as laid back by his fellow employees. In this regard, and by his own account, Vail rarely challenged Francis the CEO, or signaled disagreement, "A lot of things are... pretty good about his vision... I always tell him ... I agree with most of it, all the time. We think more alike than... do we have a conflict" (Vail, personal communication, March 18, 2021).

Vail was introduced to Francis via Mentor Mike (a pseudonym) and Mentor Mike's partner. Mentor Mike, said Vail, was a "rainmaker for startups" who, with his partner, were "hired guns" for "taking companies to Amazon and other channels of retail distribution" (Vail, personal communication, April 7, 2021). Moreover, according to Vail, Mentor Mike had "really good ties with the venture community...[who] would contact him for building out channels of distribution" (Vail, personal communication, April 7, 2021).

Mentor Mike's network connections in Silicon Valley facilitated business processes. In this regard, Granovetter (1973) described the strength of weak ties concept as a way that agents in a network interact with the network to make new business connections such as finding clients

or new employment. Notably, for example, a new job doesn't come from strong ties such as those between family members, but often weak ties such as those found in a professional network. According to Ferrary and Granovetter (2017) venture capitalists, are one of several major "networks of heterogeneous, complementary, and interdependent agents" (p. 329) operating in Silicon Valley

These interdependent network agents aren't all equal note Ferrary and Granovetter (2017) with some agents adding more "to the robustness of a complex network of innovation" (2017, p. 328) than others. Due to his ties and activity in the Silicon Valley venture capitalist network, Mentor Mike said Ferrary and Granovetter (2017) was an active node in the network. Mentor Mike, said Vail, connected startups with distribution channels in the formal Silicon Valley network structure. Mentor Mike also made informal connections, such as by connecting Vail with start-ups who required Vail's operation skill set. By actively connecting Vail to start-ups for back-office infrastructure, Mentor Mike acted as a Silicon Valley network agent "Agents are active nodes that influence the structure of networks" (Ferrary & Granovetter, 2017, p. 338). This type of informal yet active network connectivity by a network agent, said Ferrary and Granovetter (2017), was important to maintaining Silicon Valley's overall robustness.

Vail said he'd moved into several roles at companies based on an introduction from Mentor Mike "He'd give me a call saying, 'Hey, these guys need to set up all the back-office infrastructure stuff.' That's what happened for me for a lot of the companies that I worked at," said Vail (personal communication, April 7, 2021). Mentor Mike connected Vail and Francis and the early version of IoT Inc. began. As Ferrary and Granovetter (2017) said, two agents in Silicon Valley's distributed network may have "complementary professional competencies" (p.

330) leading to the creation of a start-up together. Now that Mentor Mike had retired, Vail joked, “I have no way of actually getting more jobs!” (personal communication, April 7, 2021).

Tristan, an IoT Sales Visionary

Tristan grew up in eastern Canada near the ocean. At a bit over six feet tall, Tristan had dark hair and his disposition was described as intense. He was a sales hunter, quick to connect and sum up situations related to building business opportunities. His memory was exceptional, he was able to recall details of dates and circumstances quickly. His technical skills and sales intensity brought him to Silicon Valley. Just before IoT Inc. he’d worked at a well-known Silicon Valley firm, Big Networks Inc., which had acquired the previous company where he was VP of Sales.

Tristan was a person of action and movement who I had worked with at a previous firm. At that time, he and I went for a high-speed lunch drive in his new BMW. I was alarmed and thrilled by the bursts of acceleration and lurching stops. Similarly, at a company getaway with go-cart racing Tristan drove fast and aggressively. He forced me into the rubber tires lining the racetrack and won the race. In the next race, I mimicked his racing style and won the consolation race.

Tristan’s career started on the technical side of technology companies. He served as a sales engineer, in support of a salesperson. Salespeople often rely on sales engineers to address technical details when working on projects involving technology companies and their customers. About 17 years ago, while at a technology company in the Midwest selling to telecommunication companies, Tristan shifted to a full-time sales career. In doing so he was also able to leverage his technical capabilities and interests. It was there that Tristan and I first met.

Around 2007, while working with a technology integration firm, Tristan said he recalled a brief conversation involving an IoT-type project:

I happened to look up when the term Internet of Things was coined. It says in 1999 ...they referenced RFID [radio frequency identification]. That reminds me of a different, shorter, brief thing. I remember a conversation about IoT, but I had forgotten until I saw this.

When I was with 'Technology Integration Firm L' (a pseudonym), in 2007 a colleague of mine got me involved in some RFID stuff. We were thinking about putting on tags and tracking everything. And I remember there were conversations...but it was scratched from my memory [until recently]. (Tristan, personal communication, November 19, 2020)

Tristan is a technology salesperson, and his disposition is focused on technology-related sales opportunities. An interest in a field is determined, says Bourdieu, by a habitus disposed to perceive certain solicitations, and a field with those solicitations (Bourdieu, 2020). In this case, Tristan did not have an interest in the IoT until the IoT field and the interests of Tristan's habitus were aligned. Drawing on Bohm's (Nichol, 2005) quantum holography, the field of information about a future IoT opportunity, and its solicitations would be enfolded in the implicate order. Focusing attentional energy on the future opportunity would attune psychophysiological systems, the habitus, to the quantum level of the opportunity which contained information about the opportunity's potential (Bradley, 2006). Bohm referred to the process of actualizing the potential of such an enfolded opportunity as the generative order. As a pragmatic matter, Tristan noted, without a pragmatic business-related application for the term IoT Tristan says he was likely to have ignored it:

I may have encountered it before then, but it didn't have significant meaning for me. Because at that point I said, 'Okay, how am I trying to be successful and grow my business?' So that's the first anchor. I probably had seen it but was dismissive and didn't care. (Tristan, personal communication, November 19, 2020)

Early in his technology sales career, Tristan said he paid attention to the actions of fellow salespeople to align his interest in sales with a specific field. His initial practice of technology sales was the result of noticing what successful colleagues accomplished at a previous startup:

It may seem like formal training, but my first example of that was when I was at a different firm. And I went out and found every network manager at every university across Canada and sent them an email introducing the company and value proposition. The whole thing. That was the first time I did that kind of thing...My colleagues at the time, I could see that they had success...other examples of universities buying that product. It just looked like common sense. (Tristan, personal communication, November 19, 2020).

In other words, Tristan's experience and habitus were informed by the actions of fellow sales practitioners in his network. He noticed that his interests would be served using their actions as a guide to attune his habitus with the solicitations from the field. Finally, whether the means to achieve the goal was guided by his quantum or socially described psychophysiological attention, Tristan was pragmatically minded. Ultimately, he was focused on pragmatic means and outcomes, not a specific method.

Brad the Technology Storyteller

I have described my business disposition as a combination of kindness, creativity, bluntness, and impatience. Moreover, as a former endurance athlete, I am accustomed to

persevering and focusing on the task at hand in pursuit of a distant goal. I can also be abrupt when facing rigid, bureaucratic situations or expectations based on authority, rather than pragmatics. In this regard, at times I've felt I have two modes, fully committed to a cause or indifferent - with little room in between. As a result, I've succeeded at particularly challenging things where others have failed, but I have also failed at simple things where my enthusiasm and attention have gone astray.

When I reflect on my younger years, my skillset centered around communications. For example, during my high school years, I was the editor of the school newspaper, lead actor in the high school play, sang in the swing choir, and was on the debate team. In the early 1980s, I traveled and attended universities in Wisconsin, Minnesota, Florida, and London, under the auspices of an English literature degree. During those years, I studied a wide variety of topics including basic computer programming, Mesoamerican archeology, Existentialism and Phenomenology, theatre improvisation, scriptwriting, European history, Shakespearian studies, as well as meteorology and geology. To put it succinctly, during what I refer to as the bohemian years I envisioned living a life wealthy in experiences, rather than money.

My perspective was impelled by an explicit desire to seek an answer to the question of my individuality, to see its mark on the world, and therein to experience an answer. To this, American pragmatic philosopher Richard Rorty famously referred to a Philip Larkin poem describing a life constructed as a lading list defined and summed, versus a strong poet perspective oriented to an individual's life uniquely impressing an influence into the language (Rorty & Richard, 1989). In short, when I was younger my orientation was toward the latter.

However, as became the case in my own life, Rorty argues neither perspective fully defines the truth of the world or our place in it. It is rather that our representations of the world

should be oriented to the finite, and ultimately pragmatic, project of our lives. This, some decades on, is a more accurate reflection of my perspective.

As I traveled, I worked a wide variety of jobs and alternately as an entrepreneur, actor, journalist, and editor into the mid-1990s. I earned enough money, often barely enough. My relationship with earning money changed with the birth of a daughter in the early 1990s. I was 30 years old and realized that as much as I sought the strong poet path, I despised scraping by. I had grown up dependent on my grandfather's generosity not just for my mother's job at the store, but also for fundamentals like housing and vehicles. Constant movement throughout my 20s provided the intense experiences I craved, total eclipses of the sun in the Mexican desert, midnight swims in shark-infested waters, and touring the East Coast as an actor to name a few. But, with a free-range, but low-income life, also came bouts of homelessness, hunger, and experiences like stepping out my backdoor to see a suicidal neighbor still swinging from his balcony and flattening myself into the sidewalk as bullets flew during a drive-by shooting in a neighborhood where gunfire was common.

I have many interests and prefer to have several of what I call buckets or income streams happening at one time. By the late 1990s, and with a young daughter in tow, I was increasingly applying my communication skills in the growing technology field – quickly tripling my previous annual income – and had also started a master's degree in business communications. I handed off my editorship of a small Minneapolis newspaper, *The Whittier Globe*, and as the leader of a troupe of actors exited the stage at the *Northern Lakes Center for the Arts* delivering Oberon's blessing to couples and children a final time:

“Through this palace, with sweet peace; ever shall in safety rest, and the owner of it blest. Trip away; make no stay; meet me all by break of day,” Act 5, Scene 1, *A Midsummer’s Night Dream* (Shakespeare, 2011).

The spell of the bohemian life was broken, and I bought a house in the suburbs. By early 2000, I was the property owner of a duplex and had taken a role as a marketing manager at a large and growing telecommunications firm.

From there I worked in a series of technology firms, including an Internet packet inspection firm in 2005 where Tristan and I met. In 2008, I joined an early-stage startup monitoring the worldwide infrastructure of the Internet where I stayed as VP of Sales and Marketing for nearly a decade. In 2015, I began my doctoral work at the University of St. Thomas, and feeling stuck at the stable but unfulfilling monitoring firm began to explore other opportunities. As I prepared to leave the VP of Sales and Marketing role, I established myself as CEO of an early-stage startup. I was the co-founder alongside a technical founder who had created a compelling technology. Also, I took on the role of leading a business management education service providing weekend expert speakers for enterprise firms in the local metropolitan area. Neither of those two efforts took off to the degree where they would achieve a meaningful flow of income.

In early 2017, I was contacted by Tristan about the role at IoT Inc. as VP of Marketing. The firm needed someone with B2B expertise as the firm was pivoting from a B2C to a B2B marketplace. The role Tristan described began as a consulting engagement with the opportunity to transition into a longer-term job. I was hired for the consulting role. For a few months, I was earning a severance salary from the monitoring firm, consulting dollars at IoT Inc, and income from the weekend management consulting education service. The technology of the other startup

where I was CEO was offered for sale on a technology brokerage (it never sold) and the business was shut down.

After three months, I traveled to Silicon Valley to meet the team in person. I stayed at a modest nearby hotel for five days. At that time, the IoT Inc. office space was shared with an attorney. Boxes of the product were stored in cubicles and decorations were sparse. The unspoken message and startup mode was clear - this was a make-do environment.

It was during this early consulting period that I learned from my new colleagues that keeping costs low was a priority for Francis. As a result, I didn't take a direct flight from my Midwest home to the Silicon Valley headquarters, instead opting for a cheaper flight with a layover in Denver. The hotel I stayed at in Silicon Valley was next door to the office building and was bland. I ate at average restaurants, including Denny's near the IoT Inc. office. I ordered food from delivery services, like DoorDash, and ate modest meals. My colleague, Tristan, who introduced me to IoT Inc. lived nearby and provided car transportation when I needed it.

Like a long endurance event, I understood early on that conserving resources was paramount.

Denim: Disposition of a Technology Hunter

In his 30s with a wife and two children, Denim lived outside the Silicon Valley business bubble. The one-way commute to the IoT Inc. office was often at least an hour one-way. His demeanor was focused and steady, reflecting his interests in hobbies with discipline at their core, bodybuilding, and hunting. I recall listening to Denim describe a view of marketplace factors associated with the developing IoT field while at an industry event in Silicon Valley. His delivery was fast, intricate, and precise. He held the attention of the informally gathered group at a restaurant table during a break from a nearby Silicon Valley conference.

Denim went to undergraduate college in the Northwestern US, as Denim described it, at a “super conservative...Republican... hick town” (Denim, personal communication, December 6, 2020) and enjoyed it at the time. There he acquired an engineering degree. After working for a few years in forestry he went to ‘Liberal University’ (a pseudonym) “Which was the opposite of that ...very progressive and much more liberal” (Denim, personal communication, December 6, 2020). There he earned his master’s in business administration with an emphasis on entrepreneurship.

Before his work at IoT Inc. Denim’s business career aligned with his interest in physical fitness and technology. During an informal conversation when we were both still at IoT Inc., I recalled discussing the discipline at the core of the endurance sports I had competed in and Denim’s pursuit of muscular excellence in bodybuilding. I felt we shared the quiet determination of individuals willing to do whatever was necessary to reach long-term goals.

Denim was willing to learn and listen. His calm, but focused demeanor translated well to making presentations. Of average height, he nonetheless had a physicality in his movements that expressed and inspired confidence. When IoT Inc. had the opportunity to make a stage presentation to an audience of potential buyers Denim was a reliable choice for the role.

The previous descriptions demonstrate how the individuals at IoT Inc. brought their history, social capital, and dispositional expertise, or *habitus*, to the IoT Inc. endeavor. It provides some color on how entrepreneurial attention to opportunity is informed by the lives of the individuals at IoT Inc. It touches on a few of the social, psychological, educational, and physical layers of individual dispositions. The next section steps further into the who, what, when, and how descriptions of team members as they joined the effort at IoT Inc.

Linkages Between Actors' Backgrounds and "IoT World"

In this section, I go deeper into the backgrounds and interactions that the actors have within IoT Inc., their external connections, as well as their general *modus operandi*. This data is correlated to Bourdieu's (2020) analytical concepts, especially social capital, habitus, and field, and then explores a correlation with Bohm's (Nichol, 2005) quantum perspective, and how these individuals work at a Silicon Valley IoT startup.

Argonauts Joining the Ship

"People carry their habitus around with them; they are so tied up with it that they cannot shake it off – which gives it a mysterious quality" (Bourdieu, 2020, p. 340).

The common view is people join a startup like IoT Inc. to make money while chasing a dream in a new field, or because more formal, less risky endeavors aren't a good personality fit. As Denim also noted, potentially a person's career path has defined them as a 'startup person,' and for that or other reasons they don't have the option to join a more traditional organization. As will be pointed out, in Silicon Valley certain institutional players, for example, Big Networks Inc. served as a kind of advanced training ground for a repertoire of IoT startup skills while also providing the social capital needed to participate in the field (Bourdieu, 2020).

The reasons an individual joins a startup are also specific to the habitus of the individual. For example, the challenges – intellectual, personal, and financial – of working in a technology startup are acute, engaging, and unique. Working at a Silicon Valley IoT startup carries a broader cultural cachet; it evokes a presumption of talent, an insider 'Silicon Valley' status, and an understanding of the digital technologies impacting society. When asked to describe the experience of joining an IoT startup versus "other startups" Tristan responded with a knowing

chuckle “Explain it to someone who’s not in the know...gotcha” (Tristan, personal communication, November 19, 2020).

Tristan’s differentiation of an IoT startup points, in part, to the emergent nature of the IoT field. As described in Chapter One, the IoT field is co-emergent with the Fourth Industrial Revolution encompassing a “vision of the all-communicating world” via an “amalgam of various technologies...with IoT as a centre” (Shafique, et al., 2020, p. 23023). In turn, the IoT startup is participating in a unique combination of social and technical challenges. As was described previously, for example, the Bluetooth gateway innovation at the center of IoT Inc. involved new relationships between software, hardware, and connectivity technologies.

Comparatively, a startup that involves a single innovation in a single technology, hardware, for example, is challenging. At an IoT startup, a technology innovation needs to coordinate with several other technologies and successfully connect to a set of customers. The challenge of complexity, coordinating technologies, and connecting to a set of customers, while in a startup environment of low resources, uncertainty, and elevated risk, is said Tristan, uniquely daunting – and exciting:

There is... substantial complexity around, the device hardware, manufacturing, and then data flow, connectivity, communication, and business processes ... there are a lot of things that need to be worked out, problems solved, and new challenges that crop up. [It’s] sort of like the iceberg analogy. (Tristan, personal communication, November 19, 2020)

The complexity of the challenge was also a factor in the decision to join a startup like IoT Inc. People throw themselves into these challenging ventures, and all the risks they entail, because they are pursuing personal and epic voyages of self-excellence (Chia et al., 2013). Thus,

the individuals who join an IoT startup are seeking to become a *phronimos*, an individual who embodies *phronesis*. During such a business venture an individual can apply the knowledge of their craft, or *techne*, a form of instrumental knowledge, as directly measured by profitability. In the context of IoT Inc. one measure of a person's expertise, in the form of profits, or no profits, was always near at hand.

But there was also something more at play than pure profitability. Individuals are motivated by more than the expertise and *techne*, they have acquired (Chia et al., 2013). Individuals are not merely calculative *homo economicus*, but rather moral creatures. The moral basis of *phronesis* is not separable from the individual pursuing a journey of self-excellence according to Chia et al. (2013). More than a simple circumstance to express one's *techne*, the *homo phronimos* seeking to join a high-tech startup, like IoT Inc., would also seek to embody the highest expression of what amounts to their vocation or calling (2013). As Tristan said, of joining IoT Inc., "Signing up for that, it's very exciting that you get to work on these problems that are difficult. They're intellectually engaging. You can get a lot of satisfaction from making progress against these challenges" (personal communication, November 19, 2020).

By way of orientation, it is helpful to think of what Tristan's language does not evoke. As James (1890/2007) notes, language constrains thinking but also provides a boundary to the "big blooming buzzing confusion" (p. 50) of raw experience. Tristan's language of a personal encounter with a kind of iceberg composed of hidden complexity and challenge does not suggest a cog fitting into an existing machine. Instead, it more closely echoes Baumard's (1994) clandestine metistic processes and the stories of skilled individuals who feel compelled to face a primal field of forces, like sailors facing unknown seas, hunters stalking game in the mountains, or soldiers entering a chaotic field of battle. Moreover, there is a nexus of social and material

factors in this case study touching on the ad hoc navigation of complexity. As a reminder from Chapter One, Bluetooth networks were originally conceived as ad hoc networks for circumstances, such as battlefields. Moreover, as Wheatley (2011) notes, the desire to face off against primal forces is a factor of complexity leadership. In such circumstances, an individual's expertise and morality are encompassed and tested in extremis within a capricious and dynamic environment. Tristan's comments, in effect, echoed that sentiment and Vail recounted the stressful impacts of the testing.

Further, as described by Detienne and Vernant (1991), the interplay of these primal forces encapsulates the structure of the universe to include human nature. An opportunity to face off against the unknowable and create a new path, rather than follow those that are well-worn, according to Tristan, affords a unique satisfaction. He said his decision to join IoT Inc. was not simply money motivated, but because "I'm attracted to messy problems and challenges" (Tristan, personal communication, November 19, 2020).

In turn, the capacity to navigate within the dynamic IoT environment pointed to an individual's informed perspective, or manner of seeing, rather than a readily transferable skill. It is, as Bourdieu (2020) reminds us, based on a field's solicitations and habitus disposed to perceive those solicitations. This included the ability of individuals in startups to seek out patterns and discern paths in a pathless, emergent IoT field. Arguably, the messy complexity and stress may simply look like chaos to individuals whose habitus is not disposed to perceive the solicitations of the IoT field. In environments composed of "vast networks of interference patterns" strategy involved reacting to and creating the environment from a "quantum perspective" said Wheatley (2011, pp. 38-39).

The specific attraction to the IoT field for individuals, and their unique capacity to navigate it is suggestive of how strange attractors reveal order inherent in chaotic systems over time (Wheatley, 2011). At the level of the case study, the language of and discussions about navigating the complexity of the IoT field by individuals at IoT Inc. is constant. It includes discussions about IoT Inc.'s broader vision, individual perspectives on daily situations, and their various dimensions. In other words, the discourse wasn't simply about how to move a tradeshow booth from the office to a conference in time and space, but also how to transform an idea from the conference room into a marketplace buzz and manifest it as a commercialized marketplace actuality.

Given the nature of the rapidly evolving IoT landscape, it was also necessary. The forthcoming chapters touch on individual narratives within IoT Inc., but also provide an overview wherein the reader may get a sense of wider patterns in the narratives as they converge and conflict. In other words, at times the single individual experiences and moments at IoT Inc. often seemed to only reveal chaos, but when "we stand back and look at what is taking shape, we see order" (Wheatley, 2011, p. 118).

Moreover, the capacity to move towards a broader order in the emergent IoT field, without necessarily seeing it, was suggestive of a dispositional characteristic associated with individuals at IoT Inc. In other words, the unfolding story of IoT Inc. suggests individuals could see the forest and the trees. For example, Tristan's capacity to forge a path in the face of the seeming intractable chaos of the IoT marketplace pointed to a disposition imbued with the quality of metis, or cunning intelligence (Detienne & Vernant, 1991). However, before describing how individuals find the paths to go down at IoT Inc., I return to the early days of how individuals joined IoT Inc.

It was exciting to join IoT Inc. It was mid-afternoon in Silicon Valley when Tristan first introduced me to Denim. We drove together to a mostly empty restaurant to get to know each other. Tristan's energy was infectious and on that Silicon Valley afternoon we were all on board to pursue the vision. Even while acknowledging the challenges faced by IoT Inc. at that time, there was during these enthusiastic onboarding gatherings, a suspension of disbelief. As Francis said, "Startup teams need to be very passionate about a vision" (personal communication, November 19, 2020) or it doesn't work. In those early days of joining IoT Inc. and listening to the vision described by Francis the CEO, it was easy to get caught up in the excitement. Denim said he was motivated and impressed by what he heard:

...super interesting and exciting to me...and I walked out of those meetings feeling like, man, he [Francis] has got a vision for where he wants to take this company...he's a leader with a vision, which is a good thing. (Denim, personal communication, December 6, 2020)

Momentarily, the long odds arrayed against success are set aside. As Denim described it, a vision of "what the future could be" is embraced as "motivating...re-invigorating and re-energizing" (Denim, personal communication, December 6, 2020). However, even in those early meetings, there is an acknowledgment that a dispositional attraction to the motivating visions of a high-tech startup environment carries career risks. There is a sense that a clock has started ticking. As previously noted, compared to careers in more stable organizations, a career in startups, though interesting, as Tristan notes, is precarious:

The rewards are not guaranteed. The rewards may not be in line with the accomplishment. Sometimes we see successful outcomes aren't appreciated. Or, you

experienced failures that were completely unexpected as well. I describe it as my Achilles heel.

After having done a few of these risky high stakes, high-reward types of scenarios, there's a part of me that looks back and wonders, what might've been different if I took a more risk-averse path. Go with something simpler, more established, less intellectually challenging individually, and has a greater likelihood of a successful outcome. (Tristan, personal communication, November 19, 2020).

Denim, who eventually left IoT Inc. for a new role at a more established Silicon Valley-based IoT company said, "I didn't have nearly as much experience in IoT...and the nuts and bolts of what we were trying to do" (Denim, personal communication, December 6, 2020). With the benefit of experience, the initial excitement of joining an IoT startup can appear oddly out of sync with the realities team members face after being at IoT Inc. for a while. The practical challenges facing the team like "How to make our products work today" (Denim, personal communication, December 6, 2020) become equally, if not more important as time goes on. In retrospect, Denim said he'd be less likely to become enthralled with the vision and the early excitement of joining a startup, "When he [Francis] went into his 'Francis church' type of thing I may be more likely to roll my eyes and be like 'Oh my God shut up.' We need to worry about how we're going to go sell this thing" (Denim, personal communication, December 6, 2020).

Whether joining or leaving a startup, timing also played into the uncertainty and anxiety experienced by individuals, according to Tristan (personal communication, November 19, 2020). Because IoT startups involve many interwoven known and unknown factors influencing success Tristan said it is difficult to time joining or leaving a startup (personal communication, March 4, 2021). For example, after Vail joined IoT Inc. in 2015. He didn't see a physical product until

eight months later. He wondered, at times, what “I had gotten myself into” (Vail, personal communication, April 7, 2020).

Although Vail’s particular long-term association with Silicon Valley startup networks and agents like Mentor Mike, would appear to have provided some further advantage, the situation was perilous. Ferrary and Granovetter (2017) said the “embeddedness of entrepreneurs” (p. 338) as agents in the complex network of Silicon Valley is a major factor determining a start-up’s success. As was the case with Vail, the embeddedness of an agent can include growing up in the region as well as graduating from a university in the area (Ferrary & Granovetter, 2017). By these criteria, Vail’s embeddedness was operating on multiple levels, including growing up, graduating from college, connecting with multiple start-ups, and aligning with other active agents in the Silicon Valley network. Although this was the case with Vail, he described the early few months at IoT Inc. as uncertain, and personally a time of high anxiety (personal communication, Vail, 2020).

Most entrepreneurs in Silicon Valley are less embedded, and some are isolated from business networks (Ferrary & Granovetter, 2009). Notably, “entrepreneurs behave strategically to embed themselves” (p. 352) with other agents and multiple networks within Silicon Valley (Ferrary & Granovetter, 2009). There is little research, say Ferrary and Granovetter, into “how agents become embedded in a specific network” (2009, p. 338), yet clearly Tristan, Vail, Francis, Denim, and I were all embedded in the IoT field to varying degrees via networks of professional relationships. My embeddedness, for example, stemmed from a long-term association with Tristan, who lived in Silicon Valley and had previously worked at Big Networks Inc., an institutional player in the IoT field. Francis had also worked at Big Networks Inc. and lived in

Silicon Valley as did Denim and Francis. There was a prior previous professional connection between Vail and Denim at a Silicon Valley startup.

In my case, this association and the subsequent accumulation of Silicon Valley social capital wrought by additional network connections, as well as my frequent travel to Silicon Valley could be said to increase those connections and embeddedness. For example, the physical presence of IoT Inc. in Silicon Valley carried social capital. Conversations referencing IoT Inc.'s Silicon Valley address at 'Silicon Valley Boulevard' would receive the verbal handshake equivalent of 'Ah yes, my IoT friend, Silicon Valley Boulevard I know it well!' Moreover, ostensibly casual conversations also served as social capital signaling embeddedness within the general Silicon Valley startup milieu and the IoT field. For example, discussions in a crowded Silicon Valley IoT conference center lunch area where new IoT network connections were made by introducing an IoT entrepreneur to another IoT entrepreneur. These interactions and others like it, such as casually relating the best airplane flight times in and out of Silicon Valley airports during IoT conferences, served as social capital exchanged to confirm credibility in the IoT field.

The network of connections helped to confirm credibility and helped to alleviate some of the anxiety and uncertainty of joining an IoT startup. For example, Vail was introduced to Francis by Mentor Mike, a long-time Silicon Valley network connection, "He's kind of like a father figure mentor to me. I learned a lot from him. I trust him a lot. He's a good anchor for me over the years" (personal communication, Vail, 2020). As was noted, Mentor Mike had introduced Vail to several startup companies over the years. In turn, Vail brought in Denim, a colleague from the company they'd both been at before IoT Inc.

Similarly, I was introduced to IoT Inc. by Tristan. Tristan and I had known each other for several years after we had worked together at a previous network technology startup. We helped

bring that previous startup to the NASDAQ stock exchange; he in a sales role, and me in a marketing and partnership management role. Based on that personal and professional connection, Tristan wanted to bring me into IoT Inc. We knew each other and he was familiar with my skills. On a pragmatic level, Tristan trusted my ability to quickly create a B2B lead generation process at IoT Inc. to accelerate his ability to sell. In short, each of the individuals brought on to IoT Inc. had social capital based on their requisite skill sets. Also, they all were part of Silicon Valley social networks based on location and professional network connections as described by Granovetter's (1973) strength of weak ties.

I recall a sense of acceleration and momentum as the opportunity at IoT Inc. unfolded. After eight years, I had recently left a startup I had joined as the second employee hired. At that company I had a sales and marketing leadership role, growing the network performance company to a 45-person stable, profitable operation. That organization became more of a lifestyle business affording the owner a comfortable lifestyle but did not offer equity or significant growth opportunities. Frankly, although my role at the company was secure and the company was stable, I was bored.

Tristan introduced me to Vail as a B2B marketing professional with startup experience. I was quickly brought into IoT Inc. as a marketing consultant. The marketing skills, the techne, I had picked up in my previous roles – content development, event management, search engine optimization, partnership building, and creating prospects for sales - readily transferred to filling needs at IoT Inc. I got to work.

Moreover, Tristan and I had known each other from working together at a previous company and had stayed in touch over the years. During a previous business trip to Silicon Valley, I'd met with Tristan at another sparsely furnished, low-rent startup. During his time as an

executive at that startup Tristan participated in that startup's acquisition by one of Silicon Valley's premier technology firms, Big Networks Inc. in Silicon Valley.

By this time, I had left my previous role and shortly after starting the consulting work, I began monthly flights to Silicon Valley. I typically stayed for a week. As had been noted, keeping costs down was core to Francis's leadership perspective and I was conscious of keeping travel expenses low. I researched flights and flew indirect routes from the Midwest to Silicon Valley. While in Silicon Valley I stayed in Airbnb rentals. The least expensive rooms were often spare bedrooms in people's homes. The furnishing was modest, for example upon arrival at one of these Airbnb homes, I realized I was staying in a garage converted into a spare bedroom.

My travels to Silicon Valley were aligned with IoT Inc.'s culture which valued the conservation of resources. In some ways, the whole experience reminded me of the Bohemian period of my younger years. For example, especially during the first few months, I booked accommodations close enough to the IoT Inc. office to walk to work, was driven by Tristan, or traveled sparingly via Uber. One late afternoon I decided to walk to a bookstore a few miles away. Immersed in a Silicon Valley landscape designed for cars, my path along broken sidewalks took me past homeless encampments and parks choked with weeds and litter. An hour or so later, as dusk turned to darkness, I jogged back through unfamiliar pedestrian paths, and neighborhoods, aware that in my mid-50s I'd put myself in a risky situation.

In the mornings, Tristan would often pick me up from my latest Airbnb and we would catch up on what was happening at IoT Inc.'s Silicon Valley office. He often had a healthy breakfast smoothie in his car for me during this initial period at IoT Inc. We chatted and enjoyed each other's company. Tristan still drove fast, but with a spouse and children, some of the more careless aggressiveness of his younger years had moderated. Similarly, with an awareness of my

own family awaiting my Friday evening return to the Midwest, I ultimately limited the walking wanderlust of my Bohemian period while in Silicon Valley.

Meeting Francis, the leader of IoT Inc., was a right-of-passage before fully joining IoT Inc. as a full-time employee. At my initial office meeting with Francis, I presented a marketing plan for the next year to the entire U.S. team, including Francis in the conference room at IoT Inc. It was my first exposure to the front-stage dramaturgical (Goffman, 1959b) workings at IoT Inc. My first impression of the conference room recalled an earlier period of my life working in the theatre and subsequently time in rehearsal rooms. The conference room was cluttered. There was a rickety bookshelf in the conference room corner with a dusty, haphazard collection of Bluetooth router parts, small devices the routers connected to, coffee cups, and a scattering of business cards. My immediate impulse was to clean it up and organize it, which I did. At one end of the beige rectangular room, a whiteboard filled the top half of the wall. The door to the conference room was at the far end of a floor-to-ceiling glass wall stretching the length of the room. It was here that plans for, and concerns, about the future, were routinely revealed and debated.

Tristan let me know that the conference room presentation served as a final job interview. Tristan has brought me into IoT Inc., and Vail had signaled his support. My role at IoT Inc. came about via networking. At the time, it was notable that my first meeting with Francis was a presentation about the future. At the time of the presentation, Francis had not asked for a description of my past career accomplishments. In short, it wasn't a behavioral interview with questions about past situations to achieve some result. It was exclusively attuned to painting a picture of the future.

The live fire exercise of presenting a future-focused marketing plan was the final hurdle to joining IoT Inc. With support from Vail and Tristan, the job was mine to lose. If the presentation wasn't oddly out of sync with expectations, Francis's acceptance of someone from Tristan's network, whom Vail had also recommended was likely. After the presentation in the conference room, I recall getting a thumbs-up sign from Tristan and Vail. The presentation was well done and well received. I could expect an offer from Francis to join the company at the end of my three-month consulting contract.

Vail recounted how his network had also smoothed the runway for joining IoT Inc. Mentor Mike had arranged for Vail to meet with Francis at a Silicon Valley restaurant. There, with a habitus informed by his sustained experience in Silicon Valley and startups, Vail recalled his first impression of Francis. In that first discussion with Francis, Vail said he considered several factors, culture, demeanor, areas of business aptitude, stability, and need:

Conservative. I got the sense that... it felt like he needed some help. I had some areas of expertise that he didn't. He had the banking and the entrepreneurial side of things. He had the money lined up, which was nice. To be honest with you, I was nervous culturally. I didn't know how that was going to play out. As far as whether or not they (Francis' team) would be able to trust me, being somewhat of an outsider. Working for an Indian founder company or Chinese founder company, they tend to hire within their own community and are trusting of folks with similar cultural backgrounds. That was kind of a question in my mind in terms of how the relationship would work. (Vail, personal communication, March 18, 2021)

The newness of the IoT Inc. startup though was familiar ground for Vail. He was also interested in early-stage startups that had a high need for his operational talents. Vail said he had

rarely worked in a startup for longer than two to three years. After that point “Most of the interesting problems had been faced” and he didn’t want to get bored (Vail, personal communication, March 18, 2021).

Joining IoT Inc. was exciting, said Denim, because the vision of the product technology was so new and compelling (personal communication, December 6, 2020). As has been noted, Tristan was also excited by the stimulation afforded by the complexity of the challenges faced. I too had left a previous long-term and stable role, was curious about the IoT, and was seeking something new. Francis also started IoT Inc. with the idea of bringing to life his vision of a new IoT firm. In short, the disposition of all the individuals joining IoT Inc. was attuned to novelty and facing new challenges.

Bourdieu (2020) notes the dispositions, or habitus, of the agents in a field, are formed by the field. In turn, says Bourdieu, the habitus of the agents in the field composes the field. As had been noted, the Silicon Valley IoT startup habitus included novelty and the excitement of facing significant and complex challenges. They were dispositionally aware that the excitement of joining was intertwined with the ad hoc and likely unstable career outcomes. The habitus and field also included social capital flowing via networks of relations creating, in effect IoT Inc., as a small startup node in the IoT field. As has been described, the habitus of the individuals involved also revealed high anxiety, precarity, and pragmatism as well as a suspension of disbelief. As they joined IoT Inc. the habitus of the individuals, said Bourdieu (2020) would also inform the IoT field.

Bourdieu (2020) would note that society is composed of interweaving fields. In the case of IoT Inc., the IoT field can be traced to other institutional actors in other fields. In turn, the individuals who joined IoT Inc. could be traced to these adjacent fields. Kelsey (a pseudonym),

the leader of a major IoT investment and job placement firm, said he had found “Three diaspora vectors of where people have largely come from, in terms of industries, to come into IoT” (personal communication, December 7, 2020). The three major areas contributing to the development of agents in the IoT field include those with backgrounds in telecommunications, industrial, and enterprise IT, he said. People with experience in technologies “operated near the edges” [where computation and data storage operate close to the source of the data]. “Big Network Inc. people is a good example” of a firm with edge technologies, he said. Big Networks Inc. is an institutional actor in the Internet field which has contributed individuals to the IoT field (Kelsey, personal communication, December 7, 2020).

People who are leading IoT startups said Kelsey, generally have a history in one of those areas. The one caveat is people with “strong domain skills,” he noted (Kelsey, personal communication, December 7, 2020). For example, an individual with deep expertise in consumer packaging could add IoT technology to the consumer packaging field. At IoT Inc. several of the relevant leaders had backgrounds fitting the definition of Kelsey’s three diaspora vectors: Tristan and Francis had both worked at Big Networks, Inc., I had worked at a telecommunications company, and Denim and Vail had each had roles in companies aligned with the domain, consumer healthcare technology, in which IoT Inc. had first debuted.

We also all arrived at IoT Inc. with experience in startups. In short, we could quickly act, create, and make progress in an environment with few guidelines. At IoT Inc., the phrase ‘building the ship while sailing it’ captured this sentiment and was reflected in nearly every aspect of the startup, including hiring. The hiring process didn’t take long in the sense of multiple interviews and background checks as may be more typical of a larger firm. Individuals joined IoT Inc. quickly in the sense that a network contact would initiate a relationship. People

would then start working relatively quickly, but often as contractors. The contract process served as a buffer of sorts to ensure the working conditions at IoT Inc. fit the contractor as well as IoT Inc. Then, the contractor either joined full-time as an employee or the contract ended.

In this sense, Orlikowski and Scott (2008) argued the reciprocity of interaction between actors and things forms a single web in organizations. As will be seen, both the technology and the team at IoT Inc. were unstable. In turn, these instabilities at IoT Inc. would reflect the wider inherently unstable characteristics of the emergent IoT field. Not to put too fine a point on the connection, but at IoT Inc., versions of the product rose in importance and then quickly disappeared. In a similar vein, several of the individuals who joined IoT Inc. were gone within a year or two.

Assembling IoT Inc. took time and highlighted the various knowledge perspectives at play. For example, an administrative aspect, the incorporation of IoT Inc. in Delaware where the paper was filed, took place in 2014. The Bluetooth range-extending patent was filed in early 2015. The patents would serve as a form of institutionalized cultural capital (Bourdieu, 1986). Since the patents at IoT Inc. were composed of mathematics they were a legitimizing symbol of rational scientific knowledge, Aristotle's episteme (Flyvbjerg, 2001). They were objectified credentials recognized in the IoT field. Developed by Francis and other engineers before the formalization of IoT Inc., the patents were recognized as cultural capital by government officials, stakeholders, investors, and individuals joining the firm. Moreover, because they were epistemic forms of social capital they were not questioned. The patents were a settled truth, and therefore a basis for legitimacy (Foucault, 1994).

Notably, although Francis was the only member of the IoT Inc. team who understood the relationship between the algebraic Friis formula used to calculate the signal-to-noise ratio in the

Bluetooth gateway, the patent itself was taken for granted. I wrote and released press releases announcing patents at IoT Inc. without understanding their scientific basis. In short, and as will be described in detail, many aspects of IoT Inc. were up for debate and often in flux, however, this was not the case for IoT Inc.'s epistemic elements. As has been described, the episteme of the patent faded into the background as a unique and settled truth.

By contrast, the craft knowledge, or *techne*, of the various agents at IoT representing areas of expertise, such as operations, sales, marketing, product development, etc. were more subject to interpretation. In his catch-all area of expertise, operations, Vail was the first to join as a contractor in May 2015 to set up the fundamentals of the firm. Moreover, the *techne* of the operations role was based on “setting up all the back-office infrastructure stuff” (Vail, personal communication, 2020) at IoT Inc. In short, the core internal workings of IoT Inc.'s structure, like setting up an office location, as well as early product, marketing, and sales efforts. As Vail noted the operations role at an early-stage firm like IoT Inc., “Involved a lot of doing a little bit of everything, in terms of setting up the company. I’ve done that multiple times... that’s my area of expertise” (Vail, personal communication, March 18, 2021).

Where the patent is distinguished by its unique epistemic quality, operations, and other roles tied to *techne*, are, by contrast, less specific. As Vail noted, his operations role started with essentially a blank slate that he and Francis began to assemble:

It’s [IoT Inc.] very similar to early-stage opportunities that I’ve been involved with. I started consulting for about three or four months. This is way before they had anybody hired ... For the most part in the U.S., it was just Francis and myself. (Vail, personal communication, March 18, 2021)

During those first few months, Vail would set up basic business structures like – payroll, office location, etc. In turn, IoT Inc. could accommodate additional roles, like sales and marketing. In these roles, the orientation of the agents' dispositions and the techne they employ shifted IoT Inc. to activities more external to the firm, such as potential markets and customers. These external-facing roles were more specific than the operational catchall role but remained broadly flexible.

As is the case with many aspects of a startup, job descriptions weren't planned in detail. It appeared that the Head of Marketing job description was lifted, in part, from another job listing. As noted earlier, it is common for a startup to assemble itself using the components of other startups (Perkmann & Spicer, 2014). As Denim noted, a startup job description would include a title and a basic list of responsibilities, but flexibility was expected, "You've got to do 15 different jobs" (personal communication, December 6, 2020). In general, at IoT Inc., it was expected that even if a role were specific, the individuals in the role would take on any responsibility required to create IoT Inc. in pursuit of its goals. Individuals who joined IoT Inc. took on the broad outline of the role's responsibilities, but also adapted their role to the situation - and in doing so created the organization. As a note to the reader, the expectation of flexibility in roles at IoT Inc. will be important to keep in mind during the forthcoming descriptions of Tristan and Vail's journeys at IoT Inc.

Job transitions in the startup space can appear unstable from the perspective of those accustomed to more long-term careers in well-established organizations. Compared to more established firms, startup tenures are short, and roles change abruptly (Charles, 2018). With that said, because startup markets, products, and funding are fundamentally uncertain, within a startup the most stable aspect of a startup is often, perhaps paradoxically, the people involved.

Moreover, and as the case study points out, the personal networks the people in startups participate in also serve as ongoing sources of stability. With that in mind, the following goes into more detail about the historical experiences of the individuals that led to their joining IoT Inc.

Francis at IoT Inc.: Japan, then the United States. Over 20 years ago Francis accepted a job opportunity in Japan with a Silicon Valley technology firm, Big Networks Inc. He worked there for eight years. Big Networks Inc. then offered him the opportunity to work in the United States in its technology business development and strategy group. He was asked to review what was known, at that time, as ‘system network’ technology, an early precursor to the IoT (Francis, personal communications, November 19, 2020). Big Networks Inc. had capitalized on the privatization of the Internet field in the 1990s, acquired significant social capital, and formed a new socio-technical paradigm via networks of entrepreneurial innovation (Castells, 2000b). According to Bourdieu (2020), within the Silicon Valley field Big Networks Inc. was positioned as an institutional agent.

At that time, said Francis, Big Networks Inc. invited many companies who were creating technologies that were precursors to the IoT. At Big Networks Inc. these startups were called system networking companies and they were invited to bring their product in for testing. Francis was involved in the early testing of these early IoT companies’ products. The results of the testing, he said “were kind of disappointing” (personal communication, March 10, 2021). Based on the review, he found the infrastructure needed for building robust IoT systems was not yet mature. “It was very early. There was no smartphone, no cloud computing...and Bluetooth, Zigbee, and everything else was just at the beginning” he said (Francis, personal communication, March 10, 2021).

In this case, Big Networks Inc.'s review of technologies and companies was a habitus forming within an emergent IoT field. According to Bourdieu (2020), habitus can take the form of the apparatus of a system, such as in banking, to include the system's institutionalized rules and non-institutionalized modes. Moreover, according to Bourdieu, the formation of a field is a struggle to define the social capital needed to participate in and constitute the field. In this regard, Big Networks Inc.'s role in reviewing early IoT technologies was a legitimizing move to establish its position in the field as an authoritative agent of the IoT field. As Francis notes, the testing of early IoT technologies by Big Networks Inc. rendered a judgment on the status of early IoT companies, products, and the IoT field. This defining and judging activity to legitimize or exclude, describes a power struggle that Bourdieu (2020) says is an ongoing aspect of fields.

As a large high-tech organization, Big Networks Inc. is a core node in Silicon Valley's unique complex network of networks driving innovation (Ferrary & Granovetter, 2009). Moreover, former Big Networks Inc. employees, like Francis, who go on to form startups like IoT Inc. for example, are an example of active agents in Silicon Valley's network of innovation (Ferrary & Granovetter, 2009). In this way, the Silicon Valley innovation network is a social space according to Bourdieu (2020).

In the social space actors negotiate the interplay between personal attitudes, skills, experiences, habits, and contextually specific structures (LaMagdeleine, 2016). Bourdieu's goal was to demystify the ways seemingly neutral institutions make it hard for people to learn the truth about institutional structures, like the state, and public affairs, (Calhoun, 2003, p. 284). In this case, the seemingly neutral institution was Big Networks Inc. As an institutional actor in the IoT field with a history of commercializing the Internet, Big Networks Inc. had obvious commercial interests. However, the vetting of the early IoT companies and products could be

viewed simply as an objective review of the technological maturity of the IoT field. It is in this sense, that Bourdieu's (2020) work on institutions in fields raises necessary questions to help with the demystification of Big Networks Inc.'s earlier role in the IoT field.

After a few years, Francis left Big Networks Inc. He founded a small company, Internet Wireless (a pseudonym). Internet Wireless was sold to another Internet-focused firm in Silicon Valley a few years later. According to Bourdieu (2020), Francis's experiences at Big Networks Inc., and then as a startup founder who had sold a wireless firm in Silicon Valley would inform his IoT habitus, symbolic capital, and position in the IoT field.

Bourdieu's habitus represents the symbolic meanings of a social agent's subjective dispositions and tastes imbued with certain properties, as a collective representation of shifting social spaces (Bourdieu, 1986). Importantly, an individual propensity to act either with *metis* or *phronesis* in a management setting is a consequence of habitus (Chia, 2009). However, research into the social capital of IoT is largely unexplored in the literature. It is described as uncharted territory within social sciences (van der Zeeuw et al., 2019, p. 1356). Even so, rather than exaggerating subjective tastes Bourdieu highlighted how the action of agents produces and reproduces underlying social structures, as well as the fundamental importance of objectively grasping those underlying structures, which also exist inside the agents themselves (Calhoun, 2003, p. 289).

Moreover, Bourdieu asserted the primacy of relations noting habitus and fields exist as a duality (Bourdieu & Wacquant Loïc, 1992). In this regard, it is perhaps notable that the leader of the firm who purchased Francis's Internet Wireless had also worked at Big Networks Inc. at the same time as Francis. Francis and the leader of the buying firm would have shared characteristics of the Silicon Valley field and habitus. Habitus, said Bourdieu (2020) forms the agent's

performance of subjective dispositions and preferences. By contrast, a field is an objective space of physical and social relational phenomena within a society informed by agents. The agents, by their subjective habitus, constitute the field by participating in it and imbuing it with meaning.

The relations between the agents' habitus and its properties are reinforced by fields. The institutions in a field, such as the Big Networks Inc. in Silicon Valley, are internalized by actors, in a feedback loop of creation and reproduction (Bourdieu, 2020). Institutionalized capital is a form of cultural capital (Bourdieu, 1986), that objectifies and confers original properties on the cultural capital as a guarantee (Bourdieu, 1986, p. 242). Putnam (2000) argued social capital played a key role in the success of Silicon Valley's fledgling companies. The cooperative personal networks and exchange of social capital served to deliver stability to these companies (Manning & Sun, 2015). The expatriates of Big Networks Inc. according to the IoT analyst Kelsey, would embody IoT credibility due to Big Networks Inc.'s history in the field of Internet network innovation and manufacturing.

The socializing network effects associated with the Silicon Valley innovation network, point to Bourdieu's social capital, field, and habitus as a structure. Moreover, the situated learning of the group of people in IoT Inc. who share a passion, interact, and want to pursue excellence also suggests a Community of Practice (CoP) (Lave & Wenger, 1991). A CoP is the result of individuals moving through knowledge, skill, and learning processes as members of a specific sociocultural practice in an extended group (Lave & Wenger, 1991).

As a theory, CoP is credited for contributing to opening organizational learning as a social process, rather than confining learning to an individual's cognition (Gherardi, 2009). For example, as a network infrastructure vendor in the wider network structure of Silicon Valley, Big Networks Inc "Built the backbone of the Internet...the IoT is a natural extension of that"

(Francis, personal communication, March 10, 2021). In this sense, Big Networks Inc.'s holding of knowledge-building activities centered on the IoT created CoP assets for Big Networks Inc. According to Francis, Big Networks Inc. understood, that the Internet's connection to billions of people on the planet would evolve with the IoT into each person "Connected to hundreds, if not thousands, of those smart devices" (Francis, personal communication, March 10, 2021).

In short, Big Networks Inc.'s motivation to create an IoT CoP was to shape the IoT field based on commercial interests "The implication is the Internet of Things would be a hundred times bigger than the current Internet. Big Networks Inc. certainly wants to have a part of that. That's the motivation" (Francis, personal communication, March 10, 2021). In short Big Networks Inc. had commercial leanings. Moreover, during Francis's early exposure to the IoT, the CoP at Big Networks Inc., including its commercializing aspects, would shape his habitus. Francis said his review of early IoT technologies while at Big Networks Inc. was disappointing, but that said he learned a lot, and a long-term interest in IoT was started (Francis, personal communication, March 10, 2021).

Yet, in noting the emphasis on the situated nature of CoP (Lave & Wenger, 1991), as well as shifts in its theoretical development over time, Gherardi raised concerns regarding the applicability of CoP to communities of limited duration, like IoT Inc. At Big Networks Inc., its IoT CoP would support the accumulation of IoT knowledge for individuals like Francis. As an institutional player in the early IoT field, Big Networks Inc. would have the resources to support the IoT CoP over the long term. However, at smaller firms and in online project groups knowledge is diversified and distributed (Gherardi, 2009, p. 521). In other words, a CoP doesn't retain knowledge when the CoP doesn't last long. Nonaka et al. (2008) also differentiated what

they called “ba” space from a CoP. In ba space participants focus on knowledge-creation within its fluid boundaries, rather than the retained learning and full membership in a CoP (p. 36).

As Foucault described, power and knowledge are a duality, and power is not a possession but an effect (Gherardi, 2009). On the one hand, Big Networks Inc.’s capacity to sustain knowledge-power duality was an asset within the Silicon Valley field. Its power flowed from its sustained situatedness as an institutional player in the field and its retained learnings in a CoP. By comparison, an entrepreneurial endeavor like IoT Inc. is situated in the same Silicon Valley network. However, its situatedness is not sustained and it is difficult for it to retain what it learns. Therefore, it would be better served by its capacity for knowledge-creation of an exploratory nature, such as that provided by the ba space concept.

IoT Inc.’s startup structure and the exploratory leanings of its CEO and founder Francis were more oriented to the concept of a ba space. As Francis noted “My way of thinking is constantly evolving...we are learning new things every day” reflecting the emergent, mutual, but lightly held nature of knowledge at the IoT Inc. start-up (personal communication, March 10, 2021). In the Foucauldian sense of a knowledge-power duality, Francis’s comment would be mirrored, albeit imperfectly, by his stated principle that the “Best idea wins” at IoT Inc. (Francis, personal communication, n.d.).

As will be seen in a later chapter, the ba space which connected IoT Inc. to a much larger organization played a key role in IoT Inc.’s evolution. The individuals who were immersed in the ba space shared and synthesized their subjectivity (Nonaka et al., 2008). As Francis noted previously, the knowledge was held lightly and continued to evolve. In short, the individuals in the ba space loosened the sense of an atomistic self into social relationships with others. Like the fast-moving blurring of boundaries happening on the technical side of IoT, the social borders of

ba space are fluid. In ba individual tacit knowledge is socially shared to mingle openly within explicit organizational understandings, continually generating and shaping the emergence of knowledge. In turn, the emergent property of knowledge and understanding, “leads to the building of the social capital” (Nonaka et al., 2008, p. 36) of the firm.

In a sense then, it also shaped and guided the characteristics of individual habitus at IoT Inc. Individuals at IoT Inc. would be expected to be constantly exploring and learning, which corresponds to the reason they joined and how the habitus of individuals at IoT Inc. operated.

Francis and the Origins of the Bluetooth Product.

Francis said that several years ago his older brother had a heart attack. His brother, he said, was out walking in a neighborhood and fell unconscious (personal communication, November 19, 2020). Fortunately, Francis’s brother was found by neighbors and saved. The incident worried Francis. Based on his wireless background he investigated creating a fall detector. In doing so, Francis learned that “Bluetooth is ...dominant in IoT on these (fall detection) devices” due to its “very low power” requirements, and low cost (personal communication, November 19, 2020).

A fall-detecting Bluetooth sensor was available, but to his surprise, the Bluetooth connection was facilitated by a phone or iPad which contained a Bluetooth receiver. There wasn’t a standard Bluetooth receiver device, nor was there a well-standardized language naming a Bluetooth router (aka, gateway, relay, access point, AP, base station). It didn’t exist. The discovery, said Francis, was unexpected:

I was surprised... I did some investigation and say [to myself], ‘You know, no one was really making that thing.’ Yeah. I decided, ‘How could that be?’ [incredulous] The Wi-Fi always has an AP [access point] as a router. Cellular has a base station. ‘Why

doesn't Bluetooth?' The Bluetooth experts told me that was by design. Bluetooth was designed to be connected to a phone or a PC or whatever. It is a short-range one-to-one communication. It was not meant to have a base station, or AP, or gateway, or router. (Francis, personal communication, March 10, 2021).

Further, when discussing how developers and companies were then connecting Bluetooth sensors to a receiver, Francis found they were using ad hoc Bluetooth receivers, such as iPads which "didn't work very well" (Francis, personal communication, November 19, 2020). The discovery, said Francis, was amusing but also piqued his interest. As noted, Francis's habitus had been informed by his experience in the early IoT while at Big Networks Inc. He had experienced the learnings of the CoP at Big Networks Inc. and he also had an exploratory disposition.

At the time, it was common to use Internet-style receivers to connect the Bluetooth sensors of early IoT applications. The status quo was out of sync with Francis's habitus and thus the feel for the IoT game Francis was developing. In short, to Francis, it didn't make sense:

I think that's silly... spending like several hundred dollars, and the iPad was not meant for that. It's meant for something else. I don't think Steve Jobs, when he was thinking iPad, was thinking okay, this iPad would become a Bluetooth relay station [laughs]. (Francis, personal communication, November 19, 2020)

Having started and sold a Wi-Fi router company previously and having participated in a review of the commercial aspects of IoT at Big Networks Inc. Francis could also see a commercial opportunity. As he noted, he understood routers and how a Bluetooth router could have value:

We thought we knew something about that [routers]. Although those Bluetooth experts didn't think that's doable...But we did it...Sometimes if you didn't know it well

at the beginning - it might not be such a bad thing. You didn't know it was not possible [laughs] ... didn't know that it was not meant to do that. For me, it's like, why not?! Well, it is actually kind of natural. Why can't we just make this like Wi-Fi? (Francis, personal communication, November 19, 2020)

Francis's habitus included an entrepreneurial focus, commercialization of the IoT, and the creation of a Wi-Fi router company. As a result, he saw the potential for a Bluetooth gateway. Moreover, as Sarasvathy noted, expert entrepreneurs use contingency to effectuate their path forward (Sarasvathy, 2009). In other words, the unforeseen discovery that a Bluetooth gateway to support his fall detector didn't exist wasn't the end of the road, it was the beginning of a larger opportunity.

As Francis had noted he was looking for a new entrepreneurial venture before his brother's unexpected heart attack. That negative experience also could not have been foreseen. And yet, it influenced Francis to pursue the idea of a device to detect falls. In turn, he said he discovered the larger Bluetooth opportunity and its potentially wide-ranging influence on the IoT:

At the beginning, I was thinking about making a device to help people like my brother. Through that, I found there's a bigger problem to solve. And then, if you have this [router], you can connect to all kinds of medical devices. The fall detector, the body temperature sensor, and the glucose monitoring sensor, and this and that. Later we learned that it can be used for industrial IoT and this and that.

That was the "Aha moment" for me when I saw this iPad thing. The body temperature, sensor manufacturer uses an iPad for connecting their sensor to the network - say there's a market there. (Francis, personal communication, March 10, 2021)

Francis began exploring the context of this new entrepreneurial opportunity in the IoT. He began investigating alerting devices. He discovered they were primarily based on Bluetooth connectivity. He also found it was common for the sensor devices detecting a fall to connect to the Internet by using tablets, iPads, and smartphones as Bluetooth receivers. Importantly, he found Bluetooth systems used tablets and smartphones as base stations for connecting fall detection sensors to the Internet. These devices were costly, unreliable, and had limited networking capabilities. In general, the design of these systems limited their usefulness and commercial potential.

Francis questioned why a connection to a tablet or smartphone was used. He asked Bluetooth experts about Bluetooth gateways. In turn, they described limiting factors involving Bluetooth technology. Bluetooth's comparatively short range and inability to connect to more than a handful of Bluetooth devices, they said, limited the potential value of any Bluetooth gateway.

Based on his background in developing a gateway technology, Francis decided to explore the factors limiting the development of a Bluetooth gateway. With former employees from his previous Wi-Fi startup, as well as social capital accumulated based on that successful exit, Francis pursued a Bluetooth gateway design. The Bluetooth gateway they designed greatly increased the number of Bluetooth connections and the range.

Francis submitted technical attributes of the design to the U.S. Patent Office. The patents provided epistemic social capital in the IoT field. He began to assemble a new startup, IoT Inc., around the Bluetooth gateway product. By that point, Francis saw that the Bluetooth gateway could function in a household like a Wi-Fi gateway. Rather than connecting Wi-Fi-enabled

devices to the Internet, it could connect Bluetooth-enabled devices within a household to the Internet.

As part of the business-to-consumer (B2C) commercialization process, Francis met with Mentor Mike. Mentor Mike specialized in helping companies move new B2C products into large B2C distribution channels, for example, Amazon and others. At one of these meetings, Mentor Mike told Francis he should meet Vail, a startup operational generalist, who was experienced in setting up startup processes.

Tristan and Sales Habitus

In a more formal setting or an organization with more resources, said Tristan, the process of finding and contacting the customer would likely be initiated by a marketing process “In many places that [customer identification process] would be training on the ideal customer profile” (Tristan, personal communication, November 19, 2020). However, while the sales role varies from startup to startup, it means “Getting in front of the customer” said Tristan (personal communication, November 19, 2020).

This sales practice or feel for the game emphasizes the practical context of a field, like IoT startups, and involves everyday shared actions or rules like shaking hands, going to lunch, or greeting (Bourdieu, 1977). At an IoT startup, said Tristan, a key sales practice is “Advocating a new idea” (Tristan, personal communication, November 19, 2020). This, he said, is how the sales agent in an IoT startup “Participates in the vision” of a leader, like Francis (personal communication, November 19, 2020).

Moreover, until the potential customer has acquired the product, the sales agent embodies the product (Bourdieu, 1977). This embodiment includes the startup’s big vision, noted Tristan (personal communication, November 19, 2020). The startup team, particularly its salespeople

evangelize the vision by “Sharing that idea with people” and work to actualize it by “Translating that [vision] into real-world scenarios, trying to make it possible” (Tristan, personal communication, November 19, 2020). As such, the role of the sales agent at an early IoT startup, agreed Tristan, is much like a religious disciple whose role it is to evangelize and actualize, the vision of a prophet.

According to Bourdieu, an agent’s practice is the result of the relationship between the agent’s dispositions (habitus), and position in a field (capital), within the current state of play of that social arena (field) (Smith, 2020b). The practice debate, ala Bourdieu, and extended by Macintyre is that practices cannot survive for long unless they are supported by institutions (Macintyre, 1985). In the context of Silicon Valley, the practice of IoT entrepreneurship is supported by a network of institutions, including Big Networks Inc., within the field of high-tech startups. For example, Tristan worked at Acquired Startup (a pseudonym) around 2010. It was during this time, when Tristan was selling to Big Networks Inc. from Acquired Startup, that Tristan first became aware, in a pragmatic way, of the term IoT:

And so, my earliest recollection of IoT ties to my time at Acquired Startup which would’ve been [in] the cloud-based integration of IT services management, workflows domain – selling to my biggest customer, Big Networks Inc. Big Networks Inc. was one of the very early adopters espousing all these connected devices. Because they [Big Networks Inc.] are in the network business. So that represented a significant driver for them over many years.

And as I was seeking to understand my customer [Big Networks Inc.] and figure out how I could align my value proposition to them. That’s where I started thinking about

the Internet of Things, [and] Internet of Everything as they termed it for a while. (Tristan, personal communication, November 19, 2020)

Bourdieu (2020) pointed out that an agent's habitus is not derived from a deliberate or organized action but is processual, derived from experiences, and incorporated by the agent due to the social necessity (p. 134) of adapting to the objective opportunity i.e., the social reality presented. In short, while at Acquired Startup Tristan was keenly aware that Big Networks Inc., his largest customer, had a growing interest in the IoT. As a result, he adapted to accommodate himself to the necessity of his sales role, and the opportunity, to sell to Big Networks Inc. in the IoT field.

Further, an agent of a field possesses habitus enabling interaction within a field, as well as providing a component of the field's continuity – its past, present, and future. In this context, Tristan's earlier incorporation of IoT as an aspect of habitus enabled his future interaction in the emergent IoT field. As an agent active in the IoT field his habitus also provided continuity to it.

A few years later, Big Networks Inc. purchased Acquired Startup. Tristan, who was leading sales at Acquired Startup at that time, became an employee of Big Networks Inc as part of the acquisition. In its role as an institutional agent in Silicon Valley, Big Networks Inc. was famous for acquiring technology startups and thus supporting the robustness of the Silicon Valley innovation network (Ferrary & Granovetter, 2009). Tristan worked at Big Networks Inc. for a few years, thereby acquiring the social capital of Big Networks Inc. as well as a connection to its employee network, before joining IoT Inc. to lead its sales.

The interplay of employees between Big Networks Inc. and the agents in the Silicon Valley field who are part of startups is continuous. As such, the Silicon Valley network is specifically described as a robust system, rather than a stable system (Ferrary & Granovetter,

2009, p. 339). In short, stability involves returning to a previous position following a shock. By contrast, robustness, said Ferrary and Granovetter (2017) involves the ability to reorganize (p. 333) to a new configuration following a shock. In this sense, Silicon Valley has the characteristics of a complex adaptive system (Capra, 2004; Lichtenstein, 2014).

Silicon Valley reorganized following shocks in the 1980s due to semiconductor competition, and in the early 2000s when the software industry responded to a shock induced by outsourcing (Ferrary & Granovetter, 2009). Each shock and reconfiguration noted Ferrary and Granovetter (2017), “generates agents with new competencies” (p. 339) who interact with the agents of the former configuration and, in turn, improve the robustness and innovative capacity of the Silicon Valley network. As is noted in Francis’s case, his embedded position at Big Networks Inc. included the early shift from the Internet field to incorporate and accommodate the growing IoT field. As an agent in the Internet and early IoT fields, Francis would have participated in this generation of new competencies.

When Tristan took the role at IoT Inc. at the beginning of 2017, it pivoted from a B2C to a B2B enterprise strategy. This emphasis on enterprise B2B field, Tristan’s area of expertise, as well as IoT Inc.’s status as an IoT startup with a novel technology played into Tristan’s decision to join:

... the premise from the CEO at that time was they were looking for somebody with enterprise sales experience. They were pivoting from a consumer-oriented strategy to an enterprise-focused strategy. And I did see and believed in a significant market opportunity for new ways to connect a massively growing ecosystem. ...Device types use all these different use cases. If everything is going to get connected, there are going to be very different ways to connect them. And I did believe in a large market opportunity

there, associated with the expansion of the Internet of Things and the market forecast to be the billions of devices connected over X number of years. (Tristan, personal communication, November 19, 2020)

As he'd describes it, the complexity of the IoT marketplace was also a significant personal motivator for Tristan's interest in joining IoT Inc. In a sociomateriality sense, Tristan's interest in grappling with complexity corresponded with the technical complexity of IoT. His interest in tackling the entrepreneurial complexity and uncertainty at IoT Inc. also correlated with an elevated level of career risk. Pointing out the uncertainty and complexity of a startup career may seem self-evident. However, it is relevant to this discussion to reiterate that IoT Inc. is also a startup in an emergent IoT field within the new Industry 4.0 era. Simply put, IoT Inc. is not, by contrast, an Internet startup, or a startup from an earlier era, like a cobbler shop. As such, the career complexity and uncertainty of the wider IoT field were largely unknown. As Tristan broadly recalled the process of joining an IoT startup, and the expected results also were subject to uncertainty and complexity:

Signing up for that [IoT startup jobs], it's very exciting that you get to work on these problems that are difficult. They're intellectually engaging. You can get a lot of satisfaction from making progress against these challenges. But conversely, you're starting up in an environment that is very high risk [as is] the likelihood of a successful outcome. And having that [successful outcome] reflected in your career is low...the rewards are not guaranteed. [Also] the rewards may not be in line with the accomplishment. ... sometimes we [also] see successful outcomes aren't appreciated. Or you experience failures that were completely unexpected as well.

When I describe it as an Achilles heel, after having done a few of these, risky high-stakes, high-reward types of scenarios, there's a part of me that looks back and wonders, what might've been different if I took a ... more risk-averse path. [Instead] I go with something simpler, more established, maybe less intellectually challenging [and] individually having a greater likelihood of a successful outcome. (Tristan, personal communication, November 19, 2020)

Tristan's comments suggest claims to expert *techne* appear to be more difficult for a sales technic to substantiate in the entrepreneurial IoT field. A *techne* must master a determinate subject, according to Roochnik (2010). In this case, the subject is sales in the IoT field. Helpfully, the substantiation of proficiency within an IoT startup involves a specific type of *techne*. Roochnik (2010) referred to this type of career craft knowledge as the imprecise, *techne2*, variation used by doctors, pilots, and musicians.

By comparison, for *techne1* results are the primary claim to expertise. For example, a builder of ships can only 'hang their shingle' claiming *techne1* if the ship floats. Similarly, a developer of an IoT software application can only claim *techne1* expertise if the IoT application works. By contrast, said Roochnik (2010) the *techne2* of hunters, pilots, and musicians is judged less by a guaranteed result and "more in the hunting" (p. 168) and an increased mastery over chance. Thus, it is *techne2* that the habitus of IoT sales can claim as expertise in the IoT field.

Even as he ruminated on his career, the vision of the new continued to have a draw on Tristan. As he described evangelizing the big idea at IoT Inc. of shifting Bluetooth from a personal connection technology to a Bluetooth network platform for the wider IoT, his cadence was fast, clear, and compelling:

Breaking open the idea that Bluetooth represented a bigger opportunity to play a bigger role in providing different types of connectivity. Instead of just one-to-one Bluetooth pairing you had one-to-many Bluetooth pairing. You could create a Bluetooth network...looking from access point to access point node. The types of use cases that could be supported with that [network] created a lot of potential business opportunities and new ways of doing things. (Tristan, personal communication, November 19, 2020)

Moreover, before this description, Tristan had noted the variety of audiences he had evangelized to “The vast majority of people. Layman, professionals, what have you” (personal communication, November 19, 2020). Sales agents alertly, but invisibly, match their discourse of expertise to the buyer’s habitus or accumulated social capital to ultimately bind the prospect to a contract (Bourdieu, 2005). This would suggest that the audiences Tristan was evangelizing to were also seeking IoT evangelists. This matching capability, said Bourdieu (2005), is core to the sales agent’s habitus. Over time, he said, this matching ability becomes less calculated and more instinctual, an unconscious aspect of habitus. In a similar vein, said Detienne and Vernant (1991), *metis* is an unconscious adaptive attention to an environment. To describe *metis*-laden skills they used the analogy of the hunting octopus, an ambiguous but ever-alert and living eye attuned and matching its environment, imbued with the power of binding.

Advocating for the new idea centered on technological innovation at IoT Inc. happened in multiple contexts. The sales role needed to instinctively blend evangelizing and binding as an adaptation to a flow of various prospects and environments. For example, at a technology conference, it was common to interact with prospects with widely varying degrees of technological capital - from world experts to novices. The sales agent’s role in “defining the truth of the interaction” (Bourdieu, 2005, p. 80) was a balancing act of seeing the buyer’s perspective,

their own, and the social reality of economics and varying degrees of social capital. To, in effect bind buyers, sales agents, said Bourdieu (2005), employ various “rhetorical strategies of ‘ambiguization’” (p. 153) such as presenting themselves as an expert, or as an alter ego in alignment with the buyer, to take over the transaction discourse.

Initially, a sales agent, like Tristan, in the IoT field might act to convey especially technical prospects to an IoT Inc. technologist, rather than attempt to present himself as a technical expert. However, immersed as Tristan and other core members were in IoT Inc.’s unique technology, there was an increasing willingness to assume the role of the IoT expert involving technical and use case expertise. The willingness to quickly step into the role of technical expert was a characteristic of the IoT Inc. habitus. Tristan, for example, recounted assuming the role of an IoT Inc. technical expert for the first few meetings with several large firms:

Going to see Acme Worldwide, it was in a trade show event sort of thing... I had no solution engineer or product person. I was that person. And then going to ‘Multinational Giant’ (a pseudonym), I carried a meeting with a dozen engineers and product managers. At Multinational Giant, I had nobody I could take. (Tristan, personal communications, March 4, 2021)

In another case, Francis couldn’t make a presentation at an IoT conference. I stepped in, literally overnight. Getting to the conference required a last-minute overnight flight. and briefly sleeping on the floor of an airport during a layover. The presentation went well, though I had joined IoT Inc. just six months earlier and the presentation was a technical walkthrough about Bluetooth. Similarly, a few months later the IoT Inc. sales team no longer existed. Also, Vail and

I stepped into sales roles to complete deals with buyers who had technical questions we confidently, if not completely, answered.

IoT Inc. participated in in-person conferences and events on a routine basis. In these often fast-moving and chaotic dramaturgical environments, the sales agents, and other members of the IoT Inc. team learned to quickly shift their roles and scripts, ala Goffman's (1959b) dramaturgy, to align with prospects (Collins, 1994). Moreover, the IoT Inc. team learned to maneuver and assign designated speakers for types of prospects with facial expressions, as well as verbal, and non-verbal cues. In these public venues, these shorthand signals remained backstage hidden from the view of prospects.

Time is at a premium at conferences. Therefore, a simple one-to-five prospect ranking system was created for when IoT Inc. had a booth at a conference. The flash of a full hand with five fingers or mouthing the word 'Five' would signify a promising or hot prospect for IoT Inc. Comparatively, a 'One' prospect was not worth spending much time with and should be ignored. The 'Five' prospects would receive more time and perhaps an introduction to IoT Inc.'s CEO. The behavioral practices of introducing a hot prospect to the CEO and the veiled in-group signaling by IoT Inc. team members during IoT conferences arose over time and is a type of Durkheimian ritual, a sacred object loaded with emotional significance (Collins, 1994).

The habitus of an agent is disposed to perceive conditions in a field, said Bourdieu (2005), such as the reactions of prospects at an IoT conference. In a "space between stimuli and response" and without calculation, the habitus is well suited for an agent in the "ordinary conditions of existence" to quickly act concerning chances of profit (Bourdieu, 2005, p. 213). Per Bourdieu (2005), these ordinary, practical responses by habitus to a social space portray the

obscure relation between habitus and field where the “habitus determines itself in determining what determines it” (p. 213).

Denim: The IoT Sales Hunter

Denim first encountered the IoT as a salesperson in a previous IoT startup, Sports IoT (a pseudonym) which sold a B2C sport product. The CEO of that company pivoted from selling to consumers to sports instructors, according to Denim. At the time of the pivot, Sports IoT was bringing in approximately \$1 million in annual revenues. At that point, said Denim, the CEO thought he could do no wrong especially after he raised investment money for Sports IoT (Denim, personal communication, December 6, 2020).

Denim said it was typical for IoT startups to pivot during their growth process. The CEO’s particular version of a pivot involved quickly shifting the sales emphasis away from consumers to sports instructors. The pivot of Sports IoT from a B2C to a B2B market, in this way, was like IoT Inc.’s pivot. However, in contrast to IoT Inc., Denim, as well as other employees at the Sports IoT company, tried to convince the CEO that the pivot was a mistake. As Denim put it the Sports IoT CEO instigated the pivot literally overnight (personal communication, December 6, 2020). When contrasted with the slower speed of IoT Inc.’s pivot, the Sports IoT pivot was much faster.

At Sports IoT, the pivot was initiated by the CEO but not supported by other members of the firm. In a fractal sense, the CEO’s move at Sports IoT was a single line. It was not a form with a length, width, and depth and it could not self-replicate. It was summative within the topological borders of the firm along Euclidean dimensions. As a result, it was two-dimensional leadership, the sum of options limited to the CEO and the field. It was not a generative shape in

the fractal sense. In the context of leadership, the CEO's move was an example of leadership as trait theory (Northouse, 2013) based on power, however, it was leadership without followers.

By contrast, at IoT Inc., the firm members accepted its pivot from B2C to B2B or joined the firm within the context of the pivot. The entire IoT Inc. team believed in the pivot vision if not all of its strategic implications. They evangelized the vision of the pivot to the wider IoT field. Thus, IoT Inc. moved forward with the leader, team, and field as a wave or generative shape as may be expected within a fractal evolution.

As a result, Francis's pivot, and its followers – core team members, prospects, and stakeholders - collectively exhibited a pattern of self-similar actions. The prospects originating from the IoT field were self-selected B2B prospects. They moved towards IoT Inc. and provided feedback which the team members and Francis used to adjust the product, the language, and their actions also along B2B lines. In the context of leadership, IoT Inc.'s pivot exhibited complexity leadership, as described by Wheatley (2011). It included evolving feedback to the IoT Inc. team and access to creative options arising from the “jagged edges” (p. 124) of a fractal perspective.

The nature of a fractal is self-similarity in that each iteration exhibits characteristics of the previous group of fractals (Wheatley, 2011). In the case of Denim's firm, the Sports IoT CEO moved forward as a single tendril in a fractal, but the rest of the firm did not support the move. Therefore, the singular move by the CEO did not exhibit a leadership capacity for fractal self-similarity. The Sports IoT CEO's unsupported pivot, said Denim, was disastrous: employees like Denim lost confidence, sales plummeted, customers were confused, and the company largely folded not long after.

Poor leadership, said Denim, is a core issue in IoT company failures. Company leaders with scientific and technical skills “Get excited about their one big idea” but they can't grow a

company (Denim, personal communication, December 6, 2020). In achieving early entrepreneurial success based on applying their scientific and technical expertise, they mistakenly believe those forms of expertise are all that is required to build a company around their one big idea. As noted in Chapter One, the bias toward epistemic and techne is a relatively recent phenomenon historically speaking. Here, the application of a limited set of knowledge types is described as employing a ‘thin stack’ of knowledge. As process-oriented organizational theorists note, the application of phronesis and metis in firms provides a more imaginative and innovative entrepreneurial approach (Chia, 2009; Nonaka et al., 2008). By contrast, the application of several knowledge types, including episteme, techne, metis, and phronesis is a ‘thick stack’ or ‘Vision Stack’ of knowledge. In the case of IoT Inc., a thick stack supported a pivot that, eventually, proved successful.

The phenomenon of founders launching, but then limiting rather than building their startup, is a known issue in entrepreneurship (Davidsson et al., 2008). Tristan described the tension caused by a founder’s blindness to their limitations as an inability to switch from “This is my vision and I’m going this way and I’m not listening to people” to “I need to build a team and engage with customers and market and start listening to people...but I can’t listen to people [instead] I lay waste to them” (Tristan, personal communication, March 4, 2021).

Denim was introduced to IoT Inc. by Vail. Vail and Denim had worked together at a previous company. “We worked together [at] the company right before IoT Inc.,” said Vail (personal communication, March 18, 2021). Denim was the Director of Sales at IoT Inc. when the company was focused on the B2C marketplace. When IoT Inc. shifted to a B2B, Tristan was brought on to lead B2B sales as the Vice President of Sales and Denim reported to Tristan.

Though the difference between a Director title and a Vice President title may seem trivial in a two-person sales team, it served a social purpose. The titles were an aspect of impression management according to Goffman (1967a). The titles supported how the social life of individuals was managed to manipulate the perceptions of other social actors. Internally, the Director and Vice President titles served as a shorthand for who was reporting to who. The titles also served to signal to those outside IoT Inc. that they were talking to the senior members of the sales team with, therefore, the power to get things done or make deals happen. More than just manipulation, role management involved an aspect of sincerity and belief based on the individual's decision to believe in the role (Kivisto & Pittman, 2013). In this respect, the belief in the titles by the salespeople at IoT Inc. could also empower them to act boldly on behalf of prospects to finalize deals.

In that context, the next section starts with additional key aspects of an IoT startup, so-called Rules of the Digital Road, that came into play at IoT Inc. starting with the need to believe in a vision. Or, in this case, visions.

Rules of the Digital Road for IoT Startups

In this section, I describe primarily unquestioned characteristics of the IoT Inc. startup. In Goffman's (1959b) dramaturgical sense, these characteristics form the stage upon which this set of circumstances was performed. Specifically, the vital role of the vision in an IoT startup and the importance of the pivot, i.e., adjusting to factors external and internal at IoT Inc. are described.

Importance of the Vision

A vision to change the world by disrupting an industry, or at least to enrich the founders, is such a common mantra in Silicon Valley startups that it evokes a bit of tiredness from Tristan,

“In Silicon Valley, the vision is Mission-based. That’s the Silicon Valley startup ethos, mission-based kind of stuff. We’re on a mission to accomplish...whatever” (Tristan, personal communication, November 19. 2020).

The vision was often on the front stage at IoT Inc. However, bringing the vision to life involved all aspects of IoT Inc. including its backstage. And behind the relatively clean front stage version of the vision and mission, noted Tristan, the backstage within the startup was complex and messy (Tristan, personal communication, November 19. 2020).

The Silicon Valley startup field included the need for a vision in its habitus. Bourdieu (2020) described socialization as a person’s habitus adapting to objective opportunity. The adaptation involves a person’s permanent struggle between utopianism (pleasure) and determined social laws (reality) of the field: “what we would like and what we can have” (Bourdieu, 2020, p. 135).

In this context, the idea of the startup vision is a fundamental underpinning of the startup dreamers and schemers struggling in Silicon Valley. These dreamers seek to achieve the transformative vision - millions of dollars, glory, power, love, etc. that goes with it. In the Silicon Valley milieu, the startup grind is the price of admission to the dream: long odds and long hours, complexity and chaos, unstable careers, and a considerable risk of burnout and failure. At IoT Inc., the vision, and especially its persistence, connected the promise of a better tomorrow with the reality of the struggle of today.

Denim relayed the persistence of Francis’s fixation on the vision, and its importance, as IoT Inc. struggled to position itself in the IoT field:

He always had a way of projecting ... a longer-term vision that he had. He always tried to bring things up to a 40 or 50,000-foot level of ‘Look guys what we’re

doing is important. I think what you guys don't realize is that there's no such thing as a Bluetooth router in the market.'

We were focused more on the 10,000-foot level of 'We can extend your range and we can connect to multiple devices, and we can do all those things.' He would bring it back up to 'What you guys need to realize is that we're doing something that nobody else has done before.' (Denim, personal communication, December 6, 2020)

This type of vision, based on a belief in a limitless, timeless, objective, yet virtuous and attainable utopia where individuals can be freed, via the marketplace, into a new world, is at the core of American exceptionalism (Noble, 2012). In this vision, individuals are freed from the confining rhythms of the natural world. In the long history of the vision of two worlds described by Noble (2012) – one world subject to the rhythms of the world, one freed from them - innovative technology is simply the most recent means to achieve that latter vision. As noted in Chapter One, Turner (2006) situates the Silicon Valley culture in the context of a vision and struggle for a definition of humanity aligning technologies to privilege personal control.

To engage in this struggle durably, says Bourdieu (2020), workers must transform themselves. This incorporation of the necessity principle says Bourdieu, in the effort to struggle, is "the habitus of the dominated" (2020, p. 125). As such, based on their habitus social agents will act reasonably, as determined by their social world, not rationally. In effect, said Bourdieu (2020), they "will act as they ought to act to avoid conflict with the social world, given their capital and the objective likelihood of successfully challenging the objective laws – you can roughly predict what people are going to do" (p. 125).

In the Silicon Valley IoT startup field, leaders are expected to have a vision, and members who join startups are expected to "Drink the Kool-Aid" (Denim, personal

communication, December 6, 2020). In this sense, Francis's vision is a habitus characteristic expected of leaders in Silicon Valley startups. As Denim noted, followers in startups are expected to expect a vision and to take part in it:

In a startup you either drink the Kool-Aid and you're all in, or you don't drink the Kool-Aid and you go find something else to do. At big companies like Silicon Labs, Cisco, or Microsoft or any of these big companies you don't have to be drinking the Kool-Aid of what the company is... the vision of the company, and all that. A lot of people are just there for their paycheck. And as long as they keep getting paid and they feel like they're making a decent living, they'll just keep doing what they're doing. They don't care if the company is changing the world ...

But I think in a startup because you never know if the startup is going to be there today or tomorrow, and you're taking a lot of risks by being there and usually 10 times more work because you've got to do 15 different jobs. [You don't do] all those things unless you believe in the vision. (Denim, personal communication, December 6, 2020)

A belief in a vision at Silicon Valley startups, including the belief in the vision at IoT Inc., also binds individuals to the firm, according to Denim:

In these IoT startups, in startups in general, but in the Valley here particularly... if you don't believe in what the company is doing, and you're not excited about it, people move on and do something else. If somebody has been at a startup for a year or a year and a half or whatever... I would be pretty shocked if they didn't truly believe or have 'drank the Kool-Aid' of what the vision of that startup is. (Denim, personal communication, December 6, 2020)

The belief in the vision at IoT Inc. was tested based on how well it helped achieve things. In that sense, describing the vision in terms of goals was important, said Vail, because achieving the goals required the leader and crew at IoT Inc. to align around the vision. The alignment around the objective goals at IoT Inc. was demonstrated by the direction and structures of the firm. As will be noted in more detail, the process of alignment around goals between the leader and crew at IoT Inc. involved ongoing adjustments and negotiations. However, as has been noted in the case of IoT Inc., the first impression of the vision was compelling for IoT Inc. team members as well as the IoT field. Denim described the first reaction to the vision this way: “Initially the vision of the product was compelling. You just had to say, ‘Long-range Bluetooth connections’ and the usual sales challenges of getting people excited melted away” (Denim, personal communication, December 6, 2020).

The process of navigating and negotiating the vision in line with personal interests, market forces, and practical results was ongoing at IoT Inc. On the one hand, said Vail, Francis “Continues to try to communicate his vision for what he wants” (personal communication, March 18, 2021). On the other hand, Francis’s vision, noted Vail, is not simply a top-down phenomenon. The people in the company “have our own collective sense [and] individual experiences that we try to provide input to him, based on the world as we see it” (Vail, personal communication, April 7, 2021). In this way, the ongoing creation of belief in the vision holding individuals to IoT Inc. is a mediated process. Moreover, the process of mediating the belief in the vision played out backstage at IoT Inc. as well as on the front stage, for example during Monday morning meetings.

There were discussions and disagreements on some aspects of the vision at IoT Inc., but not all. The disagreements typically involved strategic elements and didn’t include the

fundamental aspects of the vision held by Francis. As Vail noted, “Ultimately Francis doesn’t change that much,” noted Vail (personal communication, April 7, 2021). In short, as described in LaMagdeleine’s (2016) leadership taxonomy, the unchanging aspects of Francis’s vision were sacred components of IoT Inc.

In this respect, Vail said there were aspects of Francis’s vision that were static and unchanging. In a dramaturgical context, having recognized their sacred character, Vail did not consider an overt challenge to the vision to be an important part of his operations role. Francis likes to get input, said Vail, and yet he noted it is human nature to “respond positively to affirmation as opposed to being challenged” (personal communication, March 18, 2021).

When Vail described Francis and his vision he did so as a duality. In other words, if Francis’s vision was challenged Francis is challenged, and if Francis was challenged the vision was challenged. When the discussion centered on whether to affirm or challenge Francis’s vision, Vail demurred “We all like to hear nice things” (Vail, personal communication, April 7, 2021). Moreover, the challenges to Francis’s IoT Inc. vision had steadily decreased as time went on, said Vail, and by 2021 he offered “There’s not a lot of people that are challenging him [Francis] now in the company” (Vail, personal communication, Vail, April 7, 2021).

When challenges to the vision did occur, they primarily came from the sales function (Vail, personal communication, April 7, 2021). Tristan challenged Francis routinely and later Tristan’s replacement, Head of Sales #2 (a pseudonym) also challenged “him [Francis] a fair amount...and I do too, to a quite a lesser amount” said Vail (personal communication, April 7, 2021). Vail seemed aware that his lack of challenge may be viewed as a savvy move of self-preservation but also asserted it was not a primary aspect of his operations role within the firm. As head of marketing at IoT Inc. my perspective was similar, I rarely challenged Francis. When,

for example, the marketing budget was reduced to zero for one quarter, I considered it instead a short-term challenge to essentially ‘make do.’

Tristan would assert the lack of challenge to the vision was because neither the marketing nor operations role had the pressure of “carrying a number” (Tristan, personal communication, November 19, 2020) tied to a quarterly sales number and goal. I had led sales and marketing in a previous role and Tristan’s sentiment resonated. For example, the sales role at IoT Inc. was more tightly tied to the timing of a shift in Francis’s vision, the pivot from a B2C to a B2B marketplace. Sales goals were closely tied to the immediate value B2B prospects gave to IoT Inc.’s product as it was introduced to that marketplace. Tristan was also aware that B2B products are typically one part of a larger system in B2B companies in which the weakest part of the system determines the strength of the entire system. As a result, few B2B prospects would be willing to buy IoT Inc.’s B2B enterprise product offering unless it was stable and mature.

Tristan’s sales role perspective on the B2B pivot, vis-a-vis the other roles, said Bourdieu (2005), is an example of agents’ distinctive positions in a field, which are in indirect conflict with others playing the game in the field. In Vail’s view, the people in the sales roles tended to challenge “more so than any other group within the company” (Vail, personal communication, March 18, 2021). At IoT Inc., there were challenges regarding the technology, the product roadmap (the timeline and prioritization of product development) as well as other key areas, like whether sales compensation packages were achievable. In this regard, the sales role had a vision based on “what they believe is truth for them,” (Vail, personal communication, March 18, 2021). The sales vision, said Vail, was pragmatic. It tied sales efforts to sales results and commissions.

In other words, people in the sales roles at IoT Inc. were interested in the vision, such as a pivot to the B2B, to the degree that it served the motivational and practical attainment of their

vision of sales compensation. The resulting tensions between a sales role's vision, and a CEO's vision, said Vail is "The salt in the wound, as it were, for most companies" (Vail, personal communication, March 18, 2021). Moreover, the resulting tensions between the competing visions were necessary, the result of their respective positions in the IoT field.

At the same time, the sacred nature of the CEO's vision couldn't be violated without dire consequences. As a result, the actions involving the tensions between sales and the CEO were primarily indirect and backstage at IoT Inc. In a dramaturgical sense, when the tension did surface on the front stage other actors worked to mitigate the disruption to the socially constructed structure at IoT Inc. Even so, and as Bourdieu (2005) noted, whether backstage or front stage the actions of an agent may destroy other agents, even without intending to do so.

The sales role's challenge to the CEO's vision was described as necessary because the ability to challenge enables an autopoietic avenue (Capra, 2004), in this case between IoT Inc. and the marketplace. In an autopoietic sense, the challenges to the vision by salespeople at IoT Inc. positively disturbed IoT Inc. with necessary information from prospective customers in an ongoing feedback loop. In this way, the autopoietic openness to feedback enabled IoT Inc. to self-reproduce efficiently in co-evolution with the environment (Maula, 2000, p. 157). IoT Inc.'s co-evolution with the environment started with the B2C marketplace and then pivoted to the B2B market. Tristan noted an example of the feedback loop from the initial B2C effort:

Denim had already gone the rounds [with the B2C prospects] and he said, 'Look, this isn't working because of these product deficiencies...we blew it here, here, and here. They'll still talk to us, but we need this, and if we don't get that they won't talk to us.'

(Tristan, personal communication, November 19, 2020)

The sales role's challenge to the technology and vision at IoT Inc. was allowed, to a degree, because there was a tacit agreement that the pragmatic results – company sales as well as compensation for the sales function – mutually served the visions of sales as well as the leader of IoT Inc. Yet, by challenging the CEO in the social structure, as well as the CEO's vision while also facing an undifferentiated and emergent IoT field, the sales role at IoT Inc. was exposed to risk from multiple directions. There was, for example, a limit to the degree of challenge which would be allowed and accepted by the CEO at IoT Inc. This will be explored in more detail in a later chapter. In short, IoT Inc.'s autopoiesis was limited by the autopoietic corollary to the open flow of knowledge in a feedback loop, no matter how necessary. The corollary said Maula (2000) is the boundary closure or self-referentiality (p. 159) requirement limiting information flows. Individuals like Tristan who interact with clients and navigate this open, yet limited feedback loop are in an autopoietic boundary role.

In recognition of this challenge, the sales role is well compensated, but it is also in a “no-win situation most of the time” (Vail, personal communication, March 18, 2021). In effect, the sales role is paid by the organization for ensuring direct contact with the truth of the market resulting in revenues. However, the sales role also paid for, in a sense, the privilege of using that direct external contact to pursue their own goals, because it necessitated challenging, or at least questioning, the CEO role at IoT Inc. who had the power to reward, support, or punish the sales role. In Vail's view, the typical response to the sales role by those in power was to punish them. “When sales is doing a super good job, the company tries to punish them by reducing their commission percentage, or they're given unrealistic objectives” (Vail, personal communication, March 18, 2021). In short, individuals in an IoT startup sales role are in a precarious situation.

They are expected to provide disturbing but necessary feedback from clients, drink the Kool-Aid, challenge the CEO's vision, and serve their self-interests.

The leader at IoT Inc. had some sensitivity to the conundrum the sales function faced, said Vail. However, the leader of IoT Inc. also maintained a vision of the sales function that was "Performance-based ... regardless of whether or not there are enough marketing leads, the product is robust, or there is product-market fit, etc." (Vail, personal communication, March 18, 2021). In other words, the feedback from the marketplace was important, but the achievement of revenues was the final measure of performance for the sales role. In short, the sales function is expected to achieve the leader's vision of sales revenue regardless of the context – even if the context was key to revenues.

At IoT Inc., the sales role faced fixed revenue goals tied to an aspirational vision, both of which were part of the social structure. However, there was also a pragmatic agreement between the sales role and the CEO involving flexibility i.e., using whatever means were available, to reach the goals. As a result, the social structure at IoT Inc. supported a combination of pragmatic approaches, including practical techniques (*techne*) as well as means both ethical (*phronetic*) as well as expedient (*metis*) to reach revenue goals in support of the IoT Inc. vision. As noted, the pragmatic means to achieve sales goals weren't written down. In this sense, the flexibility to pursue a combination of pragmatic approaches for achieving sales goals went without saying - it was *doxa*, at IoT Inc. In this way, the IoT Inc. CEO's result-oriented perspective of how sales pursued the actualization of revenues was aligned with the startup's revenue goal and the intertwining sales and aspirational visions.

As Vail noted, sales goals are forever positioned beyond reach – there is no endpoint (Vail, personal communication, March 18, 2021). In this way, the *habitus* of the sales role at IoT

Inc. would be expected to embody a corresponding form of attention forever attuned to feedback from potential clients and the pursuit of sales opportunities (Bourdieu, 2005; Chia, 2017). In this sense, a sales habitus infinitely reaching but never touching the goal is like Mandelbrot's fractal sets. Moreover, where attention on the fractal border is directed for magnification determines the fractal pattern that is presented. A sales habitus would seek to magnify a border area informed by the experience of previous successful patterns.

In turbulent environments like an IoT startup, a constant sensing embodiment by sales versus the use of a set of known and then applied sales practices, is "vital to sustainable organizational success" (Chia, 2017, p. 11). In this way, Tristan's disposition, and wayfinding actions (Chia, 2017) contrasted with the aspirational rationality of the IoT Inc. vision an abstract description of the future. As will be noted, Tristan applied a technique based on Granovetter's (1973) strength of weak ties as a means of penetrating enterprise businesses. The use of the technique was based on prior experience. The technique was applied when Tristan's habitus sensed an opportunity. Chia (2017) describes this as wayfinding:

Wayfinding better describes how successful organizations cope effectively in the face of uncertainty. It entails constantly sensing, adapting and effectively responding to environmental solicitations and taking advantage of their affordances to meet the organization's evolving needs. Much of this happens prior to mental cognition and retrospective rationalization. Superior organizational performance, as such, depends on how successfully an organization is able to detect and "bending" the grain of the world's becoming to aid its own survival and growth. (Chia, 2017, p. 3)

Moreover, the position of the sales role and use of pragmatic techniques, or *techne*, in pursuit of a goal with no end point, mirrors Plato's description of *arete* (excellence). It is a kingly

techné that continually refines itself towards, but never achieves, an aspirational and excellent end point (Roochnik, 2010). This is a paradox, but not an unfamiliar one to process thinkers. The notion that pursuing arete is only possible in its continual pursuit by practical skills and means is central across multiple disciplines (Nonaka et al., 2008; Pirsig, 1992; Roochnik, 2010).

Moreover, the wider IoT field also recognizes the need for this tension between the practical sales orientation and the primary vision. Sales hunts for revenue. In turn, revenues are perceived as the objective measure by stakeholders in the IoT social field for reducing costs and risks and demonstrating expertise and success. As such, revenues serve as symbolic capital for IoT Inc. within the social reality of the IoT startup field (Bourdieu, 1989). Revenues are widely perceived as a legitimatizing asset for IoT Inc. by its stakeholders, including potential investors, partners, and customers, as well as existing customers, employees, and investors.

In turn, the unique position, and habitus of the sales role in creating revenues also legitimized its challenges to the CEO's aspirational vision. An autopoietic feedback loop between the marketplace and the firm, brokered by sales, is perceived as necessary to pursue revenues. In its constant interplay with market inputs, the sales function provides an influx of implicit knowledge, by necessity disturbing the aspirational vision and explicit power structures. This created tension. As Tristan noted his experience of disturbing IoT Inc. with feedback, "I was driving all this research and positioning and advocating around what it [the B2B enterprise version of the product] needed to be and meeting with all kinds of resistance" (Tristan, personal communication, March 4, 2021).

Along these lines, the relationship between implicit knowledge garnered by sales at IoT Inc. and the explicit knowledge of power structures at IoT Inc. formed a dialectic. Such a dialectic would, according to Nonaka et al., (2008) allow sales to provide the local and

contextually implicit knowledge required for IoT Inc. to reconceive its explicit knowledge and power structures in pursuit of excellence. In short, the feedback loop was necessary for IoT Inc., but it came with tension and at a cost. Without the dynamic feedback from sales, IoT Inc.'s ability to make changes in the direction of revenues, the objectively agreed symbolic capital, and the measure of excellence in the IoT field, would be hampered. However, as Vail had noted, although Francis agreed to a measure of dynamism based on sales feedback, the aspirational vision he held, and his definition of sales performance at IoT Inc., were static.

When Tristan joined IoT Inc., he said “They were getting demand from the enterprise side and wanted to go down that path” (personal communication, March 4, 2021). The capacity to pursue this path required the knowledge-creating dialectic just described. Moreover, an approach to creating knowledge at IoT Inc. required a disposition informed by *phronesis*, as noted by Nonaka et al. (2014):

What exactly is *phronesis*, then, in the context of a knowledge-creating company?

Building on Nonaka and Toyama (2007) and Nonaka and Takeuchi (2011) it consists of six abilities: (a) the ability to make a judgment on ‘goodness’, (b) the ability to perceive reality as it is, (c) the ability to create *ba* (i.e. a shared context for emerging relationships, which provide a platform for advancing individual and collective knowledge), (d) the ability to articulate the essence into a narrative, (e) the ability to exercise political power to realize the narrative and (f) the ability to foster *phronesis* in others to build a resilient organization. These qualities are what makes for a ‘wise leader.’ (p. 369)

As Tristan interacted with the B2C and B2B markets, he provided feedback to IoT Inc. While the feedback entailed a skill based on craft knowledge, or *techne*, the application of the feedback entailed *phronesis*, as Nonaka et al. (2014) noted:

...technê, entails the 'knowledge of how to make a car well,' while phronesis is the cultivated disposition towards excellence and self-perfection that enables us to 'know' what 'a "good" car is ... and how to build such a car' (p. 54). Such a deep understanding of what constitutes an ultimate 'good' and how to act towards it is what differentiates a phronimos (someone showing phronesis) from a technically proficient craftsman. This distinction is reinforced by Aristotle's observation that 'Pericles and men like him have practical wisdom ... because they can see what is good for themselves and what is good for men in general.' (p. 369)

Also, the sales roles' phronetic openness to feedback from the market, said Nonaka et al., (2014) is a 'negative capability' as first articulated by the poet Keats:

Phronesis does not require explicit rational articulation, indeed resists it, because reason can stymie the capacity for deliberation since rational understanding is only ever a retrospective assessment of what has occurred rather than a pure or direct form of perceiving from within a particular set of social circumstance (Dreyfus and Dreyfus, 2005). To reason is to remove oneself dispositionally from the situation encountered, and, increasingly, to invoke established rules as known standards, or yardsticks to guide comprehension. In contrast, deliberation arises from an intimate 'indwelling' or of being in amidst and embedded in a complex of social relations, a persistent and pressing entwinement in situations from which a form of direct and complete perception is made available, without any need for reason or justification from above. It uses a perceptual rather than conceptual repertoire. (p. 368)

Moreover, as a necessary capability for the pursuit of arete, deriving what is good was unique to the ambiguous IoT market realities Tristan faces. In this way, Tristan, and Denim first

use techne to gather market feedback as a wayfinding by embedding their habitus in the IoT market experience from which they can then exercise what they learn as a perceived and phronetic series of actions. It is in this context that Tristan's phronesis continually points to a practical 'good' unique to the B2B enterprise situation in pursuit of arete in the IoT field. As described by Pirsig (1992) the techne and phronetic actions of the sales role are, at IoT Inc., a 'dynamic quality' necessary for the pursuit of arete.

By contrast, a 'static quality' pattern includes unchanging abstracted social patterns (Pirsig, 1992), such as Francis's aspirational vision for IoT Inc. and the unyielding expectations of sales performance. To be clear, in Pirsig's (1992) view, the pursuit of excellence requires static and dynamic qualities. Pirsig reconciles the complementary dynamic and static properties into a ratcheting motion – the dynamic quality pulls forward and the static quality then holds the forward movement in place. Pirsig frames this tension and motion as a pragmatic and endless pursuit of arete. From this perspective, the market reality disturbance from Tristan in sales and the unwavering vision and expectations of the CEO form a ratcheting motion. Thus, the pursuit of revenue as arete at IoT Inc. is socially constructed.

As conceptualized by Pirsig (1992), the intertwining of dynamic and static quality patterns is the penultimate matter of care for the organization, the individuals involved, as well as its wider group of onlookers and stakeholders. In this case, the sales feedback disturbing IoT Inc. and the CEO's static revenue-performance expectations and revenue results are a socially enacted pattern at IoT Inc. whether it is fully recognized or not. In other words, the IoT Inc. system was perfectly designed to get the results it got.

In a sense, the broad frame from which the pattern of sales feedback and revenue expectations continually emerges and then fades into the background at IoT Inc. was reminiscent

of the implicate order conceived by Bohm. The pattern was continuous throughout the research. Pirsig (1992) would suggest that a pattern of this nature is the essence of arete. It is the only real thing, and the stakeholders cannot help but care about it. This was true at IoT Inc. As Vail notes individuals, organizations, and the wider IoT startup field accept the sales and founder conflict as necessary “salt in the wound” (Vail, personal communication, March 18, 2021). It is evident in the tension between the sales roles and leaders and was seen as a necessary reality at IoT Inc.

The value of stock equity is a measure of arete and social capital in Silicon Valley startups. At IoT Inc. individuals were given the option to purchase stock when they joined IoT Inc. The choice to exercise this purchase option is a matter the individuals discuss as they consider whether IoT Inc. has a profitable exit path (Porter, 2007). As is typical in startups, IoT Inc. awarded the options to purchase stock based on the length of time an individual was employed at IoT Inc. While negotiable, typically stock options are awarded on a schedule, such as 25% of the total stock option award after every year of employment. Thus, if an individual leaves IoT Inc. after three years they can option, or purchase, up to 75% of their total stock award.

Questions about exercising this option and the value of IoT Inc. equity were ongoing topics at IoT Inc. Individuals weighed the time they devoted to the firm and the potential future value of the firm. Like other uncertain characteristics of IoT Inc., this exit path is an indeterminant aspect of the firm. As Vail described the decision to purchase the equity options has:

So many different kinds of variables that can play out ... that it gets my mind racing. I've seen this so many times in the past [and] recognize common experiences

...there's not a clear vision and not a clear path to where this is going to exit. (Vail, personal communication, March 18, 2021)

In short, purchasing equity options is a risk and an opportunity. The culmination of the path, referred to as an 'exit' could result in a monetary loss, or gain to the holders of equity. Moreover, the decision to purchase the stock options and the timeline to an exit path are part of the considerations about remaining with or leaving IoT Inc.:

We're entering into that transition, and I knew it was coming. It's been a little bit longer than it typically is in a startup. I have mixed feelings. ...I'd love to sell this to a big company (or) see it grow and be part of that next growth phase...[but] that comes with a lot of instability and a lot of politics in a bigger company which is not as fun...

I could work here for another 10 years. I don't know. I don't think Francis has got the appetite to do that. I think he has got the appetite to flip [exit] this in the next couple of years. He's not saying it, but body language suggests [that after] doing this for seven years...he's thinking this is about time to get a return for my time and energy. (Vail, personal communication, March 18, 2021)

For example, Vail reflected on a possible path to an exit, "We're not really at a pivot point...but whenever you try to raise more money there are lots of things that can happen" (personal communication, Vail, March 2021). A discussion with Vail about the exit possibilities was typical at IoT Inc., but not definitive. Notably, the tone of these discussions – good, bad, ugly - tended to shift dynamically based on current events, including personal circumstances as well as company circumstances. For example, at one point Vail noted "There was not a clear vision and not a clear path to where this going to exit" (Vail, personal communication, March 18,

2021). An actual exit may involve an acquisition by another firm, a public offering, or something else.

As noted earlier in Vail's description of a possible exit, IoT Inc. is "not really at a pivot point" in which the company is, in a sense, rotating around a thing (the product) but it may be said to be at an inflection point. At the time of the interview, the inflection point involved seeking another round of funding, with Vail suggesting a variety of outcomes:

1). Not raising money. 'Things start to tighten down ...start getting rid of people. That's the worst possible scenario.' 2.) Not raising enough money. 'So, nothing really changes.' 3. Raising enough. 'Really go for broke and grow or potentially get acquired for people or assets.' There are so many different kinds of variables. (Vail, personal communication, March 18, 2021)

In other words, the process of determining and plotting the course for an exit at IoT Inc. involved multiple variables such as hiring, funding, and the development of the product. In general, plotting the course of a startup like IoT Inc. had general guidelines, but not pre-established routes guaranteeing a successful journey. As described in the rules for the road for digital startups basic guidelines were followed: Francis provided a vision and patented technology recognized by the Silicon Valley IoT field. Vail enacted operational structures like an office building at a known startup address in Silicon Valley. Sales roles were filled and provided feedback from the market. Marketing enacted messaging, built websites, and set up participation at conferences.

However, IoT Inc.'s route into the marketplace and the IoT field veered from B2C to B2B. Course corrections were constant based on a feedback loop between the marketplace and IoT Inc. crew members. Especially, in this regard, the guidance of IoT Inc. was less of a mapped

process and more of a piloting exercise. The art of a pilot said Detienne and Vernant (1991) derived from a combined capacity “to determine his route over the undifferentiated expanse of the sea” (p. 149) with an ability to reference the stars as signs from the gods. The movement of the stars enables good pilots to divine navigation and avoid “shallow marshy waters in which they had lost their way because they lacked metis” (p. 149).

Tristan’s visionary capacity included an ability to pilot IoT Inc. between Charybdis and Scylla, as it were, and towards the features required by B2B enterprises. Navigating a field where time and space fuse, said Detienne and Vernant (1991), required an embodied skill. To the Greeks, skill in this type of primordial space, or *pontos*, could be represented by an adventure on ever-changing seas lacking reference points and differing with every crossing (p. 152). *Metis*, they said, was an essential quality needed to pilot in a *pontos* environment.

Moreover, *Poros*, or creative ingenuity is the name Plato gave the son of the goddess *Metis* (Cooper & Hutchinson, 1997, p. 486). Detienne and Vernant (1991) interpreted the god *Poros* as representing an element of initiative given to an intelligence capable of exploiting future opportunities when facing an unchangeable destiny. *Poros* describes an ability to navigate “a way which has not been plotted in advance, a voyage was undertaken across an unknown and hostile region, a path to be opened up where no proper path exists or can exist” (Detienne & Vernant, 1991, p. 152). In short, *Poros* is the action of plotting and pursuing a path into an unmarked expanse, by a person with *metis*. During the crossing, the person with *metis* seeks the navigational signs and portents of the gods in pursuit of a goal while facing their destiny.

In this chapter, three themes to help the reader understand IoT Inc.’s history, nature, and development within the IoT were explored. First, the key role of individual histories and *habitus* and their role in the creation of IoT Inc. were described. Concrete examples of how individual

experience informs habitus and the expertise for navigating complexity were given. The details of how participation in an IoT startup requires a unique type of dispositional expertise oriented to creating opportunity were provided. These skills include an understanding of how the entrepreneurial IoT field works and certain rules of the road were described.

It was argued that social networks and social capital played a vital role in the creation of IoT Inc. The layers of personal and professional connections influencing the individuals who joined IoT Inc., including individuals who had had previous working relationships were described. It was noted that the social capital of the IoT field in Silicon Valley, such as having worked at Big Networks Inc., played an integral part in the creation of IoT Inc. The histories and habitus at IoT Inc. were explained. The social and material networks that interact with the visions powering and shaping the firm were described. Furthermore, how IoT Inc. crew members work together and separately to navigate complexity and uncertainty is noted, as well as the themes which will shape the choices made and paths taken. In the following chapters, the readers will see how the future unfolds, how that future was fundamentally shaped by these elements, and how they interact.

The next two chapters describe key events in the development of IoT Inc. - the Pivot, Monday morning meetings, and the Barcelona event – the who, what, when, and how.

CHAPTER 5: BUILDING THE SHIP WHILE SAILING IT

“Panting and snorting like a mad battle steed that has lost its rider, the masterless ocean overruns the globe.”

(Melville, 1851/2015, *Moby-Dick: or, The Whale*)

The story of how the following key events led to IoT Inc.’s current state is a surprise, even for those who created those key events. At the time, the longer-term impact of the events was shrouded in the drama and complexity of building IoT Inc. while also pursuing opportunities. The moment-at-hand in a startup is often devoted to addressing the planned-for stuff and juggling unexpected stuff. The daily grind of setting up meetings with clients, flying to conferences, and sourcing components while perfecting a pitch deck for a new investment round requires time and attention. In short, as Parviainen et al. (2021) note, at the complex intersection of technology, power, and speed it is impossible to see everything clearly at once:

...decision-making follows the rhythm of knowledge production in which phases of ‘known,’ ‘partly-known,’ ‘not-yet-known,’ ‘will-be-known,’ ‘unable-to-know’ and ‘unable-ever-to-know’ vary; this is because assessments of risks and uncertainties change constantly. (p. 237)

However, with the benefit of hindsight, it’s also not surprising. As the case study brings to the surface, paradoxes happen in startups. The surprising results of these events also feel, paradoxically, like no surprise at all. Like Heisenberg’s uncertainty principle, IoT Inc., when viewed from more than one perspective, appears to have contradictory properties. In any case, IoT Inc.’s current state does come with stable elements in its history: the pivot from B2C to B2B, the dramaturgy of the Monday morning meetings, and the importance of the vision. The case study shows how the actions taken and the paths chosen result in conflicts or convergence, and sometimes both.

This chapter provides a leadup to those events and tells the story of the events themselves from the perspective and lived experience of the individuals who were building IoT Inc. at that time. I acknowledge my insider role at IoT Inc. as head of marketing informed my perspective on these events. And yet, I also sought to capture a collective social reality via the people who lived the experience.

The narrative describes three main events in a loosely chronological order, the Pivot, Monday morning meetings, and the Vision. Each event receives an independent overview. In each independent overview, the timeline of the event moves forward. When the next event is described, the timeline returns to an earlier period but also integrates elements from the previous narratives. The description of the events and their integration is interwoven with analysis. The chapter concludes with a brief summation.

Importance of the Pivot: From B2C to B2B

The chapter begins with additional details about how the IoT Inc. team was built. It builds a narrative and renders a dramaturgical account of its early launch as viewed through the lens of Bourdieu's habitus, capital, and field. References are made to types of knowledge like *techne*, *episteme*, *metis*, *phronesis*, and *arete*, and their relation to the pursuit of a vision is situated.

At this point, the narrative circles back to early 2015 when Francis connected with Mentor Mike whose expertise was piloting IoT Inc.'s early effort to enter the B2C market. Specifically, Mentor Mike contracted with IoT Inc. to introduce IoT Inc.'s long-range Bluetooth consumer product to consumer market retailers like Amazon and others. Mentor Mike had been a part of Vail's Silicon Valley network for several years:

He [Mentor Mike] was basically sales and marketing for early-stage companies ... brands that did really well. I kind of followed him around. [Me] being the generalist and he being the rainmaker for startups. He had really good ties with the venture community. Venture capitalists would contact him for building out channels of distribution. And he'd give me a call saying 'Hey, these guys need to set up all the back-office infrastructure stuff.' That happened for me for a lot of the companies that I worked at. (Vail, personal communication, March 18, 2021)

During Mentor Mike's meeting with Francis, Mentor Mike recommended Vail for his broad operational experience setting up B2C early-stage startups. As Vail said, "Most of what I've done previous to IoT Inc. was B2C" (personal communication, March 18, 2021). In general, an operations role in a startup sets up several areas of the business including manufacturing, component sourcing, back-office setup and management of payroll, office space, customer service, hiring, marketing, sales, and more. In his experience, said Vail, an individual working in startup operations for a length of time eventually sets up almost everything:

I'm a generalist. I can come in and set up all aspects of the business. I like to joke that I've done everything in the company except for the engineering. That's usually my value pitch as I try to get involved in early-stage stuff. (Vail, personal communication, March 18, 2021)

IoT Inc.'s focus on the B2C market required personnel with the two aspects of techne, results-focused specialized skills as well as the expertise to move IoT Inc. processes forward. Based on his previous startup experience, Francis was aware that IoT Inc. would change and require both. For example, Vail provided a suite of what Roochnik (2010) described as techne1 capabilities specific and result-focused to assemble an operating structure, and techne2 flexible

enough to change processes quickly when needed. As such, Vail's techne skillset and habitus were suited to IoT Inc.'s need for the capability to create as well as adjust its operational structures.

In early 2015, former employees based in China with engineering skills who had been a part of Francis's first startup followed Francis to IoT Inc. Even before a product was fully established Francis applied to a China-based kick starter and in 2015 received a small amount of early-stage investment funding. It was around this time that Francis recalled he gave IoT Inc. its name. It was "more general...more like the Apple" name because he knew in the "longer-term what we do may change" (Francis, personal communication, November 19, 2020).

The flexibility Francis sought extended to hiring practices. New members of the endeavor were often hired as consultants for a few months before being offered full-time positions. That was the case when I joined IoT Inc. It was also the case when, based on mentor Mike's recommendation, Francis hired Vail initially as a consultant for IoT Inc. in May 2015. After this initial period, Francis said he hired Vail full-time as the first U.S. employee in October 2015. During this time, Francis said it was not clear which use cases or markets the IoT Inc.'s long-range Bluetooth gateway was best suited for:

We made this Bluetooth gateway. We talked about replacing [an] iPad to relay the signal for Bluetooth body temperature [monitoring] and then for the fall detector thing. We didn't know where to start to be very honest. We knew there would be a lot of applications. Which market would be the best? We didn't know. (Francis, personal communication, November 19, 2020)

Around the same time, in October 2015 IoT Inc. hired a public relations firm, Loud PR (a pseudonym) to announce their product the IoT Inc. Hub at the Giant Consumer Show (a

pseudonym) in January 2016. Vail describes the accelerating success of IoT Inc.’s initial B2C path:

If you can imagine from that hiring in October 2015 to the Giant Consumer Show in January 2016. We actually won Best of Giant Consumer Show - with hardly anybody. It was just an insane time. Loud PR ... did a lot of the heavy lifting as it related to some of the initial positioning. And this was before we even had a product that worked. They did a lot of outreach to different industry pundits. (Vail, personal communication, March 18, 2021).

In four months, IoT Inc. had gone from no attention to winning a major award at the world’s largest and most influential consumer electronics event. After the announcement of the major B2C award in January 2016, Vail and Francis were scheduled to bring IoT Inc. to another conference event a few months later. At this following conference, IoT Inc. “went from nobody knows us” recounted Vail, to nearly 200 companies approaching IoT Inc. at the conference looking for a long-range Bluetooth solution (personal communication, March 18, 2021). At that time, Francis and Vail were IoT Inc.’s only full-time U.S. employees.

Vail was a long-time B2C startup operator. His habitus included an awareness of the requirements for success in the B2C IoT field. The need to pivot away from a B2C market was evident to Vail, he said, soon after winning the B2C award:

The epiphany after winning... shortly after, and I started advocating for it with Francis...when I recognized in Francis very early on that he was not [going] to spend money to create a consumer brand...was not going to be willing to do what it takes to be successful as a consumer brand. It made sense to try to pivot to create a product that could be used by multiple different types of applications and verticals. I think it was the

right decision based on Francis's philosophy. (Vail, personal communication, March 18, 2021)

At the same time as IoT Inc. was gaining early traction with potential customers, Vail recommended hiring a full-time salesperson to accommodate the influx of interest. Leveraging his network, Vail recommended Denim with whom he had worked previously. With a background in B2C technology sales, Denim joined IoT Inc. as the Director of Sales in April 2016.

Winning the Best of Giant Consumer Show award with the help of a PR company brought awareness of IoT Inc. and its vision of a new long-range IoT technology. Despite their cultural differences, it also positioned Vail as a trusted partner to Francis. Vail had accumulated social capital for IoT Inc. and in doing so demonstrated his habitus was aligned with the development of the IoT field:

All the work with the agency, getting us to a point where we won Best of Giant Consumer Show. That established the credibility bar for me and made life a lot easier. That was the beginning where I felt he trusted my contribution. [He] wasn't going to question everything I did. (Vail, personal communication, March 18, 2021)

The PR firm created attention for IoT Inc. in 2015 resulting in the award in early 2016. However, "this was before we even had a product that worked," according to Vail (personal communication, March 18, 2021). In the language of startups, IoT Inc.'s Bluetooth gateway was 'in beta,' an immature product. Denim's assessment of the product at that time was blunt "It never worked very well" (Denim, personal communication, December 6, 2020). Moreover, the monthly cost of the PR company was significant. Without a stable product to offer, the additional attention brought by PR was not helpful. What the company needed was a product that did what

it promised, according to Vail “We found out after winning that PR just really wasn’t that effective because the product wasn’t ready,” he said (Vail, personal communication, March 18, 2021).

It could also be said the market wasn’t ready for IoT Inc. The startup pursued the Bluetooth consumer speaker market in 2016. One of the target applications and markets was streaming music, for example, from one music source to all the Bluetooth speakers in a home via the IoT Inc. Bluetooth gateway. However, IoT Inc. discovered the manufacturers of Bluetooth speakers each had unique configurations. As a result of the unique Bluetooth speaker configuration by each manufacturer the single music stream played at slightly different speeds from each brand of Bluetooth speaker. The resulting music stream was an out-of-sync cacophony, “Synchronizing the multiple Bluetooth devices ... was proving to be a challenge,” as was “getting it to connect on the Wi-Fi chips that they [IoT Inc.] had used” (Tristan, personal communication, March 4, 2021).

There were other issues. IoT Inc.’s Bluetooth gateway simply didn’t act in the manner consumers had become accustomed to with Wi-Fi routers. For example, the Bluetooth gateway didn’t easily and automatically connect with all the Bluetooth devices within its range. Instead, it connected with a limited list of compatible Bluetooth devices. Also, maintaining compatibility, the ability to connect with those Bluetooth devices, was a major challenge. Consumer devices were constantly changing and in doing so would lose compatibility.

Consumers expected an easy-to-use product, not a beta product and a difficult user experience. Operating IoT Inc.’s Bluetooth gateway required consumers to set it up and connect to various Bluetooth consumer devices via an application downloaded from the IoT Inc. website. In late 2016, users of the Bluetooth gateway’s consumer application were complaining that it

crashed more often than it worked. As Vail noted, IoT Inc.'s engagement in the consumer marketplace from late 2015 to early 2016 "was just an insane time" (Vail, personal communication, March 18, 2021). On the one hand, winning best of Giant Consumer Show was great, said Vail. On the other hand, Vail saw that:

The product still was at a place where it didn't deliver on the promise. We were selling the dream. It was a very stressful time. Looking back, I questioned how long I was going to stay with the company at that point. (Vail, personal communication, March 18, 2021)

In 2015, sales efforts included working with Vail's network connection Mentor Mike and his partner as contractors. Vail recalled this as a dynamic period "Exciting times, but also a lot of frustration and a tremendous amount of work because there just wasn't anybody to do anything" (Vail, personal communication, March 18, 2021).

Sales efforts included direct retail sales and sending single demo units to dozens of manufacturers of Bluetooth consumer devices to test. However, the salespeople at IoT Inc. could not capitalize on the demo units sent to the manufacturers of consumer devices due to technical issues with the Bluetooth gateway. Denim, the Director of Sales at IoT Inc. had "already gone the rounds with the whole audio space, Bluetooth speakers and the like" from April to December of 2016, according to Tristan:

[Denim] had said, 'Look, this isn't working because of these product deficiencies. ... basically, we blew it here, here, here, and here. ... they'll talk to us, but we need this, this, and this, ... and if we don't get that, then they won't talk to us.' And we [the salespeople] were sitting... they basically couldn't make it work. (Tristan, personal communication, November 19, 2020)

There was, however, a group of consumers, the so-called early adopters, who were willing to see beyond the product's limitations. Their sentiments reflected IoT Inc.'s longer-term vision. The promise of long-range Bluetooth and the Best of Giant Consumer Show award had captured the interest of these consumers who, while acknowledging the Bluetooth gateway's immature state, were excited by and willing to tinker with the innovative technology.

In general, the early adopters with an interest in the technological vision were curious about the possibilities of the developing product and company. These users were willing to accept IoT Inc.'s growing pains, including the product's technical immaturity and confusing user interface. However, a sizeable percentage of consumer users – expecting an easy-to use and well-designed consumer product – were not so forgiving. To them, the product simply was not ready for the consumer market. It was during this period that IoT Inc. also caught the attention of B2B companies experimenting with or seeking IoT solutions. As such, by late 2016 IoT Inc. was signaling that an enterprise B2B version of its product was forthcoming.

In late 2016, IoT Inc. sent out a press release that coincided with a Silicon Valley conference held by the Bluetooth standards association. IoT Inc. announced it had created the world's first Bluetooth router signaling the arrival of a new commercialized category of Bluetooth networking technology. Importantly, the press release also described securing a multiple million-dollar Series B round of funding, a Silicon Valley startup field signal of symbolic capital (Bourdieu, 1989).

The pivot from B2C to a B2B marketplace was not a clean break. In the same press release, IoT Inc. announced a new B2C product offering that purported to stream consumer music streaming services to any consumer Bluetooth speaker. IoT Inc. was positioning across intersecting fields of Bluetooth, IoT, as well as B2C and B2B marketplaces. Moreover, the

Silicon Valley and IoT social capital of the individuals involved in IoT Inc. was signaled by listing their associations with well-known Silicon Valley companies.

For example, Francis had formerly worked at Big Networks Inc., (Tristan also worked at Big Networks Inc., but had not yet joined IoT Inc.) and had sold his previous Wi-Fi startup company to another well-known Silicon Valley company. As such, IoT Inc. described its origin story with multiple pieces of symbolic capital. The symbolic capital was recognizable by the Silicon Valley startup field. It supported the emergent IoT startup field. IoT Inc. had acquired a recognized technology credential, an award at the Giant Consumer Show. Moreover, IoT Inc. had a recognizable Silicon Valley address, and the members of its team were veterans of Internet and communications companies in Silicon Valley. Moreover, this team signaled it had a Silicon Valley-style mission and a vision about the future of the IoT field, specifically to make Bluetooth the heart and soul of the IoT future.

The press release was aimed at the consumer market, however, the tide of the B2C market was going out. By contrast, the undertow of the B2B market was strong. Consumers were signaling usability gaps in IoT Inc.'s product capabilities and the feedback Denim had gathered from consumer companies revealed significant technical challenges. Moreover, Vail had noticed early on that Francis's approach to spending would not support the large and fast investments required to build a successful consumer brand. At the same time, IoT Inc. had become aware of an opportunity to develop in the B2B enterprise market. "It made sense to try to pivot to create a product that could be used by multiple different types of applications and verticals [industries]," said Vail (personal communication, March 18, 2021). By the time Tristan joined in January 2017 "They [IoT Inc.] had already come to the conclusion that they were getting demand from the

enterprise side and wanted to go down that path” (Tristan, personal communication, November 19, 2020).

These enterprise companies were considering how IoT Inc.’s novel long-range Bluetooth capabilities could apply to B2B use cases. At this point, internal and external factors were influencing the pivot toward the enterprise B2B marketplace. The meteoric rise of a promising consumer B2C product quickly fell to earth. Moreover, IoT Inc. had also caught the attention, and imagination, of other entrepreneurs seeking low-cost Bluetooth connectivity options for building their own IoT products. In 2016, IoT Inc. sent dozens of free Bluetooth gateways to these entrepreneurs to evaluate. The hope was an entrepreneur in IoT Inc.’s network of entrepreneurial partners would build a successful business which, in turn, would purchase IoT Inc.’s Bluetooth gateways.

On the dramaturgical front stage of the IoT field, IoT Inc. was winning awards and claiming a leading role in the Bluetooth future of the IoT field. IoT Inc.’s symbolic capital included the award, as well as pending patents and the technical development of an enterprise Bluetooth gateway offering network capabilities. At that time, Vail described Francis’s effort to portray the personality of the company as “simple, elegant, warm, authentic” (Vail, personal communication, February 23, 2017) which continued to reflect attributes influenced by its B2C origins. Francis’s broad vision of a new category of Bluetooth IoT gateway opened the door to B2C and B2B possibilities. Moreover, at that time, the B2C and B2B markets were both still attached to the go-to-market messaging at IoT Inc.

However, while IoT Inc. pursued an all-encompassing B2C and B2B future, the front-stage messaging increasingly leaned toward the symbolic capital required for the B2B marketplace - technical acronyms and descriptions. IoT Inc.’s second PR firm announced IoT

Inc.'s enterprise solution in late 2016. The press release described the interconnections between Bluetooth routers, the ability to control them remotely via an access controller, and the availability of developer software development kits (SDKs) to create interoperability. The public relations messaging continued to promote Francis's encompassing B2C and B2B vision for IoT Inc. However, the front-stage messaging was increasingly technical and focused on B2B. And backstage at IoT Inc. a pivot away from B2C and towards a B2B enterprise solution was unfolding.

To accomplish this pivot, Tristan was hired full-time as the VP of Sales on January 1, 2017. Tristan had deep experience in B2B sales as well as technical acumen "I was brought in with the idea that I was supposed to lead the transition to the enterprise" (Tristan, personal communication, November 19, 2020). The pivot, however, was not a clean break. Although the movement towards the B2B enterprise market was beginning Tristan noticed IoT Inc. had not given up on the B2C marketplace, "They [IoT Inc.] were also still trying to sell to the consumer audio space as well" said Tristan. "They also still believed that they could make it work and get traction in the consumer thing" (Tristan, personal communication, March 4, 2021).

As a result, Tristan and Denim made additional attempts to engage with Bluetooth B2C device manufacturers in early 2017. "We went through a couple more rounds and failed. And it's like, okay, this is dead... We basically, in short order, proved that the consumer market was dead" (Tristan, personal communication, March 4, 2021). At that same time, Tristan was repeatedly asking Francis about the development of the Bluetooth gateway's B2B enterprise capabilities. He was specifically looking for its ability to manage multiple Bluetooth gateways remotely via an application. Based on his experience in enterprise sales, Tristan knew hundreds of Bluetooth gateways could be sold to enterprise customers as part of an IoT/Internet network.

These Bluetooth gateways needed an administration layer. In short, selling to B2B enterprise customers required an application to remotely provision and manage Bluetooth gateways in the network.

In this regard, the constancy of Tristan's disposition corresponded to the regularity of the economic games in which agents in a field participate (Bourdieu, 2005). In short, Tristan expected to earn sales commissions if a product was ready for selling. In this case, the B2B product required an application to administer multiple gateways within a B2B network context. However, by February 2017, Tristan saw that without faster product development his ability to sell Bluetooth gateways to enterprise companies was unlikely:

I was told when I was hired that the [enterprise] product was 'under development' I started the 1st of January [2017]... I remember it was the February timeframe. I was asking ... 'When was this thing going to be ready?' The access controller... and Francis, then it's like [said], 'Yeah, we're hiring a guy.' And I'm like, 'The access controllers, it's being built now?' [incredulous] And that was when I started to realize the terrible engineering capabilities. That was the first moment of 'Oh shit.' (Tristan, personal communications, November 19, 2020)

In general, the core team responsible for selling the product had ongoing concerns about the vision the company promoted versus actual product capabilities throughout 2016 and 2017. Tristan was aware of the challenges of the product as well as its sales potential in B2C and B2B markets. Vail was also worried about the speed of product development throughout 2016. As Denim recounted, by early 2017, the then-core team members were all concerned about the Bluetooth gateway's capabilities and its impact on sales:

Me, Vail, and Tristan, the three of us...we would talk a lot about how we weren't really in agreement with the things that Francis was doing, and the engineering couldn't deliver. And it never worked very well. Tristan and I had quotas to try to sell stuff, with products that we couldn't really sell... it turned into this cycle of a lot of negativity.

(Denim, personal communications, December 6, 2020)

In short, from the perspective of sales, the market for IoT Inc.'s B2C product was dead. A sellable B2B product did not yet exist. Not only was the B2B product not designed, but the feedback from Francis to Tristan was an engineer to design was not hired. Yet, both Denim and Tristan had sales goals to achieve which were set by Francis. By early 2017, Denim had been with IoT Inc. for a year. However, he had never come close to achieving his sales quotas. Tristan was aware of this fact.

At IoT Inc., the salespeople focused on achieving sales goals. Sales goals and the ability to achieve them were widely discussed at IoT Inc. It served as an overall measure of the team's effectiveness and progress. Bourdieu notes sales agents achieve a practical mastery over an uncertain future via habitus in the form of *practical anticipation* (emphasis in the original) (Bourdieu, 2005, p. 214).

At IoT Inc., sales quotas were expected. They involved planning and goals based on business quarters (Q1, Q2, etc.) and annually. However, by mid-February 2017, Tristan understood a core capability necessary for selling the product did not have an engineer hired to work on it. As a result, in Denim and Tristan's view achieving sales commissions at IoT Inc. was doubtful. Anticipating a continued inability to achieve sales goals and commissions, said Denim, "That's what eventually drove me to find something else to do" (Denim, personal communication, December 6, 2020).

At the same time, signs that the attainment of IoT Inc.'s vision and the realization of sales commissions were also evident. By late March 2017, IoT Inc.'s website described the imminent release of IoT Inc.'s B2B enterprise Bluetooth gateway. At that time IoT Inc. won a prestigious innovation award and a \$10,000 award at a Bluetooth event in Silicon Valley IoT Inc. In effect, on the front stage of the IoT field, the IoT Inc. startup continued to perform and accumulate symbolic capital in the IoT field. However, behind the scenes, the sales team at IoT Inc. was struggling to sell the product.

Other organizational aspects of IoT Inc. also pushed forward. A product manager was hired. After the base product arrived from IoT Inc.'s office in China, she finalized products for shipment out of the Silicon Valley office. Also, an expert in Bluetooth technology joined the firm. However, in the face of persistently low sales commissions, the promise of the vision was wearing thin for the sales team.

As Denim put it, he was not actively looking for a new job. It was “totally serendipitous” when he “bumped into somebody at an event for my daughter’s school” who casually inquired “How’s work going?” (Denim, personal communication, December 6, 2020). Denim said he might be looking for something else. In turn, Denim’s acquaintance “introduced me to my new boss that night” at the event (personal communication, December 6, 2020). In short order, the new boss made a great offer and Denim thought “All right, I’ll go do that,” as he described:

I wasn’t looking hard for a new job, but I was on my way out. Yeah. I had lost my confidence that it was going to be a good successful company and that I was going to continue to be able to be successful at it. And I think once you get to that point, whether you find a job in two months or six months or a year, your heart’s not in it, you know? (Denim, personal communication, December 6, 2020)

In summary, the core team at IoT Inc. understood that a pivot from a B2C to a B2B market approach was needed. Winning the B2C award, in January 2016 was an early highpoint for IoT Inc. in the B2C market and occurred with the help of the Loud PR agency IoT Inc. had hired. Moreover, there were incoming B2B inquiries that required someone with expertise in managing these B2B sales opportunities, especially for enterprise organizations. By October 12, 2016, a job description for a VP/Director of Enterprise Sales ran on various job recruiting websites. Tristan responded with a resume. He lived nearby in San Jose and after a round of interviews joined IoT Inc. at the start of 2017.

However, where the January 2016 award facilitated by Loud PR had launched awareness of IoT Inc. the following 12 months of PR did not achieve much, according to Vail. A switch to a different PR firm, ‘More PR’ (a pseudonym) in late 2016 was a waste of money, he said. I began consulting for IoT Inc. in early 2017 and met with More PR. They did not understand IoT Inc.’s B2B pivot. Moreover, IoT Inc. had yet to decide which B2B market to focus its public relations on and the contract with More PR ended.

As originally coined in 2009, a pivot is not a jump. It is “the idea that successful startups change directions but stay grounded in what they've learned. They keep one foot in the past and place one foot in a new possible future” (Ries, 2009, para. 5). In this sense, IoT Inc.’s pivot was a metis-like changing of skin (Detienne & Vernant, 1989). The pivot at IoT Inc. carried forward its aspirational vision and focused on pragmatic goals. However, the pivot included an important shift in its strategic vision. As Francis noted of IoT Inc., “The essence is always the same, but the form can change over time” (Francis, personal communication, March 10, 2021).

Moreover, a pivot is also a common occurrence in the startup field (Flechas Chaparro & de Vasconcelos Gomes, 2021). In effect, a pivot in a Silicon Valley startup is doxa, in that it goes

without saying (Bourdieu, 2020). Letting go of the B2C potential market was not just a strategic shift to survive, it was a sacrifice of a potentially lucrative future market, according to Vail. If IoT Inc. had been able to successfully grow into the B2C marketplace “We’d probably be generating ten times more money now than what we’re doing today” (Vail, personal communication, March 18, 2021).

In the case of IoT Inc., the phenomenon mirrors a sacrifice ritual, in which key characteristics of IoT Inc.’s B2C identity are consumed, and transformed for use in IoT Inc.’s B2B future (Detienne & Vernant, 1989). Examples of the transformed characteristics included IoT Inc.’s replication of the 2016 B2C event win with a B2B event award in early 2017, reapplication of the long-range Bluetooth patent capabilities from a consumer gateway to an enterprise gateway, and a reorientation of *Denim* and *Tristan* from consumer vendors towards enterprise prospects. As such, IoT Inc.’s pivot was strategy under conditions of absolute uncertainty (Kirtley & O’Mahony, 2020), including changing the firm’s orientation to the marketplace while retaining its visionary essence and other characteristics.

The navigation of uncertainty requires ongoing course corrections and adjustments. The pivot was a more noticeable course correction. As Vail described, he realized a shift to B2B was needed shortly after winning the Best of Giant Consumer Show award in early 2016. The pivot from B2C to B2B made sense because of Francis’s unwillingness to quickly devote the significant funds needed to create a consumer brand, said Vail. “I recognized in Francis early on that he was not going to spend money to create a consumer brand,” said Vail (Vail, personal communication, March 18, 2021). The B2C path would have required quickly refining the product for consumer use and “spending a lot more money in terms of [building] awareness,” said Vail (personal communication, March 18, 2021). Although IoT Inc. was at that time pointed

at a B2C future, Vail's embodied habitus provided the "cognitive and somatic structures" for "acting artfully and improvising" a new position for IoT Inc. in the entrepreneurial IoT field (De Clercq & Voronov, 2009).

Early in his tenure at IoT Inc., Vail learned that Francis wanted to organically grow the company. In short, that meant keeping spending in line with the acquisition of sales revenues and, therefore, growing the company slowly. By contrast, pursuing a B2C process meant spending money quickly to create awareness within a crowded and noisy consumer marketplace. A B2B focus, where the product could be used by multiple different applications and industry verticals, is a much longer process. Based on Francis's approach to time and money, the pivot to B2B "was the right decision based on Francis's philosophy" said Vail (personal communication, March 18, 2021).

The pivot represented a choice between spending money faster to move in a B2C direction or spending money slower to move in a B2B direction. Spending money slower to pursue a B2B approach suited to Francis's personality, which had provided "stability and predictability" (Vail, personal communication, April 7, 2021). Francis considered missing a B2C market opportunity less risky than spending money to go after the B2C market, "He didn't want to spend himself out of money," said Vail (personal communication, April 7, 2021) By contrast, the lower cost and slower-paced B2B path gave Francis time to "figure out the magic formula," said Vail.

Because of the pivot to a slower-paced B2B focus, Vail said he was at IoT Inc. much longer than with previous startups. Based on the age of the company, said Vail, a typical startup would be generating seven to fifteen times the revenue IoT Inc. is currently bringing in, he noted.

Yet, despite the slower timeline that he is accustomed to within startups, Vail believed those higher revenues were one day possible (personal communication, April 7, 2021).

The longer B2B path has resulted in a “stable and robust solution” that customers can rely on and “I can sleep at night” (Vail, personal communication, April 7, 2021). Before making the pivot from B2C to B2B, the excitement was high, but mixed with high anxiety, said Vail “What if this product doesn’t really work...where’s the cliff? Is this going to crash and burn?” (Vail, personal communication, April 7, 2021). When the product was still focused on a B2C marketplace “We were selling the dream and it was a very stressful time,” said Vail. At that time, the workload was extreme, the stress was high, and the product was “not delivering on the promise,” according to Vail (personal communication, April 7, 2021). He wondered how long he’d be able to stay with the company.

In the end, the longer B2B path did result in a mature product “I don’t have those senses [of crashing and burning] anymore,” said Vail. The journey has been stressful and unexpected things have happened, said Vail, but “Francis gets to choose how he wants to do things. And that’s the beauty of being a CEO and the founder” (Vail, personal communication, March 18, 2021).

The Dramaturgy of an IoT Inc. Monday Meeting

“Real strength never impairs beauty or harmony, but it often bestows it; and in everything imposingly beautiful, strength has much to do with the magic.”
(Melville, 1851/2015, *Moby Dick: or, The Whale*)

Close the door so we can talk.

Before the weekly Monday morning meetings Vail would provide an update informally about what was happening in the company. The weekly meeting at a startup, or in the case of IoT Inc. the Monday morning meetings would be described as a standard startup activity. It “goes

without saying,” or is doxa (Bourdieu, 2020, p. 133). The Monday meeting at IoT Inc. was an example of doxa because the “mental structures are so in harmony with the objective structures” (p. 133). As a social development within the IoT startup field, the Monday morning meeting would tend to be reproduced as a structure of the IoT startup field. Also, as agents in the IoT field, the habitus of the IoT Inc. leadership team would be in harmony with the external objective structures of the field. In this case, IoT Inc.’s weekly status meeting was an expected custom.

Goffman’s contribution to the Chicago School symbolic interactionism paradigm attracts researchers centering empirical subjects relaying self-identity, experiences, and expressions in the form of interviews, life stories, and personal narratives (Denzin, 1992, p. 35). The dramaturgical role development involved impression management by an actor in a role. The actor creates credibility for their role. In this sense, conversations before the Monday morning meetings served as dress rehearsals. In short, like improvisational theater games loosening up actor interactions with a live audience, pre-meetings served to provide the team members with contours that reflected the accepted narratives occurring at IoT Inc. in the Monday morning meeting performances.

In his younger years, Vail played several musical instruments. Similarly, Vail presented himself as a character actor to startups, with the versatility to take on many distinct roles. Notably, in a nod to Vail’s versatility, Francis once referred to Vail as the startup version of a Swiss army knife. For example, during Monday morning meetings on-site at the Silicon Valley office and conference room, Vail took on the role of the Stage Manager coordinating the actors backstage and as well as the Director preparing the frontstage.

Vail could be relied on for backstage updates before frontstage scenes, like the Monday morning meetings. Vail could fill in the gaps between what was known and Francis’s body

language involving issues like funding. The updates might have occurred before Francis was in the office and described what was happening in the company, especially Francis's reaction to new, contradictory, or contentious issues. These pre-meeting updates provided the accepted contours for the Monday morning meeting narratives. When Monday meetings occurred remotely Vail was also available via email or phone to provide context for activities happening in the company. For example, I copied Vail on an email to Francis regarding a proposed overseas trip, Vail responded with an email "Let's discuss before your call with Francis in the morning. I want to give you a heads-up on a few things" (Vail, personal communication, February 7, 2019). In turn, these informal backstage body language conversations facilitated a more efficient information exchange during formal frontstage meetings. In a way, these body language conversations were like conversations around the water cooler, except in this case, Vail embodied the water cooler.

In such pre-meeting discussions, Vail provided an overview of current organizational scenes, sentiments, and sensitivities he described as body language. The topics of these pre-meetings and feedback based on Francis's body language often involved spending money and personnel issues. Issues involving money typically involved Francis's unwillingness to spend and the personnel issues were whether specific IoT Inc. individuals were on their way in or out with Francis. During meetings, Vail rarely challenged Francis or other team members. Also, there was a tacit understanding that Vail's preference to listen for body language, rather than engage in challenges, enabled him to gather and provide insights for later use which he would otherwise be shut out of if he was actively challenging Francis.

Goffman's conceptualization of dramaturgy includes pre-performance team rehearsals (LaMagdeleine, 2016, p. 54). At IoT Inc. the rehearsals allowed team members to mutually

construct the identities and competence necessary for IoT Inc.'s stage, a process Goffman described as face-work (Goffman, 1955). The face work before a Monday morning meeting performance with Francis directly, ensured the actors didn't break the frame by acting out of character or revealing the messy backstage aspects of IoT Inc.

The stage for IoT Inc.'s front stage performances was the conference room at the Silicon Valley office. The IoT Inc. conference room was rectangular, approximately nine feet wide and eighteen feet long. A long conference table filled the center of the room. It was surrounded by ten office chairs in various states of disrepair. Acting as the Stage Manager, Vail would collect old coffee cups and water bottles from the conference room table before the Monday morning meeting. He'd ensure one of the better chairs was located at the head of the table for Francis.

Members of the IoT Inc. team were typically in the Silicon Valley office before Francis. Francis arrived at the office around 9 am PST. The group would assemble in the conference room before Francis's entrance to the Monday morning meeting. As befitting the social capital of a righthand man, Vail sat immediately to Francis's right. When I was in Silicon Valley, I set up a working area in the conference room on the right side of the conference room. Those with higher social capital sat closer to Francis. Immediately to Francis's left sat Tristan or Head of Sales #2 followed by other members of the sales team. In short, the seating arrangement depicted the social status and power of the individuals in the room.

If the Monday morning meeting were a play, Francis's entrance would not entail a spotlight, but rather a gradual brightening of the footlights. Pre-meeting conversations would bubble on for a moment then fade as Francis took his seat. Eventually, Francis would calmly say 'Good morning' to the assembled team. If the gathering were more of a standard meeting, he'd glance at Vail and nod or with a small hand gesture indicate that updates from each leader of a

department – operations, sales, marketing - could proceed. If Francis had a special announcement, he would say he had an announcement, but then hold off presenting it until after each department leader first provided departmental updates. For example, following the departmental reports at one Monday morning meeting Francis announced “IoT Inc. funding was successfully conducted...a strategic round” (Francis, personal communication, April 8, 2019).

Vail often provided the first departmental update. His reports conveyed the operational facts at IoT Inc., such as this example describing the status of procuring Bluetooth gateway components needed for a customer “asking for separate mounting kits and power adapters. We have separate SKUs for both of those. We have 50 of that separate SKU in inventory” (Vail, personal communications, January 2, 2019). Status updates of supply-chain matters mainly described a logical sequence leading to the assemblage of a completed product. By contrast, sales and marketing updates sometimes described a logical sequence but at other times described the indeterminate status of a deal or marketing campaign. These had room for interpretation. In the case of these departments, the number of leads or revenues could be easily measured. However, the ultimate interpretation of the quality of a marketing lead and the status of a potential customer deal extending over many months was much more indeterminant.

As described by Roochnik (2010), *techne* is value-neutral and pushes back against mere chance. In short, whatever the *techne* or skill the value judgment doesn’t adhere to the skill itself, but to how the skill is applied. As Roochnik noted, there is a difference between *techne1* and *techne2*. *Techne2* is compatible with failure, but *techne1* is not. *Techne1* is rigidly demonstrated by the result provided, its function is tied to its result. By contrast, the function of *techne2* is not tied tightly to its result. *Techne2* is dependable, offers rules of thumb, and is precise but not in a mathematical sense.

In this sense, the status update by operations was often more a *techne1* capability tied to a specific result. For example, if Vail's operations report relayed securing components needed for the completion of customer product orders, then *techne1* was demonstrated. *Techne1* requires precision, and as in this case, the math-like assemblage of the components results in a product. Thus, the *techne* of Vail's operational social capital at IoT Inc. accrued based on fixed success measured in a formulaic manner.

By contrast, IoT Inc. sales and marketing leaders were expected to reliably exhibit *techne2* expertise by working prospects and deals based on rules of thumb. A final winning result occurred as a small percentage of a total pipeline of prospects. On the one hand, the status updates often involved the rule of thumb practices, or *techne2*, of sales and marketing. The predominant practices were in the ordinary language of *techne2*, including rhetoric (Roochnik, 2010). By way of a *techne2* sales example, Tristan described meeting with an early customer, "I had no solution engineer or product person. I was that person...I carried a meeting with a dozen engineers and product managers...I had nobody I could take" (Tristan, personal communication, March 4, 2021). The meeting exhibited *techne2* expertise. It was part of a process. It was successful because it led to another meeting. However, for sales and marketing the accrual of social capital at IoT Inc. was tied to the final mathematical results, or *techne1*, like leads and revenues. There was a general sense that, compared to the mathematical certainties of *techne1*, Francis didn't understand nor appreciate the *techne2*-type practices of sales and marketing. As Denim noted:

Francis never really appreciated the importance of strategic marketing...more of a VP of marketing level kind of person, not just blocking and tackling stuff...I don't think he [Francis] put importance on the value of having somebody really good that was

driving marketing strategy and how we are going to message...and position. I always felt he viewed marketing as an expense that he didn't want to have. (Denim, personal communication, December 6, 2020)

For sales at IoT Inc., the *techne2* capability would also include creating a feedback loop from the marketplace. As noted previously, Tristan's role in the market feedback loop was key to connecting IoT Inc. to sales opportunities in the marketplace. However, as a *techne2* skill, he didn't think it was well understood or appreciated. As Tristan recalled, the rules of thumb information from the market didn't seem to connect with Francis's approach to engaging the market:

I think he could comprehend it academically, but this is what the challenge was about...[because] that [the niche market] then defines where you will go [with the product development] to engage the customer and market...That's where we kept getting punched in the face over and over again. Customer trials [the product]. [Product] needs feature. [Product] breaks. (Tristan, personal communication, March 4, 2021).

In summary, functional roles at IoT Inc. employed *techne1* and *techne2*-based skills. The whole number *techne1* derived results such as revenues. These results were dependent on the feedback loop from the marketplace provided by *techne2* skills. In a quantum construct, *techne2* is analogous to a Mandelbrot fractal's indeterminant ratio between zero and one, in that the *techne2* result is also not determinant. By contrast, *techne1* is tied to whole numbers one, two, three, etc., and mathematics. The *habitus* of IoT Inc. required both types of *techne*, but mathematically-informed *techne1* skills tied to a whole result - assembled products, revenues, etc. – were privileged over indeterminant *techne2* skills tied to rules of thumb rather than mathematical results.

It was following such techne-based announcements, that Francis would reiterate his vision for IoT Inc. and then also describe the wonders of a broader technological IoT future. As Roochnik (2010) noted, arete is expressed as techne continually seeks arete. In this way, the far-off vision was an expression of arete, of which techne was in continual pursuit. He would, for example, announce the securing of new funding and then follow on by reminding the team that IoT Inc.'s "purpose...and destiny" was "redefining Bluetooth" (Francis, personal communication, March 10, 2021). The IoT field and marketplace were very noisy, said Francis, so IoT Inc. needed to be "very clear about what we tell the outside world." This messaging included the practical problems IoT Inc. solved for enterprise IoT companies as well as the "essence" of its value (Francis, personal communication, March 10, 2021).

The essence of Bluetooth, said Francis, included quantum physics and the "mystery" of particle-wave interference patterns embedded in all the world's electronics (Francis, personal communications, April 17, 2018). Francis would often then append a description of a technological wonder, such as a supercomputer besting the world's best player of the ancient Chinese strategy game of Go. It is estimated Go has more board positions than there are atoms in the universe. On such occasions, his presentation, the arete to pursue, was the final act of the Monday morning meeting, the final word connecting IoT Inc. to its destiny.

The energy increased during on-site Monday morning meetings rituals when there was a direct impact on the vision for IoT Inc. such as special announcements or annual planning. It was standard practice that these meetings would start in the morning and extend into the early afternoon. The individual departments' presentations would map out their annual goals and plans. The departmental plans included dialogue involving other department plans as alignment across departments was sought. The dialogues were guided by the principles Francis highlighted "No

ego, the best ideas win” and “Brutal truth with respect” (Francis, personal communication, January 3, 2019). Within those rough guidelines, there was room for dialogue and debate.

These stated principles were influenced by unstated principles in support of roles and associated power dynamics. The expected role of Sales was to bring the truth of customer feedback to these meetings but to do so respectfully in a face-saving manner within the established lines of an interaction ritual (Goffman, 1967a). The face-work of these encounters was contained within certain informal, but mutually agreed working lines to include emotions and the use of aggressive face-work (Goffman, 1955). In a backstage discussion before a Monday morning meeting, for example, Tristan described preparing for the sales discussion with Francis as “beating him up” (Tristan, personal communications, November 19, 2021).

Although hyperbole the visceral nature of the expression challenged the positioning of the social order. As articulated, it seemed clear either Francis, Tristan, or both could lose face (Goffman, 1955) in an exchange driven by that sentiment. As such, an immediate response was to attempt to mediate Tristan’s intensity. The discussion could support the truth of Tristan’s perspective while also generating trust by doing so in a respectful, face-saving manner (Brad, personal communication, n.d.). The ensuing Monday morning meeting discussion about the need for product maturity to increase sales was truthful, but also tense. It did not, however, result in a gaffe due to poorly managed face-work (Goffman, 1955).

Similarly, during an annual planning discussion in January 2019, Francis noted the prior success involving penetration of the industrial IoT (IIoT) marketplace and the need for dominance of a niche market. By that time VP of Sales #2 (a pseudonym) was in the role previously held by Tristan. Held to delivering sales revenues attached to this notion of dominance, the VP of Sales #2 immediately challenged Francis. “What’s your definition of

market dominance?” he said (annual planning notes, January 2, 2019). Everyone in the conference room would have recognized what was happening. Francis made a broad assertion. The head of sales challenged the assertion by asking for a definition.

In moments of overt challenge, the collective reaction might be to step back and let this play out between the sales leader and the CEO, or to step in and keep the interaction from getting out of hand. In effect, others in the room were cast in supporting roles as this drama took center stage. The supporting roles then sought to enable a discussion resulting in the actions needed to achieve the goals while also containing the discussion within certain boundaries. In this case, Francis responded “Thirty percent of market revenue...be a big fish in a small pond,” (Francis, annual planning notes, January 2, 2019) indicating IoT Inc.’s dominance would capture nearly a third of all potential revenues for Bluetooth gateways from the IIoT market.

Given the emergent nature of IoT Inc. in the IIoT market this was an aspirational number tied to the never-ending pursuit of arete. Specifically, moments later Francis noted IoT Inc.’s role as the “big fish in a small pond” of a huge “motor vibration sensor sensing \$10 billion niche market” (Francis, annual planning notes, January 2, 2019). In other words, Francis was asserting IoT Inc.’s dominance equated to three billion dollars – a stunning sum of money.

When tied to the pursuit of IoT Inc.’s vision, or arete, linear math was acceptable. However, linear math was rejected when it was tied to the resources needed to achieve this vision of revenues. In short, the vision and certain aspirational guidelines were sacred, but the strategic means to achieve the vision were negotiable. As the dramaturgy of an annual planning meeting will highlight, the tension between Francis’s aspirational vision and the pragmatic pursuit of revenues by sales leaders occurred along this aspirational and strategic dividing line.

To set the stage for that January 2, 2019, meeting the group gathered in the conference room. Francis introduced the next two days of simple and quantifiable goal-planning discussions:

It's a relatively quiet week this week. Use this time to have some deep discussions...not that complicated...Lay the foundation for the... full-year operational plan...With the understanding, the environment will change, and the plan will change....Sales is simple. It is how we measure product dominance which is more important than pure sales revenue numbers. How do we measure each of them? How do we measure the release timeline? More discussion and decisions and have that for each department. How many sales leads were generated...how many case studies per month...how much news media coverage? Anything that can't be measured is useless, then becomes nebulous...

I hope by the end of the week we agree on metrics for sales, marketing, and operations for the US. In the next few weeks get metrics for all departments. These metrics are transparent for the company. Next time we meet for our Monday weekly meeting ...just tell us how it is going on metrics. Compare 'I did this, I did that' to reach the goals and their specifics. That's all from me...not that complicated. (Francis, personal communications, January 2, 2019).

However, when the realities for sales, marketing, and operations encountered these quantitative goal discussions the metrics immediately came into question. As noted, achieving sales and marketing goals at IoT Inc. required metis, phronesis, techne1, and techne2 skills. Moreover, dependencies between IoT Inc.'s functional areas were not exclusively based on a techne1 skill-sets or results. At the time, for example, Vail noted that operations "change and evolve," even as he agreed to "get metrics set up for this week" (Vail, personal communications,

January 2, 2019). And yet, metrics involving the future were substantively contingent on current rapidly evolving circumstances, as Vail noted:

I sent out a list of business assumptions about operations. There are types of things in my presentation that affect my ability to plan. I have to have answers to detailed questions in my presentation...[for example] is there an agreement to carry accessory kits this year, or no? For me to have peace of mind [regarding metrics] it's a longer process. Some things are immediate, some are driving back to the supply chain side of things and take longer...If you guys are cool with that. (Vail, personal communications, January 2, 2019)

Similarly, the Head of Sales #2 immediately “dovetail(ed) with Vail” and began “making points” by deconstructing the metrics (Head of Sales #2, personal communication, January 2, 2019). In parlaying Vail’s comment that metrics are dependent on other factors, the VP of Sales #2 was participating in the mutually accepted lines established for an interaction ritual (Goffman, 1955, p. 11). At this point in the interaction sequence, VP of Sales #2 challenged the metrics:

I’m concerned with the target plan for February...the assumptions about ‘\$N million’ (pseudo data), by Dec 31, 2019...we’re already behind what we should have done in 2018 Q4. [We] can’t wait 6-8 weeks in 2019.

Brad doesn’t have anything magical to turn on for leads to get prospects ready to buy. It takes time...or we need to pull sales numbers way back. One sales team will not get us close to \$N million. I may need five sales teams to get to that number. (VP of Sales #2, personal communication, January 2, 2019)

During these meetings, the metrics set by Francis were an expression of power tied to the aspirational vision, orienting the team around the narrative of exponential growth. In this context,

exponential growth represented the ‘good’ of phronesis expressed as IoT Inc.’s destiny, which Francis described as an acorn becoming a tree. Moreover, Sarasvathy (2009) would note the ritual centered on the aspirational metrics knitted together as well as constraining the path forward. In retrospect, it is noticeable that the push and pull of the discussion centered on aspirational rationality. The VP of Sales #2 floated the idea of adding five people to the sales team to reach the aspirational metric. Francis immediately responded, “We don’t need to wait for anything. We’re not adding five sales teams. We’re a startup company. We cannot add \$150k in monthly expenses. The VCs would not be happy about that” (Francis, annual planning notes, January 2, 2019).

In turn, in the dramaturgy of IoT Inc., Vail, who played multiple roles in the staging of the Monday morning meeting performances, stepped into his role as Stage Manager. His role in the interchange included re-establishing the interaction ritual’s equilibrium (Goffman, 1955). Vail mediated the tension between the VP of Sales #2 role as the scene’s Antagonist and Francis’s starring role as the Visionary. Vail responded, “We need to balance revenue with ramp up....from a budget perspective we can carve out two salespeople and one [supporting] sales engineer” (Vail, annual planning notes, January 2, 2019). In a dramaturgical sense, Vail positioned the discussion as a matter of balance and not a conflict. This included aligning sales personnel expenses with expected revenues or sales goals in alignment with the aspirational narrative and metrics. In a dramaturgical context, the IoT Inc. team cooperated to conduct the face-work of the interaction ritual during the annual planning Monday morning meeting which explored how the aspirational vision would occur.

In the improvisation flow of the interaction ritual, an additional follow-on statement helped to reestablish two face-work elements or social agreements. Goffman said face-work

serving dual purposes exhibited savoir-faire (Goffman, 1955). On the one hand, it was a statement that cooperatively supported Francis's role as a Visionary. On the other hand, it also served to establish my role and credibility as a marketing expert. The statement added a qualitative catalyst to bridge the creation of a sustainable sales team model with the aspirational vision:

We can't assume a linear line of revenue to sales when scaling infrastructure as a startup. We need exponential growth of the revenue pipeline. That means higher quantity and quality in the revenue pipeline of leads, conversions, and closed won deals. (Brad, personal communications, January 2, 2019).

In short, without saying it specifically, it pointed out that the aspirational vision of dominance, orienting the team's discussion towards a \$3 billion market, was dependent on a qualitative factor – the marketplace's behavior. The comment cooperated in the interaction ritual by tactfully bridging the VP of Sale #2's resource math with Francis's aspirational vision. It supported Francis in his role as the Visionary. Moreover, the comment portrayed me in an expected role - the marketing expert.

With statements supporting the ritual order from myself and Vail, the sequence could then lead to Francis pronouncing how the aspirational vision was attainable. It was not by adding more sales resources, but by correctly targeting the market. "The truth is more and more clear, not worried about it. Finding the right target market leads to exponential revenue" (Francis, personal communication, January 2, 2019). In other words, we know there are fish to catch in this ocean of opportunity. To catch them we do not need to add more boats or lines in the waters. We need to identify the right place to fish. In effect, this was how Moore's (2014) *Crossing the Chasm* argument was applied at IoT Inc.

In this snippet of dialogue, an interaction ritual played out with the VP of Sales #2 in the role of the necessary Antagonist challenging the metrics and Francis's Visionary role. Vail as Stage Manager maintained the equilibrium of the face-work by orienting the discussion to the aspirational metric in pursuit of arete. As a Supporting Actor, I tactfully set up a bridge between the aspirational metrics, the resource metrics, and the aspirations of the next act. Francis, as a Visionary, walked over the bridge and pronounced that the attainment of the metrics was possible, not with logic, but by scanning the horizon. The quest to capture a small fraction of a vast number set aside the conflict and reaffirmed the crew's pursuit of the aspirational vision. The quantifiable math offered by the VP of Sales #2 was rejected. The non-quantifiable "finding the right target market" solution was accepted. Paradoxically, a non-quantifiable solution was accepted as a means to dominate a quantifiable, but wildly aspirational three-billion-dollar market niche.

As noted, Vail functioned as the Stage Manager for the IoT Inc. team organizing and coordinating the direction of facework in pre-meetings, and during Monday morning meetings. When Monday morning meetings lasted longer, as was typical of meetings with announcements by Francis, Vail would coordinate lunch orders and manage the deliveries. As part of that role in the conference room, Vail was also a Prop Master ensuring props like dry-erase pens and chairs supported the roles during the interaction ritual. If for example, a dry-erase pen did not work as expected when Francis used the whiteboard Vail would apologize and appropriately fuss. Vail would tactfully make a show of seeking a dry-erase pen that worked properly. Everyone would join in the ritual of solving the dry-erase pen problem. A joke or two about the huge profits of dry-erase pen manufacturers would occur. The dry-erase board was not necessary to express most ideas. Nobody got down on one knee to kiss Francis's ring, but the performance was

nonetheless one that acknowledged who had the most power in the room. Vail continued to present himself in the broadly capable Operations role supporting expressions by Francis as the leader and Visionary. As Vail noted, “He really likes being the visionary...he likes that role” (Vail, personal communication, February 2021) and he and the rest of the group supported him in it.

It was customary for the team to go to lunch following a Monday morning meeting in the conference room. As a rule, the more substantive the interactions of a Monday morning meeting, the more elaborate the ensuing luncheon interaction ritual. Following a standard Monday morning meeting, lunch was at a nearby chain or sports restaurant. The team walked to these. During these lunches team members ordered for themselves and paid their tabs. The conversations would alternate between non-work-related topics such as the Silicon Valley sports teams and work items.

When the meetings involved substantive planning discussions, the ritual involved finding a new restaurant and an elaborate lunch. Recommended by team members from Silicon Valley, the restaurant was always East Asia themed, Japanese, Chinese, Thai, or Korean. At these restaurants, Francis would order a series of dishes to share. He would also pay the tab. At these restaurants, the conversations were lighter, and full of jokes and laughter.

Francis also played other roles at IoT Inc., such as the Judge and Impresario. Francis’s role as Judge involved the work results and the job status of IoT Inc. team members. For example, Vail used the phrase “the jury is still out” to denote the indeterminant status of an individual who had recently joined IoT Inc. (Vail, personal communications, n.d.). At the heart of the phrase was a simple question: Is the individual who is the subject of judgment staying onboard IoT Inc. or headed overboard? On the one hand, Francis described the people in an IoT

startup like IoT Inc. as its “most important aspect” (Francis, personal communication, November 2020). On the other hand, as a reflection of the indeterminacy of the IoT startup field, the job status of members of IoT Inc. was precarious. For his part, Francis related the dismissal of employees due to “direction change” (personal communication, March 10, 2021). Dismissing a crew member was not the “easiest thing to do,” said Francis, but necessary, and “probably the part of the work that I least enjoy as a leader” (personal communication, March 10, 2021).

Moreover, in backstage conversations, people at IoT Inc. routinely discussed alternative job options as well as the precarity of other employees’ job statuses. Generally, the relative job status of a person at IoT Inc. vis-a-vis Francis’s role as Judge was known. For example, for those who challenged Francis, such as Tristan or the VP of Sales #2, discussions about who was on their way in or out were ongoing. Issues involving Francis as Judge were a part of the backstage discussions about the overall state of IoT Inc. involving product, funding, and personnel matters.

In a similar vein, quarterly and yearly plans, budgets, and proposals were submitted for Francis’s review and judgment. In Vail’s role as a Judge-Advisor to Francis as Judge, Vail often had insights into Francis’s deliberations over these plans. As Vail noted, he and Francis held expansive conversations at least weekly that included reviewing many aspects of IoT Inc., including personnel, plans, projects, and the philosophy of IoT Inc. (Vail, personal communication, April 7, 2021.). Vail’s broad look into various departments, and insights into Francis’s deliberations, differed from the weekly conversations Francis had with individual department leaders.

Although Francis was open to a variety of topics during one-on-one department meetings, at least for the marketing function, those conversations tended to focus on departmental actions and goals (Brad, personal communication, n.d.). Moreover, the topics again often centered

around the disposition of funding relative to departmental actions or goals. It is in this sense, where Francis played the role of the Judge deliberating over and determining departmental plans, that Vail served as a Judge-Advisor. In the legal system, the Judge-Advisor relationship with the Judge is based on trust, confidence, and expertise and often involves the disposition of money (Sniezek & Van Swol, 2001). Francis reviewed departmental actions and plans based on his administration of funding, and Vail had insights into Francis's overarching view of IoT Inc. either directly or as body language.

As a result of Vail's Judge-Advisor role to Judge Francis, Vail could participate in backstage conversations with other IoT Inc. team members with inside information to fill in gaps and plans. For example, in February 2018, Vail had the most updated budget for the new year. In February 2018, I met with the Head of Sales #2 via a video call to coordinate plans based on the funding and goals Francis had set. In this case, I was aware the marketing budget was minimal because I'd met with Vail for a backstage conversation. At the start of backstage conversations, Vail would signal the information was based on his role as Judge-Advisor role by saying 'the body language was' or something similar (Brad, personal communication, n.d.). Because the minimal marketing budget was known from Vail in advance of the official budget, at the time of the February 2018 meeting with the VP of Sales #2 I had already shifted my marketing activity.

Thus, the February 2018 meeting with VP of Sales #2 was focused on improvising 'hacking' rather than the use of funding. "It's all kind of a hack right now because there's no budget" I said, whereupon the Head of Sales #2 jokingly interjected "Is that important?" and we laughed (Brad, personal communication, February 28, 2018). The shared sentiment involved Francis's conservative approach to funding in a backstage strategic planning discussion. Based on Vail's insights based on body language, enterprise sales leads would be impacted, "I've

estimated I can hack it for two quarters...but it's going to start falling apart in April....things are going to start slowing down" (Brad, personal communication, February 28, 2018).

The early backstage information about the low budget served a pragmatic purpose. It resulted in the shifting of marketing activity, in advance of the official budget, to maintain a flow of leads for sales. The information exchange facilitated efficiency: the search engine optimization (SEO) budget shifted from targeting a more costly industry (healthcare) to a less expensive one (industrial). Additional efforts around joint marketing opportunities with partners at an upcoming conference in Europe were pursued, "If we can get in bed with Acme Worldwide...they said they would do joint PR, a use case and all that kind of stuff" (Brad, personal communication, February 28, 2018).

At that time, there was no formal budget for attending the conference. However, the lack of a front-stage budget did not necessarily mean there was no money backstage. During the conversation, the Head of Sales #2 and I also agreed to jointly approach Francis to acquire more marketing funding including attending the conference, as he noted:

I think what we need to do is to get back to Francis and say 'Here's the minimal viable budget to keep leads coming in over the next few months'...I keep digging at Francis every chance I can [laughs] ... let's put some numbers on the problem go in as a united front and say 'This is what we need for marketing to do its job in sales to get it to close deals. This is what we need to do it.' (VP of Sales #2, personal communication, February 28, 2018).

Notably, the European conference included IoT Inc.'s largest customer Acme Worldwide at that time and was two months away. In turn, I said:

I think with Acme Worldwide we have to take the risk. It's not all figured out, it's not all in the bag...What if Acme Worldwide is in early testing with clients and it [Acme Worldwide's IoT system which includes IoT Inc.'s Bluetooth gateway] doesn't work or whatever?

But it is our best gamble, that I know of right now. We're a startup. I mean this is why we do this craziness. Because we've just got to take risks, and this is the risk worth taking. (Brad, personal communication, February 28, 2018)

Based on the advanced insight into the marketing budget and the ensuing plan by myself and the Head of Sales #2 we did secure additional budget funding and attended the European conference. Furthermore, attendance at the conference propelled IoT Inc.'s business relationship with Acme Worldwide forward.

As described, the sequence of discussions of the marketing budget funding of the European conference was another example of a hiding-in-plain-sight ritual. The ritual coordinated the formulation for risk-taking via backstage information exchanges and actions which accounted for but also bypassed Francis's frontstage pronouncements and guiding principles. The hiding-in-plain-sight ritual was reliant on Vail's Judge-Advisor role and his ability to relay Francis's deliberations and body language. In turn, these insights enabled the Antagonist and Storyteller to navigate even with scarce resources. Informed by habitus, these risks of economic capital often involve necessary investments in social and symbolic capital, such as meeting with customers at a conference, necessary for achieving sales goals.

In short, the hiding-in-plain-sight ritual Francis, Vail, Brad, and Head of Sales #2 participated in was an expression of individual habitus working together albeit veiled from an overt disclosure. Moreover, it exhibited a pragmatic mix of knowledge types necessary for

navigating the IoT startup field. They employed the craft knowledge of techne required to create a business process, an enterprise pipeline of prospect leads, and subsequent sales revenues. They reflected the pragmatic reflection of phronesis to organize their actions with IoT Inc.'s guiding principles, especially the adherence to the conservative use of funding. They also cooperated within the hiding-in-plain-sight ritual to circumvent Francis's front-stage principles within IoT Inc. In doing so, they enacted the cunning intelligence and action orientation of Baumard's (1994) clandestine metistic processes, to position their short-term goals in pursuit of IoT Inc.'s arete and aspirational goals.

The principle of financial conservatism and its other side, the hiding-in-plain-sight ritual, were persistent at IoT Inc. Moreover, they were both oriented to persistently chase the aspirational goals of IoT Inc. In effect, financial conservatism in the face of uncertainty served to extend the capacity to take risks via the hidden-in-plain-sight ritual. In turn, the hidden-in-plain-sight ritual extended IoT Inc.'s risk-taking capability. It did so while maintaining support for financial conservatism as a core principle. It also supported the tacit, knowing-based form of risk-taking necessary to navigate an emergent IoT field. The team acknowledged but didn't rigidly follow a map of quantified cause and effect plans and engaged in somewhat veiled expertise-based actions to effectuate a path forward.

In the sense of IoT Inc.'s dramaturgy, Francis's joint starring Visionary role and application of conservative financial principles was like the role of an Impresario in theatre. Notably, Francis played his Visionary role to tell IoT Inc.'s aspirational story as part of creating a flow of funding from sources in the United States and China. When Vail met Francis for the first time at a Panera bakery in Silicon Valley, Francis's Impresario role was evident. He had said Vail, the entrepreneurial vision, money lined up, and a conservative financial perspective

(Vail, personal communication, March 18, 2021). Although IoT Inc. team members challenged how funding was used at IoT Inc., they acknowledged that in the Impresario role, Francis's fundraising in the U.S. and China was consistently successful. Central to the two-country funding exercise was an effort, said Francis, to leverage and balance the strengths and mitigate the challenge of operating in two countries:

... IoT Inc. was started as a(n) international company. It was started as a Delaware company and our engineering team is largely based in China. We also sell in China. It's both a strength and a challenge for the company. It is a strength in that on the market side, it's good that you have some diversification. It will reduce risk. In some quarters the US market will do better, in some others, the Chinese market will do better, overall. It was just like an investment portfolio. If you only have one company for your whole portfolio... if at that company there is something wrong, then you're pretty much dead. (Francis, personal communication, November 19, 2020).

As an Impresario, Francis referenced bilateral symmetry, a fractal and evolutionary characteristic, to describe this balanced approach:

Mother Nature also gives us two eyes, two hands, and two ears, - much for the same reason [laughs]. Because the people, [and] the animals that have only one eye, or one this or that, typically, during evolution ... they just die out. (Francis, personal communication, March 10, 2021)

Further, Francis also said the bilateral approach aligned with his pragmatic and conservative financial perspective:

We can also benefit from the cheaper engineering costs in China. If we hire like 20, or 30 engineers in Silicon Valley we have to raise a lot more money to do all the

R&D work. So those are the strengths and the benefits. (Francis, personal communication, March 10, 2021)

At the same time, Francis acknowledged that the organization of IoT Inc. across two cultures caused unique communication challenges:

... but definitely, there are also a lot of challenges. Cultural is definitely one.

Yeah. It's more about communication. And human beings, you know, they probably trust more, the people who they can see [and] who look like themselves. It is nothing right or wrong. I think this is just human nature. But to do international business, we have to find a way to somehow to balance that part. It's not always easy.

Better communication, more often communication. Sometimes meeting in person, that kind of thing can certainly help. Having an open culture and open communication would also help...As long as we have this international organization, I think the challenge would always be there. But as long as we can manage that, that would not become a big issue and the benefits of that would become stronger over time. That's my hope (laughs). (Francis, personal communication, November 19, 2020)

During this period, Francis alternated traveling to and residing in China and Silicon Valley for weeks at a time. As such, from the perspective of US-based employees, Francis's role was, at times, unclear. Notably, as the product was pivoting from B2C to B2B in the 2017-2018 period Francis's management role in the U.S. office was less well understood. On the one hand, according to Tristan, as a "CEO I don't even know where to ...land him. Was he involved in product or was he not?" (Tristan, personal communication, November 19, 2020). On the other hand, according to Vail, Francis did "play the product role. He does manage the guys in China. I think that's probably his biggest daily activity" (Vail, personal communication, March 18, 2021).

At the Silicon Valley office, Francis focused on high-level goals and was otherwise hands-off according to Vail, “He’s not a ‘Give me five things’ a ‘To-do list today’ kind of guy. He’s the only boss I know that doesn’t have deliverables (laughs). That’s been interesting...and in some ways good” (Vail, personal communication, March 18, 2021). Tristan also said because Francis was in China every other month the U.S. employees were expected to work on their daily tasks without daily oversight. In effect, the team members were held to the aspirational metrics and left to determine how best to pursue them. Moreover, many aspects of product development were led by customers, said Vail (personal communication, March 18, 2021). In general, IoT Inc.’s Silicon Valley office was often quiet (Tristan, personal communication, November 19, 2020).

That was not my impression of the Silicon Valley office. My travel to the Silicon Valley office was timed to coincide with Francis’s presence in the United States. Thus, my time at the Silicon Valley office coincided with front-stage performances in the conference room as well as at conferences in Silicon Valley where IoT Inc. was exhibiting.

The travel routine consisted of a Sunday evening departure from the Midwest with a return flight on Friday. Due to the two-hour time zone change I was typically in the Silicon Valley office by 7 a.m. PST. Rather than staying at a hotel, I stayed at various Airbnb rooms during the week. Although they cost less, the Airbnb accommodations were of higher quality than hotels. Staying at an Airbnb was also my way of signaling that I had drunk the Kool-Aid of IoT Inc. by keeping costs low.

A broader context is also important to keep in mind. IoT entrepreneurs and entrepreneurship have lives. There is not a bright line separating the uncertainty of entrepreneurship from an entrepreneur’s personal life. Entrepreneurial and personal matters spill

over into each other. A short sampling of experiences included precarious travel accommodations, delayed flights, lost Uber drivers, smashed rental car windows, and a stolen backpack containing a passport and computer. In short, personal, and family issues impacting IoT entrepreneurs included the uncertainty of any human existence.

The individuals at IoT Inc. experienced matters of substantial personal uncertainty, including family health issues, car breakdowns, and crashes; stressful and chronic family issues involving addiction and marriages under pressure; and disruptive surprises like job offers from competitors and intelligence agencies. This is a small sample of personal issues the IoT Inc. leadership team faced while immersed in a highly contingent and precarious business environment.

In that light, the following Airbnb experience adds color and context to the connection between the personal and professional aspects of IoT entrepreneurship. The experience recounts a week-long Airbnb stay in Silicon Valley stay in mid-September 2017. In that case, the owner of the Airbnb listed a fraudulent address on Airbnb and then sent me an address a half mile away during my flight to Silicon Valley. At that time, travelers to a conference in Silicon Valley its Airbnbs and hotels. With misgivings but no other ready options, I headed to the new address.

My Uber ride on Sunday brought me to the new address, a back alley next to a methadone clinic. People were living in ragged tents on the sidewalk. As I exited the Uber, a young man on the street veered in my direction aggressively cursing me “You CIA m***” and then passed by (Brad, personal communication, September 10, 2018). I rolled my travel suitcase to the door of the Airbnb.

The owner of the Airbnb, a young man, brought me inside a cluttered kitchen and pointed up a narrow flight of stairs. He was noticeably drunk and sharing a bottle of wine with a young

woman. Although I maintained a friendly demeanor, I also questioned the mid-flight change of address. The young man offered a nonsensical explanation and then went on to claim he had friends inside Airbnb. I stayed close to my luggage and spent a night sleeping on a blow-up mattress in an alcove at the top of a stairway. The next morning, I called Tristan and explained the situation, quietly gathered my luggage, and waited for my host to go out. Tristan's car arrived and I fled the Airbnb.

In a way, it was just another Monday.

In the context of personal uncertainty, where would I live the rest of the week? I arrived at the IoT Inc. office for the Monday morning meeting. I needed to address the uncertainty of where I would sleep that week, attend the Monday morning meeting performance, and dive into my job tasks. That week I was responsible for IoT Inc.'s presence at a multi-day conference at the Moscone Convention Center.

On a personal level, I was contacting Airbnb's customer service about my case. At that point, I did not know where I would be sleeping for the rest of the week. My Airbnb case did indeed bounce around inside Airbnb's Silicon Valley customer service office in an odd way. It was transferred, lost, then refused. However, I was persistent. As I was getting increasingly frustrated with Airbnb, I was also loading boxes of tradeshow booth material, banners, one-page pamphlets into Denim's pickup truck. Instead of hiring a delivery service, we hauled our conference items to the convention center ourselves to keep costs low. I coordinated vehicles traveling to the convention center while I simultaneously worked the levers of Airbnb's customer service email and phone channels to ensure I had a place to sleep that night.

After multiple calls and emails with Airbnb, the false listing and the odd response by the Silicon Valley Airbnb customer support personnel caught someone's attention. The case was

escalated to an Airbnb customer service manager in Europe. The owner of the building got involved as their lease policy prohibited Airbnb listings. As that was happening, I was on the conference hall floor as a small city of booths was noisily erected. I was coordinating the team and assembled IoT Inc.'s tradeshow booth. I was also ignoring calls and texts from the owner of the false Airbnb listing.

With my mobile phone balanced on a hinge on the back of IoT Inc.'s tradeshow and set to broadcast I talked to AirB2B's customer service in Europe. At the same moment, I was hand tightening the bracket on a halogen overhead light so it would not tip forward and burn a hole in the IoT Inc. logo printed on the booth's tension fabric. In the end, Airbnb did not directly address the details of my odd experience with their Silicon Valley customer service team. However, I did have a place to sleep. As I made final adjustments to IoT Inc.'s convention center booth Monday evening, Airbnb's European customer service manager arranged to pay for my accommodation at a \$500-a-night hotel located in San Francisco's Union Square district. It was within walking distance of the convention center.

In terms of Bourdieu, this episode demonstrates how managing uncertainty, personal and professional, was an aspect of habitus for team members at IoT Inc. Tristan's assistance in fleeing room, the use of Denim's truck, and the group assembly of the tradeshow booth exemplifies the cooperation and social capital at work. Like the theater show *Noises Off* (Frayn, 1985) which revealed the interplay of a professional frontstage and the personal backstage realities of a theatrical production, the IoT Inc. team members cooperated to manage their backstage uncertainties. We focused on delivering a front-stage performance at the IoT Inc. booth at the conference.

Ritualistic Routines, Ending with Francis Orally Weaving The Vision

The story of IoT Inc. is a story of vision. In Silicon Valley startups, a leader is expected to provide and promote a vision. In a Goffmanesque sense, the vision is also a ritual confirming the identity of IoT Inc. as a Silicon Valley startup. In short, the vision described a better tomorrow. The vision expressed by the leader of IoT Inc. is primarily about what the firm and technology can be, rather than a story of what is.

At IoT Inc., there were three types of visions woven into the Monday morning meetings as well as the quarterly and annual planning meetings. The three types of visions include strategic vision, aspirational vision, and inspirational vision. The aspirational vision was constant, but the strategic vision changed. Moreover, the dimensions of the strategic vision were bound to and rotated around the aspirational and inspirational visions. There were adjustments to the ritual processes involving the distinct types of visions. The adjustments focused on social capital and power at the core IoT Inc. team.

According to Bourdieu, the key to understanding strategy is not just that an actor wants to accomplish something based on rules. The key, according to Bourdieu, is knowing they are trying to do so under conditions of uncertainty where time, timing, and the actor's perspective plays a part (Calhoun, 2003, p. 287). As such, the strategic vision evolved. The pivot at IoT Inc. included strategy. Aspects of the pivot at IoT Inc. changed based on the crew's discussions and planning processes. In matters of the strategic vision, Francis reinforced open discussion and exploration "For you heads of departments, you decide your strategy as long as it aligns with the company strategy" (Francis, personal communication, January 3, 2019).

Francis's principle of 'brutal honesty' informed these discussions (Francis, personal communication, January 3, 2019). In this way, the strategic vision discussions served as a means

for department leaders to influence, and comment on aspects of Francis's aspirational vision. In other words, as Vail said during the discussions about the strategic vision, "We have to ask ourselves if we're drinking our own Kool-Aid. We need to look with an unbiased perspective" (Vail, personal communication, February 11, 2019). In this way, the strategic vision discussions served as a counterweight to the unbounded aspirational vision.

During special quarterly and annual meetings, Francis promoted this principle of open discussion. For example, on January 2, 2019, at the annual planning meeting Francis described "using this week as a starting point" for "deep discussions" to "lay the foundation for the whole year," (Francis, personal communications, January 2, 2019). Strategic vision decisions were based on the use of resources, product development, and growing markets. They also involved setting goals, reinforcing the principles and longer-term aspirational vision for IoT Inc. As Vail noted, "As a leader in this space we have to have a plan regarding how we lead" (Vail, personal communication, January 2, 2019).

Over the years, strategic decisions occurred as parts of a series. Rather than a straight line of cause and effect, it would be easier to think of the strategy as an arc of decision points rotating a stable core. As discoveries were made, strategy branched and evolved across technical, market, and organizational dimensions. In a fractal sense, the arc of decision points with additional dimensions would include real numbers and imaginary numbers.

To illustrate the multiple dimensions, originally the strategic vision at IoT Inc. was not tied to Bluetooth connectivity. As Francis noted "At the beginning, I was thinking about making a device to help people like my brother. Through that I found that there is a bigger problem to solve" (Francis, personal communication, March 10, 2021). The bigger problem was an inability to connect multiple low-power health sensors to a single system, in effect an IoT network

capability, as Francis noted “That was the ‘Aha moment’ for me when I saw that” (Francis, personal communication, March 10, 2021). That decision point led to using Bluetooth.

What followed was the B2C market move and a subsequent pivot to the B2B market. The shift to B2B included a strategic decision to focus on the IIoT marketplace, a specific area of the IIoT, and a targeted list of IIoT manufacturers. In this sense, the strategic decisions occurred across multiple dimensions of a line, like a quantum view of a particle measured as a probability wave function.

The IoT Inc. team routinely reviewed strategy during Monday morning meetings based on different dimensions. For example, a potential direction for IoT Inc.’s strategic vision was discussed by the core team at a Monday morning meeting involving pursuing a gateway approach or an end-to-end solution approach (Brad, personal communication, April 8, 2019). In other words, the strategy, in a fractal sense rotated to a new previously ‘imaginary’ dimension, the product’s configuration.

It was at the level of the strategic vision that Francis would take input. By contrast, matters of aspirational vision were not open to input. As Francis noted at the April 8, 2019, Monday morning meeting after announcing a successful funding round “At the team meeting the week of [April] 15th we’ll go over product positioning and strategic focus. The China and USA product roadmap. Plan to talk about those things that week, I’d love to hear your thoughts” (Francis, personal communication, April 8, 2019). However, noted Vail, while Francis took input, he also directed the resources associated with the strategic vision (Vail, personal communication, February 11, 2019). In short, Francis held the power to actualize or ignore input to the strategic vision. This was true, especially as actual or proposed strategic elements related to the aspirational vision.

Tristan was hired to achieve a strategic vision. It involved a pivot to the B2B enterprise market. However, Francis directed the resources to actualize the strategic vision and B2B pivot. Moreover, the timing of resources applied by Francis to Tristan's strategic input contributed significantly to the tension between Francis and the sales department. My decision to expend resources, including the trip to Barcelona to engage with Acme Worldwide and the early focus on the industrial IoT market was also emblematic of the strategic vision process at IoT Inc. In all these cases, funding and timing were points of conflict mediated by hidden-in-plain-sight actions. For example, I was strategically committed to the IIoT in 2018. From a resource standpoint, Francis would strategically commit to the IIoT market in 2021. In these cases, the crew around Francis influenced the strategic vision. However, the strategy was subject to the principles of Francis's aspirational vision, such as retaining 18 months of cash.

To paraphrase Foucault (1978), where there is power there is resistance. There was resistance in the form of strategic challenges to Francis's conservative principles. Tristan said the low pricing of the B2C version of the product led to the use of low-cost components which compromised its potential in the enterprise marketplace (personal communication, Tristan, April 2021). The initial low-cost design, said Tristan, meant that redesigning the product for the B2B marketplace would involve a fundamental redesign of the product. The strategic approach affected multiple layers of the product, according to Tristan. In 2016, said Tristan, "that was the first time where he went cheap on the Wi-Fi chips set. That's why it didn't work," (Tristan, personal communication, November 19, 2020) and attempts to sell the product in 2017 floundered. As a result, in early 2017 the Silicon Valley sales team questioned Francis's influence on the strategic vision:

We would talk a lot about how we weren't really in agreement with the things that Francis was doing, and the engineering couldn't deliver... It [the product] never worked very well. Tristan and I had quotas to try to sell stuff with products that we couldn't really sell. ... it turned into this cycle of a lot of negativity. That's what eventually drove me to find something else to do. (Denim, personal communication, December 6, 2020)

The low pricing of the IoT Inc. product meant the product design costs also had to remain low. In Tristan's view, this increased the time it took to create a stable B2B enterprise product. For example, a B2B enterprise version of the product included a management application which was needed for the B2B marketplace because enterprise companies would need to remotely manage hundreds of IoT Inc.'s Bluetooth gateways. According to Tristan, the low cost of the IoT Inc. B2C product did not accommodate the higher cost of a B2B version of the IoT Inc. product which included a management application "I could see the decision go in the wrong direction. And the [B2C product] ...they had already started the development on the low cost. It's going to be ninety-nine dollars" (Tristan, personal communication, November 19, 2020).

There were also times when there was agreement around the strategic vision. There was a general agreement regarding the strategic vision of pivoting from B2C to B2B markets. However, strategically timing resources to achieve the pivot was a point of disagreement. In early 2017, Tristan was critical of the speed and use of resources for the pivot to the B2B marketplace:

You don't have the engineering capabilities and the product vision. Then when the access controller [management application] came. So now 'What you did do, let me try and sell it.' Ah surprise, surprise! This thing is a broken-down heap. And so that's not surprising. You built it so quickly.

Then it's in a customer lab. Here's the feedback. Here's what they [IoT Inc.'s engineers] need to do. Can you fix this problem so we can get an order? No, they can't even understand the problem! All the communication issues, product management to engineering and around and around and around. (Tristan, personal communication, March 4, 2020)

In short, from 2017 to 2018, it was Tristan's view that Francis's strategic timing of resources was not facilitating the sales team's ability to sell the product. The product development strategy and the sales strategy were not aligned. Tristan laid the responsibility for the lack of alignment on Francis:

He [Francis] repeatedly failed on being able to set a vision and [where] there's a whole ... we're going to have to do a lot of technological development to get from here to the vision state. And you won't necessarily know all the steps along the way ... we haven't figured it all out. That's the work we have to do, but [Francis would say] 'We will.' Well, we didn't. (Tristan, personal communication, November 19, 2020)

There was, said Vail, a collective sense of the team attempting to influence the strategic vision. Tristan's pointed criticisms were based on his expertise and B2B enterprise sales habitus. Especially at the level of the strategic vision the individual team member habitus included expertise which was part of the feedback to Francis. In this sense, the expertise of habitus provided by individuals was tied to the specific context at IoT Inc. and to specific dimensions of the strategy. For example, Tristan's habitus was tied to expertise along the sales dimension. The expertise of Francis's habitus was tied to product development. However, the power to accept or decline the input, and in effect bind, the strategic dimensions at a new scale was unique to Francis, said Vail:

Francis tries to communicate his vision for what he wants. But I do think that people have... our own collective sense of experience. [We have] individual experiences that we try to provide input to him based on the world as we see it. But ultimately Francis doesn't change that much. (Vail, personal communication, March 18, 2021)

Chalking it up to human nature, Vail said Francis “responds positively to affirmation as opposed to being challenged” (personal communication, March 18, 2021). When a discussion about the vision at IoT Inc. was strategic Francis was open to input. Francis also had the power to align, adjust, and ignore dimensions of strategy. Moreover, as Vail described if the input on a strategic dimension challenged the principles of the aspirational vision, Francis was not likely to change his view.

Vail noted that distinct functions of a startup like the sales function mediate their acceptance of the vision based on a sales perspective. For example, Tristan’s acceptance of the product strategy was based on whether Tristan trusted that the product aligned with the sales strategy for a B2B enterprise marketplace. Notably, the previous B2C version of the product was demonstrably not sales-ready. In a pragmatic sense, Tristan had to ask himself: Could the Bluetooth gateway do what IoT Inc. claimed it could do and can it generate sales commissions in a B2B marketplace?

The sales function, in general, noted Vail “has its own vision of trust or truth” (Vail, personal communications, April 7, 2021) which involved IoT Inc.’s use of resources to support the technological capabilities of the product in the B2B marketplace. This sales strategy may not align with the aspirational vision set forth by the leader. Moreover, the sales team’s definition of the situation included whether Francis’s sales strategy resulted in achievable “compensation packages” (Vail, personal communications, April 7, 2021). As such, IoT Inc.’s use of resources

to support the product was a pressing matter for the sales function. Interest in the product was based on the sales habitus perceiving solicitations from the IoT field, which would lead to sales compensation.

Therefore, the strategic visions held by the sales function and Francis were in conflict. Operations, sales, and marketing in the US office provided strategic feedback to Francis. However, the role of translating the strategy dimensions into action functioned through Francis. The strategic dimensions available to the individual departments narrowed based on Francis's aspirational vision and the principles it included. In his role as Francis's Judge-Advisor, Vail had insights into Francis's body language regarding the ongoing and dynamic interplay between the strategic and aspirational visions. The interplay and the tensions of resources, timing, and the B2B strategic vision were subject to Francis's power expressed as an aspirational vision with governing principles. The strategic dimensions rotating around the aspirational vision created the conditions for social conflict at IoT Inc.

On the one hand, the core team appreciated the aspirational vision of the IoT Francis provided. On the other hand, as their own experience in the IoT increased they viewed the aspirational vision with an increasingly critical eye. On the one hand, the aspirational vision set pointed everyone in the same direction during day-to-day tasks. It was motivating and oriented individuals towards a belief in a future result. As Denim noted "if we could... get there [the vision], maybe this company could be worth something" (Denim, personal communication, 2020). However, as time went on the disconnect between the aspirational vision and the strategic dimensions eroded belief. In retrospect, said Denim, he would react to an IoT leader's aspirational vision with more skepticism:

Now I may receive that [vision] with a little bit more ‘Oh my God, here’s another CEO or founder that’s got these grandiose visions that we’re never going to get to.’ We need to be more focused on how to make our products work today. (Denim, personal communication, 2020)

As noted, the aspirational vision and its governing principles influenced strategic maneuvering at IoT Inc. The aspirational vision and its governing principles were of a higher order than the strategic vision. In comparison to the components of the strategic vision, the aspirational vision differentiated IoT Inc. and its product within the emergent IoT field. Like a divergent eddy within the standard Silicon Valley stream, the first governing principle at IoT Inc. was “Going against the consensus, and being right” (Francis, personal communication, March 10, 2021). Where the strategic vision worked to align with emergent IoT market forces (in effect to enable sales of the Bluetooth gateway), the aspirational vision differentiated IoT Inc. within the emergent IoT field. In this regard, Francis’s perspective that “IoT thinking” was different from “Internet thinking” also exemplified a governing principle of an aspirational vision (Francis, personal communication, March 10, 2021).

The defining and differentiating characteristics of the aspirational vision also influenced early strategic decisions at IoT Inc. For example, the aspirational vision led to the strategic choice to use Bluetooth (rather than a different type of connectivity, like Wi-Fi or Zigbee) as IoT Inc.’s connectivity option. In turn, the choice to use Bluetooth led to an innovation that ‘went against the consensus’ - long-range Bluetooth. The governing principles of the aspirational vision included a conservative approach to resources. That approach enabled the pivot from a B2C market to a slower-paced B2B market. The interplay between the aspirational vision and the dimensions of the strategy was a dynamic area for IoT Inc. and its members.

Also, the principle of going against the consensus at the core of the aspirational vision set the stage for early changes to IoT Inc.'s strategic choices. Over the long term, these were consequential, reflecting a butterfly effect as described in chaos theory applied to an entrepreneurial setting (Churchill & Bygrave, 1990). For example, the technical decision to pursue a Bluetooth strategy in turn positioned IoT Inc. for the consequential award at the 2016 B2C event. This led to the B2B pivot and then a B2B event award in early 2017. Moreover, IoT Inc.'s distinctiveness was central to Francis's capacity to inspire the IoT Inc. team – it was the only long-range Bluetooth router company in the world.

Invariably, the aspirational vision served two functions. It was a boundary to internal criticism, a sacred line in the sand, as well as a binding force. Notably, core members of the team debated how the interplay between the aspirational vision and dimensions of strategy impacted goals. Tristan described this interplay and how the expertise of team members influenced the goals at IoT Inc.:

To go out and say, 'I know better. I'm going to do this visionary thing. I'm going to overcome. You're all wrong and I'm going to do this.' ... On the device side, that part of the solution ... he's visionary... For the first little while, that's the driving force of the startup...

But then you get customers. You have to be able to turn that off. Start being empathetic to your customers and listen to what the customer and market tell you...[Rather than being] blind on the total solution piece ... Say, 'I don't know about that. Let me get someone in here and they'll figure that out for me'...

To balance ... the visionary state [with] reality turning out to be something different. Listen and hear the right moment - and guide in. The ones [leaders] that can do

that go ‘Boom!’ They do very well. But many cannot make that transition. They never listen. They die on the battlefield they were on and never adapt. (Tristan, personal communication, November 2020)

Here, Tristan encapsulated the need for leaders to coordinate an aspirational vision with the context of the situation and, in response, dimensions of strategy provided by individuals with specific expertise. Tristan notes leaders with aspirational visions and the power to influence a strategic vision process must hear, and act on the expertise of core members. Listening to the department experts was necessary for expertly maneuvering IoT Inc. towards opportunity in the emergent IoT field. Like a Greek ship captain hearing sailors calling out *ob portus!* from various parts of a ship timing was key. On the face of it, Francis agreed. As Francis said on January 3, 2019, at an annual planning meeting:

If you see things differently, tell me ‘Francis you are wrong.’ I’m not married to any ideology. You know better than me. You talk to the customer more than me. I see from 10,000 feet, the big picture. You see from a much closer distance. (Francis, personal communication, January 3, 2019)

Francis’s comments point to two perspectives. One, a close-up contextual perspective, and two, a distant and more abstract perspective. On the one hand, Scott (2020) underscores the importance of the local expert informed by the local context. Landing a ship at a port requires a specific type of expertise, says Scott, different than sailing the open seas. Harbor pilots are exemplars of *metis*. Each time a harbor pilot maneuvers a ship into their local port the characteristics of the ship, wind, tide, and crews are different. Over time they accumulate a repertoire of responses to a multitude of port landing patterns. In that same light, at IoT Inc., the *habitus* of IoT Inc. members, accumulate the social capital, *techne*, and *metis* for close

maneuvering towards entrepreneurial opportunity. In effect, their IoT habitus and the IoT field cohere as a feel for the game (Bourdieu, 2020). Their metis is the expert feel for the ob portus moment while maneuvering towards opportunity.

The nautical analogy is also useful in describing how entrepreneurial leaders apply ‘maps’ to an environment without paths. In this case, the maps are the view from a distance, Francis’s guidelines, and aspirational vision. The guidelines make the uncertainty of the emergent IoT field legible (Scott, 2020). In this way, the strategic vision process was constrained by the guidelines of the aspirational vision. The contextual perspective was beholden to the abstract perspective. It was also beholden to the power structure at IoT Inc. The core team members’ pursuit of opportunity was facilitated by the metis of hidden-in-plain-sight rituals as well as market actions. As will be described, the habitus informed by metis was central to positioning IoT Inc. to dominate much more powerful companies and markets. By comparison to the strategic vision process, Francis’s aspirational vision and the principles supporting it were less subject to variation and debate. For example, Francis’s guidance on resources was to always maintain “eighteen months of cash,” as he noted:

We learn from failed companies, what we want to avoid. They fail for many reasons. The core reason is they run out of cash. Cash management is the most important thing. Many companies learn that too late. They may have a good technology and team. But that one thing [running out of cash] will doom a company for sure. (Francis, personal communication, February 15, 2019)

Francis’s conservative use of resources went against the Silicon Valley startup consensus and its principle of spending money quickly and failing fast. Francis’s 18-month cash principle governed IoT Inc. It was a differentiating principle for IoT Inc. as well as a constant in the social

structure. It was a border for and informed the aspirational vision, and in turn, impacted strategic decisions.

Similarly, Francis's perspective on "Internet thinking" versus "IoT thinking," was another guiding border for the aspirational vision role at IoT Inc. (Francis, personal communications, March 10, 2021). For the IoT field, Francis favored scaling solutions based on low power characteristics over Internet characteristics. The "bigger and faster" of the Internet, said Francis is:

... still good. But it is not the most important thing, [It] may not be even a central thing. For the Internet of Things what is way more important is battery life and low power. That's a thing a lot of people get wrong when they do the Internet of Things. When they use traditional Internet thinking. (Francis, personal communications, March 10, 2021)

The notion of IoT thinking was another border and guideline supporting the aspirational vision. Tristan noted, "I think the vision is much higher order..." with the guidelines serving as unchanging supports to the aspirational vision. Moreover, the aspirational vision served as a form of symbolic capital aligning and inspiring the IoT Inc. team :

Francis really was great at the vision piece. We want to connect all these billions of devices over Bluetooth because it's super low power. They [the devices] can't be (hardwired) powered devices. They are going to have to be battery-powered. Bluetooth is the way. That vision part Francis was really good at that. (Tristan, personal communication, November 19, 2020)

In short, the strategic vision was up for debate, but the aspirational vision and its supporting guidelines were not. As the quote above details, Tristan acknowledged the importance

of the aspirational vision and its guidelines like IoT thinking. At the same time, where these borders impacted dimensions of strategy is where negotiations, and criticisms, took place in the social structure:

I think he was terrible at the strategy piece. The strategy piece was very complicated with lots of possible options. Based on this vision from Francis, what's the strategy to pursue? We want to synthesize all those data points and figure that out. Move to the execution piece. There were parts of the execution piece that worked well and parts of the execution that did not work well. (Tristan, personal communication, November 19, 2020)

Thus, these two forms of vision at IoT Inc., strategic and aspirational, were different but interwoven. They complimented each other. They also resulted in tension and conflict. Depending on the circumstances, the tension was resolved via Francis's power, backstage actions, hidden-in-plain-sight maneuvering, or a broad orientation toward pragmatic results.

In a quantum sense, the relationship between the strategic dimensions and aspirational vision and its guidelines were analogous to a complex number function on a fractal complex plane. On the one hand, IoT Inc.'s metrics, funding, sales, etc. could be described as real numbers on the x-axis of the complex plane. The stable aspects, like funding, are plotted between zero and one. The unstable aspects, like budgets, could be plotted greater than one as negative or positive numbers. Also, in this way, the relationship between the real metrics and the non-linear factors could be accounted for and expressed. The factors influencing strategic dimensions were more like imaginary numbers rotated in proximity to the aspirational guidelines, at times stable or unstable. On a complex plane, they were more like imaginary numbers. In this way, a factor like the 18-month cash rule could be plotted as a stable negative imaginary, between zero and

one on the y-axis as a constraint. Alternatively, the vision of Bluetooth at the center of IoT would be plotted as a positive, stable imaginary factor. While locatable, these imaginary factors are more like probabilities analogous to the location of particles in a quantum wave function.

The output stability, or instability, of strategic dimensions was contingent on their relationship with other inputs, like factors at IoT Inc. including power dynamics, as well as developments from the wider IoT field. The strategic dimensions tended to exist in a superposition, existing in multiple states simultaneously until they were acted on in some way and ‘collapsed’ momentarily. The relationship between the aspirational factors, strategic dimensions, and other inputs could then be described as a complex number, i.e., not quite real but useful number, located on a complex plane. Moreover, as this pattern of relationships unfolded, they could form a fractal set by cycling into a pattern, or they could escape into chaos or converge to a point.

There was also a third type of vision at IoT Inc., the inspirational vision, which was a ritualized aspect of the social structure. Francis relayed the inspirational vision at the end of quarterly and annual planning meetings. The inspirational vision involved exploratory descriptions of technology in the context of paradigm shifts. They included other rapidly developing technologies of Silicon Valley and Industry 4.0 such as artificial intelligence (AI).

For instance, Francis presented a narrative of how supercomputers using AI were able to beat the world’s best players of ‘Go,’ a complex game of positioning. This aspect of the vision had little to do with IoT Inc. or its Bluetooth-enabled product. Instead, these future-world visions were a specific imaginative exercise tied to Noble’s (2012) concept of two worlds. The inspirational vision relayed a vision of technological triumphalism breaking free from the natural

rhythms of the world. As noted in Chapter One, the notion that technology could free a person's humanity coincided as a habitus characteristic with the Silicon Valley field in the late 1960s.

In a sense, the inspirational vision served to push out the borders of imagination, to paint a wider landscape in which the strategic and aspirational visions at IoT Inc. could inhabit. As such, it lifted IoT Inc. and its crew out of the present and into a visionary future in which IoT Inc.'s product would play a part. Also, by describing IoT Inc. as a component in a wider future, the inspirational vision acknowledged that random impacts at IoT Inc. due to adjacent, and accelerating technologies were likely.

The inspirational vision served as a ritual in the social structure at IoT Inc. It placed IoT Inc.'s aspirational vision of the future; Bluetooth gateways at the center of Bluetooth networks powering the IoT in a fully realized Industry 4.0 era. In that context, it positioned IoT Inc. as a 'butterfly effect' factor of complexity theory, with an exponential effect on the Industry 4.0 era. Churchill and Bygrave (1990) noted this type of quantum jump entrepreneurial narrative is how quantum thinking is pragmatically applied to an entrepreneurial setting.

The inspirational vision also included the expression of exponential probabilities. Francis evoked these probabilities to differentiate IoT Inc. For instance, Francis said IoT Inc. had, by achieving Series A and Series B funding, beat the odds. Only one out of 10,000 startups receives a Series A and one in 100,000 startups achieves a Series B funding (Francis, personal communications, n.d.). In turn, Francis would continue the probabilities narrative and turn it towards the future. As IoT Inc. progressed in its funding journey it would become a "one in a million" startup and achieve a Series C funding round and eventually a unicorn with more than a billion-dollar valuation (Francis, personal communications, n.d.). When Francis presented the inspirational vision during Monday morning meetings pens stopped moving and meeting notes

were ignored. Team members tilted back in their conference room chairs and, with Francis driving the narrative, imagined the future.

The combined strategic, aspirational, and inspirational visions Francis presented during quarterly and annual meetings were inspiring. The inspirational vision placed the aspirational vision into the context of an imagined social, technical, and financial future. It also tied the strategic dimensions to future possibilities. At the same time, it lifted the narrative out of the ongoing indeterminacy, fraught strategy negotiations, and the day-to-day grind. In other words, the inspirational vision converged and oriented multiple organizational lines – strategic, aspirational, and organizational - towards the singular ongoing pursuit of excellence, or arete. It was, as Denim's quote suggests, inspirational:

That was one thing I liked about him, ...it kind of helped me walk away from those meetings re-invigorated or re-energized about man, this is pretty cool stuff. We're doing things that are amazing. You get caught up in the...all we needed was to be right in the go-to-market details.

What are the different value propositions that we're focusing on for comfort and all that. Having that person reiterating that bigger picture, longer-term vision... the first in the world... I remember that I really liked that about those specific meetings. (Denim, personal communication, December 6, 2020)

There were also meetings where the inspiration vision ran headlong into disbelief and doubt. For example, the aspirational vision of placing IoT Inc.'s product at the center of the Industry 4.0 era was challenged based on a technical basis. Francis had hired an expert in Bluetooth technology named 'Valerie' (a pseudonym) who worked from a remote office in the upper Northwest. During a quarterly planning meeting, Denim recalled Valerie's focus on IoT

Inc.'s product's existing technical capabilities of Bluetooth, versus the aspirational vision of the IoT Inc. product:

Valorie was more like 'Here's what everybody is trying to do with the Bluetooth spec [specifications].' It was less about our company. It was more about where is Bluetooth going and the longer-term roadmap for Bluetooth [and] the difference between the two...On one hand, you've got a visionary for the company. He wanted to be the guiding light of 'Here's where we're going and here's how we going to penetrate things and why it's so amazing.'

And then Valorie saying, 'Here's where the market is going as it relates to Bluetooth [and] what all the companies are trying to do and ...how do we bring those things together?' (Denim, personal communication, December 6, 2020).

At the group meeting in the home office conference room, Valorie provided a technical view at odds with the aspirational vision. In effect, Valorie expressed frustration with the aspirational vision crowding out the technology, noted Denim, "He was... giving us some of the sausage-making [happening at] the Bluetooth SIG. The things they were working on. We were calling him 'Professor Valorie' in that meeting" (Denim, personal communication, December 6, 2020).

The wider team took notice of Valorie's technical input regarding the technology, as well as his frustration with Francis's vision. A group subtext of an individual's frontstage challenge of the aspirational vision was whether is whether the challenge had crossed into disbelief. As Denim had made clear, "In a startup, you either drink the Kool-Aid and you're all in. Or, you don't, and you find something else to do" (Denim, personal communication, December 2020). After the discussion at the meeting, working with Valorie would become a frustrating experience

for team members at IoT Inc. He simply did not show up for meetings and did not respond to emails or phone calls. Within a few months, Valorie was no longer working at IoT Inc.

The vision discussion also happened in one-on-one meetings with Francis outside the office. As noted, the leadership roles at IoT Inc. included an awareness of the vision variations and embodied knowledge forms of expertise. However, Tristan noted the various vision types – strategic, aspirational, and inspirational “have to converge together and start working in synchronicity” (Tristan, personal communication, November 19, 2020). In a fractal sense, the desired convergence of IoT Inc.’s types of visions - as constants, probabilities, and luck - could be plotted on a complex plane. In turn, iterations of the factors plotted would converge as a stable fractal pattern, or pull the plotted factors towards chaos.

One of the implicit goals of leadership at IoT Inc. was the continued investment in this trinity of visions – strategic, aspirational, and inspirational - and their convergence. The means to accomplish this was conducted via the dramaturgy of roles supported by the team, and the discourse during rituals like the Monday morning meeting. As has been described, during these meetings, a space was created where these visions were discussed. In that space, multiple iterations of these factors were constantly explored.

The attention of the crew pursuing an opportunity at IoT Inc. was not simply a linear, cause-and-effect process like pirates step-by-step investigating a coastline for inlets in search of hidden treasure. Entrepreneurs who act in this manner are not demonstrating effectual expertise (Sarasvathy, 2009). It is more accurate to say, the IoT Inc. crew was effectuating in search of a fractal pattern. Metaphorically, they were simultaneously investigating a coastline linearly, reviewing multiple island coastlines from a plane, pushing aside the fractally patterned leaves, and reading the interference patterns produced by waves on the ocean for ‘signals.’ Simply put,

the goal was to experience and create patterns that self-replicate at a different scale. The expertise to do so involved a convergence of linear knowledge types, like *techne* and *episteme*, and imaginary knowledge types, like *metis*, *phronesis*, and *arete* plotted, as it were, as complex numbers on a complex plane.

To do so, the members of IoT Inc. required what Senge et al. (2005) called containers where raw material could be transmuted (p. 34). The raw material included the impressions and weak signals which could be shared and explored. Bohm (Nichol, 2005) described this as a spirit of dialogue that is not designed to immediately find a solution, but to face disagreements and create a “new form of consensual mind” (pp. 299-300). Bohm considered dialogue a means to release the creativity of the implicate order, in a form he referred to as the generative order. In doing so, the various forms of knowledge – *techne*, *episteme*, *metis*, *phronesis*, and *arete* – embodied by the *habitus* of the core team members at IoT Inc. and expressed as expertise could work towards a common end. As its history demonstrated, IoT Inc. required the expertise of individuals with a variety of *habitus* to navigate the complexity of market opportunities within the emergent IoT field. In this context, *metis* is importantly noted for its ability to recognize patterns better than AI, especially within an improvisational and contextual environment (Holford, 2020b).

To be clear, the open-ended dialogue was important but navigating the complexity didn’t happen by merely conjuring the changes at IoT Inc. The dialogue created a space where transmutation (Senge et al., 2005) was possible. As Holford (2020a) noted, the “Materialization of discourse stimulates action and change to take place” (p. 268). In other words, the narrative inputs in the Monday morning meeting as well as backstage areas were exploratory based on IoT

Inc.'s social construction. In turn, at IoT Inc. narrative inputs resulted in action-based outputs, a key principle, as Sarasvathy noted of expert entrepreneurs acting effectually (Sarasvathy, 2009).

Moreover, in the sociomateriality context described by Orlikowski and Scott (2008), the discourse at IoT Inc. containing the visions and embodied habitus at IoT Inc. was entangled with the stack of IoT technologies and their ongoing emergence in the IoT field. Moreover, according to Holford (2020a) adopting a sociomateriality lens on discourse in digital organizations metis helped to “comprehend the entangled problematics of knowledge and power within digitized workplaces” (p. 270).

In this case, as described, there were tensions based on which knowledge types used by the core team members were sanctioned based on power dynamics associated with the three vision types. Notably, the habitus of individuals in a startup, like IoT Inc., emphasized metis to navigate the emergent IoT field. However, digital Taylorism at firms like IoT Inc. privileged episteme and techne over metis resulting in “power distortions” (Holford, 2020a, p. 268). In short, the actions and information practiced and derived by the metis-laden habitus of core team members were accorded less power.

The privileging of digital Taylorism at IoT Inc. worked to “repress the human capability known as *mètis*, which organizations require to deal successfully with dynamic ambiguities in the form of unexpected emergencies” (Holford, 2020a, p. 253). Finally, all knowledge types were required at IoT Inc. to pursue arete in the IoT field. The IoT technology field is more complex than the Internet. Multiple technologies are required to create an IoT process. As Francis noted, in the Internet field not all the technological layers of the Internet stack are required, it can work on as few as three layers. However, the IoT requires all seven layers of

technologies in the IoT stack. As such, IoT entrepreneurs need to understand and interact with more technological complexity.

In a sociomateriality context, the complexity of the IoT technology stack would point to a correspondingly complex embodiment of knowledge for the IoT. For example, in the IoT, the entrepreneur's knowledge would require multiple layers, such as *techne1*, *techne2*, *episteme*, *metis*, *phronesis*, and *arete*. This thick knowledge stack would be required to navigate and create an IoT product, startup, and field. By comparison, because the Internet requires fewer technology layers, a thinner knowledge stack would suffice, for example, *techne*, *episteme*, and *arete*.

As was noted, *metis* was needed to discern fractal patterns with scaling potential to operate with effectual expertise at IoT Inc. It was both required and repressed. Individuals enacted *metis* as a form of expertise *habitus* at IoT Inc. to navigate the complexities of the emergent IoT field at IoT Inc. However, it was also not fully sanctioned and thus occurred as a hidden-in-plain-sight phenomenon within the power structure at IoT Inc.

To pursue a quantum perspective necessary to navigate the complexity they faced, including the pursuit of fractal patterns, the *habitus* of core members at IoT Inc. also used the dramaturgical backstage to “enact alternative discourses and outcomes which mitigate organizational barriers to *mètis*” (Holford, 2020a). As was demonstrated, these discourses included hidden-in-plain-sight actions such as backstage discussions, sharing of body language, and the creation of the key, but easily missed, details in reports. The reason, the *habitus* of individuals sought the full expression knowledge types was to converge the visions into scalable patterns as a full expression of expertise, self-realization, and *arete*.

Francis, a Cross Between Delphic Oracle and Penny-Pincher

I know the number of grains of sand and the extent of the sea; I understand the deaf-mute and hear the words of the dumb.

Herodotus. (1996). *Herodotus: The Histories*.

According to ancient Greek stories, Delphi was located at the navel of the world providing the Delphic priestesses access to the wisdom of the gods. For over a thousand years, the interpretation of utterances by the Oracle of Delphi guided the direction of Western civilization. In a similar vein, the Silicon Valley startup field has its Delphic oracles, utterances, and interpretations. For example, in 2009, Facebook CEO Mark Zuckerberg's prime directive to his developers and team was summed up as the descriptive motto 'Move fast and break things' (Blodget, 2011). Subsequently, the motto was sometimes interpreted as a Silicon Valley startup ethos to simply disrupt and break things (Taplin, 2017; Vardi, 2018).

Similarly, interpretations of Francis's utterances also took on Delphic qualities at IoT Inc. For example, funding discussions and the strategic vision were bounded by the operating principles set by Francis. Notably, Francis's principle was to always have 18 months of cash on hand. The 18 months of cash was the amount of money needed to sustain the company without income for 18 months (Francis, personal communication, January 2, 2019). And yet, the actual amount of cash on hand at IoT Inc. was a mystery known only to Francis. The department leaders at IoT Inc. who in essence made supplication to Francis for budgetary funding were subject to and learned to interpret his utterances. The interpretation of Francis's utterances, and via Vail the Delphi's body language was ongoing.

For example, on January 3, 2019, at the annual planning meeting in the conference room, Francis noted IoT Inc. could "catch the imagination of people" (personal communication, January 3, 2019) by enacting a brand messaging approach. However, a brand messaging approach would require substantial spending. On the other hand, describing the company's product and position in the IoT market could be specific to a more technical B2B positioning,

something like “we’re chasing ‘Bluetooth for Enterprise IoT,” he said (personal communication, January 3, 2019). The ensuing conversation was an imaginative exploration. Core team members threw out branding ideas related to BMW’s catchphrase ultimate driving machine (Young, 2007) and Nike’s use of athletes to sell shoes. Ultimately, Francis concluded the open-ended discussion, “This is better for thinking about on a long walk on the beach, to think totally beyond where we are now. Always pay attention to the inspirational and practical” (Francis, personal communication, January 3, 2019).

The discussion moved on without setting a definitive direction between the two options. As noted previously, the how of connecting the aspirational and inspirational with the strategic and practical was often an area of interpretation and negotiation. Vail noted IoT Inc. did use business models to “try to organize the focus of the company” but added with a chuckle, “I don’t know how much we use it as a company” (Vail, personal communication, April 7, 2021).

Where aspirational rationality opened the door for imaginative exploration and often drove the narrative, it also revealed differing perspectives regarding timelines, costs, and goals. At the same meeting, while reflecting on the value of successfully conveying IoT Inc.’s public relations story Francis recounted “We caught the imagination with ‘Bluetooth Router’ at the Best of Giant Consumer Show Award – and didn’t pay a penny for that thing,” (Francis, personal communication, January 3, 2019). Although the narrative proffered the award as a singular moment, a PR agency had charged a substantial fee for several months to initially position IoT Inc. for the opportunity to win the award. Moreover, after the Giant Consumer Show award, the PR agency continued to bill monthly but provided minimal results. In addition, Vail had also paid in terms of personal stress. The promises the award signaled to the marketplace he said were

at odds with the product's actual capabilities. During that time, Vail said, he questioned whether staying with IoT Inc. was worth the personal anxiety.

By contrast to Zuckerberg's Silicon Valley mantra, during January 3, 2019, meeting, Francis reiterated IoT Inc. would not be pursuing a spend fast, fail fast model. Instead, he said IoT Inc. was worthy of long-term "care" versus a shorter-term "run" at scaling the sales function Francis, personal communication, January 3, 2019). Francis paused and described the basis for his thinking:

Long-term thinking, survival is the first thing. Let me make this more specific. To survive we need to prepare for no revenue and have at least 18 months cash. VC [venture capitalist] mentor I had told me that standard. Companies that follow that rule survive. And time will be on our side. No matter how much or how little money we have, it won't make a difference...We can prolong the company with cash for 18 months. (Francis, personal communication, January 3, 2019)

Francis then immediately related how the 18-month principle supported the continued exploratory nature of the aspirational vision as well as previous, important strategic choices:

We're headed in the right direction, pursuing, and exploring. Nothing is 100% in a startup - 30% is the best you get. We already made the Bluetooth bet over Zigbee. The education [market] in China was very risky to do. We spent a lot of time on the consumer side and changed course [to B2B enterprise]. It didn't kill the company. Why? Because of the principle - 18-months cash. Not going to break that thing. Within that principle, we are as aggressive as possible. Invest smart. Bring sales quickly. (Francis, personal communication, January 3, 2019)

At this time, Tristan had already exited IoT Inc., and VP of Sales #2 was pushing to drive faster revenues by building out a sales organization. Based on the revenue goals set by Francis, VP of Sales #2 was strongly advocating for regional sales personnel in North America, as well as a sales team in Western Europe, or both. In short, sales would seek to tie sales goals to past sales performance. For example, the revenue number would tie one salesperson to bring in one-million dollars in sales revenue. The logic of the sales team size to revenue was linear, or as the VP of Sales #2 described it “disciplined” (VP of Sales #2, personal communication, January 3, 2019).

By contrast, Francis’s annual sales goals were exponential, tripling the previous year’s goals but without tripling the size of the sales department and marketing budget. For example, during the 2019 planning meeting, the VP of Sales #2 was seeking to tie Francis’s aspirations for reaching the 2019 annual revenue goal to a linear step-by-step sales pipeline. In the sales pipeline, the average size of a deal was a factor as was the average time it took to complete a sale, start to finish. Moreover, much of the time and resources spent on sales involved sales processes that didn’t result in a sale. In other words, based on an industry average 3% lead-to-sale conversion rate, for example, a salesperson selling a \$100,000 product needs to successfully develop and manage hundreds of sales projects to achieve a \$1 million sales quota.

It was clear that based on Francis’s 2019 annual sales goal the VP of Sales #2 would need to develop and manage many hundreds of unsuccessful sales projects to win the many dozens of smaller deals necessary to reach the annual goal. However, Francis’s stated 2019 sales revenue goal was not connected with linear growth in the sales team. Early in the January 2019 annual planning discussions, Francis said, “At the beginning when the business is small it takes time for the team to ramp up...For a small team like us to survive and thrive sales team needs to feed

themselves and revenue for the whole company” (Francis, personal communication, January 3, 2019).

In one sense, the VP of Sales #2 was negotiating with Francis to decrease the annual sales revenue goal if additional monies weren’t spent to build a sales department to a size capable of reaching the goal. However, the discussion involved more than math. It touched on principles, varying perspectives on pacing, and the habitus of the players in a conference room dramaturgical performance navigating in an environment of uncertainty. The result was tension and social actions designed to coordinate the situated knowledge towards pragmatic goals within the context of the performance. For the moment, we’ll return to the discussion of the structuring of a sales team, and Francis’s expectation that the sales department will quickly deliver improved revenues.

Francis was willing to discuss the linear approach to sales approach. However, he also conceded his expectations for annual sales revenue weren’t based on a linear model noting “linear growth is not attractive to investors” (Francis, personal communication, January 3, 2019). In Silicon Valley, an IoT startup CEO like Francis is expected to aspire to the exponential growth of annual sales revenues. Moreover, exponential sales growth is expected regardless of the complexity and uncertainty of an emergent IoT marketplace, product maturity, or the sales team's size. A bounded rationality perspective, “driven by the search for alternatives that are good enough (measured against some existing aspirations) rather than optimal” (Augier & Mahnke, 1998, p. 8) does not apply to revenue expectations. Instead, the VP of Sales #2, as Tristan had been previously, was in a position where Francis’s aspirational rationality applied to revenue expectations.

During January 3, 2019, annual planning meeting the core team members, especially the sales function at IoT Inc. were driven by the urgency of reaching quarterly and annual revenue goals set by Francis. The conversation in the conference room had surfaced differing, and conflicting, perspectives on funding, timelines, and goals. Sitting to the left of Francis, the VP of Sales #2 laid bare the tensions:

Francis, you're a patient man. I am not. I'm more concerned about this market. I think what we're doing is giving an opportunity for some big guys who want to swoop in and crush us. That's my concern if we're too cautious. I appreciate your fiscal responsibility. It's good not to spend rashly. But the market is here, even if it's early times. We're approaching the chasm, but we're in better shape than most startups. We gotta have the momentum to run and make the big jump within being responsible fiscally.

(VP of Sales #2, personal communication, January 3, 2019)

However, although Francis was driven by some urgency tied to a broader set of stakeholders, including investors, he was adamantly against the Silicon Valley spend fast, fail fast principle. To the right of Francis at the conference table, Vail weighed in by reinforcing the rejection of the Silicon Valley mantra and in support of Francis's leadership role:

In Silicon Valley, there's a crazy spend-for-growth approach. We're discussing a disciplined approach for survival. You get to choose as the CEO, to decide the strategy and what gets executed...It's not a democracy. You're driving the ship. (Vail, personal communication, January 3, 2019)

The VP of Sales # 2 picked up the discussion and continued to press Francis to accept growing the sales team based on a linear sales revenue model. Each additional salesperson, said the VP of Sales #2, could be expected to bring in a percentage of the total revenues. The

revenues per salesperson approach, said the VP of Sales #2, would accommodate Francis's annual revenue goal. The VP of Sales #2 said achieving the vision was possible if he received a budget to hire a team:

My number [sales goal] is \$N (pseudo data). The US sales team is one sales engineer and one VP. The China sales team has technical sales assets all the time. We don't have that here. If I just have one team it doesn't matter. The sales number is not going to be exciting...Are you investing or not? No way to get even close to that [sales goal]...If we want to dominate a market, we need to invest. Let's dominate. Let's make it happen. Take a leap of faith...

[Directly to Francis] You believe in this company. You sold 'Big Venture Capital' (a pseudonym) on your vision. This baby is not going to grow. There are other people bigger than us. 'Hungry Competitor' (a pseudonym) is not waiting around. They're going after markets. They are investing. 'Total Networks' (a pseudonym) and Big Networks Inc. are not waiting around. Having a bigger sales team is going to get us there. If not, we're giving other guys the opportunity if we wait around. (VP of Sales #2, personal communication, January 3, 2019)

At the onset of this exchange, the VP of Sales #2 implied he had acceded to Francis's annual sales revenue number. In short, he signaled that the annual sales goal, though exponential, was attainable. However, it was, he said, only attainable based on certain conditions. Specifically, the VP of Sales #2 pressed Francis for the budget to reach the goal based on a linear model tied to spending cash to build a larger sales team. Each member could bring in a portion of the total sales goal, said VP of Sales #2. He implied Francis's belief in his aspirational vision was not supported by strategic actions. Further, the VP of Sales #2 explicitly stated that by not

investing in the sales teams Francis would lose the opportunity to dominate the market to competitors. In a Goffmanesque sense, the VP of Sales #2 was questioning Francis's Visionary role.

"We're not sitting back," responded Francis.

"Compared to other startups we're sitting around," said the VP of Sales #2 (Francis and VP of Sales #2, personal communication, January 3, 2019).

In general, Francis's demeanor was serene. At this moment, he was noticeably unsettled. His role was being challenged. Francis stood up from his chair and looked directly at the VP of Sales #2 and then down the length of the conference table and into a middle distance:

Some startups are more aggressive, some less so. We're making investments in sales, marketing, support, and R&D. If you sit in my chair, you'd know how many places we're making investments. You need to do the math VP of Sales #2. If you're in my shoes we need to consider everything. It's my burden to bear. It's the work I like.

(Francis, personal communication, January 3, 2019)

He paused briefly and then referenced not having the full picture on the various funding requests he needed to consider, "Brad is still giving me numbers for marketing, and I need to balance the investments with the return and risk" (Francis, personal communication, January 3, 2019). The pause had returned the discussion to a linear approach, the cost versus a return on investment. However, fundamental principles were being challenged, as well as roles, and the stakes were high. Francis's voice was determined:

There are people saying 'I'll make a big bet and at the end of year the company will have upside'... and if it does not work out the company goes down. I've invested in

more than 40 companies. Inevitably companies with less than 1 year of cash go down. Occasionally they're saved at the last minute. But it's no way to run a company.

It is not going to happen as long as I'm CEO. No, I think of that I am 100% sure. I know, okay it doesn't work out it... some people say 'succeed fast, fail fast'...Some people have that mentality. If I'm 25 years old I'd do that too, but not now. Not when I love this company this much. Sometimes board members they want you to succeed fast and fail fast. ...[That is] only because they invest in 100 companies. But we only have one life. (Francis, personal communication, January 3, 2019)

Francis sat down. In this context, he'd effectively signaled his commitment to the conservative approach and in doing so had exercised his power. Moreover, in a dramaturgical sense "power must be clothed in an effective means of displaying it" (Goffman, 1959b, p. 241) both affirming the approach as well as directing the actions of the core IoT Inc. team. He turned to the VP of Sales #2 and his tone moderated as he returned to the interrelationship between strategic choices that were supported by the aspirational vision and conservative funding principles:

We invested millions in product research and development, and we had a lot of difficulties to overcome. We overcame them. We found the education market in China and the predictive vibration monitoring industrial IoT market in the United States and Europe – and that was great. All these can become very significant. I notice VP of Sales #2 that you too are very conservative with your sales forecast number which is very good...

Right now we're challenging the assumptions on the strategy. Is distribution the best way to find target customers and reach them? Direct sales or channel sales? You all

know more than me in your areas... We'll continue to discuss. Honest feedback on where we came from and where we are. (Francis, personal communication, January 3, 2019)

Francis paused before he continued by tying the conservative principles to an aspiration vision, "Granted the 18-month cash principle may limit the upside. I'm fine with that. We can survive long enough...we can become a \$1.5-to-2-billion-dollar company. That is my thinking. Normally I don't talk about these things" (Francis, personal communication, January 3, 2019).

At this point, Vail stepped into the conversation to reaffirm the roles of Francis as the Visionary as well as the VP of Sales #2 as the necessary Antagonist. Performances require a show of emotional and intellectual involvement (Goffman, 1959b). Moreover, a challenge to roles or performances, like those of Francis or VP of Sales #2 requires protective measures by other performers. The performers, said Goffman, exercise loyalty, discipline, and circumspection designed to maintain the show and the roles portrayed (1959b). As he had done previously, Vail weighed in by addressing the need to balance the challenge to the strategic vision by the VP of Sales #2 with Francis's aspirational vision:

I like the spirit of blunt honesty. We don't want to miss this opportunity. The elephant in the room is, how do we improve the odds of success and balance that with staying alive? Sometimes those things are fighting. (Vail, personal communication, January 3, 2019)

As Goffman (1959b) notes, expressions manage impressions. The tone of voice and the timing of specific words adjust performances. Vail continued to wring the tension out of the conference room by wryly quipping, "As the oldest person here, where I spend my time is important," garnering a laugh "and it is fun if you can raise money. You'd like to build as big as possible. We'd all like to make a bunch of money" (Vail, personal communication, January 3,

2019). In the next moment, Vail shifted the conversation by reaffirming Francis's singular role to "choose as the CEO, to decide the strategy" (personal communication, January 3, 2019.)

Specifically, the discussion pivoted to strategic matters, not involving roles or aspirations. Would the VP of Sales #2 prefer to structure the sales teams by geography or by verticals (industry sectors)? The timing was right and as the market expert, I stepped into the discussion. I related that a vertical approach to the growing IIoT market was "already informing everything we do and say. It should inspire the new sales structure" (Brad, personal communication, January 3, 2019). I could step into the discussion because Vail had also reaffirmed the social power dynamics and roles at play. In doing so, he facilitated the ongoing production of situated knowledge while intelligently guiding social action, exemplifying *phronesis* (Flyvbjerg, 2001).

The discussion of unresolved strategic choices would continue along the lines of the dramaturgical roles validated by the performers. The VP of Sales #2 wasn't done pressing for a budget based on adding geographically situated sales teams on the coasts of the US, and Europe, as well as direct sales versus phone sales teams. The conversation continued to take sharp turns. Exasperated, at one point Francis said bluntly, "The VCs [venture capitalists] couldn't care less about a structure discussion. They are there to make money" (personal communication, January 3, 2019).

In short, the people who provide the funding for IoT Inc. want exponential revenue results, regardless of the sales team's strategic structure. Thus, the investors lack an understanding of the *metis*- and *phronesis*-laden strategic dimensions of an IoT startup. They don't have the *habitus* enabling the expert fractal patterning work of effectual IoT entrepreneurs. As was the norm at IoT Inc. involving strategy dimensions, the sales team issue wasn't settled –

it remained in a state of probabilities. However, at the end of the day, there was a constant ongoing exploration, a guideline of the aspirational vision, with Francis concluding:

I've heard all the arguments and comments and I'm leaning toward a focused [vertical market] approach. The IIoT is bigger so we address that bigger market. We can't do everything. I'm hearing everything starts with this team focusing on IIoT partners. We need a pipeline of one-third of the companies in that space...Leaning towards IIoT. Go there. Go down that path for a few months. Is the connected health [vertical market] next? Or in a few months if it [IIoT] is not as effective as we thought we can focus more geographically. (Francis, personal communication, January 3, 2019)

In the end, the discussion maintained IoT Inc.'s aspirational guidelines, such as the 'Go against the consensus' stance versus the Silicon Valley mantra of succeed fast and fail fast. The habitus of entrepreneurs includes the capacity to prioritize areas of attention. In a linear sense, that may include simply a 'next step' such as finding a niche market to target. However, in a fractal sense, attention to the location of magnification on the border of a fractal determines the next pattern. Moreover, the degree of magnification is infinite. Thus, from a quantum perspective, where, and how much attention is paid is a key area of entrepreneurial expertise. Paying more attention to a highly detailed area may be slower, but it may also reveal a self-replicating pattern that scales exponentially faster, higher, and more efficiently. An interview participant 'IoT Physics Ph.D.' (a pseudonym), an IoT startup founder with a Ph.D. in physics, said this 'Go-slow-to-move-fast' approach, is paradoxical, but was a coherent approach to pursuing an opportunity in the complexity of the IoT field (IoT Physics Ph.D., personal communications, n.d.).

The discussion with Francis also retained other aspirational guidelines as constants, including ‘Being correct,’ by emphasizing a flexible approach to time. Also, the ‘IoT thinking’ approach accorded with a sociomateriality view emphasizing IoT’s low battery power versus ‘Internet thinking’ focused on speed and volume. Moreover, the IoT thinking approach aligned with the emergent IoT field in which key customers like Acme Worldwide, continued to move slowly. The discussion navigated differing perspectives on funding and pacing.

The Oracle at Delphi served petitioners with enigmatic pronouncements touching on the destiny and realities of the times. As noted, Silicon Valley had pronouncements from soothsayers and commentators. It may be hard to say whether the mantras of the Internet era served an intended purpose or were more accurately ingested into the language of the era, and only later were assigned deeper and more accurate meanings.

In any case, in my Storyteller roles at IoT Inc., I began outlining the principles at IoT Inc. in late 2018. A few months later, I described IoT Inc.’s principles further in a document I sent to Francis entitled “IoT Inc. Principles” distilled from Monday morning meetings, one-on-one meetings, Zoom calls, and meeting notes (Brad, personal communications, February 14, 2019). The document noted IoT Inc. was not a throw-away to be used for high-stakes risk and gambling. It noted a huge up-front investment in a risky bet usually doesn’t end well, and that people were important (Brad, personal communications, February 14, 2019). It noted several of the aspirational aspects in this research as well as other aspects that are not included.

It didn’t note what Bourdieu (2005) said about agents in a field having distinctive positions, who are in this way in “indirect conflict” (p. 208) with others playing the game in the field. In fact, without intending to, said Bourdieu, the actions of an agent may destroy other

agents (2005). Nor did it predict that eighty-nine days after documenting IoT Inc.'s principles I would be dismissed and IoT Inc. would sail on.

Scylla and Charybdis: Time, Money, and Choosing a Pivot Path

Previously Francis had demonstrated he was reluctant to get caught up in the noise of a B2C marketplace. It required Internet thinking and was predicated on increasing volumes and speed. Instead, Francis had chosen IoT thinking. Its slower pace would frustrate the habitus of core members seeking faster returns. In effect, by making the choice, Francis, like Homer's Odysseus (Monro, 1886) chose between Scylla, the six-headed monster, and Charybdis, the whirlpool of the epic tale. Scylla was the slower path. Instead of risking the entire ship with Charybdis, he risked the devouring of individual crew members of IoT Inc. as he followed conservative funding and the B2B enterprise path.

Odysseus's (Monro, 1886) epic voyage adds color to the elements and tensions of the pivot and the implications of the vision. IoT Inc.'s pivot from B2C to B2B required an enterprise sales VP with the metis to navigate uncharted IoT waters (Detienne & Vernant, 1991). The role also required a habitus with commercial capital for discerning how and where the product fits the market (Bourdieu, 2005).

Moreover, trust between the sales VP and IoT Inc. leader was based on maintaining mutual respect as experts each with their respective techne, perspectives, and respective positions of power. Each was aware that to survive the next stage of a high-risk IoT endeavor choices need to be made. In effect, Francis faced a Scylla or Charybdis type of choice when navigating IoT Inc. forward. In this case, Scylla, the six-headed monster entangling, and consuming sailors, represented Time. The path that leaned towards Scylla risked less money but cost more time.

Alternatively, the draining whirlpool of Charybdis represented Money. A reliance on Charybdis risked more money but cost less time (Monro, 1886).

Francis's 18-month cash principle set the path leaning towards Scylla. Scylla was a slower approach and preserved IoT Inc. longer to "be correct" (Francis, personal communication, November 19, 2020). In the Homeric version, the Goddess Circe tells Odysseus that by choosing Scylla's path six sailors will be devoured – their fates are sealed. Similarly, IoT Inc.'s slow speed created a higher risk that the IoT Inc. crew members would be devoured by Scylla. As demonstrated, the tensions caused by the slower speed at IoT Inc. did result in the departure of core IoT Inc. members.

In this sense, Francis's mirrored the choice made by the hero Ulysses in Homer's *Odyssey* (Monro, 1886). Ulysses opts to pass closer to Scylla and loses a few sailors rather than pass closer to Charybdis and risk losing the entire ship in the whirlpool. Francis decided that it was better to maintain flexibility in terms of time. By going against the Silicon Valley consensus and not spending money to succeed or fail fast Francis risked failing to capture and dominate a share of the market.

To navigate the passage, Francis's leaned towards maintaining an unbounded flexibility "to pursue and explore" (Francis, personal communication, January 3, 2019) secured within an 18-month timeframe. As may be expected, the crew at IoT Inc. i.e., the sales team members subject to faster-paced quarterly and annual goals, challenged the Scylla path. They were aware the slower pace consumed their time and capacity to earn commissions. Francis leaned away from managing risk based on linear models tied to spending aka the draining whirlpool of Charybdis (Monro, 1886).

In short, his aspirational rationality continued to seek exponential scaling, as he had noted, greater than one billion in revenues. However, the path was predicated on using time to find patterns of exponential scaling versus the linear power of money. To be clear, Francis's perspective on managing risk didn't exclude either Scylla or Charybdis (Monro, 1886). From Francis's longer-term vantage point, he sought to leverage the dynamic powers generated by each in service of the entire ship while managing the risks that each entailed.

Comparably the aspiration rationality of the core team at IoT Inc., and specifically the sales team, involved a shorter-term and tighter coupling between time and money. The sales and marketing team faced the task of reaching quarterly and annual goals at the same time as they were constructing the organization. Or, as Tristan put it "This is where you get these analogies of building the airplane as you're flying it" (Tristan, personal communication, November 19, 2021).

Navigating the dynamic space between Scylla and Charybdis in pursuit of opportunity influenced everyone onboard IoT Inc. Everyone was keenly aware of how the priorities set by Francis affected the speed of the passage and chances for success. As Vail noted, in the role of CEO "Francis is the constant tiebreaker on prioritization. And prioritization for Francis is all about business opportunity" (Vail, personal communication, April 7, 2021). Moreover, as the captain of the ship, Francis had the power to prioritize the navigation towards opportunity based on a longer-term perspective than the crew. As noted, aspirational rationality creates different perspectives regarding the passage of time, especially in non-Euclidean spaces (Augier & Mahnke, 1998) like those faced by IoT Inc.

At IoT Inc., time was referred to as speed. In other words, while everyone shared the same amount of time, the narratives and perspectives on speed varied. In particular, the sales function at IoT Inc. faced high revenue expectations tied to short-term goals in a dynamic high-

risk environment. Tristan noted, “Sometimes you’re taking off and flying at a high rate of speed. More often most companies crash and burn” (Tristan, personal communication, November 2021). The high-risk, time-compressed environment is common in startups, according to Tristan. In turn, the experience informs the habitus of salespeople in startups. He noted, “It is not unique to IoT Inc. at all” (Tristan, personal communication, November 19, 2021). At IoT Inc., as at other startups, sales belief in the aspirational vision is an aspect of habitus. Moreover, the IoT startup habitus is also informed by experiences, including a high failure rate of IoT startups:

More often, most companies crash and burn. That’s playing out in the IoT space. There are very many kind of bumping along. There's been very many failures. There are less that are having raging success or 'Flying Success' to continue with my analogy. (Tristan, personal communication, November 19, 2020)

Therefore, the degree to which strategic decisions prioritized the speed of sales was carefully observed by salespeople. At IoT Inc. for example, the initial stages of the Acme Worldwide deal were exciting for Tristan:

In some of these scenarios... one big customer, and then you can be off to the races...you figure out what you need in the product, who wants to buy it, the money starts to flow...it’s the beginning of achieving the big vision. (Tristan, personal communication, November 19, 2020)

However, as an experienced startup salesperson, he knew “How well is the plane flying at a particular moment in time” (Tristan, personal communication, November 19, 2020) would be reflected in sales. Tristan noted that at the time of introducing IoT Inc.’s product to Acme Worldwide the transformation of the product’s B2C capabilities to a product with B2B capabilities needed to happen faster to increase the pace of sales. Sales of the Bluetooth gateway

depended “upon that product transformation happening...[but] it was insufficient progress” (Tristan, personal communication, November 2021). It was too slow and cheap from Tristan’s sales perspective. In other words, by leaning towards Scylla (Time) and away from Charybdis (Money) the sales capability to achieve revenue was slowed:

He prematurely cost-reduced the product before product-market fit... believing so strongly in a need for a low-cost product that it was impossible for the engineering team to deliver features that were important to the B2B marketplace. (Tristan, personal communication, November 2021)

In principle, like the North Star, prioritizing 18-month cash served to navigate IoT Inc. in the long term. It was a stabilizing constant in a fractal sea of strategic probabilities. At the same time, IoT Inc. salespeople embodied the product, and their social capital was bound up in it (Bourdieu, 2005). As an enterprise IoT salesperson, Tristan had represented and embodied the aspirational vision of the enterprise version of the Bluetooth gateway to prospective customers. The feedback was positive, but at the strategic level the product required faster development, which was hampered by the aspirational constant according to Tristan:

We're hearing from enterprises. They'll be interested in connecting Bluetooth sensors. We're going to switch to enterprise IoT. Well, the product needs to go through a transformation. We're going to shift to a completely different market from consumer to enterprise the product needs to be recreated. Much of the go-to-market depends upon that product transformation happening and meeting those customer expectations...

Progress was made, [but] it was insufficient progress in the right amount of time. I think that that's a result of the long-term sort of vision that was held. Years later it still needs to be achieved. (Tristan, personal communication, November 2021)

The conservation of time versus money in effect reduced the speed of sales. At IoT Inc., salespeople faced short-term sales goals, their habitus embodied the product, and their path leaned towards Scylla. Odysseus didn't explicitly tell his sailors that he had chosen the Scylla path though he knew six of them were fated to be devoured. In a similar sense, tied to the timeline of an immature product Tristan was frustrated:

The frustration became very acute when we had specific customers evaluating and coming back with very specific product needs and capabilities... 'Give me this feature and I can buy 5,000 units.' An inability to capture that and get it communicated through product engineering so that feature could be delivered. (Tristan, personal communication, November 2020)

In the case of Acme Worldwide, they were in the infancy of testing and rolling out a solution to the market when they began testing IoT Inc. Notably, the relationship with the potential market opportunity of the IoT field occurred via "field sources" within a network of social relations that "deform the space in their vicinity, conferring a certain structure on it" (Bourdieu, 2005, p. 193). As an agent representing the field source, the engagement with Acme Worldwide was an exciting potential alignment of time and money, said Tristan. It was also, according to Tristan, a major opportunity and potential achievement of the aspirational vision. The opportunity at Acme Worldwide matched Tristan's habitus. The opportunity, he said, presented itself uniquely as an IoT opportunity, filled with risk and possibility, within an emergent IoT field:

Because of the complexity and because of the challenges...if you don't have everything lined up, you face a much higher risk of failure. Say there are 10 things. And you're not doing very well on one or two, maybe you're okay. But, if they're critically

important, one or two things out of 10, you could, could fail completely. You have over the passage of time some opportunity to correct them and get enough of the things working correctly enough to get to the next step and reach the next milestone of success, and then continue evolving and tweaking. This is where you get these analogies about building the airplane as you're trying to fly it. Sometimes you pull it off and then eventually you're taking off and flying it at a high rate of speed. And more often, you know, you crash and burn. Most companies crash and burn.

Yes, of course, we had some great moments laying out the vision and strategy. Getting customers interested in evaluating product, testing product, committing to it. But not a sufficient rate of conversion and adoption. (Tristan, personal communication, November 2020)

The sales function at IoT Inc. was expected to employ *metis* by actively engaging in the sales activity quickly without formal training using whatever techniques worked in the situation (Kenney, 2010, p. 180). The sales expertise at IoT Inc. was not just the settled knowledge of *techne*, nor the largely subconscious tacit knowledge of a sales professional. It was like other professions focused on adaptability and ingenuity in fluid environments, a combination of *techne* and *metis*. While trained in sales, Tristan's *metis* was not carried in an instructional manual but was "experiential know-how...accumulated over time and repeated practice" (Kenney, 2010, p. 188). It was also based on moving quickly in a situation like the Acme Worldwide opportunity when it appeared.

However, Tristan's orientation towards sales volume and speed supported by faster product development exemplified the Internet thinking associated with the development of Internet networks. Similarly, Vail decided to strategically pivot away from B2C to the B2B

enterprise market and I decided to cross the chasm to the industrial IoT far in advance of Francis. In all these cases, the perceptions of opportunity at IoT Inc. emphasized higher volumes and speeds, i.e., Internet thinking. By contrast, Francis's organizational choice emphasized a slower pace in alignment with the construction of IoT networks emphasizing the low power needed for long battery life associated with IoT thinking (Francis, personal communication, November 2020), rather than high speed or increased volumes.

To navigate IoT Inc. into a position with Acme Worldwide, Tristan reacted with metis. Once positioned, he needed to set the conditions for IoT Inc. and Acme Worldwide to create a space where together they could create knowledge. This is necessary because an enterprise B2B deal is rarely a short-term process – it typically takes months or years – and it isn't a simple exchange of information. The B2B enterprise deal is a creative process transcending the boundaries of both organizations. Especially in the case of an emergent technology like IoT, a space was necessary to mutually synthesize the intuition and rationality required for long-term value-creation between IoT Inc. and Acme Worldwide. Francis would later note, it took two years for the money to start flowing via projects with Acme Worldwide “You have to be patient with those guys” (Francis, personal communication, March 10, 2021).

In this case, Tristan's metis emphasized speed, essentially cutting corners by leveraging his social network at Big Networks Inc. to penetrate Acme Worldwide. In turn, he quickly set conditions in the early relationship between IoT Inc. and Acme Worldwide to share a physical space at the IoT Barcelona conference. The meeting experience was important, according to Bennie of Acme Worldwide, “in order to build a certain trust space” (Bennie, personal communication, June 25, 2021). As previously noted, the Bluetooth gateway product was immature at the time of the Barcelona meeting. The trust created stemmed from Tristan and

Brad's embodiment of IoT Inc. and the product. The mental ba space created involved Tristan's evangelizing an idea of what the product could be in the future by mutually creating knowledge. However, while Tristan and Brad approached the moment with metis and speed, the knowledge creation necessary for value creation was not supported by a go-fast principle at IoT Inc.

The 18-month cash principle supported the opposite approach. And yet, in retrospect the opposing slow approach directly addressed a primary risk Acme Worldwide sought to address in its relationship with IoT Inc. Acme Worldwide's risk was that IoT Inc. was too small and would lose its main solution if IoT Inc. was unsuccessful and went bankrupt (Bennie, personal communication, June 25, 2021). Fortunately, the mitigation of risk involving the depletion of cash was central to Francis's habitus and principles.

On the one hand, the quick development of the ba space benefitted both organizations. Led by Digital Guru (a pseudonym), it aligned with Acme Worldwide's digital transformation initiative. It empowered IoT tinkerers like Bennie at Acme Worldwide to pursue knowledge creation in support of customer-focused innovation. Acme Worldwide had first access to an innovative IoT Bluetooth gateway technology within an emergent IIoT marketplace. It also connected IoT Inc. with a large and supportive enterprise IoT partner, as Bennie noted:

We had a high interest that you were also successful. If we could establish the [IoT Inc.] gateway as a popular gateway for other solutions. The more companies that would adopt your solution the better it would be for Acme Worldwide. (Bennie, personal communication, June 25, 2021)

Moreover, IoT Inc. would learn the market factors, product features, and other nuances necessary for creating a product aligned with the IIoT market from Acme Worldwide. The short-

term emphasis of the sales arrangement at IoT Inc. favored individuals who could quickly penetrate enterprise B2B organizations like Acme Worldwide via metis.

On the other hand, however, the longer-term curation of knowledge creation via a ba space in pursuit of value-creation created a circumstance where a salesperson, like Tristan, would not receive a reward for his efforts. Instead, Vail curated the ba space between IoT Inc. and enterprise B2B firms including Acme Worldwide. Vail was not subject to the short-term sales goals and curated the ba space with Acme Worldwide over the long term. Eventually, the knowledge created by IoT Inc. and Acme Worldwide resulted in mutual value creation, but by that time Tristan, who had created the bridge between Acme Worldwide and IoT Inc., was gone.

Tristan Taboo Violations

“Talk not to me of blasphemy, man; I’d strike the sun if it insulted me.”
(Melville, 1851/2015, *Moby Dick: or, The Whale*)

It was early 2017 at IoT Inc., and Tristan was frustrated. IoT Inc.’s product was intriguing but immature, resulting in many small test projects, but few significant sales. By the end of 2017, one year after his hiring, Tristan told Francis he’d met “three percent attainment against the goal you gave me and that’s not acceptable” (Tristan, personal communication, November 19, 2020). In short, Tristan was making a base salary, but negligible sales commissions. As he considered the results of 2017 and planning for 2018 was underway Tristan’s frustration grew acute:

I was beating him hard on ‘What’s the goal going to be next year?’ I can’t sit here at three-percent attainment. I need more equity and a comp plan where I can make money. And, ‘What are we doing on product?’ (Tristan, personal communication, November 19, 2020)

The frustration spilled over into the personal relationship between Francis and Tristan. Tristan acknowledges that his departure perhaps could have been avoided if he'd not challenged Francis so directly. By early 2018, Tristan said the relationship of trust was breaking down personally and professionally.

Some of the relationship deterioration is my fault too. [The base salary] it's my paycheck. But I lost motivation to go create these sales opportunities knowing I didn't have a working solution nor a team that could function in that challenging environment and overcome. (Tristan, personal communication, November 2020)

On the one hand, the product of an entrepreneurial effectuation process is fundamentally unpredictable. The opportunity and the market are being created. On the other hand, according to Bourdieu (2005), a salesperson, like Tristan at IoT Inc., is expected to provide clarity regarding the maturity of the product for a B2B enterprise client. With his job performance and income tied to sales goals, yet hampered by a slow product maturity process, Tristan's habitus shifted in and out of sync with the IoT Inc. habitus. As Vail noted, at that time IoT Inc.'s culture was also in flux, continually sliding between "highly functional and...dysfunctional" (Vail, personal communication, April 7, 2021). According to Vail, the maturity of "how we operate(d)" during the first few years of IoT Inc. was challenging. "We were completely broken," he said, noting "there was so much stuff that was dysfunctional" which centered on the "information flow" (Vail, personal communication, April 7, 2021). As time went on, IoT Inc.'s capacity to center priorities around pragmatic business outcomes improved, said Vail.

However, during the earlier period, dysfunctional informational flows took place between people on the United States business side and the Chinese engineering team. In short, between a salesperson like Tristan seeking product functionality required for B2B enterprise sales and the

product team responsible for creating that functionality. Specific examples included software components engineered by the China team for a Western audience, but with no input from the U.S. team. The result was odd grammar and misspelled words, as well as illogical application layouts.

Eventually, the dysfunction and misalignment between IoT Inc.'s product development in China and sales in the United States were mediated by orienting around pragmatic results, said Vail. Francis led this pragmatic orientation by setting priorities. The basis of the pragmatic understanding, said Vail, involved the "business opportunity and size, as it relates to the strategic direction of the company or our revenue and or revenue potential. That tends to be the deciding factor, that overrules culture" (Vail, personal communication, March 18, 2021).

The China engineering team culture was to "get it (the product) in front of a customer" as quickly as possible, "Then the customer will tell us what we need to fix and change," said Vail (personal communication, March 18, 2021). This may be fine for an early-stage company creating a minimum viable product (MVP) seeking early customers, however, "you can't run a company that is six or seven years old that way" said Vail (personal communication, March 18, 2021). Customer feedback on an MVP product is important, noted Vail, but the company can't operate on MVP product cycles unless it has "lots of money in the bank" and doesn't need to generate revenues: "You can't cross the chasm and be an MVP company" (Vail, personal communication, March 18, 2021).

The habitus of a salesperson, said Bourdieu (2005), embodies commercial capital aligned with the field where they are active. In the case of IoT Inc., the salesperson's habitus stemmed from a Silicon Valley Internet field where commercial capital prioritized volume and speed facilitated by a fail fast, spend fast credo. By contrast, the IoT field was emergent, and in the case

of IoT Inc. prioritized low-power, exploration of options, conservation of cash, and longer time horizons.

Additional components of IoT Inc.'s approach to the emergent IoT field were described in a 2019 email as 'IoT Inc. Principles' (Brad, personal communication, February 14, 2019). The principles were captured as a taxonomic description. The principles privileged by IoT Inc. and viewed positively included, "Integrity=brutally honest. Proactively honest. But respectful and humble. No one has all the answers. Maintain harmony of relations and roles. Humble truths." The principles seen as detrimental and viewed negatively included, "Honesty without respect. Honest when required. Hiding the truth is not humble or respectful – it is individual pride and fear. Unstable relations and roles don't matter as long as 'the (my) truth' is told. Prideful truths," (Brad, personal communication, February 14, 2019).

The ongoing balance between truth and trust at IoT Inc. was described as integrity. Notably, the brutally honest positive principle associated with navigating the development of product functionality in the emergent B2B enterprise was embodied by the habitus of the IoT Inc. salesperson. However, a negative principle was also associated with the expression of truth, "unstable relations" (Brad, personal communications, February 14, 2019). In the next section, how the social principles of truth and trust, as an embodied duality within the habitus of the IoT Inc. salesperson at IoT Inc. is explained.

Truth and Trust

When asked to consider the ratio of truth and trust in evidence by the first sales leader, Tristan, Vail said Tristan exhibited a high and important level of truth. However, the way the truth was delivered resulted in a low level of trust, noted Vail. In short, circumstances, where team members at IoT Inc. navigated this balance towards opportunity required face work. It is

along these lines that a respect-based relationship between Tristan and Francis broke down. On the one hand, Francis could be expected to expect a type of respect that accommodated not being embarrassed in meetings, or in face-work and a Confucian sense of saving face in a hierarchy of respectful harmonious relations.

This chapter chronicled pivotal events and themes around how IoT Inc. was creating itself while it also sought to commercialize its product offering. The people of IoT Inc. each brought their own experiences and perspectives about IoT products and startups. IoT Inc. initially took shape based on these experiences and then also in response to their experiences of the market they faced together. As a result, the grand launch into the B2C marketplace pivoted to the B2B marketplace. However, elements of IoT Inc.'s B2C origins lingered in the product and the startup even as a move into the B2B unfolded.

The ritual of Monday morning meetings in the conference room brought these varying perspectives and experiences together – and revealed conflicts and tensions. How power flowed within IoT Inc., the roles, and the taxonomy of social rules was laid bare in the dramaturgy of an annual planning meeting. Individuals expressed specific types of expertise in habitus as a feel for the game, including networking techniques, body language, phronesis's knowledge creation, and cunning intelligence of metis creating inroads into opportunity via autopoiesis.

The habitus and social capital of sales and other roles in the IoT Inc. startup were rendered in the dramaturgy of these formal Monday morning frontstage performances, as well as in informal backstage areas, and hidden-in-plain-sight actions. The core team at IoT Inc. developed the thick skin needed for making headway, and the skillful facework for the team to cohere when stages overlapped, and roles conflicted. They also paid a personal and career price for the constant stimulation of uncertainty and complexity.

The vital role of visions for propelling an IoT startup was made clear. The distinct types of visions – strategic, aspirational, and inspirational – and the various perspectives on these visions and how they conflicted and converged, were described. The principles underlying the aspirational vision were framed within the power structure and came alive in the dramaturgy of hands-on accounts of budgets and goals. The relationship between the CEO’s power and the aspirational vision and the principles informing it revealed the effects of power. The core team reacted to the power aspirational vision based on their various roles, habitus, and strategic goals.

The means to understand the relationship between IoT Inc.’s relationship with complexity, possibility, and opportunity of the IoT startup field turned to the metaphors of Greek myth and quantum physics. It was demonstrated that fractal analogies could be used to better represent the probabilistic nature of the strategic dimensions in an IoT startup. The aspirational guidelines at IoT Inc. were described as fractal constants providing stability to patterns emerging at IoT Inc. In this way, the chapter sets up these themes and their details like wheels in motion that become a recognizable blur. At this stage, IoT Inc. has mass and motion, and it is going... somewhere.

In the following chapter, that somewhere arrives. Despite, or perhaps because of its paradoxes, the themes, and characteristics of IoT Inc. effectuate a recognizable future. In this chapter, I trace and analyze the origins of that future considering my core question: how does leadership in an IoT startup navigate complexity?

CHAPTER 6: WHALE HUNTING AND GETTING SWALLOWED INSTEAD

Call me Ishmael. Some years ago—never mind how long precisely—having little or no money in my purse, and nothing particular to interest me on shore, I thought I would sail about a little and see the watery part of the world.

(Melville, 1851/2015, *Moby Dick: or, The Whale*)

Frontstage and Backstage Lead-up to the Barcelona Event

This chapter serves as a play-within-the-play at IoT Inc., the dramaturgical analysis of the Barcelona event functioning to further the significance of leadership's navigation of complexity. The Barcelona event narrative is structured into three parts, pre-events, the event, and post-events. The pre-events examine how a few individuals enacted the expertise of habitus to strategically position performances at a Spanish conference and beach restaurant to pursue their hunch about an early key prospect. The event further describes the strategies and habitus of the individuals involved, including key individuals at Acme Worldwide who choose to take a chance on IoT Inc. The post-events trace the career and personal implications for the leaders associated with the Barcelona event and a cascade of results stemming from it.

The chapter returns to the analogies of fractal patterns and the metaphors of quantum physics. It demonstrates how entrepreneurial leaders effectuate opportunities using a full stack of knowledge types, specifically metis, and phronesis, to collapse the superpositioned strategic probabilities between IoT Inc. and Acme Worldwide. In turn, these fractal patterns stabilize and scale in a self-replicating process. Moreover, the quantum perspective is relayed in the plain discourse of metis as an entrepreneurial narrative shaped by individuals and organizations in the IoT field.

By way of reorienting the reader, the action kicks off in and around the time of the pivot from B2C to B2B. Tristan is getting frustrated with the lack of enterprise capabilities but hasn't yet given up. Brad is beginning to see clear patterns in IoT Inc.'s markets. Vail is keeping IoT

Inc. steady despite onboarding its first full crew members who see the vision but have different perspectives on how to get there. Francis is reinforcing the aspirational and inspirational visions at IoT Inc. as negotiations over dimensions of strategy rotate around these constants. It's early 2017, IoT Inc. is two years old, and Francis alternates month-long stints between Silicon Valley and Beijing.

Pre-event: Brad Navigates Budgets for a Barcelona Fishing Expedition

Call me email.

Of the several duties of the marketing role, one of them at IoT Inc. was to assemble lists of names, titles, companies, phone numbers, and email addresses. Lists of prospects, events, and conferences, essentially any list relevant to the goals of IoT Inc. The conference lists include details – audience size, cost, competitors, and targeted companies – to determine whether an event was worth the attendance cost. Attendance at these events was a marketing budget item and I was responsible for the results of the events. How many leads and deals could be attributed to attending the event? In short, the results were numbers.

However, measuring the results of a conference event, or other marketing channels, by numbers alone sidelines the quality of results. In short, startups aren't controlled laboratory experiments and spreadsheets of leads aren't scientific instruments. Especially in an emergent IoT field, defining quality essentially becomes, as Pirsig noted, like defining great modern art. We recognize it when we see it. Importantly, Pirsig's concept of quality "are precisely the characteristics of products, services, and processes that satisfy customer needs and expectations," (Hoyer et al., 2001, p. 58).

In short, the expertise of knowing what to do and doing what you know in pursuit of new customers in an emergent marketplace is based on effectuation (Sarasvathy, 2009). As noted in

Chapter Two, Read and Sarasvathy (2005), described this as an ambiguous ‘knowing’ due to situational alertness rather than an efficient and thereby justifiable certainty. In this light determining which conference event to attend involves expertise and habitus, Bourdieu’s (2020) feel for the game. This kind of expertise set the stage for the ensuing series of events culminating in what became known in IoT Inc. lore simply as the ‘Barcelona event’ (a pseudonym). Or in Captain Ahab’s phraseology, IoT Inc.’s version of the hunt for the great white whale. In this case, Acme Worldwide took on innovative technology and is now in the process of swallowing IoT Inc.

To color in the analogy further, the notion of ‘Building the ship as you’re sailing it’ was a common description of activities at IoT Inc. during this time. For example, marketing at IoT Inc. included product marketing, account-based marketing, email marketing, branding, and marketing via partners. All these broad categories interlink within the company as well as with the marketplace in an ever-changing dynamic oriented towards elevating awareness, revenues, and sales opportunities for IoT Inc.

On their own, each of these categories was a whirlwind of details. The event process started with creating and managing a list of events and an event budget while aligning events with strategic goals and opportunities. Deciding which events to attend was like placing a bet. Moreover, the execution of the Barcelona event included international travel, coordinating meals, and press releases, as well as pre-and post-outreach to potential clients, partners, and media. Finally, the all-important reporting on outcome metrics results would follow back at IoT Inc.

To understand the lived experience of IoT entrepreneurs, and how it relates to the application of expert habitus for navigating complexity, the details of the Barcelona event are provided. In mid-March 2017, while working as a contractor at IoT Inc. Tristan forwarded an

email to myself and Vail about the 2017 Barcelona event which included the comment: “@Brad- we have this event slated in our operating plan but have not yet committed” (Tristan, personal communication, March 13, 2017). A few days later Vail included me on an email string between himself, Tristan, and a representative of the Barcelona event who was seeking to secure IoT Inc.’s commitment to attend the conference. The email string dated back to January 11, 2017, and described the costs of exhibiting at the Barcelona event, as well as speaking and award opportunities. It culminated with Vail’s comment “Yes, we are still definitely interested” (personal communication, March 15, 2017).

The Barcelona event was also included in a series of interactions with PR Agency #2 through June 2017. To be clear, during these early considerations, and given Francis’s emphasis on cost containment, the expectation was Francis would not agree to fund the trip. In an email to Francis, I wrote: “Marketing update – August 10. Acme Worldwide – received case notes from Tristan, IIoT monitoring, will be at the Barcelona event - ongoing” (Brad, personal communication, August 10, 2017). I reported that I was monitoring the Tristan and Acme Worldwide interactions as this would help with the decision to attend the Barcelona event. In response, Francis wrote that as I was traveling to the Silicon Valley home office in the following week, we’d discuss the update in “detailed in-person meetings” (Francis, personal communication, August 11, 2017).

On August 22, 2017, I sent an email inquiry to Tristan “Market ready-Product feature fit priority” with an analysis of four industry sectors – IIoT, Retail, Health/Medical, and Smart buildings. In the email, I noted the analysis was “based on the whiteboard session last week” and sought confirmation on prioritizing the IIoT market sector. The analysis included Acme

Worldwide as an exemplar customer in the IIoT industry sector. In a follow-up on August 23, 2017, I sent an email to Tristan, Francis, and Vail recommending attending the Barcelona event:

Based on the call with Acme Worldwide today and their preliminary order of IoT Inc. product (congratulations Tristan), I recommend attending the Barcelona event show with Acme Worldwide to support:

- 1.) Successful IoT Inc./Acme Worldwide solution launch at Barcelona event
- 2.) Face-to-face meeting with Acme Worldwide for guiding next (larger) Acme Worldwide order of IoT Inc.
- 3.) Meeting to set up joint marketing

As Acme World (is a) primary sponsor at Barcelona event there and I've secured free entrance to the event there are likely other opportunities we can find there. However, in order to ensure we remain in budget for October, we need to set up travel, etc...asap.
(Brad, personal communication, August 23, 2017)

It is important to note that the number and types of other activities at IoT Inc. at that time were substantial and dynamic for everyone. Multiple events were in the planning stages and meetings with new prospects were ongoing. My own frenetic pace, including monthly travel to Silicon Valley. However, it was often less than the travels and activities of other members of IoT Inc. Comparatively, I'd spent weeks working at my home in the Midwest while Silicon Valley area members of IoT Inc. spent hours commuting daily. Denim and Tristan were flying to meetings with prospects nationally. Francis was alternating between a month in the U.S. and a month in China. It is in this context that the final decision to travel to the Barcelona event, though detailed in plans and emails, was never, in a formal sense, blessed.

I terminated the contract with PR Agency #2 not long after joining IoT Inc. full-time in July 2017 and took on the public relations activities at IoT Inc. Moreover, IoT Inc. was announcing a new enterprise product the ‘IoT1000’ (a pseudonym). Francis asked me “When do you think will be the best timing for the IoT1000 announcement?” (Francis, personal communication, August 8, 2017). In an email exchange with Tristan and Vail, I wrote the “biggest bang per market event is based on how well the new value proposition/story of the IoT1000 aligns with a specific market” and recommended the “industrial IoT market” (Brad, personal communication, August 29, 2017) which fit the focus of the Barcelona event.

On September 6, 2017, I registered for the Barcelona event. At that same time, Spain was experiencing a Catalanian independence movement and an independence vote was pending. Barcelona was engulfed in mass rallies, and, in turn, violent police actions (Lowe, 2017). In that environment, Tristan and I made quick decisions. To avoid civil unrest we moved our accommodations out of Barcelona to a hotel in a nearby city. Public transportation was spotty due to work stoppages. We rented a private vehicle to leave for Spain if necessary.

As a Silicon Valley IoT organization steeped in the habitus of moving fast and breaking things, IoT Inc.’s scripts and protocols did not exhibit the kind of bureaucratic guardrails that can stifle innovation. As noted by Letiche and Statler (2005), this allowed for a certain communication fuzziness and room for interpretation whether in meetings or written weekly updates to the IoT Inc. leader. In effect, lacking a strong organizational response from Francis, the two actors who eventually represented IoT Inc. in Barcelona took the initiative. As per Letiche and Statler (2005), their actions are in keeping with how *métis* “operates without a map” (p. 8). In their words, “Metis gets its chance when there is confusion in unresolved

circumstances, and a lack of clear direction” (p. 7). In short, there was room and reason to act with metis.

As the next section illustrates, Tristan was particularly adept in finessing his social capital in pursuing digital entrepreneurialism which resulted in the Barcelona event.

Pre-event: Tristan Leverages His Big Networks Inc. Social Network

Tristan says that as a salesperson in a Silicon Valley startup, he was expected to figure out how to navigate identifying potential customers even when the products were still not entirely clear. Whatever training occurs inside a startup it is ad hoc, and minimal. In his words, “Usually in startups, there’s not a lot of training. Call these people up. Not necessarily how. You know ... (laughter) ... just ‘Call’em up!” (Tristan, personal communication, November 19, 2020).

As Tristan recalls the method of how he first “got on the trail” of Acme Worldwide it started sometime in April 2017.

I was Googling for Bluetooth sensors. I found a press release about their [Acme Worldwide] smart sensor product. [I] turn(ed) to LinkedIn to see who I knew at the company. I saw a path and relationship to a former Big Networks Inc. exec that [had] moved over from Big Networks Inc. to be the chief digital officer at Acme Worldwide. I reached out to that individual and he referred me to ‘Bennie’ (a pseudonym). (Tristan, personal communication, November 19, 2020)

The ex-Big Networks Inc. executive that Tristan reached out to was ‘Digital Guru’ (a pseudonym). In 2014, Digital Guru ended his 20-year career at Big Networks Inc. as General Manager of its IoT division where he had been instrumental in starting nine new IoT start-ups. Digital Guru took over the new role at Acme Worldwide in the fall of 2016 as its new Chief

Digital Officer, having been charged with leading that well-known industrial organization into a new digitized manufacturing era.

Tristan contacted Digital Guru directly on LinkedIn as soon as he discovered that he was now at Acme Worldwide in April 2017. Tristan sent an invitation to connect directly on LinkedIn, as well as a message about IoT Inc. Digital Guru didn't respond to the request to connect on LinkedIn but did refer Tristan's LinkedIn message with information about IoT Inc.'s long-range Bluetooth gateway capabilities to Bennie, who worked at Acme Worldwide. As Bennie later recalled:

The very first connection came from Digital Guru. Yes. He heard about you [IoT Inc.]. He forwarded me a mail, something like, 'Hey, Bennie, I heard you're doing something with Bluetooth. Is this interesting for you? And then I saw your gateway. I looked at the products. I said, 'This might actually be quite interesting.' (Bennie, personal communication, June 25, 2021)

In retrospect, Tristan recounted his process of engaging with Acme Worldwide as a *techne*, or series of rational steps. This is characteristic of how *metis* is expressed in retrospect and turned into a *techne*. Tristan put the process this way:

1.) Google web search "Bluetooth IoT" to find a press release reference to Acme Worldwide, 2.) search LinkedIn network for connections at Acme Worldwide, find Digital Guru 3.) send a LinkedIn message to Digital Guru, 4.) Digital Guru refers me to Bennie, provides email 5.) Email Bennie 6.) Bennie replied, schedule meeting 7.) send evaluation unit etc. (Tristan, personal communication LinkedIn, November 15, 2021)

Yet, Tristan also noted that the practice of networking as a sales agent in the emergent field of IoT had a "sort of mysticism to it":

...across the industry that's what we've asked sales development reps to do day in and day out. 'Who are the potential buyers? Go find them!''... Instead of knocking on doors and asking people 'Would you use this stuff?' and 'Would you like to buy?' It's go out on the digital information cornucopia, see what you can pull out, get some clues, and follow up from there. (Tristan, personal communication, November 19, 2020)

Analytically speaking, the ability Tristan refers to above is both cookbook obvious and what sales development representatives do every day. It intentionally maximizes the core advantage of Granovetter's strength of weak ties, which is that even previously glancing contact with someone can prove a valuable resource for getting access to a group. But within Silicon Valley, this basic 'Rolodex' strategy gets augmented by a distinctive startup habitus that includes an unconscious capacity to navigate towards opportunity within the field of innovative digital technology.

As noted in the last chapter, at this time IoT Inc. was steeped in a swirl of ambiguities about its proper product packaging and customers (i.e., pivot to an enterprise business market or stay with individual customers). Thus, the template for what the enterprise customer looks like and how the product might need to change to accommodate its utility was only vaguely defined. Also, the necessary engineering and manufacturing steps needed to achieve the template were still on the drawing board. In this environment, a salesperson like Tristan is employing the well-practiced techniques of the Silicon Valley habitus on a near-unconscious level. At the same time, he is employing those techniques in an IoT context and getting a feel for the patterns that make up this new IoT field.

Tristan understood from the beginning he was not stepping into a situation at IoT Inc. in which he had a well-defined product, despite its event award-winning status. Instead, he brought

a disposition within his Silicon Valley startup habitus that specializes in navigating an emergent space. Note also how Digital Guru ignores Tristan's invitation to personally connect on LinkedIn. However, he has opened and read Tristan's LinkedIn message and was sufficiently intrigued with the Bluetooth gateway premise to forward it to Bennie for follow-up.

Digital Guru is another denizen of the Silicon Valley habitus, and one might characterize his response as something like, "What the hell? You never know...." In addition, in the emerging field of IoT, neither the product's makers nor the customers quite know what the product is and how to use it.

To augment the theories of Granovetter (1973) and Bourdieu (2020) for a moment in this analysis, Detienne and Vernant (1991) describe the kind of strategy voiced by Tristan as *mêtis*, a quasi-additional form of capital with classical Greek roots. They consider it a shrewdness akin to that of an octopus who routinely outwits its wiser and more powerful captors by regularly escaping its holding tank by adroit use of twisting maneuvers and conforming itself to seemingly impossible shapes and sizes. Detienne and Vernant (1991) note the key suitability of *mêtis* in entrepreneurial settings, wherein environmental and other relevant dynamics requires a coming-to-be orientation.

Along similar lines, Chia (2017) described deft organizational learning as a form of wayfinding that substitutes for clear navigational or geographic goals. It requires the pilot to read the current, water depth, wind, and other conditions and make often subtle course directions that eventually lead toward a suitable harbor as conditions indicate.

Tristan knew the short-term sales goals he was being held to at IoT Inc. were mostly incompatible with the longer-term processes needed to create tangible value (as measured by margins and sales commissions) for the startup's product. From a sales perspective, the halting

process of value-creation manifested itself as product problems, like numerous challenges aligning selling expectations with product capabilities. He needed big sales numbers “in order to make any money” (Tristan, personal communication, November 19, 2020). However, the time-bound quantitative measures applied to the sales process only partially considered his perspective and the reality he faced.

Meanwhile, after receiving the information about IoT Inc.’s product, Bennie’s habitus kicked into gear. He contacted a colleague in the United States and asked him to further evaluate the IoT Inc. gateway “and he pretty much ignored my email” (Bennie, personal communication, June 3, 2021). Even in Silicon Valley and multinational companies and notwithstanding the strength of weak ties, these things happen. Time passed. A couple of weeks after the Barcelona event, Acme Worldwide checked with IoT Inc. to see if stable production at the scale it required was feasible. That too went badly after an Acme Worldwide inspection of the IoT. Inc. factory in China went badly to the point “...where our people were really disappointed because they [the factory] did not follow any kind of work instructions and the environment was very poor and so on...” (Bennie, personal communication, June 3, 2021).

Bennie’s perspective on the Tristan/Digital Guru email exchange highlights a key difference between a startup like IoT Inc. and an enterprise organization like Acme Worldwide that applies even within the emerging IoT technology field. A decision to move forward with the relationship can succeed or fail. On the one hand, the much larger, more stable organizations like Acme Worldwide require a process of phronetic reflectiveness based on considerable experience and the knowledge gained from it. On the other hand, the orientation of a small startup like IoT Inc. is less reflective, using *mêtis*-driven processes focused on expediency or even the whims of

an entrepreneur/owner. The two different processes, one reflective phronetic and the other ad hoc and expedient may align and cohere, or repel and disband, the initial connection.

When a relationship that works for both sides develops it may also take a fair amount of time and some level of a personal relationship between at least a few key actors. The wayfinding space required to determine the basis for a formal agreement is held open by the personal relationships constructed, a kind of intermediate third space not initially discernable to either side. Particularly within the field of digital startups, the effect on the career paths of product lines as well as actors can exhibit earmarks of quantum reality.

Showtime: Briefly Back to Barcelona

Salespeople, says Bourdieu (2005), are like instinctive actors who always play the same role, inhabiting these roles with their habitus. Similarly, then, such salespeople approach any deal they are seeking to win, and “engage all the resources of a system of dispositions that turns out to be the more effective the closer it is to the clients’ own” (p. 157). From this perspective, salespeople practice a kind of ‘ambiguization’ within the development of a personal relationship between the salesperson and the customer. The performance of the role forms the initial foundation for contractual trust and business.

That can get ‘dicey’ when a salesperson is getting frustrated with the product. At the Barcelona event, Tristan was uncharacteristically negative while initially walking the booths at the event during the setup period. He had begun to sour on the viability of his role at IoT Inc., and it took work for him to play the part of the enthusiastic salesperson. But the materials we had brought looked quite sharp. Bennie gave Tristan and me a friendly welcome to the Acme Worldwide booth. The Bluetooth gateway wasn’t part of the official plan by Acme Worldwide’s

booth. The addition was an ad hoc setup, a digital addendum added to one of Acme Worldwide's industrial products.

In a stroke of good fortune, the Bluetooth gateway's soft white color palette, a holdover from its B2C origins, matched Acme Worldwide's booth design. The traffic was brisk at the booth and IoT Inc.'s Bluetooth gateway was set up as a live demonstration. Given the product's immaturity, a live demonstration was risky. The risk was one of the reasons why we made the trip. The IoT Inc. product acted like the not-yet-mature product it was, losing connectivity and data. We made calls to the IoT Inc. technical team and nervously fussed. Tristan alternately swore under his breath and then kicked back into his sales mode.

Bennie laughed. His delight in playing with and inventing things with electronic circuitry started when he was young and never abated. "That was always my thing" (Bennie, personal communication, June 3, 2021). His tinkerer's habitus went to work alongside our efforts to fix the IoT Inc. product. Bennie's own sales side directed booth visitors' attention to Acme Worldwide's vision of the IIoT, rather than a live demonstration of the product. In turn, Tristan brightened up and was enthusiastic with booth visitors who were unaware the IIoT demo wasn't fully operational. Other Acme Worldwide people seemed impressed, and Bennie had demonstrated a willingness to pull IoT Inc. a bit further inside Acme Worldwide's sphere.

Tristan and I put on a business dinner at a restaurant on the beach in the Spanish beach town where Bennie and other Acme Worldwide personnel were also staying. We had reserved a table on the beach to solidify relationships and the deal. There is an art to a good business dinner, where a constant flow of food, wine, and conversation combine to carry everyone forward in a relaxed convivial mood. This is not research into that art, but to provide a snapshot we set a tone of largesse by immediately ordering several bottles of wine and an abundance of appetizers. A

rule of thumb learned years before was enacted: Wait until the second bottle of wine to exuberantly raise a toast of remarkable success for all involved. The signals from the dinner were good.

As Bennie - the business unit manager at Acme Worldwide who had been instrumental in getting us invited to the conference - noted, the Barcelona meeting was the first person-to-person contact between IoT Inc. and Acme Worldwide. When interviewed about his sense of the first interactions between Acme Worldwide and IoT Inc. Bennie said he didn't remember much, including the first time he received an IoT Inc. Bluetooth gateway unit for inspection before the Barcelona event. "I just remember, basically, you two guys" (Bennie, personal communication, June 3, 2021).

When pressed for a bit more on those first 'business discourse' interactions he had with IoT Inc. (for example emails, phone calls, and shipping and receiving of products) he explained his first response a bit further. Specifically, the social interactions at the Barcelona booth and the dinner on the beach removed residual doubts about the two-year-old IoT startup from Silicon Valley:

I think, yes, by these kinds of meetings, you build a certain trust space. I mean, you get to know people. You can find out a bit more... How much is just smoke and [mirrors]... If there is really something behind the curtain...whether they're engaged and so on. I think that is of course helpful.

...We certainly gained a bit of confidence. You know, 'They are real people behind IoT Inc, and they are people who are interested.' They seem 'seal the deal ready' and are legitimate.' It was a good step for trust-building. But no formal acknowledgment

of any kind followed, where we say like, ‘Okay, now we can go on,’ or ‘Now we drop this IoT Inc. possible relationship. (Bennie, personal communications, June 25, 2021)

The process of building trust was not a one-off event. As Bennie noted, the Barcelona Event did not result in a pronouncement that IoT Inc. was a trustworthy organization from which Acme Worldwide would purchase countless units. Hence one had to be there to appreciate the beachside dinner’s ambiance of exciting potential and measurable sales results. However, Francis, the ultimate arbiter of success for IoT Inc. was not there.

Most of the last few pages have concerned how Tristan interpreted and acted out his role at IoT Inc. In addition, the discussion included some of Digital Guru’s and Bennie’s activities in addition to some of my own. Building on Bennie’s comments on what it takes to establish a solid business relationship between a small startup and a much larger entity amidst the go-go Silicon Valley atmospherics in which they were operating, did the actors’ habitus and *métis* gymnastics work?

The exact phrasing of the above question suggests a clear yes-or-no answer. But ever since Einstein’s (1920) thought experiment in which the speeding train’s whistle sounds quite different depending on one’s location outside the train, physicists have been obliged to account for the apparent bundling of sound and speed such that neither acts as an independent actor. Electromagnetism – the dynamics of how subatomic electrically charged (i.e., with + or - polarity) matter interacts with magnetism – seemed to feature similarly independent agents until, post-Heisenberg, they weren’t. Thus, quantum physics has been obliged to observe the uncertainty principle (Heisenberg, 1985) regarding the measurement of subatomic matter, which is in constant flux. Light, for instance, effectively acts as either a particle or wave or both, depending on circumstances. Yet you can’t measure which it is at any given point because doing

so compromises the subatomic dance of particles. Even time, like Einstein's train whistle and the galaxy pictures being taken by the Hubble Telescope, is a function of space travel.

Earlier in this study, nautical metaphors buoyed by Moby Dick, Odysseus, Jason's Argonauts, and intrepid sailors have periodically served the purpose of representing the birth of IoT Inc. As the recounting of sailors' actions progressed, analogies pointing to fractal patterns better served to relate how the inhabitants of Silicon Valley startups constantly operate. As such, analyzing the Barcelona event actors' thinking and actions requires a two-fold analysis: 1. Did they further the near-term goals and needs of their respective organizations? and 2. How did that thinking and those actions play in the longer-term future?

Post-event: The Short Tenure of Silicon Valley Change Agents

This section discusses the trajectory of the key actors over the next few years. As befits the Silicon Valley startup motto 'Move fast and break things,' it depicts a series of apparent victories that don't last and defeats that refuse to stay that way. One might even say the description of a Silicon Valley IoT habitus interacting with the IoT field is like the iterative process of an autopoietic fractal pattern.

Digital Guru's Trajectory: A Constant in a Transforming Pattern. Tristan reached out after reading about Digital Guru's new role at Acme Worldwide in April 2017. Digital Guru was brought onto Acme Worldwide based on his track record of digitally transforming large established businesses. Digital Guru joined Acme Worldwide in late 2016 and announced his departure in mid-2020; a tenure of just under 3 ½ years.

His task was to find a technology that could deliver on an industrial scale, which if successful would comprise a significant digital transformation. IoT Inc.'s Bluetooth technology at the time was not up to the task, and Francis was only tepidly moving it in this direction, but

Digital Guru thought it worth looking into. He needed something like it to transform Acme Worldwide, an industrial manufacturer, into an integrated digital organization. In turn, if it were to happen Digital Guru knew a rebranding of the well-established manufacturer powerhouse, as a digital enterprise, was needed. Bennie had an inside view of Digital Guru's shift to a digital brand at Acme Worldwide:

He really did the digital transformation. He initiated, [and] I think, the biggest success of Digital Guru... was this whole 'Acme Worldwide IIoT' (a pseudonym) branding. The 'IIoT' is not one product. Though many people really think about it [as one product]. And that is a good thing. Then suddenly people become aware of how many solutions - digital solutions - Acme Worldwide already has. I think that was his biggest success story.

...getting a grip on the digital solutions. But it was the reframing of digital solutions towards knowing what the customer needs and how I can get business out of [that need]. I think for me that was a big transformation. I learned a lot from this, and I think that it really spread over many, many Acme Worldwide [business] units. (Bennie, personal communications, June 25, 2021)

Bennie considered Digital Guru a talented digital transformation leader. As a testament to Digital Guru's record of success were the eighteen separate business units he integrated with digital technology and protocols during his tenure. So why did he leave Acme Worldwide? As Bennie also noted,

I think the problem in the end, and that's the reason, I guess, why he also left Acme Worldwide in the end... There was this... some would say [mysterious] group around the [new] digital units that was pretty disconnected from the base. Also, [they

were] very expensive employees. I think there was a huge overhead which was created. Which must have cost a fortune every year... [initially] without a lot of tangible [monetary] outcome out of this group.

They brought a lot of change in Acme Worldwide... A lot of *good* [italics in original] change But I think the group as such... And I think there were many people who would not really contribute much [at the beginning]. (Bennie, personal communications, June 25, 2021)

Not coincidentally, Digital Guru's major C-suite champion left Acme Worldwide just before he did; another aspect of the dynamic nature of the autopoiesis in which he was operating.

Another way to interpret Bernie's account of Digital Guru's rather brief time at Acme Worldwide concerns the nature of his role there. He was hired as a 'change-maker' to bring digital transformation to Acme Worldwide. One IoT industry expert I interviewed had himself interviewed Digital Guru following his departure from Acme Worldwide. He characterized the departure as part of the job description for which Digital Guru was hired. The IoT expert then reflected on the phenomenon of how an individual like Digital Guru first takes on, and leaves behind, a role like a chief digital officer. The change-maker role includes a mandate to transform an organization, he explained:

If you're introduced as a change-maker...you're either going to make it or break it in 18 months. And even if you make it, then you're probably on six-month intervals from there on out to always continue to prove value.

The chief digital officer has an industry-specific grounding in digital experience that is relevant to the people they are leading such as within manufacturing [at Acme]. As

such, they can demonstrate they are experts in digital manufacturing, for example, or can pattern match by applying digital from a separate industry to another. The chief digital officer then matches the digital pattern in the form of storytelling; especially the use cases from other industries and why and how they will apply to the new industry. (IoT industry expert, personal communications, December 7, 2020)

Hence, Digital Guru appears to have been quite successful in his role as a change agent at Acme Worldwide. It is also notable that he discerned and propelled a dynamic pattern in the IIoT at Acme Worldwide with elements like Tristan and Brad's efforts at IoT Inc. At this point, Digital Guru's participation in that pattern longer-term continues and is discussed in a few pages.

Bennie's Trajectory: Tinker, Transformer, Learner, Leader. Bennie was at Acme Worldwide for well over a decade, concluding four years as the digital leader in the sensor business unit that brought the IoT Inc. product into Acme Worldwide. He left Acme Worldwide four months after Digital Guru's departure but went on to head up a research and development unit at an organization providing IoT products worldwide. The new role involved a clear focus on a market with which he could become familiar from top-to-bottom; not something afforded in his Acme digital leader posting.

Bennie said reading the book *Crossing the Chasm* (Moore, 2014) characterized the initial problems Digital Guru and the business unit leaders faced at Acme Worldwide. The evolving technical capabilities of Acme Worldwide's innovative product had to be developed in conjunction with ambiguous and emergent market factors. Trained as an engineer, coming to grips with working with and reconciling these emergent factors was a change, said Bennie. It required reconciling two key and uncertain factors, "develop[ing] the market and prepar[ing] the

clients [at the same time]. [Only then] it became clear [to me]. That's why I was promoted as a digital leader" (Bennie, personal communications, June 3, 2021).

However, because Acme Worldwide is a "huge company and requires a lot of coordination," organizing the new Acme Worldwide digital product with any business unit's marketplace was challenging, he said:

Basically, you don't get to work closely enough with the [Acme Worldwide] sales team. Also, while my boss Digital Guru was responsible for organizational revenues of four billion, I was projecting a few million in revenues. [Comparatively speaking] that is nothing. (Bennie, personal communication, June 3, 2021)

By comparison, Bennie's new IoT organization faced a much easier nut to crack because it was "super focused on finding the best fit" (Bennie, personal communication, June 3, 2021) between identified clients' needs and less nebulous platforms than IoT Inc. could offer when Bennie was an Acme Worldwide digital leader. Within the near and longer-term mode of analysis I am using here, Bennie also met his Acme responsibilities while learning much along the way. He leveraged both to compile sufficient IoT phronesis to assume a leadership role in an IoT organization integrating his tinkerer interests and digital transformation leadership experience.

Tristan's Trajectory: Autopoiesis. Tristan's disposition as a well-seasoned Silicon Valley product sales aficionado enabled him to quickly see how the nascent IoT Inc. product could reshuffle the emerging enterprise IoT field. He also knew it could enable economic prosperity for IoT Inc. and himself. In Bourdieu's (2005) terms, Tristan was accurately engaged with the truth of the interaction within the IoT economic field as rife with sometimes contradictory forces and struggles. Tristan was also instinctively aware of the triad relationship

that Bourdieu noted develops between buyer and seller agents, as well as the social spaces in which they operate. As interpreted by Vail, who was always holding things together at IoT Inc. as described in the last two chapters, Tristan's calculations were quite accurate.

Tristan was largely correct. ... Francis acknowledges today that Tristan was much more of a visionary and thought leader...Tristan was a real *visionary* [italics in original] and had really thought about things much more than just a regular sales guy. He was really pushing the envelope where we needed to go from an industry perspective. (Vail, personal communication, March 18, 2021)

However, to return to the field of quantum mechanics for a moment, Tristan's habitus and social space were highly autopoietic. In other words, it produced more complexity than IoT Inc.'s environment produced. IoT Inc.'s complexity was constrained by Francis's aspirational vision and guidelines. In terms of constructing a scalable pattern, the constants of Francis's aspirational vision provided anchor points for stability in the emergent IoT field. Tristan picked up on that, but Francis's IoT field constants contradicted the constants of Tristan's Internet field habitus. In the Internet field, a stabilizing constant is spending fast and breaking things, whereas Francis's IoT field constant was going slowly against the consensus and being right.

Should the developing Bluetooth product remain tethered to satisfying the high-potential, but high-cost B2C market or take on more risk by moving faster toward a B2B model? For Tristan, the question was misguided. IoT Inc. had committed to the B2B market, but at key points like the Barcelona event, Francis systematically dragged his feet. Francis sometimes shared quasi-mystical accounts of his hesitation to give Tristan - and I - the reins to move full bore toward IIoT. However, more tangibly he insisted on maintaining the bottom line coupled with small investments based on negotiations over dimensions of strategy.

The conflict between the dispositions of Tristan and Francis is socially constructed, an inherent tension within the startup field of startups as regards Tristan's role. In his autopoietic boundary role, Tristan was providing the necessary feedback from the market necessary for IoT Inc. Yet, his primary role was to bring in sales revenues and disturbing the social order with feedback, however necessary, had limits. Was Tristan to provide significant sales revenue regardless of the state of the existing platform or leverage his experience and feel for the state of IoT technology to push toward where he thought it was heading? Tristan's habitus adopted a *métis* response to find a pathway that might lead to a successful cache of IIoT uses and purchases. By Vail's reckoning, Tristan's analysis of the situation at the time was right on. Organizations like Acme Worldwide were bound to be looking for a reliable Bluetooth platform to add better quality and speed to their operations:

I think part of the problem ...and the challenge for Tristan was that it was a little bit early... what I mean is that he could see where we needed to be and that's what he wanted to sell. But the company didn't have the resources or the product to address a lot of the things that he was identifying. (Vail, personal communication, March 18, 2021)

Here Vail is acknowledging that Tristan's assessment was accurate but could not be quickly enough acted upon, which was Francis's position. In fairness to Tristan's role, however, attempting to maintain a balanced budget coupled with small infusions of new investment capital was not the standard Silicon Valley way.

Tristan's exit from IoT Inc. led to a series of sales leadership roles at technology and IoT startups, with varying environments, but similar outcomes. Vail's earlier description of salespeople being in a double-bind when it comes to missing or successfully reaching sales goals seems to resonate - they're damned if they do and damned if they don't. Several years ago, the

Silicon Valley startup Tristan was at was acquired (and he with it) by Big Networks Inc. The rewards were high. In a fractal sense, the experience of fractal scaling from the startup to Big Networks Inc. was part of Tristan's habitus. He made several more attempts, including at IoT Inc., to position himself in a fractally self-similar situation. However, Tristan learned being hired by a startup for his skills to create the conditions for growth, as well as landing sales deals, routinely put him in a precarious situation with those in power. Like Digital Guru, Tristan's role as salesperson/ change-maker has a short shelf life in the IoT field:

I'm recognizing that I need to learn how to be better at shutting my damn mouth. Because it's like, Oh, you hired me to do this. You said you wanted me to do this, and that you needed someone like me to drive change and figure it out.

**** you. You don't want to drive change. They say they do. They don't. Oh, wait a second. Change is painful. You mean, I have to admit I'm wrong about something. I'm not doing that. I think I'll fire you instead. (Tristan, personal communication, November 19, 2020)

After some reflection about his career and the people connected to it, Tristan acquired employment in a sales role at an enterprise technology company with annual revenues in the billions. He also moved out of Silicon Valley to a burgeoning technology hub in a south-central state. Recently, he further distanced himself from his startup sales past by shifting laterally at that enterprise firm into a customer success role. In that role, the use of his combined technical and relational skills and acumen is expected.

Vail's Trajectory: Seven Years in IoT Inc. A summary of Vail's trajectory seems indicated because while he was only a bit player in the Barcelona event, he knows the key actors. He also was in a position of special insight into how I, Tristan, and Francis played our parts.

After working seven years at IoT Inc., Vail left in the early 2020s. By then his stock shares were fully vested, so he resigned and acquired a chunk of them.

At the time I asked Vail what he made of his time at IoT Inc. and what he thought the future would hold for IoT Inc.

This is the longest I've ever been with a startup company. It's hard to know where things are going to go [with IoT Inc.]...Francis was so darn conservative. It is good [in some ways]. I've been getting a salary for a while. But it's also kind of painful with regard to trying to grow the business. It [and by implication Francis] just continues down the same path of not wanting to spend any money on marketing. It's a big, big challenge for the company. (Vail, personal communication, April 7, 2021)

Vail not only departed IoT Inc. but he, like Tristan, also moved out of Silicon Valley. While still at IoT Inc. his body threatened to quit on him and he was diagnosed with severe stress and anxiety, which he attributed to working in startups as well as Covid and some personal issues.

I literally was crazy...I started talking to a counselor. I told the one guy (counselor) I'm a musician and I keep playing the same eight bars of music over in my head, like a thousand times. I can't turn it off... It took me months to stop feeling like a crazy person. (Vail, personal communication, March 18, 2021)

On the one hand, the IoT startup field attracted people whose dispositions can accommodate and navigate persistent complexity and uncertainty, who are, as Francis once said in a tongue-in-cheek way, a "little crazy." On the other hand, working in startups within the emergent IoT field exacts a toll, as Vail noted:

I paid the price of all the years of startups...It finally caught up to me...It was like a spiral...one of those things in the ocean where it's the funnel [about to drag everything under] ... It was the additive effect [of personal circumstances, the pandemic, and startup work] that pushed me over the cliff. (Vail, personal communication, March 18, 2021)

Following the period when Tristan and Denim had departed IoT Inc. in rapid succession, Vail and I did our best to pick up their potential sales deals as well as in our regular roles. During that period, we shared an insider's understanding and a joke that referred to the crazy aspect of working at IoT Inc. Stress levels were high and the "How tight is your thong?" phrase was born. It referred to the movie *Borat! Cultural Learnings of America for Make Benefit Glorious Nation of Kazakhstan* (Baron Cohen et al., 2006) in which the main character wears a ridiculously bright, and tight, green mankini. It was common for Vail and me to start a conversation with "How tight is your thong?" to laugh away some of the pressure.

Vail reoriented himself and with support, eventually felt healthy again. In conversations both before he left IoT Inc. and following his departure, Vail said he had one or two more startups in him. While seeking to join a new startup, he employed his social capital to ask me to serve as a job reference, which I did enthusiastically. Vail joined another digital startup in a south-central state with a blossoming high-tech environment in 2022. Not all, but some things die hard even in Silicon Valley.

With access to Francis and a finger on the rhythms of startups, and IoT Inc. in particular, Vail could see which way the Barcelona event would go. When it proved fruitful, but Tristan was removed as Acme Worldwide's champion at IoT Inc. Vail assumed the role and made himself, as he often did, indispensable, especially after Acme Worldwide experienced a major reorganization removing Digital Guru and Bennie.

With projects spread across multiple time zones, Vail became the constant in IoT Inc. and Acme Worldwide's relationship. Vail held things together though he would downplay his role and the stress of it, which caught up to him. In turn, Vail had a steady paycheck at IoT Inc. for years where he applied his startup habitus and musical proclivity, orchestrating a working Bluetooth gateway network model in the IIoT:

We've been able to leverage...a lot of the learnings and fundamentals that Acme Worldwide took us through...[including] the market fit from a feature set perspective on the gateway ... I mean you name it. We benefited from that Acme Worldwide relationship and extend[ed] it ...it helped us evolve...to a market fit for [the] industrial IoT. (Vail, personal communication, March 18, 2021)

In the end, Vail said he was not the same person who started at IoT Inc. over seven years ago. After departing he had reduced his stress level and rediscovered a passion for starting something new, saying, "I'm not quite what I consider my normal self ... I'm the new normal, whatever that is" (laughter) (Vail, personal communication, March 18, 2021).

Brad's Startup Trajectory.

In the early months of 2019, Vail called me and said Francis thanked me for my work, which was code for it was time for me to leave. I would receive several months of severance pay. Vail later noted that he was not surprised by Francis's decision to let me go:

Francis was so darn conservative, which.... is good...but it's also ... painful with regard to trying to grow the business. [Francis] just continues down the same path of not wanting to spend any money on marketing...It's a big challenge for the company... I think with the marketing position, Francis got in his mind that he wanted somebody he

could collaborate with in the office. I think that's what drove that change. (Vail, personal communication, March 18, 2021)

The official explanation for my departure from IoT Inc. was it would be ‘moving in another direction.’ Unofficially, and since I agreed with Tristan that the only long-term direction for the startup was along the lines he and I had initiated in Barcelona, I figured my most recent visit and presentation at IoT Inc. was uninspiring. Since no firm agreement had been struck between IoT Inc. and any IIoT firm, including Acme Worldwide, even with Tristan’s successor sales executive in place, only lackluster sales were recorded. I knew that the Barcelona event would bear fruit someday but not soon enough for my future at IoT Inc. In retrospect, I was exhausted and needed a vacation away from craziness before it became a fulltime state. Along with the intensity of IoT Inc., I was dealing with unexpected circumstances in my personal life requiring substantial time and attention. I was experiencing burnout, just as Vail would in a little over a year.

Within the next month, a friend in the local startup community introduced me to another startup in Midwestern City, where I was hired as Head of Marketing. That role was unexpectedly short-lived, and as the pandemic began to unfold, I involved myself in several non-startup projects. At the height of the pandemic, I lead the creation of a community news publication as founding editor. Despite long odds, it is thriving. A member of my network brought me into an innovative IoT-based thermal imaging startup as a co-founder which initially thrived, then rapidly fizzled. I also involved myself in other startups and projects, including developing a pitch deck and a business plan for a digital concierge medicine startup. I wrote a communication project for the world’s largest payroll processing firm, consulted for a manufacturer of pumps, and several other projects.

In 2021, based on another strength of weak ties relationship, Tristan again consulted his extensive network and introduced me to the leader of sales in another Silicon Valley startup. In turn, I employed my social capital and Vail served as a job reference. At the time, I had two simultaneous job offers. The first was from a Fortune 200 worldwide technology firm akin to Acme Worldwide. The second broadly reprised my IoT Inc. role at a Silicon Valley artificial intelligence (AI) startup. I accepted the role at the AI startup.

Assessing my trajectory post-Barcelona event, it amounts to a mixed bag in both the short and longer terms. Things had been getting more difficult at IoT Inc. as struggles over how, and at what speed, to pursue the B2B goal played out. Even if it worked, I knew at some level the *métis* required to get Tristan and I to the Barcelona event had significantly upped the odds for IoT Inc.'s success, but did little for career success. Frances would likely be more inclined to view anything short of triumphal new business arrangements at a miraculous speed - and with maximal sales outcomes - as a serious breach of protocol and judgment. He was so inclined, and the clock began ticking for me.

Longer term, my *habitus* credibility grew significantly from both IoT Inc. and the Barcelona event. After undergoing the common Silicon Valley detoxification process after overdoing my exposure to it I find myself a legitimized 'node' in the digital startup social network. I leaped back into Silicon Valley with a role at a startup centered on AI, an accelerating technology exciting the world's interest in 2023. Based on my IoT Inc. experience I trusted my quantum perspective expertise and exponentially scaled market results. The strength of my social capital similarly accelerated the number of unbidden job offers, LinkedIn connections and inquiries, and other opportunities. With an eye on the fractal underpinnings of it all, the social

increase in opportunities was less a linear accounting and more the exponential expansion of access to a larger sea of opportunities.

Getting Swallowed: The Current State of IoT Inc. within Acme Worldwide

We went hunting for a whale and got swallowed instead.

In sales, a common term for a much larger-than-average prospect is “whale” (Xu et al., 2022). Little did Tristan and I know that the whale hunting expedition we mounted to Barcelona, the appetizers and wine on the beach, and all the rest, would result in IoT Inc. being ingested by Acme Worldwide.

In 2019, a year after the first Barcelona meeting between Acme Worldwide and IoT Inc., Vail, and an Acme Worldwide executive gave a joint talk in Barcelona about the partnership. In early 2021 IoT Inc. began the process for C-round funding. According to Vail, Francis maintained a conservative approach, seeking an atypically small funding amount, and indicated it was the last funding round. In early 2022, Acme Worldwide’s investment group lead the successful C-round with a majority stake. That stake would position Acme Worldwide to select its preferred Chairman for the IoT Inc. board of directors.

The network connection at the heart of the Acme Worldwide and IoT Inc. relationship has come full circle. In early 2023, a press release announced that Digital Guru was joining IoT Inc.’s board of directors as Chairman. In a fractal scaling sense, Tristan was a node in the Silicon Valley field who understood where to look for scalable patterns on the border of the enterprise B2B field. He used metis to initiate a LinkedIn message to Digital Guru. As a result of additional metis, the resulting relational process at the Barcelona event occurred and created a stable fractal form that survived Tristan’s and my departures. In turn, Vail coordinated the metis at IoT Inc. and phronesis at Acme Worldwide into another form – ba space – where iterations on a

knowledge-creating pattern blossomed into value-creation. The pattern scaled beyond Acme Worldwide's role as IoT Inc.'s key reference client in the IIoT industry, to its role leading the C-round investment, and Digital Guru's role as Chairman of the board at IoT Inc.

In short, though dismissed by Francis, Tristan directly initiated a fractally scaling process via Digital Guru who now has the power to dismiss Francis as IoT Inc.'s CEO. To date, a pattern of onboarding and subsequent dismissals and departures has been consistent at IoT Inc. There is no indication that that type of pattern has anything to do with the near future. In a fractal sense, where magnification happens on the border of a Mandelbrot set determines the pattern and there are now more borders to look for more patterns. There could be more investment, additional knowledge creation resulting in new product lines, or more dinners on the beach.

In the Silicon Valley startup habitus, funders expect a return on their investment, and as noted in Chapter One, many funders consider firing the founder a normal means to enhance a firm's commercialization path. Francis's entrepreneurial approach to conserving cash accords with the affordable loss principle of Sarasvathy's (2009) effectuation. So too, does IoT Inc.'s network of partnerships, leveraging contingencies, and iterative customer feedback loops. However, Francis's effectual practices at IoT Inc. are now subject to venture capitalist expectations.

Moreover, Francis's habitus of finding his way forward outside of paths imposed by others, i.e., against the consensus, whether in school or startups, is now subject to stakeholders and governed by a board with social capital and economic capital at risk. As Sarasvathy (2009) noted venture capitalists are less interested in effectual approaches and more focused on predictive approaches such as the calculations of expected returns. The pragmatism of effectuation, says Sarasvathy, isn't focused on continuity but rather on pitting a "Truth against a

Truth” (p. 60) in terms of consequences. In short, Francis enabled a pragmatic effectuation coupled with quantum physics-informed indeterminacy and pattern iterations to bring IoT Inc. to its present state. However, the investors, now represented by Digital Guru, prefer math. With that said, predictability at an uncertain IoT startup is counterintuitive. Any claim to specify IoT Inc.’s exact location and momentum simultaneously runs counter to the core uncertainty tenant of entrepreneurship, and indeed, Heisenberg’s (1985) uncertainty principle.

Brief Summary of Data Patterns and Implications for IoT Startups

By way of review, I briefly review the key concepts about complexity at work in this chapter. In a Bohmian (Nichol, 2005) sense, the quantum nature of the opportunity at IoT Inc. existed as a pattern enfolded within Bohm’s implicate order, from which it unfolds as an object of the explicate order. Objects of the explicate order are quantumly entangled in the common ground of the implicate order and its patterns, which Bohm said, includes both consciousness and matter. Metaphorically, a reoccurring pattern of the IoT Inc. opportunity is that it continues to act like a quantum possibility in superposition, alternating between a wave-particle function, before collapsing into an emergent reality. Bohm argued that the implicate order was generative, creatively so, and tied to consciousness. He used fractals to illustrate how this generativity produces a variety of patterns at changing scales.

Moreover, it does so when the habitus of individuals and institutions in the IoT field creates an observer effect on it. The opportunity of IoT Inc. is continually in flux, though long entangled with the habitus and timelines of the individuals involved, the emergent Bluetooth gateway technology, as well as other accelerating technologies embedded within and around it in the IoT field.

It had existed within Francis's habitus as an "internal urge to do new things" (Francis, personal communications, November 19, 2020) and then a means to detect falls, a Bluetooth B2C gateway with home accessories, and then a B2B Bluetooth connectivity capability when it was affected by B2B organizations who observed its possibilities. IoT Inc. then pivoted the organization to the possibilities of the broader B2B market sector.

Influenced by the habitus of core members at IoT Inc., like Tristan, its possibilities were collapsed to focus on the enterprise B2B. In an effectual sense, the quilt-making by way of partnerships with Acme Worldwide and others and the choices by habitus constrained its possibilities but also managed to fabricate opportunities (Sarasvathy, 2009). In this sense, the strategic dimensions of IoT Inc. took shape as negotiated probabilities subject to Francis's constants guiding the aspirational vision.

In that context, I observed a probability to accelerate a successful opportunity in the narrowed area of the industrial IoT vibration monitoring sector where Tristan introduced Acme Worldwide. Subsequently, the B2B enterprise possibilities have reemerged again, in a broadening sense to include business-to-business-to-consumer (B2B2C), retail, schools, energy, healthcare, and other industry sectors. In short, the IoT Inc. opportunity was not identified *ex-ante* but has remained emergent in a state of superposition. Then based on observer interactions based on a sensitivity to fractal patterns, it has collapsed into a series of opportunities effectuated by the expert habitus of its crew. Bohm (Nichol, 2005) would view this observer effect by the effectuating individuals of the case study, their capacity to observe probabilities in uncertainty and fabricate an opportunity using a full stack of knowledge types, as embodied examples of the creativity inherent to the generative order.

However, as noted earlier in the chapter, constant uncertainty and creativity take a toll on people, even those practiced in navigating emergent digital environments. Everyday life privileges linear thinking. The frenetic pace and quantum perspective are extreme, and the high-tech entrepreneurial life is precarious. The resulting burnout is rough. It requires more than a good night's sleep and a long walk on the beach.

CHAPTER 7: LESSONS LEARNED IN AN IOT STARTUP, CONCLUSIONS, AND IMPLICATIONS

“Death is only a launching into the region of the strange Untried; it is but the first salutation to the possibilities of the immense Remote, the Wild, the Watery, the Unshored.”

(Melville, 1851/2015, *Moby Dick: or, The Whale*)

Epilogue

I’m curious about the nature of technology, organizations, and leadership. This dissertation attempts to glean an understanding of the nature of leadership in high-tech entrepreneurial settings. During the course of these studies and the decades in technology-based entrepreneurial pursuits, leadership has always been present. Although a precise definition of leadership threatens to get lost in the ephemera of the phenomenon, at a basic level, a leader requires followers. Leadership in this context is pragmatic and visionary. It is like a sea quest, the vision pointing the ship just over the next horizon while pragmatic actions take place above and below decks.

A view of an undifferentiated sea is pathless to the uninitiated. However, whether above decks or below, the sea provides clues to where to go and what comes next for those with experience and expertise. In such conditions, the nature of leadership and followership is another matter, with new definitions for study. Much of the dramaturgy in an IoT startup occurs while trying to navigate “...one great blooming, buzzing confusion” (James, 2007). And yet, stories always emerge from quests into the unknown, and from those stories, some new understanding.

There will be no description of the final reality of leadership here. As much as entrepreneurs and people face James’ undifferentiated sea of experience, we also crave and orient ourselves toward connection, patterns, and unity. Thus, and herein based on a pragmatic analytical approach, the compass of leadership in IoT Inc. points in a pragmatic direction. Since

this case study pursues goals on the near horizon, the leadership in evidence orients towards a vision over the horizon. Paradoxical or straightforward, whatever it is, it tends towards the pragmatic. This pragmatically oriented leadership creates, or at least influences, the navigational actions people take.

My status as an inside researcher within a normative case study created a condition of close contact necessary to experience and unearth insights both observed and lived. For example, the insider perspective enabled an understanding of the nuances of joining a startup like IoT Inc. to include Tristan's adept use of social capital and strength of weak ties technique, as well as the initial backstage dramaturgy of Vail's reading of Francis's body language as a precursor to my hiring. In the pivot from B2C to B2B, when Tristan's enterprise sales habitus was cut off from a fast ramp to sales opportunities at IoT Inc., my insider status placed me in the car with Tristan as he banged his hand on his car's steering wheel in frustration. Similarly, I was in the conference room for Francis's announcement of a successful funding round, akin to the swelling of sails for IoT Inc.

Moreover, the normative case study approach provided the experience of instances in all their multiplicity, not just as reports of the discrete phenomenon. This lived-in perspective oriented the research towards a contextualized quantum perspective. For instance, it placed me in the slanting late afternoon light of a Denny's restaurant in Silicon Valley with Francis. There, as the sunlight inched across the Formica tabletop, he reweave his transporting vision of IoT Inc. in one breath, pulled back the marketing budget to near zero to position for a funding push with the next – and then signaled a bonus was on its way for the extra effort of taking on a sales role when the sales team, Denim, and Tristan, simultaneously moved on.

Due to my insider research status, many moments in the case study are informed by this quality of close contact and concurrence. Although it is not a common approach, nor without its critics, the normative case study approach uniquely enabled a capability to directly experience, describe, and thus link the phenomenon to concepts. In short, to get at what is behind things by being in the middle of things.

The approach to the case study was anchored by LaMagdeleine's (2016) sociological framework centered on the analysis of leadership. The framework employed Goffman's (1959b) dramaturgy to research the ritualized process of Monday morning meetings where the taxonomic structure of IoT Inc. played out within the leadership team. For example, the Goffmanesque lens provided a means for discerning the backstage conversations before these Monday meetings and the front-stage performances. Goffman's dramaturgical approach brought roles, those recognized formally and those acknowledged albeit informally, associated with titles into sharp relief. As a new researcher, this enabled, for example, an understanding of the precarity of Tristan's truth versus trust balancing act as he steered IoT Inc. toward a B2B enterprise path. At the same time, it also outlined the VP of Sale #2's effort to apply a linear strategic view to exponential goals guided by aspirational principles and the implications of power.

Although visible to me as an insider, the importance of the hidden-in-plain-sight ritual its role in leadership, and its implications could have been lost within the penumbra of the vision at IoT Inc. but for insights enabled by Goffman's (1959b) framing lens. My approach argues an analysis using Goffman's dramaturgical framework demonstrates how leaders without the starring role, in effect character actors and bit players 'take the stage' at critical moments, and significantly shift the trajectory of action for an entire organization and industry, possibly for an era. The bit players served as a pivotal axis for future actions – collapsing possibilities into

opportunity - then exiting the stage, largely forgotten by the firm. Behind-the-scenes adjustments by a Stage Manager ensured resources on the front stage continued to appear at the right time but he never received top billing. I argue that actions below the surface, like a Storyteller supporting a performance by whispering a key line to a performer, influenced the speed and direction of the organization.

However, I also argue that in a complex entrepreneurial environment these oftentimes subtle behind-the-scenes moves, actions, and roles, aren't necessarily recognized by the organization. In this sense, LaMagdeleine's (2016) framework enabled the use of metaphors and analogies to add color and context to themes that emerged, including the use of nautical stories and fractal patterns. Moreover, the entrepreneurial experts who enact them often aren't consciously aware of their full importance. They are the unreflective realizations of habitus, a blend of *techne*, *phronesis*, and *metis*, as expertise that ultimately co-creates the organization and the field.

Each of these players remains a part of a wider ecosystem, an IoT field, of which the firm is a part. I suggest that IoT entrepreneurship leadership viewed via a dramaturgical lens reveals how an individual's role complexity, in effect, aligns with the technosocial complexity of the IoT entrepreneurial field. My analysis argued that leaders facing these complex and uncertain IoT entrepreneurial environments enact dramaturgical rituals, *ala* Goffman (1959b), to reinforce distinct aspects of the organization's visions – strategic, aspirational, and inspirational. In turn, the players combine the factors of these visions into patterns. As the entrepreneurs iterate, the factors are constrained and liberated by various market realities and social structures. Their effort to achieve *arete* is, in effect, an effort to converge the visions and their factors – real and imaginary - into a stable pattern that scales exponentially.

Thus, a full analysis includes concepts offered by Bourdieu (2020); the disposition or habitus of social actors, the social capitals they employ, and an understanding of fields. I argue that the penetration of the Acme Worldwide digital business group by Tristan in mid-2017 is grounded in Bourdieu's concept of habitus. In turn, Tristan's habitus involves *techne*, specifically the use of Granovetter's (1973) strength of weak ties as a technique to initiate the business relationship with Acme Worldwide. Moreover, I argue Tristan's habitus displays an elevated level of expertise created within the Internet field, which is in turn creating the IoT field. We see evidence of how the expertise of Tristan's habitus is an ongoing process of experience, informing, and being informed by the new IoT field. Tristan's IoT habitus is based on experience within one of the IoT field's institutional firms, Big Networks Inc., his use of an Internet-era sales *techne* leveraging his network to launch his pursuit of IoT enterprise sales, and the instinctive *metis* deployed to grasp, confront, and overcome more powerful components in a chaotic and pathless IoT field – inclusive of IoT Inc. itself - to achieve a specific enterprise IoT sales goal.

Furthermore, the habitus of Tristan, Brad, Bennie, and later Vail, served to converge the visions and factors of the visions, to scale a fractal pattern. The pattern included the building of knowledge in the *ba* space – and thus continuing action - between the two organizations as each continued to validate an emergent, yet unproven and uncertain, IoT product, its capabilities, pragmatic business case, and vision. Moreover, to form a bond between IoT Inc. and Acme Worldwide, I argue Tristan's strength of weak ties networking technique was supported by Brad's marketing *techne*. In turn, during the processes of *techne* tied to their habitus, for example, Tristan's pursuit of a sales path and Brad's hidden-in-plain-sight budgeting for marketing, each recognized opportunities to act with *phronesis* as well as *metis*.

As such, while the dramaturgical framing provided a deeper understanding of the stage for leadership at IoT Inc. a description of the various intertwined knowledge types – *techne*, *episteme*, *metis*, *phronesis*, and *arete* – offered evidence of the complex blend of expertise required to pragmatically move an ongoing and pivotal relationship between IoT Inc. and Acme Worldwide towards *arete*. I note that the emergent IoT field, itself built on and extending the technology stack of the Internet requires an even more complex IoT technology stack. In turn, I argue the material evolution of the IoT technology stack requires a correspondingly complex knowledge stack within the *habitus* of its leaders. In other words, I argue Goffman's (1959b) dramaturgy and Bourdieu's (2020) concepts point to IoT sociomateriality – the emergence of a new IoT technology stack is coupled with knowledge types uniquely assembled as IoT startup expertise by people at IoT Inc. – as a characteristic of leadership at IoT Inc. and in the IoT field.

Furthermore, the sociomateriality at IoT Inc., its multi-dimensionality, intertwining expertise, *habitus*, and a new Bluetooth networking technology stack within a fundamentally uncertain entrepreneurial venture in an emergent IoT field lays the groundwork for describing leadership and its results using the metaphors of complexity theory. By contrast, the metaphor of chasm crossing at IoT Inc. was used to suggest a linear journey for the product's development and the firm's efforts. The research demonstrates these actors may use a chasm-crossing metaphor to orient the crew's identity in the field, but their results are the product of effectuation and a quantum perspective, not cause-and-effect planning. At best, planning within this Internet-era framework was half-hearted, and the actuality involved expertise immersed, and expressed, within complexity.

For example, only in retrospect do the investments in the relationship between Acme Worldwide and IoT Inc. appear *phronetic*. As Francis noted, at the time of the initial pursuit of

the relationship between Acme Worldwide and IoT Inc., it was one of many such investments. However, Tristan and Brad employed multiple forms of expertise in enterprise B2B technology, to build a business relationship uniquely, intensively, and consistently. Tristan spent social capital to begin the relationship. When the product itself was less than trustworthy, they flew to Barcelona in the middle of social unrest to build relational bonds of trust. Brad doubled down to argue IoT Inc. should focus its efforts on the industrial IoT, far in advance of the decision to do so. Francis expressed frustration with the Barcelona trip, but ultimately accepted it, though it took years for its value to fully manifest. In retrospect, the frontstage path to this value appears nearly linear, practical, and wise. Yet, as an insider, I assert the actuality was a ‘Sailing the ship while building it’ process. It involved probabilities collapsed into existence by effectuating decisions and actions based on the habitus of expertise struggling to create a new reality in response to uncertainty.

Over the next few years and orchestrated by Vail, the ba space between Acme Worldwide and IoT Inc.’s Bluetooth gateway technology would create knowledge. In turn, the created knowledge would lead to value creation and spiral fractal-like in a multi-dimensional manner: diagonally, into 12 other projects at Acme Worldwide; down, into IoT Inc. product development; sideways, reorienting IoT Inc.’s manufacturing approach and Vail’s role; as well as out, influencing Acme Worldwide’s market position as it pursued IoT-informed digital transformation in the emergent Industry 4.0. and Acme Worldwide projects with IoT Inc. spread internationally to different business units.

Further, I argue the phenomenon of fractal loading is in evidence in the IoT field. An observer of the IoT field will see self-replicating patterns, predicated on Acme Worldwide and IoT Inc., at different scales in the IoT environment: initial sales connections with a digital

transformation leader, larger firms investing in IoT startups, the spread of IoT innovations in IoT firms and markets, and the naming of digital gurus to startup board of directors. The pattern between IoT Inc. and Acme Worldwide is self-replicating at different scales in the IoT field. Observers in the field will experience the pattern as habitus and carry it forward to other areas of the field.

Further, I argue Goffman's (1959b) dramaturgical approach and Bourdieu's (2020) social capital, habitus, and field concepts are especially valuable for analysis when predicated on Flyvbjerg's (2001) normative case study approach informed by the emphasis on phronesis. In 2019, approximately a year after the first Barcelona meeting between Acme Worldwide and IoT, Vail and an executive at Acme Worldwide gave a joint talk in Barcelona about the partnership. In early 2021 IoT Inc. sought another round of funding. True to his nature, Francis was conservative, seeking a small investment round based on a similarly conservative valuation of the company. According to Vail, it was likely one of the final funding rounds Francis would seek. In November 2021, Acme Worldwide's investment group signaled it would lead the investment round with a majority stake. That stake would position Acme Worldwide to bring in Digital Guru as the Chairman of the IoT Inc. board in January 2023.

In early September 2022, an email directed me to an online platform for my IoT Inc. equity certificates. The certificate is a digital image hosted by a digital platform, and yet the design of the certificate harkens to the early 19th century. The certificate's border has ornate green curlicues. The certificate includes an image of an eagle grasping four arrows and an olive branch in its talons, a ribbon emblazoned with *e pluribus unum* flowing from its beak (author's equity certificate, 2022).

Previously the only evidence I had of my ownership of the equity shares that I'd paid for was a canceled check – itself misplaced somewhere in my records. My last name was spelled incorrectly on the certificate. Yet, I was never worried. In the years since the date of the IoT Inc. certificate, I have led startups and acquired shares in other startups. The equity certificate's wandering arrival was part of a larger, familiar pattern.

Finally, the pattern of events came full circle when Digital Guru joined IoT Inc. as Chairman of the Board. Digital Guru did not describe joining IoT Inc. with a specific market in mind, such as B2C or B2B. Instead, Digital Guru referred to a mission similar to the original aspirational vision Francis noted in late 2016, to accelerate IoT Inc.'s growth by positioning its Bluetooth gateway at the center of the IoT. Firmly beyond the noise of the market or internal strategic negotiations, the aspirational vision continued as a touchpoint in the pattern at IoT Inc.

Lessons Learned on the Art (mostly) of Leadership in an IoT Startup

Documented as Chia describes Metis and Phronesis as Habitus

Francis's IoT habitus was formed within the context of Big Networks Inc., a Silicon Valley institution bridging the Internet and IoT fields. In short, where the Internet digitized modern life, the IoT, in turn, enabled digital transformation by connecting digitization to the things of everyday life. Francis describes this as the difference between a “new field” and “traditional Internet thinking” (Francis, personal communication, November 19, 2020).

Moreover, despite some proclivity for the abstracted elegance of quantum physics, Francis eschewed its required singular focus, instead choosing a more pragmatic career with the inner desire to “do something in society.” And yet, Francis's habitus also exhibited a perspective and familiar comfort with paradoxical precepts inherent to the heart of quantum physics. In this case, instead of the Internet-era ‘Go fast break things’ slogan, Francis's approach takes the time

to “figure out the best way to do IoT” by going slow and holding onto resources (Francis, personal communication, November 19, 2020). IoT Inc. said Francis, has a destiny beyond the reach of market gyrations and internal dramaturgy.

Moreover, Francis’ habitus included resisting persistent internal pressures from within IoT Inc. to unleash financial resources as he held to the 18-month cash principle. Francis’ entrepreneurial heuristic was to “go against the consensus and be right” (Francis, personal communication, November 19, 2020). The heuristic is a rather newer slogan describing the value of constant learning, an entrepreneur’s meditation practice, a collectively informed self-perception, and challenges to ego borders, propelled by a relational culture of radical openness and transparency (Dalio, 2017). If there is simplicity at the basis of Francis’s power, it is informed by this heuristic.

Yet, the case study demonstrates that where there is power there is also resistance (Foucault, 1990). In the case of IoT Inc. Francis's expressed power included his consensus-bucking and steadfast adherence to the guiding principles of moving slowly and holding onto 18 months of operating cash. Many members of the team at IoT Inc., in turn, expressed resistance in the form of direct rebuttals to Francis’s conservative financial approach, as well as by indirect means. The sales function’s resistance to the conservative financial approach included direct challenges questioning the math of sales expectations. The members of the entire team engaged in hidden-in-plain-sight activities where they applied their expertise to move IoT Inc., and themselves, towards goals.

More indirectly, the marketing function also resisted indeterminant budgeting processes that rose and fell depending on the financial picture painted during periods of funding. The startup’s Monday morning meeting discussions about funding rounds were ongoing and occurred

in advance, for example during yearly planning meetings. Similarly, some aspects of marketing, such as events like conferences and trade shows, were tied to specific periods that required planning – and budgeting. In short, a stabilized marketing budget ‘constant’ could be created when tied to events. In short, while the budget for marketing could drop to zero for the quarter at any moment at Francis’s direction, the monies spent in the previous quarter to accommodate the planning of future events had already occurred. Monies allocated for future events typically had deferred payments during quarters when no monies were available. In this way, my marketing resistance to the conservative financial approach was hidden-in-plain-sight. Notably, it funded the Barcelona event, which served as the relational constant recalled by Bennie and led to Acme Worldwide and IoT Inc.’s scaling fractal pattern.

Moreover, unlike the sales function, my marketing department's relationship to revenues was indirect and typically longer. It was not tied as closely to producing a revenue return, or as Tristan noted I did not “carry a number” (Tristan, personal communication, November 19, 2020). My previous marketing experiences had taught me that marketing is often viewed as solely a tactical function for producing things, like websites, leads, content, and trade shows. An appreciation of marketing’s unique strategic understanding of which market to influence, and how, is less well understood and appreciated by those without marketing expertise.

The strategic understanding, however, is where the gains required to satisfy my vision, to recognize and influence the marketplace levers of a community with communications occur. In a stripped-down sense, writing poetry is the craft of using words to craft a unique code to unfold an emotional truth. Similarly, marketing involves uncovering the unique hidden codes and patterns in a market, in this case within the IoT field, and crafting communications to shape the allocation of fundamental energies (money, time, attention) of that marketplace towards a goal.

The marketing craft involves expertise in specific tools – words, images, as well as constant attention as the code, patterns, energies, and relationships between the firm’s goals and the field evolve.

By analogy, it is common for those outside of marketing to notice only the tactical aspects, such as content. Like a bass player in a jazz ensemble, they see marketing for its visible outputs, tactically necessary for producing a firm’s leads, media, websites, branding, etc. but largely a background rhythm tying the startup’s presence to a marketplace. From this perspective, the product and the sales function are out front - marketing is not. But as their expertise increases the attention of a marketing expert moves towards effectuating inputs to the market, which like a gravity well tilts the field in their favor. Like good jazz bassists, they develop a unique strategic foresight of where the music – in this case the relationship between the firm and the marketplace – is going or should go. As best as I can describe it, strategic marketing feels like the convergence of a complex pattern, partially visible and partially instinctual, as a hidden code reveals itself. In turn, there is less chasing after a marketplace and more a sense of pre-positioning, an embodied sense of riding on top of a swelling wave of growth in a market. It's always a gamble but being in the right place, at the right time, with the right narrative is a thrilling and satisfying ride.

Collating organizational knowledge as it is created in startups requires knowledge-capturing structures most startups only minimally possess. By contrast, as Nonaka et al. (2008), and Chia (2013) noted, larger organizations do have the capacity to maintain phonetic reflective practices and structures which enable the capture of organizational knowledge. The knowledge created within startups, however, doesn’t occur in a vacuum and doesn’t simply vanish. As in the case of how to manage indeterminant startup marketing budgets, individuals experience the

creation of knowledge in startups and they act based on that knowledge. In turn, in a startup, the experience of creating useful knowledge as well as the knowledge itself adheres to an individual's habitus. For example, an individual's experience within a startup, such as when Vail recognized the mismatch between the spending principles at IoT Inc. and its B2C positioning, created knowledge that spread throughout IoT Inc.

In turn, these early insights based on experiential knowledge, offer choices based on style - *phronesis* and *metis* - in a dramaturgical context. In the case of IoT Inc., the possessors of experiential knowledge tied to habitus often had the earliest grasp of shifting circumstances. As such, individuals could choose to bring that knowledge forward as the definition of the situation during a ritual, such as at Monday morning meetings (Goffman, 1959b). They used this information to comport themselves to support their roles within the firm, as well as the firm's role within the field. Individuals with expertise had choices involving leadership. They could stay in the background and do the tactical job, or directly or indirectly lead the organization based on their expertise.

Moreover, while Francis was open to input, he was slow to accept or act on input touching on the core of his vision. My vision included knowing based on expertise, and thus strategic targeting of the industrial IoT marketplace far in advance of Francis's acceptance. In the case of the Barcelona event, there was an alignment between my advanced planning enabling resistance to the conservative financial power structure, and a growing capacity to understand how IoT Inc. should be positioned in the evolving IoT marketplace.

Francis's 'aha moment' took place earlier after several years of consideration and exploration. That moment included personal circumstances and random interactions during a journey. The journey was propelled both by a *phronetic* sensibility, and a personal and pragmatic

reflection, for example, what “could help people” similar to his brother who was incapacitated and alone. The aha moment also included metis, the sudden instinctual connection between other forms of knowledge, episteme, techne, and phronesis tied to pragmatic and opportunistic actions, unmediated by ethical reflection. Metis was also required to navigate an IoT startup through successive funding rounds while consistently leveraging a nascent technical capability to a point of strategic advantage within a larger IoT connectivity field.

Visions, Power, and Resistance

During IoT Inc.’s early years, the resistance to Francis’s vision was persistent (Denim, personal communications, December 6, 2020). As time went on at IoT Inc. resistance to Francis’s vision developed autopoietic characteristics in the form of feedback loops from others with strategic insights and visions. These were the personal visions of self-interest, as well as the dimensions of strategic visions, which, wholly backstage or hidden-in-plain-sight, operated within IoT Inc. As a reminder, Francis had conceived of the ‘Bluetooth network at the center of the IoT’ vision early on, but his approach was slow and financially conservative. Vail saw early on that Francis’s unwillingness to spend money on B2C branding meant IoT Inc. was better suited to a B2B marketplace. Denim also saw that the characteristics of the early-stage B2C product lagged behind consumer expectations. Tristan understood the pivot from B2C to B2B was taking too long to make meaningful sales progress. He also saw the enterprise product characteristics needed for the B2B product were nowhere on the near horizon. Brad saw the IoT industrial marketplace as a swelling area of growth far in advance. Vail saw the orchestration of the Acme Worldwide relationship as a long-term investment in job security and a scalable self-replicating pattern of organizational opportunity.

At the time, each of these insights, informed by individual experiences and adhering to a habitus of expertise, was expressed directly on the front stage of Monday morning meetings. These insights were also expressed indirectly in IoT Inc.'s backstage to fill in gaps of the frontstage visions and as a form of resistance. Interestingly, over time, each of these perspectives was incorporated, albeit slowly, as a supporting layer to Francis's vision of IoT Inc. In a sense, the experiential knowledge adhering to individual habitus, including knowledge forming the basis of resistance to Francis's power, was eventually absorbed into the originating "Bluetooth for the IoT" vision. In a fractal sense, the relationship between the probabilities of the strategic dimensions and the constancy of Francis's vision resulted in complex numbers, not quite real but stable, on a complex plane. In turn, those points formed a self-replicating fractal pattern.

As noted by Scott (2020), the complexity of a liberal economic system supports metis. Like a mudskipper fish waddling about to live in water and land, the IoT field issues from and extends the Internet field into a new plane of existence. The IoT's complexity similarly extended to IoT Inc. and its leaders in a web of sociomateriality, informing their social capital, habitus, and the IoT field, as well as the material development of the IoT products. The emergent field of IoT is imbued with unique social as well as material complexities. Thus, the techne, phronesis, and metis-derived pragmatic's at IoT Inc. are also unique, combining IoT Inc.'s "a little bit crazy" startup operators with the "traditional Internet thinking" carried forward by Internet-based social and material factors (Francis, personal communication, November 19, 2020). A fundamental openness and curiosity about a new venture in a new field are laid out as compelling challenges, iterative experiments, learnings, and patterns tied to emergent modes of being.

In this regard, the pragmatic and complex environment of an IoT startup supported robust and metis-laden resistance to power, as well as the resistance against, challenges to, and

convergence of visions within IoT Inc. It also supported multiple entwining instances of metis – Tristan binding to Digital Guru, hidden-in-plain-sight event budgeting, attending the Barcelona event, and the addition of IoT Inc. product to the Acme Worldwide tradeshow – which revealed early generative aspects of a specific pattern. In turn, the pattern accumulated and amplified IoT Inc.’s capacity, and thus facilitated an autopoietic exchange between the visions at IoT Inc. and Acme Worldwide a larger, more powerful organization. Over time, fractal-like patterns involving social and material aspects of IoT Inc. came into focus and spread into multiple business units within Acme Worldwide, leading to an investment round at IoT Inc., a co-created product deployment to the IoT field, and a leadership pattern naming Digital Guru as Chairperson of the Board at IoT Inc.

Implications for Future Research

The conclusions of the study suggest leadership studies, especially case study research, are needed to understand the inner workings of high-tech entrepreneurial situations. Notably, the utilization of a dramaturgical analysis and conceptualization of the habitus, field, and social capital in startups provides a basis for grounded theory-based research. Insider research into startups is rare and rarer still in the emergent technologies of IoT startups.

Researchers like Orlikowski and Scott (2008) have developed a line of research highlighting the increasing merger between the social and technological spheres. It suggests the inner workings of technology firms, the habitus of the people involved, characteristics of the field, and the technical and social decisions made, influence and inform the products delivered to the marketplace and in turn to society. Future research can further seek to understand how leaders in startups, the decisions they make, and the characteristics they bring to their technologies and organizations, influence their present and the wider future.

This study involved an insider perspective and brought to light the characteristics of individuals navigating in uncharted areas. It did not concentrate on the common frameworks or techniques used within startups. Where the study did mention a chasm-crossing framework it served as a contrast to a quantum perspective and where a specific technique was mentioned it was part of a wider discussion of knowledge types. It focused on the application of the practical knowledge, *metis*, *phronesis*, and *techne* entrepreneurs employ as a means to navigate in uncertain environments to pursue a vision - and the endless quest for personal and collective excellence.

Chia (1996) has described how entrepreneurial education is served by highlighting the entrepreneurial imagination. Similarly, Churchill and Bygrave (1989) launched a robust discussion in entrepreneurial education tying the entrepreneurial imagination to quantum physics. Chia (1996) and Nonaka et al. (2014) point to wisdom, anchored by an understanding of the role of knowledge types, *techne*, *episteme*, *metis*, and *phronesis*. This knowledge grounds organizational experience in human thriving and striving, or *arete*, as described by Pirsig (1992). This study demonstrates connections between these lines of research and builds on their application to the field of IoT startups.

However, this study speaks to one organization. It does not compare organizations nor does it assume broad applicability to a field. But the situations it touches on are common fare in these types of firms and the concepts it employs in the uncovering of the inner workings of the organization do point in a direction. Firms are plunging ahead using frameworks and techniques of the Internet era as we know it. These frameworks and techniques are aging fast. Even so, ancient concepts, constituting the raw fuel powering new endeavors and transformative developments in larger firms, also made their presence known. It is conceivable that additional

insider research and case study approach employing this analytical approach to leadership and a perspective informed by the knowledge types used here will add to our understanding.

Epilogue 2: Author's "So What?"

Trust your fractals.

Quantum field theory is arguably the most successful scientific theory ever. It offers a compelling perspective for expert entrepreneurs to pursue and achieve their exponential goals. A quantum perspective does not require a Ph.D. in physics. It is available for those who are simply curious. It offers additional dimensions and perspectives for navigating social spaces, expertise, entrepreneurship, and leadership.

In a fractal sense, Francis anchored IoT Inc. with stable 'constants' along multiple dimensions, real and imaginary, woven to create a stable 'field.' The Monday morning meetings had a particle-wave duality, combining a countable 'real' ritual with an 'imaginary' Bohm-style dialogue. In this space, Francis's "The best idea wins" principle stabilized at IoT Inc. along an imaginary dimension. In turn, principles and rituals anchored the multiple forms of expertise of the small crew, present and departed, to exponential effect. Real numbers, like investment round funding, anchored IoT Inc. along a linear dimension. Also on the imaginary dimension, Francis's 18-month cash principle and his vision of a Bluetooth gateway at the center of the IoT were stable. The principle constrained IoT Inc. for the slower-paced B2B market path; the vision freed it to make the B2C-to-B2B pivot and explore options. In turn, IoT Inc. used this stable field to find and scale emergent patterns of value with Acme Worldwide and then to a wider market.

In contrast, Denim recognized the pivot by the leader at Sports IoT was based on power. Actions like a pivot stemming from a singular dimension, imaginary or real, and lacking other

anchors, have less potential for pattern stability and scaling. Denim gained expertise via this negative example and carried it into his next role.

Vail brought his musical sensitivity to the complex adaptive system of IoT Inc. He read Francis's and IoT Inc.'s body language like a melody and used those insights to create harmonies resonating in the IoT field, with crew members, suppliers, and partners. The constant adaptive attunement of IoT Inc.'s wave frequency to the IoT field, a feedback loop, helped it achieve its goals.

Tristan brought with him complex expertise, consisting of more complexity than IoT Inc.'s environment. His cunning penetrated Acme Worldwide and his wayfinding vision positioned for a future of thousands of IoT Inc. products operating in enterprise IoT networks.

The IIoT wave propagated through the IoT field as a Schrodinger's Cat probability – dead, alive, or both. I used expert techniques and cunning intelligence to collapse the signals, real and imaginary, at the right moment. The observer effect determined the direction of the 'spin' for opportunities at Acme Worldwide. In this case, the cat was alive enough, the action positioned IoT Inc. with the IIoT market years in advance, and the cat went on to give birth to multiple litters. I recently did the same by positioning an AI firm with regional financial firms nearly a year before consolidation in that market made AI service a must-have.

What's going on here?

Mediocre entrepreneurial leaders routinely try to bend time and space by over-relying on math-based expertise to achieve the exponential goals of their aspirational visions. The common perspective is every problem is based on numbers, data, or dollars and the solutions are more of the same. However, innovative approaches and perspectives are emerging that push beyond the

faster speeds, bigger volumes, and ‘Fail fast’ mantras of Internet thinking. As digitization accelerates into everything those previous approaches and mantras appear inadequate.

Expert entrepreneurs and leaders use numbers and then they look beyond the numbers. They use a quantum perspective. They navigate the complexity of time and space by actively embracing the complexity of multiple forms of expertise and applying them to multiple dimensions. Tristan’s understanding of a complex IoT product was more complex than the international startup that created it, and his cunning overcame a Fortune 100 enterprise. The complexity of Vail’s guidance could not be replicated by a supercomputer. The complex mix of my understanding of market signals and market timing looked years into the future. Francis persisted by moving slowly but going fast. Paradoxically, he’s beating the odds by clinging to destiny while remaining open to radical change.

A quantum perspective is a readily accessible, holistic tool for entrepreneurs. It provides a shortcut to access the powerful social and material relationships between the real and imaginary aspects of leaders, entrepreneurs, and the organization. Expert entrepreneurs and leaders understand they are not simply swapping digital products for dollars. We’re the sailors of an emerging era, riding quantum waves, navigating multiple dimensions, creating fields, and ourselves.

Walt Whitman (1855/2003) expressed as much, exulting his readers to welcome the future by accepting their past and present contradictions:

The past and present wilt—I have fill'd them, emptied them.
 And proceed to fill my next fold of the future.
 Listener up there! what have you to confide to me?
 Look in my face while I snuff the sidle of evening,
 (Talk honestly, no one else hears you, and I stay only a minute longer.)
 Do I contradict myself?
 Very well then I contradict myself,
 (I am large, I contain multitudes.)

I concentrate toward them that are nigh, I wait on the door-slab.
Who has done his day's work? who will soonest be through with his supper?
Who wishes to walk with me?
Will you speak before I am gone? will you prove already too late?
(Whitman, 1855/2003, *Song of Myself*, 51)

Leaders with a quantum perspective are living the future into existence. We seek out paradoxes. They are a source of power. We embrace our complexities. They are a source of expertise. We trust our visions, unique perspectives, and our fractals because they are us.

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