Historic Maritime Cities as New Places for Entrepreneurs and Innovators:

Lessons from Venice, Amsterdam and Boston

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In partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Urban and Regional Planning

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 2015

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On January 15, 2015 in Partial Fulfillment of the Requirements for the Degree of
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Abstract

Scholars and policymakers cite many important factors to explain why some cities are becoming new locations for entrepreneurship and innovation, but one generally has been overlooked: quality of place and its relationship to new forms of production. In the context of a knowledge-based economy, it appears that the value of urban environments is changing. Jane Jacobs’s proclamation that “new ideas need old buildings” for economic purposes and for use diversity (Jacobs, 1961, 188) gets at part of the story, but was made far before digital technology began to revolutionize the way we work and live. This leads to my research question: Do entrepreneurs associated with new industries prefer to locate in age diverse districts? If so, why?

My general hypothesis is that historically diverse urban environments are important to entrepreneurs in 21st century industries because they possess a set of particular qualities that makes them knowledge-intensive and simultaneously provides conditions in which entrepreneurs can self-optimize. Both are newly relevant in a network society (Castells, 1996). To test this, I focus on understanding the location choices of entrepreneurs participating in information and communication technology (ICT) and the creative industries (CI) in situ in three historic maritime cities: Venice, Amsterdam and Boston. Using Boston (and including Cambridge) as a test case, I develop a statistical model to examine firm locations in relationship to building age diversity. Accounting for centrality, I find that firms established in the last five years are disproportionally choosing districts with higher than average building age diversity and, even more notable, with higher than average counts of commercial and industrial buildings from the 1880-1935 time period.

Data collected from interviews of entrepreneurs and other knowledge holders in all three case cities provides insight on how buildings and districts are utilized, concepts of entrepreneurial performance, and the nature of decision-making in the location choice of early stage firms. I find that biophilic, flexible and sociable qualities of the built environment become highly valued as entrepreneurial ecosystems become even more competitive. Even when producing disruptive technology, entrepreneurs persist as situated and social actors.

Keywords: historic urban environments, location choice, entrepreneurial performance, satisficing, and place knowledge
Acknowledgements

I am extremely grateful to the late Norman B. Leventhal, who endowed the fellowship that I received to study at MIT, and to his family. Thank you for the extraordinary opportunity you have given me.

Thank you to all of the entrepreneurs and other knowledge holders who shared their time and insights during interviews and site visits in Venice, Amsterdam, Boston and Cambridge. Without your participation, this research would not have been possible. (Please see the appendix for a full list of names). To the members of my doctoral committee at MIT: Dennis Frenchman, Lawrence Vale and Albert Saiz -- thank you for your insights, your patience and your encouragement. Thank you, also, to Brent Ryan who served as a member of my doctoral exam committee. Thank you to Adele Naude Santos, Amy Glasmeier and Eran Ben-Joseph as well as to the entire DUSP community. I would also like to say a special thank you to Mike Foster, the GIS team at Rotch Library, the DUSP CRON team, Simo Goshev at the Institute for Quantitative Social Science at Harvard University, and Katja Berkhout at the Netherlands Foreign Investment Agency in Boston.

I express my gratitude to professors and professional colleagues who shaped the journey that eventually led me to pursuing a doctorate. To my colleagues at Overland Partners Architects: thank you for teaching me about collaboration, about building relationships that last, and about the process of bringing architecture to life. Thank you to colleagues at the University of Texas at Austin, who I had the pleasure to learn from and to teach with: Anthony Alofsin, Jeff Chusid, Michael Holleran, Chris Long, Steven Moore and Larry Speck. During my time as an undergraduate at the University of Virginia, Professors Richard Guy Wilson, Camille Wells, and Jim Dobbins inspired me with their commitment to research and to teaching. I also thank them for their early encouragement to pursue my interests as a scholar. I am also grateful to the late Professor Mario di Valmarana for introducing me to Venice! Thank you to my first employers: Dealey Herndon, who taught me to think broadly about the political and economic context of historic preservation; Dr. Phillip Rylands, Director of the Peggy Guggenheim Collection for introducing me to cultural institutions in Venice; and to Gary Hoover, who has demonstrated what it means to have an inquisitive and entrepreneurial spirit countless times over.

Thank you to friends near and far who have encouraged me through this process, but especially to: Fabio Carrera, Rosanna Chiggiato, Ava Denney, Beata Dragovics, Alberto Gallo, Elizabeth Guice, Dan

Thank you to my amazing parents, Robert and Mary Zapalac, and to Amy and David Heiden, as well as David and James Heiden, the extended Heiden Family, and to Margy Stephens. Thank you for your love and encouragement, day in and day out.
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Revisiting The Value of Historically Diverse Urban Environments

In the 1960s, as concern was growing that modern planning, including many strategies aiming to bring about urban renewal, was leading to cities that were functionally limited and lacking in human scale, urban scholars presented a number of important ideas about the qualities of urban districts and the value of old buildings. In *The Death and the Life of Great American Cities*, Jane Jacobs identified four conditions as indispensable for generating exuberant diversity in a city’s streets and districts: the district must serve more than one primary functions; most blocks must be short; a district must mingle buildings that vary in age and condition, so that they vary in the economic yield they provide; and there must be a sufficiently dense concentration of people. Importantly, Jacobs also advised her reader, “Not any one—or even any three is valid alone. All four in combination are necessary to generate city diversity; the absence of any of the four frustrates a district’s potential” (Jacobs, 1961, 150-151). In a chapter entitled “The Need for Aged Buildings” she elaborated on the third condition:

> Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them. By old buildings I mean not museum-piece old buildings, not old buildings in an excellent and expensive state of rehabilitation – though these make fine ingredients – but also a good lot of plain, ordinary, low-value old buildings, including some rundown old buildings. ... Old ideas can sometimes use new buildings. New ideas must use old buildings. ... Even the enterprises that can support new construction in cities need old construction in their immediate vicinity. Otherwise they are part of a total attraction and total environment that is economically too limited—and therefore functionally too limited to be lively, interesting or convenient. Flourishing diversity anywhere in a city means the mingling of high-yield, middling-yield, low-yield and no-yield enterprise (Jacobs, 1961, 187-188).

For Jacobs, the value of old buildings in the context of an age-diverse district was derived primarily from their ability to enhance economic and social diversity for the city, while also mitigating economic risk exposure for the new enterprise, or entrepreneur. Building performance was not her primary concern even though she acknowledged that, sometimes, old buildings were in fact better designed and constructed than new ones (Jacobs, 1961, 190). She goes on to say:
Many a city's enterprise which became important economic assets start small and poor, and become able, eventually, to afford carrying costs of rehabilitation or new construction. But this process could not occur without that low-yield space in the right place, in which to start (Jacobs, 1961, 196).

What constitutes a “right place” and why does this matter, particularly to entrepreneurs? For theorist Christopher Alexander, right place was about accessibility and he perceived that pre-modern cities offered more choices than modern cities. In the essay, A City is Not a Tree (1965), he argued that “artificial” (modern) cities were being designed as strict hierarchies (in his term, “trees”, see fig. 1, left diagram) when they should instead be designed to perform as “natural” (historic) cities do, that is based upon a more complex and subtle “semi-lattice” or network structure, where overlap is a hallmark (see fig. 1, right diagram). Important, he suggests the comparison of urban structures is akin to the comparison between traditional society, in which access to other individuals is limited by the structure of society and what he terms open society, in which individuals have much more choice about whom they may access, with the result being a far greater number of possible social outcomes and including overlap and connections among multiple social groups.

![Diagram of tradition vs. open society, in A City is Not a Tree by Christopher Alexander (figure 10 in the essay).](image)

Not only have many cities become more geographically dispersed over time, but also their building stock now includes many buildings constructed since the time that Jacobs, Alexander and others were issuing their critiques. Hence, the spectrum of choices about where to locate is now much wider. Further, these critiques were made largely before digital technology started to have a pervasive impact on society. More recently, these initial critiques have been echoed and related also to the building and
workplace scale. In the book, *How Buildings Learn* (1994), Stewart Brand studies how buildings change over time and how people value buildings as they change. Like Jacobs, Brand was interested in the role of low-yield buildings -- what he termed “low road” buildings: places of production, often intended to be temporary, that entrepreneurs and other reported as “most freeing” to occupy. He found that what they had in common was that they were “shabby and spacious” providing their users not only theoretical flexibility, but also permission to make changes according to their needs (Brand, 1994, 24). In similar vein, but with impact considered at the urban scale, Richard Sennett laments the inflexibility of what he called the “brittle” city, observing, “The over-specification of form and function makes the modern urban environment peculiarly susceptible to decay” (Sennett, 2006). In *Work and the City* (2008), Francis Duffy affirmed,

> It is no longer useful to rely upon obsolescent temporal categories, such as the five day week and the eight hour day, either to categorize office work or to measure the environmental performance of buildings. Boundaries between what is work, and is not, are shifting fast. Work itself, connected by universal networks of communications, especially the growing component of knowledge work, is spilling out into even wider and more complex spatial and temporal landscapes. ... The consequence for everyone architects, and for everyone else involved in accommodating work, is not just that the office building no longer maintains a monopoly on accommodating office work, but that the office building itself, whether from a general managerial or a specific environmental point of view, has become a highly misleading unit of analysis (Duffy, 2008, 16).

Sennett and Duffy made their observations around the time that Apple released its first generation of the iPhone (2007). Though not the first smart phone, the combined elegance and integration of its operating system and physical product design had a profound impact on the integration of mobile technology in society. Since that time, smart phones and an increasing number and range of portable, cloud-based devices have furthered advanced the mobility of workers. Google recently tweeted, “75% of workers are now mobile.”\(^1\) The idea of a *knowledge-based economy* have been prevalent since Peter Drucker and others began writing about it in the 1960s, but these new conditions further call into question the definitions of *workplace* and *production*. They also call into question the highest and best

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\(^1\) Citing a report issued by Forrester Research, Cambridge, MA, January, 2015.
use of historic urban building stock. In the past few decades, many historic cities have focused on historic preservation as a vehicle for the promotion of a tourist industry, often resulting in rather restrictive forms of preservation policy isolated from broader urban development objectives. In the case of Venice, which has continued to experience population decline since the 1950s, this also reinforces the idea of the city as a solely touristic environment. There are indications, however, that much more is taking place in such environments, and often as a largely organic response to the infinite ways digital technology is reshaping both production and consumption.

Three examples

Let’s consider three examples of what is taking place in historic maritime cities today (see fig. 2).

Venice: Franco and Angela, retired telecom and banking executives, started Ski Stradivarius, a company that designs and fabricates high performance Nordic (snow) skis. It is based on the ground of floor of a palazzo in the heart of the historic center of Venice. The realization that construction practices used in traditional Venetian boatbuilding could be utilized in the fabrication of skis provided key inspiration for the company. Using these techniques, no aluminum is required, a huge advantage, since the binding between aluminum and wood is often the failure point of mass-produced skis. Ski Stradivarius uses computer aided design software to develop designs and a digital lathe for fabrication, which occurs in a nearby boatbuilding warehouse on the island of Giudecca, also in the historic city center.

Amsterdam: Martijn, Tim, Stef and Pampo are friends who went to university together in Amsterdam and who started smart.pr, an online application for public relations professionals. Although smart.pr is a
new company with tight cash flow (and no venture capital backing to date), they have chosen to locate in an early 20th century bank building on one of the most well known streets in the historic center of Amsterdam. Minimally converted and now possessing a rather "raw" aesthetic, the light-filled space is leased month-to-month and affords the workers at smart.pr the benefits of being surrounded by four floors of other startup companies.

**Boston:** Dustin is an architect who opened his own firm, DNA Architecture in 2012, after several years of working for another architect in the Boston suburb of Lexington. The small studio is located in the ground floor space of a mixed-use building (1899) just a few blocks from the Charles River and a block off of Charles Street, the main commercial street of Beacon Hill, one of the city's best known historic neighborhoods -- popular with residents and tourists. The 370 square foot space was an antique shop before Dustin undertook minimal alterations to make it suitable for his studio. It is a two-minute walk from his house and an eleven-minute walk from his daughter’s daycare. Dustin sketches by hand and uses software programs for more detailed and developed drawings. A digital plotter tucked in a closet suffices for most of his printing needs.

1.2 Research Question

These examples, a preview of findings explored in later chapters, illustrate new types of production emerging within historic urban environments. These are not merely “work from home” or “work from anywhere” strategies, but deliberately chosen locations. Why is this? For one thing, the increasingly diminutive and wireless tools of contemporary work make historic buildings more suitable for production now than in the Modern era’. These environments appear to be meeting important qualitative and programmatic objectives for these workers. It seems that it is not merely the centrality or relative density that makes historic urban environments newly attractive to entrepreneurs; it is a combination of qualities: mixed-use, pedestrian-oriented, human scaled, and places conveying a sense of dynamism, including the juxtaposition of old and new, all serving to facilitate and enhance new forms of productivity, including the production of new knowledge. Such qualities are frequently cited by workers and observed by planners and designers. Only recently has it become possible to map data about worker locations and relate this empirically to quality of place in a way that confirms intuitive

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1 By Modern Era, I mean the period from approximately 1935 to 1990, characterized by a reliance on pre-digital technology, including as applied to building construction and mechanical systems.
observations and furthers understanding of why these conditions are important in a 21st century context. This is what I seek to demonstrate in this dissertation.

In this research, I examine two concepts, entrepreneurship and innovation, that are much in vogue today. These will be described in more detail, but here are basic definitions. Entrepreneurship, the practice of being an entrepreneur, refers to the taking on of risk in order to launch a new, potentially profitable endeavor, including innovative products and/or services. Innovation is the organized application of creativity to formulate a problem and develop a new solution, as products and/or services successfully delivered to the marketplace. Of much interest is the location, or setting, in which these events take place. Scholars and policymakers cite many important factors to explain why some urban environments are becoming new locations for entrepreneurship and innovation, but quality of place, and its relationship to new forms of production, has generally been overlooked. In the context of a knowledge-based economy it appears that the value of urban environments is changing. The central research question in this dissertation is: Do entrepreneurs associated with new industries prefer to locate in historically diverse districts? If so, why? To examine this, I focus on entrepreneurs associated with Information and Communication Technology (ICT) and the Creative Industries (CI), as both industries are indicative of the 21st century economy.

1.3 Cities as Hotbeds of Technological Innovation

Thirty years ago, there was a very short list of places synonymous with digital or computational technological innovation. Among the most celebrated and analyzed are the regions of Silicon Valley and the Route 128 corridor of Boston (Saxenian, 1994). Neither can be described as urban, but both had at the time, and maintain today, important linkages to their respective cities (San Francisco and Boston), which also, to note, happen to be historic maritime cities. These regions are still important, but the relationship between them and their urban counterparts is being redefined. In the last five years, many new firms have concentrated in Kendall Square (Cambridge), Boston and Somerville — either by relocation or through the process of new firm emergence. Many venture capital firms have also relocate back to Boston and Cambridge (The Boston Globe, 2012). Places such as Framingham, Lexington, Waltham and Watertown remain important as hosts to established companies such as Bose, Phillips, Matslabs and EMC. In some cases, these companies have also opened offices in the city center or affiliated with coworking spaces that allow them to have a central office. It appears the Boston Metropolitan Area is now supporting now one tech culture, but at least two: the more closed and
spatially distributed version (how Saxenian described the Route 128 region in *Regional Advantage*) and
within the centers of Boston and Cambridge, a more open and dynamic version that operates in some
ways more like her description of Silicon Valley’s flow of information and talent between companies,
partnerships, community activities outside the workplace. Some astute companies have acknowledged
this duality by creating specialty function locations: Microsoft’s Northeast Research and Design Center
(“Nerd Center”) in Cambridge as well as Constant Contact’s creation of a 30,000 square foot accelerator
space within their campus in Waltham; it was also designed to support a broad range of community and
industry meetings (see Chapter Four). That some companies are now choosing to re-enter (or at least
have a toehold in) central locations that are more expensive to lease than locations along Route 128 and
495 is notable, especially with average asking rents for commercial office space in Boston reaching
$49.95/GSF in Boston, compared to $20.96/GSF for the suburban office market. CBRE Research reports
that for 2014, “the Seaport District again retained the lowest vacancy rate in Greater Boston, beating
out both the Back Bay and East Cambridge” (CBRE Research, 2014, 2). Rental rates in Boston’s Seaport
District (also known as the Boston Innovation District) do vary, but at an average of $41.12/GSF for Class
B/C space and an average of $63.56/GSF for Class A space, it is approximately two to even three times
the average for the suburban office market (CBRE Research, 2014, 3,4).

There is also growing evidence to suggest that the “urbanization” of established technology companies
is also increasing: the growing outpost of Google in San Francisco, as well as the relocation of the Bay
Area offices of Akamai and Visa from the suburbs to San Francisco are a few examples (Arieff, 2013).
Some scholars and journalists following this trend explain it as a case of companies merely following
human capital, which now wants to reside in urban environments, an extension of Richard Florida’s
argument in *Rise of the Creative Class*. Is it more than that? Is it perhaps the realization that the city is
the best place to be in the know and to network, or based on a new desire to work and to live in close
proximity? The introduction of technology such as smart phones with Google maps, for instance, makes
it easier to take advantage of cities –maximizing the way time can be used in urban environments.

Cities are the places where new entrepreneurs (in many cases, joined by an older generation of
entrepreneurs and companies desiring to stay entrepreneurial) are starting new ventures and meeting
face to face for certain tasks, even as many also engage a more geographically diverse network of
collaborators and clients. Not only that, as users of urban environment, some are directly engaging the
wicked problems of cities (Rittel and Webber, 1973). In what can be understood as a form of user
innovation (von Hippel 1998; Morrison, Robert and von Hippel, 2000), these innovators provide solutions that may enhance their own quality of life. At times, this is done in an altruistic manner, for instance, those who contribute to the development of Open Streets, a crowdsourced geographic information system. Other times, these individuals realize that solutions developed for one purpose can hold value for many others. Strava, a map-based biking and running app, now sells its data to cities for transportation planning (Davies, 2014).

An increasing number of cities have proven their ability to promote their own “startup communities,” as Brad Feld describes them, with distinct character, culture and sector emphasis (Feld, 2012). Boulder, Austin, Portland OR, Seattle, South of Market (SOMA) and the Mission District in San Francisco, Brooklyn, Charleston, London, Amsterdam, Berlin, Warsaw, Hamburg, Copenhagen, and Mexico City are just some of the cities where discernable self-organizing startup communities are found. In some cases, they have produced high growth companies. In other cases, while there may not be a high growth success story to single out (or at least not yet), what has emerged is a community of practice with whom an individual can identify and a local network through which tacit knowledge can flow.  

It is possible that tech savvy individuals with a high degree of location choice are recognizing the latent potential of these places before real estate developers, economic development strategists and established, slower-reacting companies. To say that this trend merely reflects lifestyle preferences misses the point. Rather, technology is opening up new value in the built environment, with all of the benefits and problems, such as gentrification, that this may introduce. I asked James Graves an American entrepreneur and CTO of Ideedock, based in Amsterdam about the apparent role of entrepreneurs as urban pioneers. James responded by quoting popular blogger Paul Graham (founder of YCombinator, a well known accelerator based in Mountain View), “Nerds are the new artists.”

What advantage do cities hold for entrepreneurs and why? What advantage (and disadvantages) does hosting entrepreneurs hold for cities? If it is possible to consider the role of the city in this context, then by extension, it should be possible to ask also, what is the highest and best use of historic cities? Many

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3 This does not happen overnight. In almost every case, development has been in the work for decades and is prompted by concerted planning as well as more organic processes. The groundwork for Austin’s existence as a tech city includes notable steps: attracting preexisting technology companies in the early 1980s, the launch of PC’s Limited, the original name of Dell Computers (1984), the creation of Sematech (1987), and SXSW (1987) and the creation of the Austin Technology Incubator (1989), among other key events.

4 Interview with James Graves, CTO Ideedock, June 5, 2013, Amsterdam.
economic development policies for historic cities have relied heavily upon cultural tourism, sometimes to the exclusion of other industries. Can a city cultivate a tourist economy while also supporting new forms of production? Shouldn't this be the case, especially given that an increasing number of innovations in urban environments are based both on user innovation and social innovation? Given how much has already been invested in (these) cities, how can we ensure that we are thinking strategically about their present and future potential, even—especially—as new technology continues to lead to functional obsolescence of some building stock? Due to the changing nature of port technology and the large number of conditions that can impact global trade, maritime cities make a particularly interesting case. The World Port Source identifies 533 ports in the United States alone (see fig. 3). While not all are as old as Boston, many of these ports are located in cities that possess buildings and sites that are, or will soon, be rendered functionally obsolete as a result of economic or technical change. Considering this on a global scale, hundreds more port cities could be added to the list. In fact, many sites are available for redevelopment now in cities that desire to cultivate new forms of economic development. As the cases in this research will demonstrate, it is exceedingly important to understand how physical conditions, programmatic support and policy frameworks interact and set the stage for new activity.

Figure 3. Google Fusion Table of 533 United States Ports. Source: Based on data from World Port Source.
1.4 Technological and Social Change

Production, Redefined

In every era, new technology ushers in social and economic change. The compounding effects of the speed of adoption and pervasiveness of new digital technologies and the nature of these technologies differentiate the present type of changes emerging. Sociologist Manuel Castells explains the difference brought on by the new technology:

...The appropriate distinction is not between an industrial and a post-industrial economy, but between two forms of knowledge-based industrial, agricultural and service production. ...What is most distinctive, in historical terms, between the economic structures of the first half and second half of the twentieth century is the revolution in information technology, and its diffusion into all spheres of social and economic activity, including its contribution to providing the infrastructure for the formation of a global economy (Castells, 1996, 219).

Not only this, but the emergent form of production he describes has specific implications for what now constitutes urban competitiveness. The term production frequently brings to mind industrial production, manufacturing, and agriculture – the easiest types of production to see. In the 21st century, an increasing portion of gross domestic product (GDP) is attributable to production of intangible things, not only software and media, but also the services that shape and are shaped by these new intangible products. The impact of digital technology on production (especially information technology and communication via the internet) in an economic context has been called many things, including a knowledge-based economy (Drucker, 1966), the digital economy and the new economy; the far-reaching implications of which are described by Castells as a network society emerging in an Information Age (Castells, 1996). The presence of digital technology is so pervasive within our processes of production and in the shaping of the global economy that it is present even when people intentionally opt out.

Things that are intentionally produced by hand rather than machine often still rely upon sophisticated technology to bring them to market. (Products sold on the website Itsy are a good example of this.) For this reason, rather than use the term knowledge-based or digital economy, or any other term, I will simply refer to the “economy” with the understanding that the concept to which I refer is an increasingly knowledge-based and digitally reliant system, in which all activities are geographically...
situated, even though activities and actors may be geographically disbursed. Further, economic policy put in place to guide it is being held to increasingly higher social and environmental standards.

In the technological tidal wave currently in motion, production in the global economy is both changing and expanding. We produce more than we have ever before, especially as rates of technological advancement vary across the globe and even across cities. New technologies also make it easier to consume at a faster rate and easier to be dependent upon products that come from farther away. Technology makes it possible to expand the distance between locations of production and consumption. We are newly interconnected, yet often remarkably disconnected and ignorant about where our goods and services are produced and under what conditions. Advances in technology do not necessarily mean that we consume less or that we consume more efficiently. In fact, sometimes, just the opposite occurs. Still, certain conditions, such as the emergence of the sharing economy, including bike sharing, car sharing (Zipcar, Car2Go) and the development of new “city cars” (a project of the MIT Media Lab) hold the potential to decrease rates of consumption per capita, especially when they function as a suite of options available to the consumer.

Consumption, Reconsidered
At the same time that applications of digital technology have automated many tasks of production, transformed what is being produced, expedited communication and revolutionized the transport of goods and services, many countries have experienced a sharp per capita increase in consumption. New aspects of production and consumption shape the resiliency and the competitiveness of cities, and in turn, the quality of life available to each citizen. The challenge to become more economically competitive by achieving targets for decreased consumption per capita are at the crux of the Obama administration’s Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs (2011), and present in the policies of many cities and countries seeking to achieve or maintain a place at the economic forefront. Federal policy has most often linked the idea of innovation to clean energy, but it is increasingly being linked to a wide set of interrelated objectives, including stimulating economic prosperity in metropolitan regions, livability of cities, poverty reduction and homeland security. The scale and complexity of problems cities face (environmental degradation, poor health care and education, climate change vulnerability, inequality, cost, crime, conflict) are so great that even more attention should be focused on unraveling what are often nested problems.
There is good news. Some cities now find themselves in an enviable position -- newly capable of supporting productivity while maintaining low or lower rates of per capita consumption. This is due in part to urban fabric that facilitates high rates of pedestrianism and/or reliance on bicycles and mass transit, as well as early adoption of more efficient strategies and technologies (such as car sharing and use of high efficiency electric vehicles in place of petroleum based ones). Car sharing and other elements of the share economy prove that it is possible to have more choice, but while owning less, and that many consumers are comfortable sharing resources when it is done equitably, with transparency and when they think they get fair value from the deal.

Technology and the changing nature of work

Accepting that technology is changing both the way we produce and consume, the following five points serve as a preface for my investigation:

1) Cities seek to attract and cultivate new entrepreneurs for a number of reasons. 21st century entrepreneurs are important to the competitiveness of cities because their activity is often self-perpetuating (they ensure their own future), self-reinforcing (they attract other entrepreneurs and high skilled workers) and because they make substantially higher wages than unskilled workers, producing necessary tax revenue for cities to operate. The wage potential of such workers means they are more likely to contribute to municipal revenue than to draw from it. If what they produce results in negative physical/environmental externalities, these are often geographically discontinuous – they don’t take place locally. It is no wonder that any city would desire to attract such a workforce (Florida 2003, Glaeser, 2011). An important question is whether the presence of such workers can facilitate the expansion of relevant skills within the “low skilled” urban workforce.

2) New organizational strategy (within firms) is leading to an increased emphasis on networks, collaboration and the role of contingent workers. Simultaneously, the changing conditions of the labor market devalue the promise of any singular employment opportunity and increase the importance of conditions necessary to support entrepreneurs. The concept of “profession,” what a person does as a source of income, what skills he or she possesses and with whom he or she affiliates, has been an important part of identity construction since the beginning of the Industrial Revolution (if not before). The benefits of working for a large organization described by William Whyte in 1956 in “The Organization Man,” including job security, a sense of belonging, a chance at the good life (if not extreme
wealth), are no longer as common today for many workers. The reasons are many, including firms’ increasing reliance on freelance workers, rates of corporate reorganization, and the willingness of workers to relocate and change jobs in order to fulfill their own professional aspirations.5

Since Whyte’s time, many large corporations, especially those in high tech sectors, have moved away from vertically integrated organizational models toward models that rely on outsourcing and development of specialized components or technology by partners within the network-based industrial system (Saxenian, 1996), through competitive selection and sometimes, collaborative development. This has led to fundamental changes in corporate structure, resulting in “flattening” (Feldman, 2004) of corporate hierarchy, in which large corporations directly employ fewer numbers of people. It has also led to new emphasis on openness and knowledge sharing across networks. This ensures the flexibility to reconfigure quickly so as to meet the increasing pace of innovation within the marketplace.

More than 30% of the U.S labor force now works as contingent workers, including in a freelance capacity (Abrahamian, 2012). A growing percentage of the workforce is now working on projects of short duration and in processes of rapid reconfiguration – even when they freelance repeatedly for one company. These changes (shifts) have substantial implications for the worker-firm relationship. Instead of deriving identity from affiliation with one large organization, there is now a greater chance that a worker may instead see himself or herself as part of a network, or community of practice (Lave and Wenger, 1991), composed of transient (Whyte, 1953) and freelance workers.

3) These organizational changes have specific implications for the concept of the workplace. These organizational changes reflect increased specialization and division of labor, but they also speak to something else equally important, and that is willingness to transform as an organization – to be nimble in response to rapidly changing conditions and opportunities in the global marketplace. For organizations to be successful, they must operate within a recombinant architecture (Mitchell, 1996) that matches this increasingly dynamic context. As a result, we are seeing substantial changes in the commercial real estate market and its impact on urban landscapes and urban economies. As large companies now choose to flatten hierarchies and rely more on contingency workers, they are organizing space around shared, task-based workspaces, and the demand for what was known as “traditional” class

5 Whyte was aware of the changes apace when he began documenting the Post War II workforce; he was one of the first to document job change and geographic relocation as part of the career trajectory of organization men.
A office space has decreased. Or, more explicitly, what constitutes “class A” space is transforming to reflect a different set of performance objectives.

4) Companies, whether large or small, are more acutely focusing on the idea that performance optimization begins at the level of the individual worker. In the conditions of the new economy, productivity is increasingly about self-optimization. This means situating oneself in a context in which it is possible to “allocate bandwidth” to the tasks at hand, and it also means situating (physically and virtually) where it is possible to be in the know so as to advance skills and build a professional network. Advances in information and communication technology (ICT) mean that it is technically feasible to coordinate a team of people working from their kitchen tables in Mumbai, Moscow and Miami. For some tasks -- particularly those contingent upon non-verbal communication, such as trust building, brainstorming, decision-making -- location/setting is important, while for others, it is variable. Location importance depends upon who is involved and the nature of the task.

The choice about when and where to locate (and how to organize) for work is increasingly in the hands of the high skilled worker⁶. Digital technology makes it possible to deconstruct the traditional boundaries of time and space, particularly in regard to when and where work takes place. Dalton describes the resulting blend effect of how we go about much of our lives as one of “weisure,” the melding of work and leisure (Conley, 2009). This is important because the choices we make affect our ability to work productively while also affecting our consumption practices and the quality of our relationships, all of which in turn shape and are shaped by our sense of fulfillment.

5) Entrepreneurship is both an outcome and driver of the changes taking place. Finally, while entrepreneurship is a timeless concept, digital technology has facilitated a new startup culture. Startups are about several things: launching innovative ideas (with the aid of new digital technology and often as new technology); making money; and sometimes, solving specific problems. For many entrepreneurs, launching a startup is also about creating a different type of work culture – changing the context of

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⁶ Undoubtedly, some types of jobs prove more flexible than others; there are also signs that some newly emergent “loose” aspect of work organization may be changing. In February of 2012, new Yahoo CEO Marissa Mayer ended work-from-home arrangements, requiring all Yahoo employees to work from Yahoo offices as part of the effort to turnaround the struggling company. The company memo states, “We need to be one Yahoo!, and that starts with physically being together.” See: http://blogs.wsj.com/atwork/2013/02/25/at-yahoo-working-from-home-doesnt-work/
work, shaping identity in deliberate ways, and recalibrating “work-life” balance. The current blossoming of startup culture is both a response to and a driver of all of the conditions just described. As innovation consultant Navi Radjou explained in a lecture at MIT, “Entrepreneurship is a mindset” (Rajou, Sept, 9, 2013).

Tim Kane’s research shows that there is growing evidence that entrepreneurs playing a special role, creating new jobs and transferring knowledge and skills to new enterprises (see fig. 4, Kane 2012, 4). Many questions remain about how startups are impacting lesser skilled workers and if in fact it is possible to leverage the capacity of emergent entrepreneurial communities to the broader communities in which they locate. Additionally, Kane points out the startup job rate was actually in decline from 2006 to 2012, and there is no clear understanding of why this is so. If startups are as critical to job creation as Kane’s work implies, then determining how to encourage them should be a priority.

![Figure 4](image_url)

**Figure 4.** Job Creation: Startups vs. existing firms. Net job creation minus loss by firm age cohorts. 
Source: Tim Kane, based on Business Dynamic Statistics, U.S. Census Department.

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7 Included would be entrepreneurs who forgo advanced education and create their own job in an effort to advance a new technology, sometimes intentionally disruptive to existing academic and corporate models of project development. This mindset stands in stark contrast to the “floating generation” (Erlanger, December 2, 2012) of European graduates who have graduated with expectations that a job would be waiting for them. In 2012, the unemployment rate among youth (age 15-24) in Europe was: 22% in France; 51% in Spain and 36% in Italy (Ibid.) This leads to important questions about agency in relationship to employment and the importance of fostering a culture of risk-taking and entrepreneurship, particularly in periods of economic downturn.

8 See also Haltiwanger et al., 2013.
The locations of intense entrepreneurial activity and innovation seem to be contingent upon a certain set of conditions (Feldman 2004, Reynolds 2012, Feld, 2012). How to induce these conditions, especially in the context of rapid social and economic change, is far from understood. Not just a matter of “lifestyle” preferences, it appears that location choice is critical to performance optimization and that inherent qualities of historic urban environments provide many of the conditions necessary to attract workers and ensure their productivity. To the degree that location choice does reflects what has been coined “lifestyle” preferences, this is important because such preferences are “satisficing” (Simon, 1956), a term combining the words “satisfy” and “suffice,” coined by systems theorist Herbert Simon. Brand points out the applicability of this concept to the way people make incremental adjustments in buildings; as I will demonstrate (in Chapter Six), it also fittingly describes the way many entrepreneurs work. Brand states,

*It is precisely how evolution and adaptation operate in nature. Even after generations of satisficing, the result is never optimal or final, though it can be, like the random-feeling street lights of Venice, sublime* (Brand, 1994, 165).

Such refinements and resulting use patterns, or routines -- which play out at the building level and also implicate interactions at the district level -- also enhance the overall performance of a worker. Rather than think of lifestyle as a supplemental consideration to location choice (i.e. coming after jobs) or as something that implies merely consumptive preferences (as if lifestyle has no bearing on the performance of an individual) it should be realized that lifestyle -- if we call it that -- and performance are inextricably linked. As the distinct boundaries between work life and the rest of life continue to dissolve, this will become even more the case.

On average, cities tend to be inherently more historically diverse than suburbs due to growth patterns, but the nature of historical diversity and the reasons for it vary widely. Urban policy (physical planning as well as historic preservation), processes of economic change, and the extent to which conflict or natural events have left the urban environment intact are but some of the forces that impact the form and character of cities over time. As Jacobs and Brand describe, historical diversity often promotes programmatic variety by providing some variety of building types and rents. Older buildings, particularly those that have not undergone extensive renovation, play a much-needed role in real estate markets, often by providing more affordable real estate (compared to restored or new construction). This is
often where we find startups, but it appears that it is not merely because such places are cheap and central. There is growing empirical evidence that these locations contribute to urban vitality based upon a number of social, economic, cultural and environmental measures (National Trust, 2014).

1.5 The Emergence of New Industries and the Transformation of Old Industries

In the transition to a more knowledge-based economy, new economic sectors have been identified. These include Information and Communication Technology (ICT)\(^9\) as well as the Creative Industries (CI). Scholars, industry leaders and entrepreneurs themselves differ on how they think these sectors should be conceptualized, including where the boundaries for each may lay. Broadly speaking, ICT includes any form of hardware or software developed for information management and communication. It is nearly synonymous with the rise of digital technology and computing and today ICT impacts every aspect of the global economy. It may be useful to think of ICT as the “digitalization” of the collection, analysis, storage and communication of information.

Evidence about changes in expenditures affirms that a new set of skills relating to information, knowledge and networks is leading the global economy. “Expenditures in information processing and software, as a share of U.S. private nonresidential fixed investment, rose from 6% in 1960 to 40% in 2000” (Violante, 4)\(^10\). Hence, information technology plays a critical role both as a tool for reshaping a wide variety of processes of production and as the “infrastructure” for new products and services. This now occurs at a scale that can reshape entire urban economies and dramatically alter their urban competitiveness.

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\(^9\) Also called IT, Information Technology. I choose to use the term because it is more comprehensive and places more emphasis on the importance of understanding both technical and social processes of communication in this context, such as in the emergence of social media and crowdsourcing.

\(^10\) Some economists have described the type of structural change now taking place as skill biased technological change (SBTC), based upon the observation that, all other things held constant, “SBTC induces a rise in the skill premium – the ration of skilled to unskilled wages” (Violante, 4). This is important in that technological change has traditionally been perceived to be factor neutral (Violante, 4). Although the exact causal mechanisms of skill biased technological change are not yet well understood, two observations are critical in the context of urban planning: first, that “The factor-bias attribute puts technological change at the centerstage of the income distribution debate” (Violante, 1); second, citing positive strong correlations between educational attainment and wages through this period of observed SBTC, that “Rapid educational advance (is) key to shared prosperity in (the) face of skill biased technological change” (Golden and Katz, 2009, 2).
Creative Industries is a description that has emerged to acknowledge the economic importance of creative work. Many creative industries, such as painting, architectural design or musical production are age old. With the rise of digital technology, these pursuits have often become more technical, such that digital technology plays a role in nearly every creative process that produces a good or service for the market, at some stage of production, if not all stages.

Concurrently, ICT has also become increasingly dependent upon the creative industries. Skills such as graphic design and animation are growing in demand, in part because digital technology facilitates visual communication. Multimedia is now integrated in numerous modes of communication today. Much emphasis has been placed on the importance of a workforce with skills in science, technology, engineering and math ("STEM") for economic competitiveness, and this is starting to strongly influence education policy and programs. There is actually a risk to overemphasizing the importance of STEM and great need for more critical thinking about applied science and technology. Creative skills, including creating thinking skills applied to complex problems, are also exceedingly important in the context of the 21st century economy, especially in some of its most dynamic sectors. (Some parties have suggested that STEM be recast as STEAM, to acknowledge the interrelationship between art and science.)

Given how quickly ICT and CI are evolving, standard industry classification coding systems have had a hard time keeping up. This places some limitations on using industry classification codes to track the emergence of these sectors, but it is still useful to some degree. Additionally, as ICT and CI can also be conceptualized as "services" to other sectors, many emerging firms ultimately sit at the crossroads between sectors. One entrepreneur I spoke with described this quandary by remarking that her co-founder had resorted to explaining to people, "We are a real estate company first. A finance company second and an internet company third," said Bonnie Burgett, quoting her cofounder, John McDonald, of Sourced Capital. This illustrates an important point: technical and creative knowledge are increasingly important to almost every type of firm today.

Much new ICT and CI “innovative” activity is predicated on technology that has now been in development for decades, if not longer. This creates an interesting condition in which many newly lucrative products and services, especially in the realm of software or applications, are developed with

11 Interview with Bonnie Burgett, Co-Founder of Sourced Capital, June 9, 2014.
little research and design (R&D) dollars directly invested. As a result, the playing ground for who can
develop new solutions has been leveled significantly.

In the past, software companies did not often receive investments of capital at the scale received
by biotech companies, which may invest millions of dollars and years of R&D to bring a solution to market. Some startups in these sectors are receiving enormous sums of venture capital, but this has to be understood in the context of the extreme competition now underway; there are more people hacking away at what are often the same, or similar problems. The other aspect that is pushing venture capital investment is the concept of ubiquity -- that the anticipated market for a product or service might reach into the hundreds of millions. A recent announcement provides testimony:

San Francisco-based social bookmarking site Pinterest has raised $200 million in a Series F funding round led by Bessemer Venture Partners, Fidelity, Andreessen Horowitz, FirstMark Capital, and Valiant Capital Partners. Pinterest plans to use the money to fund monetization and international growth, opening additional worldwide offices. Founded in 2009, Pinterest has raised nearly $540 million to date and is now valued at $5 billion.12

The concept of “social bookmarking,” at least in a virtual format, has only been around since 2007 and Pinterest, valued at $5 billion, has yet to produce earnings, though it purports to drive more traffic to e-commerce sites than Facebook and Twitter.13 It is constructed to derive an enormous amount of data about consumer preferences based upon images pinned and repinned. Perhaps there is a tipping point to this kind of investment, especially when it starts to become more speculative than substantive, but it illustrates the point that the combined ingenuity of ICT and CI has made it possible to share innovative solutions at a much more rapid rate, and for the best of these solutions to find their place in the market. These sectors are in part a self-fulfilling prophecy.

The fact that innovations in ICT and CI are often happening where these activities intersect with other sectors (or where ICT and CI themselves intersect) is exceedingly important to the concept of economic revitalization and finding new relevance for knowledge that is already present (see fig. 5). ICT and CI can facilitate a particular type of knowledge / technology transfer, not only from the university laboratory to

12 Crunchbase Daily, via email on May 15, 2014.
13 http://venturebeat.com/2012/04/09/pinterest-drives-more-revenue-per-click-than-twitter-or-facebook/
the market, but also from traditional, even dormant industries to newly relevant applications or the "next generation" version of such industries. Taking the automobile industry as an example, this might mean shifting from focusing on the production of units of automobiles to delivery of mobility services.

Figure 5. Conceptual diagram of ICT and the Creative Industries, and new forms of production emerging at the crossroads of these two sectors. Diagram by author.

In Chapter Six, I will describe some of the characteristics of ICT and CI industries in each of the three case study cities and address why these seem to be linked so intentionally to the urban environment.

1.6 Theoretical Proposition and Hypothesis

The early phases of this research led me to formulate the following theoretical proposition: In the context of innovation, cities play three timeless and interrelated roles: as repositories of knowledge, as frameworks for creative thinking, and as settings for knowledge sharing (see fig. 6).
Repository of Knowledge

The most literal form of repositories of knowledge includes the physical buildings created by institutions charged with stewarding and producing knowledge, such as libraries, archives, museums as well as universities. The broader built environment – architecture, infrastructure, the entire urban landscape -- also functions as a repository of knowledge, especially about how to build well in particular environment. Just as most libraries are collecting institutions, the function of cities as a repository of knowledge develops over time.

Framework for Creative Thinking (and New Knowledge Production)

As we are constantly processing stimuli, cities also function as frameworks for creative thinking and new knowledge production. As we will see in this research, some environments appear to be more inspiring than others. Our environments engage our senses, the literal building blocks of memory, in different ways. Who and what we encounter and what form of actions and exchanges take place are the basis of knowledge production. One of the interesting things about knowledge work is that even when we think we are not working, the subconscious mind is often still working away at the puzzles we have left behind on our desk. New information we take in can also provide the basis for problem solving.

Setting for Effective Knowledge Sharing

Cities are, by nature, built for people, though some spaces undoubtedly function better than others. Cities serve as literal markets, which often also function as a marketplace of ideas. Formal places of knowledge transfer, such as academic and cultural institutions, are often found in cities, with the intention of serving a broad population. Cities are often places where communities of practice, such as guilds, are created to promote knowledge sharing. In the context of the tourist city, a particular type of knowledge sharing may play out -- that between visitors and host. Temporary events such as festivals,
competitions, conferences and expositions for which the city plays host often have a discrete goal of promoting knowledge sharing among participants. When cities perform at their highest, we often speak of events of serendipity taking place. Sometimes this is simply a matter of similar behavior patterns playing out in a confined space, but to the degree that cities encourage social interaction (sometimes as if they are “planning for us”) they are especially effective in encouraging the sharing of knowledge through the transmission of face-to-face conversation.

**Place knowledge** can be defined as the knowledge of how to live well in a particular environment. *Place knowledge* is inherently place-specific. It is rooted in the knowledge a community must acquire to survive and thrive in a particular environment, and it is a prerequisite for productivity. (The same people displaced to a different situation may not be as productive, or at least not immediately.) In this way, it is similar to concepts of indigenous or local knowledge (Geertz, 1983), city knowledge (Carrera, 2004).

Place knowledge is both *embedded in* the built environment and *accrued by* a community over time. *Embedded* place knowledge is found, literally, in the physicality of the built environment and represents solutions to complex problems or other direct social information. One example is when architecture reveals or conveys a knowledgeable solution, such as how to build effectively in a tidal environment. Such solutions can often be understood, perhaps even on a subconscious level. Another example, sometimes literally intended to be read, would be the iconography or inscription placed on buildings as a form of ornament. These elements often convey direct messages, such as who owned a building or for what purpose it was built (see fig. 7). Messages can be practical, but also embedded to delight, inspire, or even to provide some form of commentary. The collective impact of these “bits” conveys some sense of time (Lynch, 1972) and contributes to our ability to drawing meaning from our environments. We also read, or interpret, their absence.
Place knowledge that is \textit{accumulated} is purposefully gathered, stewarded and curated, such as in archives and libraries – the repositories of knowledge previously mentioned. As such, it is “institutionalized” in some manner. Universities can be conceptualized in this way, playing the role of managers of accumulated knowledge (and providing access to this knowledge) as well as functioning as places where new knowledge is generated. More and more cities and other levels of government are now making data they collect available for analysis; thus we are on the cusp of reaching new levels of understanding the way cities function as a result.

Another important point in the conceptualization of place knowledge and closely linked with the idea of entrepreneurship is that place knowledge can have more than just local value. Digital technology makes it possible for place knowledge generated in a particular location to be transferred, finding relevance in other markets. Now, with new technological tools, such as embedded sensors, aerial photography and cell phone traces, we are able to obtain even more data about these environments than before, opening up a whole new understanding of the performance of our urban environments.

The development of new products and services often then advances place knowledge, such that the generation of knowledge can also be thought of as an output. Place knowledge is an important means by which a location, entrepreneur or firm, can gain a competitive advantage through processes of differentiation and idea refinement.
Hypothesis
My general hypothesis is that historically diverse urban environments are important to entrepreneurs in 21st century industries because they possess a set of particular qualities that make them (place) knowledge-intensive and simultaneously provide the necessary conditions for workers to self-optimize. Both are newly relevant in a network society (Castells, 1996). “Quality of place” plays a role in both. In chapter five, I present a specific hypothesis to address the idea of historical diversity in quantitative terms and to show how the idea of quality of place can be associated with the architecture of buildings from particular eras.

For workers in a knowledge-based economy, it appears that location choice is closely linked to performance and productivity. Selection is a result of both functional and aspirational demands and it is necessary to understand how these demands interact. It appears that the quality of place / quality of the built environment plays a larger role in the performance of the knowledge economy than has been acknowledged. In books such as Triumph of the City (Glaeser, 2011), much emphasis has been placed on the importance of density to foster entrepreneurial spirit and yet, our understanding of the subtleties of interactions, especially in a changing technological context, remains limited. Density is often erroneously treated as merely a single quantitative measurement. In actuality, there are different types of density that can be measured quantitatively, such as:

1) Population density, which is usually associated with the number of people living in a particular area, which can be different from the number of people utilizing an area at a particular point in time.
2) Square footage or volume of built space per area (the configuration of which in turn impact persons for area, amenities per area, etc.)
3) Programmatic density, which describes the degree to which a location is mixed-use or multi-use in function.

All of these combine to contribute to quality of place. To speak of density without concern for quality of place is problematic. There is no inherent value in density and proximity if conditions do not actually facilitate positive interaction. In fact, we know that density without quality leads to rapid spread of disease, crime, social conflict, etc. Rather than speaking of density as something that is always desirable (or undesirable), it may be more useful to focus on the idea of density optimization, while
acknowledging that density is a concept that is socially constructed, and partially in response to environmental conditions. It is rooted in semiotics and environmental-psychological responses, which vary from culture to culture. High density can mean skyscrapers. It can also mean triple deckers. One form of density may work well in one place and fail in another.

Promoting density is argued as a strategy for promoting economic growth, but this is based on an overly simplistic understanding of production. The performance of economies is most often evaluated by metrics such as Gross Domestic Production (GDP), which measures the amount of units produced by a particular nation within a particular period of time. This quantitative way of measuring more accurately reflects the efficiency of production than the effectiveness of production. It is actually quite difficult to measure the aggregate effectiveness in the performance of an individual, firm or nation because of the question: compared to what baseline? Yet we know that economies are dependent upon the creation of new ideas, more integrated ways of problem-solving and the launching of new products and services as a way to counter the loss of jobs and activity that occurs as a result of functional obsolescence. Once the shift is made to focus on the effectiveness of workers, firms, and aggregate economies, it becomes even more important to understand the conditions that individually and collectively impact worker performance. To do this, it is necessary to view performance as a situated practice and increasingly, a situated practice for which the worker has a high degree of choice about where to situate herself.

Approaching this from the urban planning perspective, regeneration is an iterative process of change in which places are remade and narrative is reimaged and rewritten. It is interesting to observe that entrepreneurial clustering occurs most often in the context of regeneration; rarely do we see it supported solely by new (greenfield) development. Why is this the case? In fact, many “science parks” that have attempted to engender entrepreneurial clustering by providing only cheap office space, thinking they will be a natural fit for entrepreneurs, have failed or failed to appeal to startups.

A simpler version of my research question might have been: Why are entrepreneurs drawn to old buildings (or to historic districts)? Focusing on just one scale would omit valuable pieces of the puzzle. Location characteristics at the city, district and building level are all taken into account in the process of location choice. It is therefore necessary to look broadly to understand the relationship between urban policy, urban form, urban program and the emergence of entrepreneurs in specific locations, namely in historically diverse locations found in cities with strong track records for innovation.
1.7 Research Objectives and Potential Implications

In this research, I am drawing attention to the value of dense, mixed-use urban environments especially given the capabilities to integrate technology, to network systems, and to create more responsive environments. Some newly perceived advantages of historic urban environments (being able to accommodate multiple uses enabling walking home for lunch) and the ability to organize in guilds and networks in these environments through meet ups, un conferences, etc. are actually rather timeless concepts (now further enhanced by digital communication technology). For the most part, however, they were ignored in rational modernist planning that dominated the middle of the last century. Jane Jacobs observed the cities as dynamic systems, when she wrote:

"Cities happen to be problems in organized complexity, like the life sciences. They present "situations in which a half-dozen or even several dozen quantities are all varying simultaneously and in subtle interconnected ways." Cities, again, like the life sciences, do not exhibit one problem in organized complexity, which if understood explains all. ...The variables are many, but they are not helter-skelter; they are "interrelated into an organic whole."

Jacobs embraces dynamism, seeing the city as a system of systems, not conceiving the city as merely an efficient rational environment or one predicated on expanding and growing, but one that strives to be effective by synthesizing what is learned into the simplest and most effective of solutions – one in which society learns over time to eliminate unnecessary complexity, even as it becomes more sophisticated and nuanced. These are important points to consider as we think critically about the introduction of new technology into the city. Cities need new solutions, but first potential solutions need cities for feedback about whether a proposed technology is in fact useful. A critical definition of “useful” could be: in service to the goals of enhancing quality of life, building capacity where there is none or where it has eroded, and regenerating natural resources and the integrity of natural systems.

Old cities that endure are places that have successfully integrated and synthesized new opportunities, selecting what is truly useful and sustainable and reworking what is not. Historic cities that are allowed to continue to evolve maintain this ability to metabolize new technology so that it enhances and adds to what has been built over time rather than unnecessarily replacing it. They become seemingly simple but highly sophisticated, discerning environments, places that can elegantly combine high tech and low tech solutions, such as those emerging from Boston’s Office of Urban Mechanics (see fig. 8).

*Figure 8.* Program directors Nigel Jacob and Chris Osgood profile a new app developed to enhance life within the urban environment. This photo, taken by governing.com, situates a high tech solution explicitly in a historic context. Photo by David Kidd.

Among the many values of historic environments, the value associated with productive capacity has yet to be fully calculated. While the real costs to regenerate historic cities may be high, these costs are likely to be lower than the replacement cost or the cost of new construction for an equally “productive” environment. In the 21st century, there is little need to transform fragile buildings to accommodate massive industrial machines or even fixed computers. Today the laptop, the smart phone, and the cloud make the machine-accommodating and machine-serving abilities of architecture nearly obsolete, while making attributes of architecture that serve human comfort all the more important.
Dissertation Organization

I intend to shift focus away from the question of why cities attract entrepreneurs and other high-skilled workers to understanding what makes these places newly productive – that is, what makes entrepreneurs effective in these places. By understanding of what role the quality of the built environment plays in fostering entrepreneurial ecosystems and it should be possible to encourage and enhance contemporary processes of adaptive use, one of the most resource-efficient strategies for city-making from both upfront capital cost and long-term strategic investment perspectives.

I have organized this dissertation in seven chapters. In Chapter Two, I begin by discussing key concepts relating to the changing nature of work in a knowledge-based economy. I then describe theoretical approaches that other scholars have established and identify the gaps in this research that I seek to fill, as well as the methodology I will use to do this. In Chapter Three, I describe characteristics that set historic maritime cities apart from other cities. In Chapter Four, I look at each of the three case study cities individually. I analyze the importance of historical events and institutional legacies, and I evaluate recent policies and programs to promote entrepreneurship and innovation. I conclude this chapter by making some comparisons across the selected cases. In Chapter Five, I focus on the Boston/Cambridge case, and present a model for mapping location of firms and quantifying what is generally considered qualitative information about the existing building stock. I identify the quantity and distribution of buildings from specific eras in order to describe the building age diversity of locations and to study specific locations where high numbers of entrepreneurial firms can be observed. I apply a discrete choice model understand in quantitative terms, conditions about building age diversity that predict high firm counts. In Chapter Six, I interpret supporting evidence about location choice and entrepreneurial performance gained during interviews with firm representatives and other knowledge holders. In Chapter Seven, I present my conclusions. I also include three appendices. In Appendix One, I include key locator maps for each city. In Appendix Two, I include a set of typologies that describe firm-location relationships in a more qualitative nature. I also discuss the interrelationships between these typologies. Both are done in an effort to describe observed entrepreneurial ecosystems in a more qualitative manner. Appendix Three, I provide a detailed description of my research methodology, including a list of entrepreneurs and other knowledge holders consulted in each of the three case study cities.
Chapter 2: Knowledge Production and Place

2.1 Understanding Age Diverse Urban Environments as Productive Work Environments

Scholars from many fields are engaged in trying to explain the relationship between knowledge production, entrepreneurship and innovation. These fields include but are not limited to economics and economic geography (including urban economics and real estate economics), management, urban planning and urban design, and psychology and sociology. While questions are frequently spatially based, views on the importance of the role of place vary widely. Scholars often generalize or assume that with higher density comes a higher propensity for knowledge production, even though this may not be the case. Few have investigated the importance of quality of place, and further, how and why historic or historically diverse districts enhance not only attractiveness, but also productivity in the context of a knowledge-based economy. When considering the state of research, at least two important factors must be acknowledged: first, the possibility to analyze qualitative aspects of the built environment, on a large scale, is still rather new and limited by the availability and functionality of geographic information software and related programs to handle large data, as well as the types of data readily available for analysis. Second, while many historic cities have been the subject of careful research by scholars, and offices or organizations charged with management of cultural heritage have been dedicated record takers, much of data about historic cities still resides in hard copy format, available by specific request, or in databases that are not linked to other general planning offices, much less made available to the general public.

The following is a detailed review of literature, organized into six key themes that cut across many disciplines: knowledge production and innovation, entrepreneurship, agglomeration, urban attractiveness and location choice, the value of cultural heritage and quality of place. I then present takeaways from this analysis, including about the research methodology objectives this process helped me to refine. The diagram below synthesizes key theoretical ideas and investigations, and describes where my research can be situated among them (see fig. 9).
2.2 Knowledge Production and Innovation

In Alfred Marshall's classic work, Principles of Economics (1890), he identifies two chief causes that have led to the localization of industries: physical conditions (in relationship to natural resources or necessary conditions for production) and patronage of a court as a means for attracting immigrant skilled workers before turning to the question, "but how did these immigrants learn their skill?" to trace the origins of knowledge and skill production. Describing the fortunes of "groups of skilled workers who are gathered within the narrow boundaries of a manufacturing town or a thickly peopled industrial district," Marshall affirms,

When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near
neighborhood to one another. The mysteries of the trade become no mysteries; but are as if were in the air, and children learn many of them unconsciously. Good work is rightly appreciated; inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas. And presently subsidiary trades grow up in the neighborhood, supplying it with implements and materials, organizing its traffic, and in many ways conducing to the economy of its material.” (Marshall, 1890, Book IV, Chapter X)

Marshall’s phrase about the mysteries of trade being “in the air” is often quoted and has been profoundly influential on the formation of modern and contemporary industrial districts, such as science parks. What is often overlooked, however, is that the picture of the location of production he paints is inherently human-scaled, implicitly walkable, and offers a high degree of live-work proximity. It is the combination of these traits that creates a relational framework in which tacit knowledge is transmitted as if it were “in the air,” even to the point that children (and others) benefit from the advantage of being situated in a context conducive to knowledge transmission. It implies density, but of a certain quality, plus social organization. It is thus helpful to ask: does this idea still apply in the 21st century, and if so, under what conditions?

It is also helpful to step back and consider what is meant by knowledge and some ideas about how knowledge is produced in the first place. Knowledge is a form of understanding derived from the analytical processing of information to reach new insights. Knowledge production is therefore contingent upon information access. Knowledge is often described based upon who possesses it or how it is acquired. Examples include formal knowledge; institutionally sanctioned knowledge shared through academic education; traditional knowledge, knowledge accrued over time by a particular community; local knowledge, the specific knowledge a community holds about a particular region or place (Geertz, 1983), or tacit knowledge, knowledge that is shared informally through social relationships and shared experiences (Polanyi, 1958).

The concept of a knowledge-based economy describes the transition from an economy based upon manufacturing and industry to an economy more focused on the provision of professional services
In a knowledge-based economy, it is not sufficient for workers engaged in production to be efficient; they must also be effective. More value is placed on the worker’s ability to think and more responsibility is given to the individual “knowledge worker” to solve problems (Drucker, 1969). This has been described as a transition from reliance upon brawn to brain made possible by the ability to rely upon mechanical technology to undertake both physical work and increasingly complex computational tasks, allowing high skilled workers to focus their energies on those social-intellectual tasks that cannot easily be handled machines. It has also variously been referred to as a “learning economy” and described as a “post-industrial” economy, thought it is important to emphasize that industrial production has not necessarily been eliminated from the economy; many new activities emerging in the knowledge-based economy inform or rely upon industrial production taking place elsewhere, in geographically discontinuous locations. Still, many workers who provide professional services are directly engaged in intangible modes of production, including the production of new knowledge. Thus, it becomes important to consider: where does new knowledge come from? How is it produced? How it shared? How is it put to use?

Building upon the work of Polanyi and others to discuss the idea of knowledge production within organizations, management theorist Nonaka proposed a Dynamic Theory of Organizational Knowledge Creation (1994). Nonaka outlines the importance of the ability for firms or organizations to recognize that an individual creates knowledge through learning as an immersive process, or “pure experience” (Nishida, 1960) or “by means of one’s total mind and body” (Yuasa, 1987), a process more comprehensive than mere cognitive synthesis. For this knowledge to be accessed by an organization, there must be social mechanisms for converting it from tacit to explicit (or formal) knowledge, from tacit to tacit, from formal to formal and also from formal back to tacit. Nonaka’s theory hinges upon the idea that new knowledge is created from existing knowledge through the process of conversion (Nonaka, 1994, 18-19). Further exploring the relationship between tacit knowledge, social context and innovation, Gertler affirms:

“Tacit knowledge has come to be recognized as a central component of the learning economy, and a key to innovation and value creation. Moreover, tacit knowledge is also acknowledged as a prime determinant of the geography of innovative activity, since its central role in the process of learning-through-interacting tends to reinforce the local over the global. For a growing number of scholars, this explains the perpetuation and
An important observation that Gertler makes is that tacit knowledge is a product of local context and culture. Tacit knowledge is inherently situated, or place-based. Place knowledge, as I define it, is closely related to this idea. Place Knowledge, as the knowledge of how to live well in a particular environment - meaning the knowledge of how to thrive (rather than merely survive) -- is contingent upon the ability to access different forms of knowledge within one's this environment. Each place has a unique profile of accrued and embedded knowledge from which to draw and build upon for the production of new knowledge. Thus, place knowledge has a direct relationship to entrepreneurial performance and innovation. It is interesting to consider that some scholars are active in investigating the importance of "context" in entrepreneurial innovation, but without defining explicitly the physical conditions of place or the role of place in a social context (see Auito et al, 2014). The problem is that this might lead, for example, to presuming that all sites developed as university research parks are the same (product), when experiencing them confirms that this is clearly not the case.

Another concept closely linked with knowledge production is creativity. Creativity refers to the production of something original, whether idea, process, product or expression. Psychologist Mihaly Czikszentmihalyi distinguishes between the idea of “personal creativity,” from which individuals often derive enormous sense of satisfaction, and creativity that “brings into existence something genuinely new that is valuable enough to be added to the culture” (Czikszentmihalyi, 2007, 24). While the explicit events of the creative processes are far from understood, it appears that creativity is heightened by sensory engagement in the processing of stimuli, resulting in the organizing and reorganizing of information and the construction of memories (Paller, 2002). This information may then be called upon as the basis for expression in the present or future. Skill in the representation of the idea, such as the skill of drawing or writing, is used and refined through the practice of creative undertakings. Such skills are not fully independent of the idea but the medium through which it may be realized and developed.

How and where is creativity elicited? The central finding of Czikszentmihalyi’s research about how people, in a variety of disciplines whose contributions have been recognized by society as creative, work

15 I introduce the idea of place knowledge in the previous chapter. I will return to the idea and its relationship to entrepreneurial performance in Chapters Four and Six.
is that they reach a state of flow, a state of full absorption in their particular task (Czikszentmihalyi, 1990). They report being so deeply mentally involved and focused that they often lose track of time and that “nothing else matters.” Importantly, they also report that reaching this state produces intense feelings of satisfaction, or happiness, and even relaxation (Csikszentmihalyi, 1990). But he also affirms:

... an idea or product that deserves the label “creative” arises from the synergy of many sources and not only from the mind of a single person. It is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively. And a genuinely creative accomplishment is almost never the result of a sudden insight, a lightbulb flashing on in the dark, but comes after years of hard work (Csikszentmihalyi, 2007, 1).

The idea of flow as an immersive experience closely parallels the idea of individual learning as pure experience (see above). Both acknowledge the role of place in shaping the way an individual engages, understands and interprets information. This emphasizes an important point. While it may appear that knowledge production occurs “in the brain,” in reality it is shaped by the totality of internal conditions (physical and emotional state, memory, previously acquired skills and insights) and external conditions (environmental conditions, presence of others, activities taking place in space) that make up the context of production. In their seminal text, Situated Learning, Lave and Wenger describe concepts of apprenticeship to point out the degree to which both learning and work are situated practices. In it they state:

Participation in social practice – subjective as well as objective – suggests a very explicit focus on the person, but as person-in-the-world, as member of a sociocultural community. This focus in turn promotes a view of knowing as activity by specific people in specific circumstances (Lave and Wenger, 1991, 52).

The situating of practice, whether learning or work, remains exceedingly important. Other research on the context of creativity and creative breakthroughs has focused not just on setting and rituals of practice, but on the importance of a different type of processing, when and where people are not concentrating acutely. Margaret A. Boden finds that individuals often report that moment of clarity or creative ideas emerge (vis-a-vis subconscious processing) during repose or simultaneous with the
mundane, repeated tasks of everyday life that are interlaced with formal periods of work. She offers: “The bed, the bath, and the bus: this trio summarizes what creative people told us about how they came by their ideas” (Boden, 2004, 25). Creativity and knowledge production are thus linked in myriad ways and shaped by the settings of practice, but formal practice itself is likely incomplete without periods of rest, rejuvenation and change of scenery in which the individual’s subconscious mind can “go to work” and do its part in the overall process of knowledge production. Other research suggests that, for some types of knowledge work, there may simply be an advantage to changing places (literally gaining a “fresh perspective”) throughout the workday or to having the ability to choose from a variety of workspaces (Strelitz, 2011). Such findings reinforce a seemingly self-evident concept: the organization of a knowledge worker’s life is important in the context of knowledge production. It also suggests that is not merely the quality of the bounded workplace that matters to knowledge production. Rather, the quality of all environments that the knowledge worker inhabits will play a role in the way he or she accesses, produces, and shares knowledge.

Creativity and knowledge production are also closely linked to the idea of culture. Culture is comprised of the many ways in which a group of people expresses its collective identity, values and its knowledge. Further, heritage refers to something passed down from prior generations; implicit in this concept is that what is passed down retains some type of value. Thus, cultural heritage relates to both tangible elements of culture (such as architecture, physical art and cultural landscapes) and intangible elements of culture (language, rituals, practices and knowledge), as well as the relationship between these tangible and intangible elements. The use of the term cultural heritage emphasizes continuity, but it does not imply that things are passed down to remain unchanged. Rather, change is at the discretion of the recipients, to be based upon their own needs, values, cultural context. The “cultural lens” is another way that scholars have engaged questions about knowledge production, engaging questions such as, what contexts encourage the production of new culture, including new knowledge? The idea of hybridity emerges as an important concept in many fields. Homi Bhabha’s theory of hybridity, which describes the emergence of new cultural forms from conditions of multiculturalism (Bhabha, 1994), provides an important lens for thinking about the process of knowledge production. He suggests that it is through juxtaposition that new ideas and forms of cultural expression emerge. As Bhabha observed, colonial port cities possess many conditions that make them natural environments for fostering new manifestations of culture.
Innovation, which relies upon new knowledge production, has become a highly popular buzzword in product descriptions, policy statements and advertising. The problem with this is the gap between the implied associations (novelty, ingenuity) and a more critical understanding of the spectrum of activity required to realize innovation. What does innovation actually entail and what is its relationship to place? The sources of innovation are, in fact, vigorously debated. Arguments can be broadly grouped among those who emphasize the importance of supply-side innovation and those emphasis demand-side innovation.

Scholars who emphasis the importance of supply-side innovation place emphasis on the importance of investment in research and development (and development time) to drive disruptive innovation and warns against government subsidies toward production as a means to launch new industries. Funk suggests this places too much emphasis on improvement at the end point of product development, limiting the scope and magnitude of innovation. Funk points to new value opportunities that emerge from geometrical scaling, as well as to multiple cases where a missing technological breakthrough holds up the delivery of a new technological system, long after the basic attributes of the system have been identified (Funk 2013).

Acknowledging that part of innovation involves invention and application of new technologies, demand-side innovation scholars argue that this is not the whole picture. Christensen, concerned directly with the decision-making of business managers, points to the difference between sustaining innovation (or incremental improvement, what incumbent industry leaders are often good at) and disruptive innovation (which may threaten the relevance of existing processes an the expertise of existing personnel), noting that adoption of disruptive technology relies heavily on the ability to identify new markets. “The pace of technological innovation can, and often does, outstrip what markets needs” (Christensen, 1997). Christensen asserts that it is only by launching a disruptive product that a market can be defined and provide necessary feedback to guide subsequent product development. Startups, or at least autonomous divisions within existing organization are often far better at this that incumbents (who may have little incentive for transitioning resources away from currently profitable products). Hence, Christensen argues that the challenges of realizing disruptive innovation is highly dependent upon marketing and management approaches.
Economic development scholars emphasize the need to combine two outlooks: “Even in the sectors that embed the most effervescent technologies, innovation is mostly driven by competitive considerations. Moreover, most of the technological progress occurs over long periods after inventors’ initial breakthroughs” (Miller, 2012, VII). Feldman offers: “Commercially viable product innovations combine scientific and technical knowledge with knowledge of the market. A new product introduction reflects the successful organization and synthesis of these diverse types of knowledge” (Feldman, 1994, 1). The prolonged period of time required for the electric vehicle to be accepted by the U.S. market is an excellent example of the necessity for technological innovation to be coupled with a thorough understanding of actors in the market.

Bringing together both supply and demand side views of innovation is important. There is also a third, prefacing (but also iterative) dimension: the importance of problem definition – determining what the problem is (and what kind of problem it is) before technical and creative expertise is deployed to solve it and marketing and management expertise is deployed to launch the initial solution. Problem definition may require an even wider range of information and knowledge types, and a more critical view, than are necessary later in the innovation process. Why do these distinctions matter, in the context of this research? How entrepreneurs interpret the innovation process likely has tremendous implications for the priorities they assert (and the proximities they favor) when choosing a location.

**Innovation and setting**

While much research on innovation focuses on the spatial and networked characteristics of players and entities, few studies frame their inquiry as an effort to understand the situated, or place-based nature of knowledge production and innovation. Some acknowledge it implicitly, even if they do not make it the focus of empirical analysis: Navi Radjou’s study of *jugaad innovation*, documents “frugal, flexible and inclusive” solutions that emerges from condition of constraint in the developing world (Radjou, 2013). In the study, *Sources of Innovation*, von Hippel begins with an important clarifying question: who is doing the innovating – product manufacturers or others? (von Hippel, 1998). Concluding that the sources of innovation vary greatly, but predictably, among users, manufacturers, suppliers and others, von Hippel places new emphasis on the motivations of the “user innovator.” From this, it is also possible to deduce that the locations of innovation – laboratory, manufacturing site and beyond – also vary. In what has been termed *Intrapreneurship*, companies dedicate resources intended to channel talent and encourage entrepreneurial and innovative thinking; often they convert some interior space
within a pre-existing company site as a locus for this activity. The Cambridge-based company, Hubspot, for instance, has a program to allow workers to pitch good ideas and, if approved, to get time and funding to develop them, while staying within the company. Studies of such initiatives do mention environment (Antoncic, 2001), but have not systemically defined what qualities of architecture or the broader built environment are most important and why.

2.3 Entrepreneurship as a Source of Economic Development
Another economist whose work is profoundly influential to interpretations of the relationship between entrepreneurship, innovation and economic development is Joseph Schumpeter. Of Schumpeter’s many contributions, two ideas are especially critical to this research. The first is his economic definition of what it means to be an innovative entrepreneur (Schumpeter, 1934). Baumol and Shilling summarize the concept in the following way:

*The successful innovative entrepreneur’s reward is profit temporarily exceeding that of perfect competition. This attracts rivals who seek to share those profits by imitating the innovation, and thereby erode its super-competitive earnings. To prevent termination of these rewards, the entrepreneur can never desist from further innovation and cannot rest on his laurels. (Baumol and Shilling, 2008).*

Hence, Schumpeter’s entrepreneur must be constant pursuit of innovation. The second is his view of the special role that entrepreneurs play in economic development under a capitalist regime, as instigators of creative destruction (Schumpeter, 1943), with the idea that capitalism is “an evolutionary process of continuous innovation and creative destruction” (Freeman, 2009, 126). The idea of creative destruction has greatly influenced the concept of disruptive innovation (Christensen, 1997), especially when used to imply the potential not only to change existing technological systems, but also the capital implications of usurping large companies that currently dominate a particular market.

While Schumpeter’s idea of the innovative entrepreneur was generally accepted by way of exemplary exceptional cases and personalities, it is only as more fine-grained data has come available that it has been possible to measure the collective impact of entrepreneurs over time. David Birch’s 1981 study, “Who Creates Jobs?” was one of the first to provide empirical evidence to do this and to show that the most successful metropolitan areas, from a job creation standpoint, have been “those with highest rates
of innovation and failure, not the lowest” (Birch, 1981, 7). Even in markets where large firms are still major providers of jobs, the presence of innovation-drive entrepreneurs seem to play a special role in keeping an economy dynamic. This places important emphasis on the role of the entrepreneur as economic and social catalyst, even in cases when many ventures launched fail to reach financial success.

The concept of creative destruction, which can be very real in destroying firms and even rendering entire industries obsolete, also brings up an important question: where does old knowledge go? Often it is naturally reconstituted, applied by capable individuals who leave old companies and make their way to new industries or ideas emerging, though sometimes it make take a while for this to take place. In creative destruction – especially in cases that are highly disruptive, it is possible that some old knowledge (and old institutions) will in fact be “destroyed” and this is something to be mindful of: to look for opportunities to reconstitute valuable aggregated knowledge or to apply it in new contexts. This is especially true when knowledge is held by individuals, as a way to affirm their value as contributors to the broader economic-social system.

**Differentiation among entrepreneurs and entrepreneurial outcomes**

Another thing Birch began to elucidate is a difference among entrepreneurs and their growth tendencies. While stating clearly the challenge of predicting which firms would succeed, Birch demonstrated that establishments have tended to create jobs at different rates. Looking at data for establishments across all U.S. industries, he identified three categories of growth: new and slow growing (“mice”), new and fast growing (“gazelles”), and established large companies, most often slow growing (“elephants”). Birch found that new rapidly growing firms (“gazelles”) were responsible for most of the economic growth in regional economies and since that time, much attention has been paid to firms that fit the gazelle criteria, but less to the particular environment (or ecosystem) in which they can be found. Policies as well as the popular press often fixate on this one element without considering the whole ecosystem.

Schumpeter’s definition of the innovative entrepreneur has greatly influenced the idea of distinguishing between different types of entrepreneurs in relationship to growth objectives. Management scholars Aulet and Murray point out that it is important to differentiate between entrepreneurs by direct intention – those who aim to exist as sound and profitable small and medium size businesses (SMEs), and those who act as “innovation driven enterprises” (IDES), who seek to introduce disruptive
technologies and/or take a risk oriented approach that allows for the possibility of rapid growth (Aulet and Murray, 2013). It may be that some IDEs, are far less “sticky” to place (Markusen, 1996) than SMEs, prioritizing perceived access to capital and human capital more highly than allegiance to place of origin. Further, it can be a challenge to discern the difference in SMEs vs. IDEs in available data. While having longitudinal data is helpful for observing growth rates and data, such as the amount and type of capital invested in a company can also be signals that the firm, as well as outsiders, view it to be innovative. Importantly, it is also helpful to have some idea about the actual product (or some proxy for these products, such as patent information), achieved market share, as well as growth intentions relative to growth aspirations, for which additional documentation (coming for instance, from press releases and company websites) or direct interviews with founders. Beyond this, just because a company wants to be innovative does not mean they will be. The reverse is also true: some companies that start conservatively may in fact revise and expand their aspirations once they gain concrete evidence of market potential or are influenced by new hires, mentors, having obtained outside capital, seeing what other startups have done, or for other reasons. All of this is to say, that the entrepreneurial “ecosystem” is an exceedingly dynamic place.

Brad Feld -- entrepreneur, venture capitalist and author -- emphasizes that what distinguishes an entrepreneur from a small businessperson is the intentionality to launch a high-growth business that will serve a broad market, not just a local one. Feld also points out that many programs and policies designed to promote the growth of small businesses, such as those directed by the Small Business Administration, are not, in fact very helpful to entrepreneurs because of the difference in knowledge and resources required (Feld, 2012, 26). Feld suggests that entrepreneurs possess a distinct set of needs from small businesses people, including an understanding of startup culture (and its variation across localities), an understanding of funding options as well as access to significant capital, and mentorship from other experienced entrepreneurs. Echoing Birch’s empirical findings and with the intention of influencing the culture of entrepreneurial communities, Feld also advises entrepreneurial communities to accepting the idea of failure as part of the entrepreneurial ecosystem process, and that it cannot fully be eliminated from the process. Here it is important to consider that the failure of an IDE versus an SME would likely have different financial implications for the entrepreneur depending upon the source of financing -- as well as cultural connotations depending upon the particularly of the local context. As an IDE funded with venture capital (in exchange for giving up some percentage of ownership in the company), the loss no doubt hurts and may impact reputations, but will be written off an investment
loss. If an SME has put up assets as collateral for a small business loan and then fails, the repercussions will be directly punitive.

There are many other important questions to be answered about the relationship between SMEs and IDEs within a particular entrepreneurial ecosystem. Preliminary evidence suggests that their relationships are both symbiotic and competitive, depending upon the particular circumstances, but that at the very least the presence of a greater number of entrepreneurs within a particular environment results in more opportunity for knowledge sharing as well as for the sharing of institutional resources.

**Thinking about the dimensionality of entrepreneurs and their impacts**

Innovative entrepreneurship is not always synonymous with technical innovation. Entrepreneurs who are participating in sectors being radically transformed by digital technology, such as Information and Communication Technology (ICT) and the Creative Industries (CI) and particularly those found at the crossroads of these sectors (where the creative meets the technical) often are highly attuned to ways in which people adopt and adapt to new consumer technology, such that it becomes an embedded part of culture, positioned to perpetuate further social and cultural change. Hence, they may be the ones promoting its adoption and in doing so, play an important role in process of innovation. In fact, Aulet and Murray point out, “some of the most exciting innovations of our time ... are, at the core, business model innovations” enabled by technology (Aulet and Murray 2013,3). This is also a helpful way to think about what has come to termed “social innovation,” in that those looking to have a direct impact on social development are finding new, ingenuous ways to use technology achieve their goals.

It is also worth being critical of the “entrepreneurial” and “innovation” frenzy now apparent in many economic development strategies. One prevalent problem is that that “entrepreneur” is still often viewed as a 22-year-old (or younger) single male, engineer. Certainly some are, but to see entrepreneurial culture as being composed of a single component rather than seeing the wide range of emergent entrepreneurism risks directing critical resources toward a too narrow element within the larger phenomenon. Recent backlash in San Francisco raises the question whether tech entrepreneurs are actually good for cities (Goode and Miller, 2013). What benefits do they bring? What new problems do they introduce? Are they longing for community, and identity? The issue of work-life balance, as it relates to those choosing to become entrepreneurs in a 21st century context, is tackled by a number of scholars (Houston, 2005; Jones, Burke and Westman, 2006; Williams 2007; Chell, 2008; Hancock and...
The topic is one that emerged in several different ways through the course of my field research and it will be discussed further in Chapter Six, especially as it relates to location choice.

Still lacking is a more complex analysis of the motivations of entrepreneurs and their impact on the locations they choose. Another important concern is whether cities are willing and able to tolerate a high fail rate of IDEs in order to see some reach extreme financial success. Understanding how to encourage economic diversification, even as certain industries may be excessively attractive to entrepreneurial talent, is also important. Further, while (age, gender and ethnic) diversity is increasing valued as an asset for decision-making in an entrepreneurial context, most cities can do far more to connect their broader populations with entrepreneurial learning opportunities. This is important for two reasons: to grow human capital and to mitigate some of the problems that emerge with skill biased technological change.

2.4 Knowledge Spillover and Agglomeration

In the 1992 article, *Growth in Cities*, Glaeser et al identify two types of knowledge spillover thought to be important for innovation and growth: MAR spillovers and Jacobs spillovers (Glaeser 1992). MAR spillover, represents the original Marshallian idea, extended by Kenneth Arrow and Paul Romer, and focuses on the concentration of firms in common or related industries as a key to innovation. In contrast, the Jacobsian view emphasizes the value of the diversity of firms (and individuals) to lead to the development of new ideas and products. Glaeser finds more evidence for the Jacobsian concept. Feldman and, making a similar investigation and focusing on science-based innovation in cities, also conclude that there is more evidence for the “diversity thesis” than the “specialization thesis” (Audretsch and Feldman, 1994). This diversity thesis may be particularly relevant in examining entrepreneurial communities emerging in historic urban environments, where redevelopment, though guided by urban policy and economic climate, is undertaken by a greater number of independent (and sometimes quite entrepreneurial) property owners and usually does not occur all at once, but incrementally. The MAR spillover idea, however, continues to strongly influence policy and real estate development, particularly conceptualization of major new development projects. Important variants of these two concepts are discussed below.

Cluster theory, networks and competitive advantage
The competitiveness of firms and industries has most often been considered at the scale of the region, even or especially when firms compete in the global market. Michael Porter’s theory of locational competitive advantage, inspired in part by Marshall’s view of industrial districts (but with more emphasis on the role of competition between actors), is predicated on the idea of industrial activity as “clusters.” It is epitomized by the prevalent use of the “Porter diamond” as a tool to analyze competitive advantage of a firm or cluster of firms (Porter, 1985, 2000) (see fig. 7, top left). It is highly influential in part because it is useful as a tool of taking inventory of what is already present. While useful in its approach to identifying both internal and external conditions that impact a firm or industry, it becomes more difficult to apply when considering the way industries are changing and how new forms of hybrid activity emerge.

Open networks of firms
Alternatively, AnnaLee Saxenian emphasizes that competitive advantage is derived from the strength of the network in which a firm participates, due to the importance of the access to knowledge flows not only within the firm, but also more importantly, between the firm and other critical partners in production (Saxenian, 1996). This view emphasizes the importance of social networks and collaboration in advancing innovation within regions. It acknowledges the necessity of adaptive organizational structure as well as the fact that workers, particularly in high tech fields, frequently move between one firm and another. Notably, while both Porter and Saxenian’s concepts emphasize complementarities and access to institutions and public goods, they treat the idea of “location” rather abstractly. Saxenian describes differences in cultures and she places strong emphasis on notions of permeability, flexible structure, and movement, but without references to specific qualities of place.

Building off agglomeration, cluster and network concepts, a number of studies explore the social-spatial relationships of actors; much has been learned about the location preferences of firms in relationship to similar or related firms, to research institutions and to sources of venture capital. Current scholarship in relational economic geography investigates networks of innovation and conditions of entrepreneurship, often through comparative analysis of policy, and social and cultural conditions within industrial districts and regional clusters (Boschma, 2005; Asheim, Cooke, & Martin, 2006; Bathelt, 2011, Asheim, 2011; Parrilli & Asheim, 2012). Scholarship in evolutionary economic geography focuses on understanding the dynamic attributes of clusters, but treatment of spatial characteristics such as density, nodes and networks is spatially abstracted rather than related to specific local geographies, let alone built.
environments with unique physical and programmatic attributes. In such scenarios, the design of all environments is (by virtue of omission) treated as equal, which is not the case. These investigations have given rise to terms such as innovation cluster and knowledge ecosystem, but for the most part, without grounding or situating such activity in the specifics of place.

**Agglomerations of startups**
Research on the emergence of innovation driven enterprises (particularly the myriad studies concerned with interpreting and replicating the conditions of Silicon Valley) has focused on the idea that proximity to research institutions (Audretsch and Feldman, 1994) and sources of venture capital is critical for cluster development. It is still necessary to understand why and if they are as important for entrepreneurs who do not directly require costly research before bringing products to market. Additionally, many entrepreneurs explicitly choose not to seek venture capital, or they do not seek it until long after they have made an initial location choice. Feldman emphasizes, in fact, that other factors are far more important than presence of venture capital in fostering the emergence of entrepreneurial communities (Feldman 2004, 2005). Some other scholars agree. To paraphrase Feld, capital will follow the good ideas (Feld, 2012).

Further, Silicon Valley as a non-urban hotbed of innovation may not be the counter example to the idea of the value of age diverse urban environments as it first appears to be; rather, it may be emblematic of early stage regional development that precedes later stage firm emergence in age diverse urban environments. Startups now flooding SOMA (South of Market Street) and the Mission District of San Francisco appear to prefer the conditions of the historic urban environment over the newer, sometimes cheaper, and decidedly more auto-dependent developments of the urban periphery.

To trace the relationship between knowledge spillover and urban agglomeration, scholars have employed various methodological approaches. For instance, Feldman and Audretsch analyzed the resident location of patent applicants (Audretsch and Feldman, 1994). These represent an important step in linking activity to place and thinking about knowledge as a product of conditions, or qualities, of place. Examining the relationship between patent activity and the density of metropolitan statistical areas’ highly urbanized areas (while acknowledging that there can be many motivations for patent application), Carlino concludes, “dense urban areas, such as central cities, foster knowledge spillovers, which are important in the generation of new products and new ways to produce existing products”
Carlino, 2001, 22). This empirical analysis thus emphasizes the importance of focusing on questions that go beyond mere spatial analysis: what kind of urban density is most valuable in producing knowledge spillovers and, beyond increased probability, what is it that this density actually engenders?

**Encouraging cluster formation for local entrepreneurial development: urban policy research**

Responding directly to intentions to promote economic growth within a region or city through cluster development, Maryann Feldman advocates that it is necessary to study what she articulates as three stages of cluster formation (inertia until exogenous shock, formation of the cluster, the establishment of a critical mass of resources) not merely the end result of the process (Feldman, 2004, 129). She emphasizes that entrepreneurs play a special role in cluster formation and that local conditions matter:

> The local environment, in terms of the types and quality of resources and the networks and institutions that provide support and further business interests, ultimately affects the sustainability of the startups, although not necessarily their initial establishment (Feldman, 2004, 131).

Like terroir is to wine, conditions of place, over time, have a cumulative effect. Importantly, she also emphasizes the relationship between productive potential and location-specific knowledge:

> Although not all locations can develop glamorous high-tech clusters, each location has a unique industrial heritage that provides some expertise and resources that might constitute the basis for innovation, technical advance, and sustainable competitive advantage (Feldman, 2004, 133).

Hence, Feldman’s approach emphasizes that cluster formation is about translating latent potential and being cognizant of conditions that support entrepreneurship. It argues against offering financial incentives to established companies to relocate to the location being promoted. Similar to Christensen, Feldman also points outs:

> Innovative firms often defy classification in standard schemes as they create an industry or industry segment by responding to market opportunities, typically operating in niches that are not profitable for larger or more established firms (Feldman, 2004, 133).
Although Feldman uses the term “cluster” (popularized by the work of Michael Porter in particular), her observations lend credence to Jacobs’s observations about the value of the presence of a diversity firms to lead to new ways of combining knowledge. In contrast, Glaeser, Poftak and Tobio’s recent report, Greater Boston’s Economy and the Entrepreneurial Age (2014), which chooses to focus solely on recognized high technology industries, is helpful for looking at where the regional activity has been, but is limited in its ability to suggest where industrial activity is currently headed. Debate on how to frame what is taking place, and how such frames inform methods for evidence gathering, continues. This is yet one more reason why further evidence about where firms are choosing to locate (and why), and in response to what objectives, will be helpful.

Desrochers and Leppala (2011) weigh in on whether specialization or diversity of economic activities should be the focus of regional development policy by lending support to the idea of Jacobs spillovers, suggesting that diversified local economic environments offer greater entrepreneurial opportunities by way of “industrial symbiosis” in which the “the waste of one is turned into the valuable input of another” (Descrochers and Leppala, 2011, 422).

Both the MAR and Jacobian perspectives on knowledge spillover likely hold some validity. It may be that varying conditions (agglomeration of specialized versus diverse firms) engenders different innovation outcomes – ranging from incremental improvements of industry standards, to new products so different from existing ones that they literally disruptive existing industries or launch new industries. Ultimately, it depends upon how innovation is defined and valued from a standpoint of immediate value creation (and for whom) as well as long-term economic development.

2.5 Urban Attractiveness and Location Choice

Scholars have long debated the role of cities and asked why people relocate. Certainly, jobs are an important factor in relocation. A critical point to keep in mind is the difference between moving for a specific job, or choosing a location associated with high rates of job opportunity. Some cities, and some

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16 Glaeser, Edward L., Steven Poftak and Krista Tobio. “Greater Boston’s Economy and the Entrepreneurial Age” Taubman Center Working Paper, January 2014. They state: “We focus on a narrow, but important, slice of greater Boston’s entrepreneurs - high technology – which we define as a set of related industries including computer-related manufacturing and services, research and development, software publishing and medical equipment manufacturing.” (p. 12)
localities within cities, are well characterized as laboratories for the entrepreneurial or as “cultural engines” (Romano, 2013). How can we understand the nuances of the relationship between job opportunity and location choice in the context of a 21st century economy, in which entrepreneurship and innovation play decidedly more important roles?

A wide body of literature attempts to explain what makes one city more competitive for human capital than another (Florida, 2002; Glaeser & Gottlieb, 2006; Becattini, Bellandi & Propis, 2009). While Florida’s emphasis on the mobility of what he terms the “creative class” has been criticized, there is no question that he demonstrates that skilled workers have a higher degree of choice than ever before and that this implicates urban competitiveness tremendously. Florida’s statistical approach and his conclusions that cities need to provide technology, talent and tolerance to compete for human capital may seem to some as an over simplification, and his praise of bohemian culture as an asset for economic development is unpalatable to some tastes, but an important shift is taking place. Talent can be highly mobile and in some cases, jobs (existing companies) do follow where talent goes. Under what conditions talent and companies should be mobile is a different question.

Other scholars have explored compelling alternative interpretations to Florida’s creative class theory. Glaeser, Kolko, and Saiz, emphasize that the role of urban density in facilitating consumption is extremely important. Analyzing data from the United States, France and England for the period between 1977 - 1995, they observe that the populations of high amenity cities grew faster than low amenity cities, while at the same time, wages lagged behind rents. From this, they infer that workers are looking beyond earnings capability to quality of life objectives when making a location choice (Glaeser, Kolko and Saiz, 2000). Subsequently, Glaeser and Saiz investigating the relationship between human capital, population and productivity growth found that, “aside from climate, skill composition may be the most powerful predictor of urban growth” and concluded that skills are essential to the process of reinvention, in which cities move from one field of specialization to another (Glaeser and Saiz, 2003). In the paper, Urban resurgence and the consumer city (2006), Glaeser and Gottlieb link urban resurgence of large American cities in the 1990s with an increase demand for social interactions, which they categorize as a “consumption desire.” Citing the fact that real wages (assessed at an aggregated level and not taking wage inequality into account) have been falling in dense urban areas, they conclude “urban resurgence is not primarily the result of rising urban productivity. Instead, falling relative real wages are better seen as evidence for an increased desire of people to live in urban areas. Big cities are
having a renaissance as places of consumption, not production (Glaeser and Gottlieb, 2006, 1276). They state “one of the main advantages of dense, urban areas is that they facilitate social interaction” (Glaeser and Gottlieb, 2006, 1275). The problem with this line of thinking is that it assumes social interaction is a product of density, when it is critical past the idea of density, to conditions such as walkability (which they mention) that inform quality of place.

While affirming the value of density as an important ingredient in knowledge production and knowledge sharing, these do so without considering urban density in qualitative terms. For instance, they do not consider the quality, typologies, form and historic uses of buildings from particular eras, or the often mixed use nature of historic districts, including the value of existing “third places” (Oldenburg, 1999) which are important in supporting new work activities and enhancing professional relationships. Gordon and Ikeda suggest “studies at the metro level that purport to show a positive correlation between density and economic growth, and between density and the migration of patterns of creative types, do not stand up to close examination” (Gordon and Ikeda, 2011, 435). They point out what many economists, policy makers and real estate developers continue to miss: “density alone is not sufficient to generate economic development or land use diversity” (Gordon and Ikeda, 2011, 435). They conclude one of the best ways to understand what “optimal” density looks like is to study “congenial micro-environments,” which one can take to mean high performing districts. To do so, however, requires first identifying these in available data so as to compare them with broad claims about the relationship between density and human capital attraction.

Differences in causal order as well as interpretation also bring up the question about the time horizon upon which these assessments about innovation, and productivity growth, are made. As Schumpeter pointed out, creative destruction is a process and it takes place in the context of economic cycles. Further, some places may in fact be better suited to play the role of catalytic innovators while others may be better equipped to ensure that such innovations are carried out. In this context, both places, even if different in culture and composition, might also support the activities and require the presence of the other for its own success.

**Hedonic models for predicting location choice**

The development of predictive models provides a decidedly more empirical approach to understanding location choice. Hedonic pricing models are used to estimate the demand, or value, of a good or service.
Theory about location choice of firms used to focus primarily on the relationship of location to transportation costs (of raw materials, of finished materials to market), to a skilled workforce and to labor costs, or to the costs of other inputs such as energy, capital and land. The new paradigm of production places much more emphasis on knowledge as a critical input, usually by associating knowledge with a pre-existing skilled workforce. While access to information and conditions that foster the production of new knowledge (such as those associated with research institutions) are recognized as key to competitive advantage, the broader concept of city as framework for knowledge production has not yet been thoroughly considered.

Scholars studying firm location choice have used hedonic models to examine the emergence of economic milieu and the “intra-municipal location choice of non-industrial firms” (Zegras, 2002, 2; Astrakianaki, 1995). It must be emphasized, however, that predictive models are based upon a set of auxiliary assumptions, such as the assumption that proximity to an urban center is important. Similar to O’Mara’s development of location decision typologies in her study of the location decision-making process of established companies with high quality “information-age” jobs (1999), the focus of this paper is to shed light on why concepts such as centrality are critical in the context of a 21st century economy, and in particular, why they are critical to entrepreneurs who are the force behind startup activity. One additional point is important: location choice for many startups is undertaken at a point in which live-work proximity (for the founding members of the firm) is often important; this is not to say, however, that entrepreneurs do not value locating proximate to other skilled workers and others within an entrepreneurial community. Rather, in some cases, the benefits (such as information sharing) that may result from these proximities may be achieved without hiring, or being hired by, fellow members of the entrepreneurial community.17

Another condition to keep in mind is that while cities may be in competition with one another, this often plays out at the district level. This means that for some entrepreneurs, the process is not about choosing between New York and Boston, but rather considering Brooklyn and Somerville, or between London’s East End (Spittlefield) and De Pijp in Amsterdam or various neighborhoods in Berlin. For others who are rooted in place, the choice might actually be more localized in nature. The reasons can be

17 This actually parallels William Whyte’s findings reported in City: Rediscovering the Center (1988) that of 32 new (suburban) locations of corporate headquarters, 31 were moved closer to the location of the CEO, with an average distance of about eight miles by road (Whyte, 1988, 327-328). Some similar rationale appears to be in use by the CEOS of “companies of one” here.
based upon confidence at the city level (New York: “if I can make it here...”) in which case we see more flexibility at the district level, at least initially. This happens in particularly hot urban markets, such as New York and San Francisco where housing is also at a premium. There is a high degree of variability among individuals; certain statistical models provide ways to account for this. This variability is one reason why discrete choice models have been used to analyze and predict firm, as well as, residential location choice. In such models, price can be treated as but one variable to explain location choice.

Working at the crossroads of psychology and economics, Herbert Simon coined the term “satisfice” to describe the ability of organisms to make selections when only limited information about possible choices is available (Simon, 1956). He asserted that while the idea of rational choice was central in economics, it does not reflect conditions of most decisions made in the real world and hence, the decision-making in pursuit of “utility maximization” is also problematic. Simon asserted that rather than literal optimization, organizations seek to “satisfice” - a word created to unite the ideas of “to satisfy” and “to suffice.” Referring to the psychological environment in which an organism makes a choice, he states

“... a great deal can be learned about rational decision making by taking into account, at the outset, the limitations upon the capacities and complexity of the organism, and by taking account of the fact that the environments to which it must adapt possess properties that permit further simplification of its choice mechanisms (Simon, 1956, 129).

He goes on to say that “the kinds of simplifications that are suitable may depend not only on the characteristics – sensory, neural, and other – of the organism, but equally on the structure of the environment,” or as he put it – the life space” of the organism considered (Simon, 1956, 130). Further complicating his calculation to include the idea of making a choice selection to fulfill more than one goal, he added, “At the very least, the presence of two goals will introduce a consistency requirement – the time consumed in attaining one goal will limit the time available for pursuit of the other” (Simon, 1956, 130). The premise of decision-making is so simple is because of the idea of maximizing is not present; rather the chooser can select any choice that ensures fulfillment of the primary goal – adequate conditions to survive -- and is not concerned with finding a selection that maximizes all objectives. He also asserts: “the organism may be led into “regions” where the probability of goal attainment is high

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18 Many approaches are based upon McFadden’s Conditional Logit Model framework (1974). In Chapter Four, I explain in more detail why I selected a specific type of count model that is a subtype of the Poisson model.
relative to other regions, but it may have to explore randomly for food (representing the goal) within a
given region” (Simon, 1956, 135). Other scholars have applied Simon's conceptualization to the study of
location choice of entrepreneurs (see Smit, 2012, 31). I conclude that while the idea of satisficing may
seem almost paradoxical to the concept of competitive entrepreneurial performance, it is linked by the
idea that the primary need of any entrepreneurial firm is to survive long enough to gain additional
knowledge about newly emerging market opportunities and additional understanding of its own
capabilities – including where and how these can be grown. In this context, rational choice is not about
reaching full utility maximization, but rather ensuring highest probability for survival.

When the question of value related to qualities of the built environment is considered more broadly,
new methodological approaches for distinguishing preferences based upon qualities of the built
environment prove useful. Carlino and Saiz's strategy of validating the number of leisure trips to
metropolitan statistical area (MSAs) as a measure of consumers’ revealed preferences for local leisure-
oriented amenities allows them to conclude that “‘Beautiful Cities’ disproportionally attracted highly
educated individuals and experienced faster housing price appreciation, especially in supply-inelastic
markets.” (Carlino and Saiz, 2008, 33). They interpret this to reflect demand for consumer leisure
amenities among certain individuals within the population; this may in turn reflect awareness of how
access to these amenities supports individuals’ improved performance. Further investigation is needed
to know if these conditions are relevant from a standpoint of consumption, production or both.

2.5 Cultural Heritage

Since the organization of the Historic Preservation movement in the 1960s, the passage of the U.S.
National Historic Preservation Act (1966) and the creation of the World Heritage Convention (1972),
management of cultural heritage has become an increasingly prevalent idea as well as a formalized
practice distinct from its roots in Western practices of art conservation and architectural restoration.
The economic value of historic districts has been considered by the field of preservation and real estate
development mostly in relationship to heritage tourism, the economic impact of building trades, the
influence of district designation on residential real estate value (described above), or the potential to be
gained or lost from wholesale demolition and redevelopment.

Most analysis of the value of historic districts has focused on impacts of historic designation on a
designated property or all property within the environs of designated properties. Since the mid-1980s, a
number of scholars have examined this relationship. Most find that designation is a stabilizing force in
local property value and that it moderately raises the value of property (Asabere, Huffman, Mehdian, 1994; Rypkema, 1996; Coulson and Leichenko, 2001, Ahlfeldt et al, 2012). Analysis has not yet focused on the production value of historic districts or value in the context of broader economic development. Further study of the impact of Main Street programs (a National Trust for Historic Preservation economic development program) and inscription of sites to the list of UNESCO World Heritage Sites may be useful. Brian Graham points out that there has been little research on the role of heritage in the knowledge economy, suggesting that the difficulty of this task is in part due to the fact that heritage is “a knowledge that fulfills many different economic and cultural uses” (Graham, 2002).

In the 21st century, understanding of what constitutes cultural heritage has broadened, with management approaches moving from an “object-based view” focused on saving works of art and architecture, to an “idea-based view” that places value on both tangible and intangible forms of culture, as well as the context of cultural production (Bouchenaki, 2003). This is reflected in the criteria for evaluating sites nominated to the World Heritage List, and increasingly, in the diversity of nominations put forth for evaluation. Recently scholarship has focused more acutely on the relationship between cultural heritage management and social development (Calame and Sechler, 2004, Phillips and Stein, 2011), urban livability (Allison and Peters, 2011), and quality of life. Still more evidence is necessary to move discussion beyond the idea of development of historic places as tourist destinations or entertainment districts, and to consider the full (if latent) productive capacity that these places hold. Additionally, the effects of inscription and landmark designation in general are far from well understood. Often designation or nomination is driven by economic development objectives perceived to be attainable through the cultivation of tourism development. Yet, tourism at an industrial scale (“mass tourism”) is both relatively new and not well regulated. According to the World Tourism Organization, tourism is now the second largest global industry after energy production and the number of people traveling (currently estimated at 980 million trips per year) will continue to rise in the near future (WTO, 2009). Much of this growth has been oriented around urban tourism; the potential to capture market share in the tourism industry has already been a formidable driver of many urban regeneration projects. In many cases, such as Venice, proponents of tourism development argue that tourism is one of the few things that can make historic urban environments economically viable without necessitating radical transformation of physical form and infrastructure. Tourism activity, compared to industrial activities, is perceived or idealized as less likely to harm historic environments. If harm to the physical environment
is an issue, then there is even more reason to look at potentially less harmful, new forms of productivity and economic diversification.

**Creative industries and creative cities**

In *Economy and Culture*, David Throsby argues for consideration of multiple concepts of cultural value in his discussion of the relationship between economics and culture. He suggests that these include, but are not limited to: aesthetic value, spiritual value, social value, historical value, symbolic value and authenticity value (Throsby, 2001). Various studies of creative industries and the creative or cultural economy, often seeking to affirm the economic values of such activities to the urban, regional or even national economy, have expanded this discussion tremendously. (For a detailed review, see Lazzeretti, 2013). This includes the 2008 paper, *Defining the Creative Economy: Industry and Occupational Approaches*, in which the authors compare methodological approaches for identifying and mapping producers in New England’s Creative Economy (Markusen, Wassal, DeNatale and Cohen, 2008). These report validates the value of culture by showing it in its component parts as by conceptualizing it as industrial practice then generates measurable economic impacts and jobs.

Other scholars have gone further, building on these ideas to study “creative cities” as a typology, the clustering of cultural and creative industries, and notions of milieus by providing important analyses at the city level or through comparisons between cities (Currid, 2007; Cooke & Lazzeretti, 2008; Landry, 2008; Romein and Trip, 2009; Currid and Williams, 2010; Andersson, 2011; Rutten, Marlet and van Oort, 2011; Belussi and Staber, 2012). Still, these often emphasize differences in policy, economies and (spatial) geography, while taking a limited view of “place” and speaking only generally about the quality of the built environment. Documenting the economic importance of cultural production is critical to understanding the new, knowledge-based economy. There is a danger, however, that classifying cities as “creative cities” is too limiting a lens (or label), especially if it focuses exclusively on the arts without considering other modes of production. It is easy for well-meaning public relations entities to appropriate the concept superficially. Landry clarifies: “the greatest impact of creativity comes when it finds a way of solving wicked problems (Landry, 2011, 526). Ideally, both research and policy will acknowledge the deep value of “creative” and “technical” capabilities present in cities, and seek to further understand the relationship between these endeavors.

**Historic urban environments as locations for new productivity**
Recent studies that embody a more progressive view of cultural heritage include the Lincoln Land Institute’s *Regenerating America’s Legacy Cities* (Mallach and Brackman, 2013) and a recent report published by the Brookings Institute, *Rise of Innovation Districts* (Katz and Wagner, 2014), both of which link the idea of formerly industrially productive, age-diverse urban environments with new innovative potential. Each of these in some ways looks to the accrued knowledge of cities as the basis for regeneration and focuses on understanding the strengths of existing assets as a starting point for regeneration. The recently released report by the National Trust for Historic Preservation, *Older Smaller Better*, specifically looks to investigate Jacobs’s hypothesis about the value of diversity through GIS-based analysis of urban fabric and demographics in San Francisco, Washington DC and Seattle (National Trust for Historic Preservation, 2014). It considers the value of building age diversity by examining the relationship between qualities of the built environment, including building age diversity, with demographic characteristics and situated behaviors (for instance, vis a vis analysis of cell phone usage). These represent important building blocks for the development of theory linking quality of place to entrepreneurial performance and innovation.

2.6 Quality of Place

Taking much inspiration from Jane Jacobs (especially in regard to the value of diversity), Richard Florida first described the importance of quality of place in *Rise of the Creative Class* (2002). He again framed his argument regarding the creative class in a short article entitled, “What Draws Creative People? Quality of Place” (Florida, 2012,1). In it, he articulates that quality of place cuts across three dimensions: What’s there, who’s there, and what’s going on. He defines “what’s there” as “the combination of the built environment and the natural environment; a stimulating, appealing setting for the pursuit of creative lives,” but stops short of saying that historic urban environments often inherently possess many of the conditions that not only attract entrepreneurs, but also enhance their productivity. (Here is where he breaks with Jacobs, who was explicit about observing the way cities evolve over time.)

Without further understanding of what qualities of the built environment actually matter and why, it will be difficult for this concept to be applied proactively, though we may continue to call for it when we sense it lacking. Quality of place implies not just physical qualities, but the quality of programming and the (quality of opportunity for) participation by individuals. Environmental and programmatic conditions come together to inform “who’s there,” with participants then iteratively shaping both environment and program. This also implies that quality of place is something that develops over time.
Quality of place is a complex and dynamic concept; analysis requires more than merely taking an inventory of the built environment or analyzing location choice as fixed locations.

Studies have noted correlations between skilled workers or “creative entrepreneurs” with specific qualities of place (Florida, 2002, 2007, 2012; Richards and Wilson, 2007, Krakte, 2011), but few have systematically investigated the nature of this correlation. Currid and Williams’s analysis of differences between cultural industries in New York and Los Angeles involves mapping of firm locations to compare neighborhood-level activity. This revealed important differences in location attributes at the sub-sector level; these are reported as reflecting general differences in conditions of neighborhoods, but are not directly correlated with specific locational attributes (Currid and Williams, 2010).

Robert Kloosterman is one of the few economic geography scholars to examine the impact of new cultural institutions and other development emerging in historic urban districts (Kloosterman, 2009); such critiques are more common among architectural critics, though rarely to do these link qualitative assessments with any type of quantitative outcomes. Based on case studies, Kloosterman’s research was concerned with the introduction of new architecture in historic environments to create successful cultural districts, not the adaptive use of these environments per se. In a study of the location preferences of creative entrepreneurs in the Netherlands, Annet Smit found by way of interviews that visual features of districts (including both historic and contemporary architecture and urban forms) were very important in location decisions (Smit, 2011, 181). She points out that location factors at the spatial scale of the district and visual quality have generally been overlooked, and concludes:

_The visual appearance of a district catalyzes creative production, because it acts to reflect creativity of individual firms and their products (what they make), and it inspires their work process (what they do) (Smit, 2011, 181)._ 

With the exception of this study and the others included as part of Smit’s dissertation on the value of spatial quality of cultural production districts in the Netherlands (Smit, 2012), no study has pointedly looked at cluster or ecosystem emergence in age diverse districts (including those recognized as “historic districts.”) This entails understanding not only what types of firms are choosing to locate in such districts, but also what can be understood about discrete location preferences, down to the building level.
Exploring aspects of quality of place from a different vantage point, Talen and Koschinsky review what the academic literature reports about the effects of compact, walkable, and diverse neighborhoods on residents. They observe that most research suggests significant, positive effects in three areas: social interaction, health and safety of residents (Talen and Koschinsky, 2014).

Quality of place as it relates to individual buildings and interior architecture
Mentioned in Chapter One, in Work and The City (2008) Frank Duffy addresses many aspects of the role of the city as a work environment. Speaking generally about the nature of service-oriented work in the city, he anticipates that as digital technology continues to transform the nature of work, certain physical qualities of work environments and certain types of space programming concepts will become increasingly important. He identifies, for instance, transitioning away from hierarchical arrangement of workspaces to more transparent and socially democratic configuration of spaces. Duffy’s observations about architecture are in many ways complementary to Saxenian’s observations about organizational structure effective for knowledge flow. Similarly, new studies on the concept of task-oriented workspaces and “maker spaces” (Doorley and Scott Witthoft, 2012); on high performance work environments and conditions designed to meet the needs of contingent workers (Strelitz, 2011; Emergent, 2012) extend Duffy’s argument at the building level and even the level of the individual space.

Another way to consider quality of place is in relationship to the concept of biophilia originally proposed by biologist Edward O. Wilson. It has been summarized by Kellert as “the idea that humans possess a biologic inclination to affiliate with natural systems and processes instrumental in their health and productivity” (Kellert 2008, viii). Exploring the implications of biophilia on the design of building, environments and even cities, Kellert asserts:

*Biophilic design emphasizes the necessity of maintaining, enhancing, and restoring the beneficial experience of nature in the built environment ... It arises from the increasing recognition that the human mind and body evolved in a sensorially rich world, one that continues to be critical to people’s health, productivity, emotional, intellectual and even spiritual well-being. (Kellert 2008, vii).*
Kellert differentiates the idea of biophilia from sustainability, noting that sustainability is too limited a concept, focused ultimately on mitigating adverse effects rather than on advancing a relationship between humans and the natural world. But he notes: “biophilia is nonetheless a “weak” biological tendency that is reliant upon learning, experience and sociocultural support for it to become functionally robust” (Kellert 2008, viii). It is for this reason that human expression of biophilic concepts, including in the built environment, is highly variable. It follows, then, that biophilia is a critical and foundational aspect to quality of place.

2.7 Conclusions from the Literature Review

I chose to take a broad approach in reviewing relevant research, as my research question implicates different ways of understanding cities as historic urban environments, including their potential economic and social value. Key findings generated from this exercise are:

**Knowledge production and the urban environment**: Marshall’s idea about knowledge being “in the air”, with an implied value of tacit knowledge still holds true. In fact, as communication technology allows knowledge to be accessed and shared even more rapidly than ever before, it may place more value on *emergent new knowledge* and that is often first transmitted tacitly. So this leads to the question: in what kind of air, or rather, in what kind of environments is knowledge being produced and shared most effectively? It is now possible to treat this question more systematically by looking, for instance, at differences in the quantity and quality of building stock, as well as other environmental conditions, in location where entrepreneurs are choosing to locate.

**Entrepreneurs and economic growth**: One of the key issues that current research has raised is the importance of understanding the difference between SMEs vs. IDES, not only in terms of the support they need from the public sector, but the potential impacts (both positive and negative) within a local economy. Beyond this, there are many other answered questions about the relationship of these entities within entrepreneurial ecosystems, both as economic enterprises that provide services to one another, as well as entities that share knowledge and motivate one another. It is also important to consider when (under what conditions) entrepreneurs shift objectives from becoming a successful SME toward the goal of being a more capital intensive IDE with higher growth potential.
**Agglomeration:** Clusters analysis, popularized by the work of Michael Porter and heavily influential among economic geographers, has provided important insights about intra-firm relationships, but has also often led to abstraction of the relationship between the firm and its environment. To understand the more systemic, or eco-systemic nature of such relationships, other types of analysis are needed. Reliance on abstract cluster theory, spatial and network analysis without consideration for the influence of the “local,” the particular situated environment has, to date, largely discounted the importance of place. This, de facto, omits analysis of the value of (sometimes latent) physical and programmatic resources present in age diverse urban environments. Maritime cities, for instance, retain particular legacies in urban form, institutional roles and knowledge profiles. Further documentation of such resources should precede and inform quantitative analysis.

**Urban attractiveness and location choice.** There is still much to be understood about the combination of attributes that come together to inform how cities attract and retain human capital, especially in the context of rapidly changing technology. Rather than consumer/lifestyle factors and jobs (or employment possibility) as absolute concepts in explanatory conflict, perhaps it is more useful to focus on how lifestyle or other quality of life attributes informs productivity and shape “work-style.” This means accepting that both consumption and production matter, and are integrally linked, in location choice and that entrepreneurs will be drawn to the locations that offer the best “bundle of goods” to support their overall entrepreneurial performance.

The ability to work using mobile tools (laptops, smart phones) has in effect introduced a new elasticity in the supply of office space, or what can be constituted as workspace. As we will see in chapters four and six, the promulgation of coworking spaces, some of which are membership-based, is further compounding this elasticity. This introduces new challenges for estimating the value of real estate or for understanding rent in relationship to other variables. These factors also negate some of the underlying assumptions relied upon in the past to predict location choice. Under such conditions, the application of choice models rather than hedonic models may prove more useful, if less specific to price.

**Cultural heritage:** Recent research continues to march toward a more progressive and comprehensive view of the many values of cultural heritage. The National Trust for Historic Preservation’s Report “Older, Smaller, Better” (2014), applies an overlay grid strategy, is the first to systematically link district
age diversity and quality of life. I have found no study that explicitly measures the relationship between building age diversity and location choice preferences of entrepreneurs.

**Quality of place:** A review of the literature suggests it is now time to move beyond calls for density to calls for quality of place. This means finding new ways to document contributing conditions so that they can be linked to other ways the built environment is documented (such as land values). Certain qualities of the built environment seem to play a key role creating the pre-existing conditions that enable valuable proximities to emerge, that directly shape knowledge access, knowledge production and knowledge sharing. Neither the concept of satisficing nor biophilia (which can also be conceptually related to one another) have been directly evaluated in studies of location choice or entrepreneurial performance. Taking a solution-oriented and systemic perspective, this also places new onus on understanding in a contemporary context, why conditions such as walkability or proximity to water -- informed by numerous sub-conditions -- hold so much value and may be becoming even more valuable as digital technology continues to be advanced.

On one hand, focusing on quality of place leads to questions about near-timeless human needs – pervasive physiological and social responses to environmental conditions – in pursuit of understanding under what conditions people effectively create and share knowledge. On the other hand, it asks us to move beyond late 19th and early 20th century constructs of historic cities as places that merely teach us about the past, to focus on what their persistence, or resilience, can teach us about how to improve quality of life now and in the future, even, or especially as we continue to rapidly evolve technology. For instance, to consider how digital technology can be used to produce systemic strategies for managing transit, conserving energy, directing crowds, and even more fundamental challenges such as improving access to education and affordable housing.

**Empirical approach**

It is important to find new ways to understand the relationship between the quality of the built environment and knowledge production, as it is crucial to entrepreneurial performance, though perhaps especially to those firms that can be characterized as innovation driven enterprises (IDEs). I now return to my research question: *Do entrepreneurs associated with new industries prefer to locate in historically diverse districts? If so, why?* Taking the literature review into account, the empirical approach I have devised to investigate the research question includes three major components:
In the next chapter (Chapter Three), I introduce key attributes of historic maritime cities and discuss characteristics of the three cases that inform how they can be compared today. This provides a way to understand the broad context in which contemporary activity is taking place. In Chapter Four, I then analyze a selection of current policy and private sector site-based initiatives to foster entrepreneurship and innovation and discuss different outcomes they are producing.

In Chapter Five, I take a more quantitative approach. Using Boston/Cambridge as a case study, I use GIS to develop a multi-scalar model to examine where entrepreneurs associated with the sectors of information and communication technology (ICT) and the creative industries (CI) are locating. The model begins at a scale that covers the Greater Boston area, and then focuses on the relationship between location choice and the age diversity of building stock present in these cities. Taking this approach, it is possible to gain a more statistically based understanding about what kinds of urban density are most valuable in this context. It also makes it possible to begin to examine the relationship between ICT and CI firm types, as well as the influence of formal colocation (such as co-working sites and accelerators) as catalysts and organizers of entrepreneurial communities.

Then in Chapter Six, I turn to the entrepreneurs themselves to report what they say about why they chose their location (considered at the city, district and building scales) and how they use and value their environments. For Boston/Cambridge, this will help to contextualize the findings from Chapter Five. For all three, it offers the opportunity to consider qualitative evidence in context of findings about existing conditions as well as present initiatives to foster entrepreneurship and innovation (Chapters Three and Four).
Chapter 3: Historic Maritime Cities

Figure 10. Return of the Bucintoro to the Molo on Ascension Day by Canaletto, c. 1732 shows the pageantry of 18th century Venice in commemoration of a historic naval victory. Source: Royal Collection, Windsor Palace, United Kingdom. Source: Wikimedia Commons.

3.1 The Historic Maritime City: An Urban Typology

In this chapter, I define the historic maritime city as a typology and assert that this typology is useful for planning purposes. I offer a brief overview the historical development of the three historic maritime cities, emphasizing key themes relevant to this research. I highlight some contemporary conditions and conclude by summarizing key points about historic maritime cities, and how these cases can be compared. Each of these cities has a long history of entrepreneurship and innovation. To offer some glimpse, let me introduce a few emblematic entrepreneurs:

Venice: Meet publisher, Aldus Manutius. By 1482, Venice was the printing capital of the world, a rapid achievement in the wake of the invention of moveable type (1457), but Aldus saw a new opportunity in 1499 in the invention of a new book format, the small octavo, precursor to the modern day paperback
(or Kindle) in the respect that it was inexpensive and could be easily carried about, far more convenient than bound manuscripts meant for private libraries. Realizing the significance, he focused part of his business on the provision of Greek classics. He, along with his immigrant workers, many of whom had fled the Byzantine Empire after the fall of Constantinople, translated the works into the languages of Europe, making Classic Greek culture broadly accessible to the west (Burke, 1978, 5). Watery Venice may seem an odd place to be a center of publishing, but many assets played in its favor. Venice had taken advantage of its location at the crossroads of East and West to accumulate capital as well as intellectual property through centuries of successful trade and pillaging. Its library holdings already included Greek manuscripts. Its polyglot residents and visitors were producers and consumers of new information; Venice served as a logical distribution point for the new products they created.

**Amsterdam:** Meet Casparus Van Houten and his son, Coenraad. Chocolate had been popular with the elite in Europe after the Spanish first brought it from the Americas, but Casparus was the first to patent a hydraulic press method (1828) for removing much fat from cocoa beans to produce a type of cake that could be ground into cocoa powder, used as the basis for most chocolate today. The powder provided a much less expensive way to make chocolate flavored drinks, leading to what has been called the democratization of chocolate (Courtright, 2009, 25). Son Coenraad built on his father’s accomplishments, improving the powder to make it more soluble in water, in a process now referred to as *Dutching* to render what is called Dutch chocolate. Equally important, Coenraad keenly understood the importance of marketing. Early advertisements read, “There is no nourishment in tea or coffee, but plenty in cocoa, especially Van Houten’s … It is strongly recommended to students and all whose duties involve much wear and tear, whether mental or physical.”

Telling the story of a product -- and the ability to do so in many languages -- continues to be an important skill set in Amsterdam’s growing advertising and public relations industries.

**Boston / Cambridge:** Meet Nathaniel: son of Jacob Wyeth, owner of the Fresh Pond Hotel in Cambridge. After seeing the early efforts of Boston merchant, Frederick Tudor, to develop the ice trade, Nathaniel Wyeth devised a number of tools and techniques to extract the ice in uniform blocks, realizing that blocks were far better equipped for storage and transport (1827). With these advances, the ice could be shipped to distant ports, as far a way as China. By 1836, Cambridge was the nation’s largest

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19 http://www.dailydutchinnovation.com/browse/dutch-chocolate/
producer of ice. Wyeth, in collaboration with Tudor, invested in the construction of a railroad line between Fresh Pond and wharfs at Charlestown, to further expedite the process of shipped ice to foreign ports on what came to be known as “ice clippers” (Cambridge Historical Society, n.d., 15). The advent of electric refrigeration in the 1920s brought the ice industry to a close, but in his time Nathaniel achieved a timeless idea of entrepreneurship: to bring a product to market that is viewed as both essential and versatile, capable of serving a myriad of uses.

These entrepreneurs developed ingenious solutions for their time, building on their knowledge of markets, using technology to address challenges in production, time, cost and distribution. In each case the maritime nature of the cities in which these events took place, enhanced access to raw materials and transport of finished products, and all provided access to specialized knowledge and capital. Still: why did these individuals produce things we now almost take for granted – when others did not? What if any role does an urban setting and its attributes play in encouraging an entrepreneurial mindset?

To explore these questions this, it is useful to think of the historic maritime city – inclusive of the port and the city beyond -- as an urban typology. While port activity still plays an important role in these cities, it has often been the way that each city has leveraged its maritime economy to develop broader economic and cultural activities, which contributes greatly to its continued resilience. In fact, of the three cities, only Amsterdam operates as a top port (in rank), and activity is projected to decrease in the coming decades as the Port of Rotterdam expands and certain heavy industrial activities are moved elsewhere (see table 2, p. 72).

**Historic maritime cities: Resilience over time**

To thrive in a tidal environment (even in the Mediterranean where the tides are of a relatively low amplitude) requires a systemic understanding of one’s environment and a commitment to ongoing maintenance. Though maritime cities are particularly integrated with their natural settings, they are intrinsically man-made, reflecting acute knowledge of place. Maritime cities continue to survive and thrive only when human ingenuity is continually applied to environmental challenges and to understand the local implications of changes in the global economy.

Maritime cities face distinct vulnerabilities: historically speaking, they were often the receiving point of outside attack or invasions. They are vulnerable to hurricanes and, in some locations, tsunamis. Not all cities that supported once thriving harbors and ports survive today. For example, in Israel, the city of
Caesarea and its port, Caesarea Maritima, founded c. 25-13 BCE, once served as one of the Roman Empire’s most important Eastern Mediterranean provincial capitals. It supported a population of roughly 125,000 and rivaled Piraeus, the major harbor of Athens. It served as an important administrative center under subsequent rulers, but was eventually abandoned c. 1265 CE. Caesarea Maritima now exists as an archaeological site managed as a national park (see fig. 11), partially submerged off the coast of the modern town of Caesarea, which is now so small it no longer retains a local council (Raban, 1996, 53). Why does one city prevail and not another? Many port cities developed a strategic competitive advantage at a particular point in history that they have not been able to sustain indefinitely. How can this be explained? Is this merely a case of fortunate geography – the mere luck of having a deep enough harbor to support large ships, of being on the right side of a particular political boundary, or of avoiding a hurricane? Regarding anticipatory resilience, Vale suggests: “A more holistic view of anticipatory resilience ... needs to respect and accommodate the full range of affected parties” (Vale, 2014, 194). Applying this idea to the past, can a more holistic explanation of historic urban resilience be offered, including one that addresses the relationship between city’s ability to overcome adversity over time and its ability to improve life circumstances, even for its most vulnerable residents?

Figure 11. The now partially submerged site of the port of Caesarea Maritima. Source: Wikimedia Commons.

One common culprit in port city decline is often the opening up or expansion of alternative trade routes, either by land, sea and then eventually by air. A second is a process of functional obsolescence that
occurred as the technology of shipbuilding and navigation has changed, leading to the construction of bigger and faster ships of iron and then steel. As the reliance upon larger ships has become more commonplace, some natural harbors simply prove too small and too shallow to viably support trade activity. These usually lose out to other ports naturally suited to accommodate larger ships or manipulated through costly investments in dredging, channeling and land reclamation.

Tidal conditions and other environmental challenges inspire collective ingenuity in resource management. The *polder* model of collective management of dikes in the Netherlands and neighborhood based rain water collection systems in Venice are solutions that have come out of sheer necessity to sustain life in these locations. Over time, dissemination of knowledge about appropriate building technology solutions (a form of place knowledge) become part of the architectural vernacular and come to hold specific social meaning as well. Particular building typologies emerge. In Venice, *casa* or *ca’* (house) in Amsterdam, *grachtenhuis*, (canal house), and in Boston, the merchant homes in the 18th and 19th century, do not have merely a residential connotation, but usually implies the mixing of household and business activity (including the storage of goods). Similarly, warehouses in these cities often included offices and sometimes even sleeping quarters for agents who were traveling (see fig 12).

![Figure 12. Comparability of urban fabric and mixed-use building typologies (A Venetian trading warehouse, canal houses in Amsterdam, and a warehouse building in Boston). Photos by author.](image-url)
Urban fabric as a kit of parts

The urban morphology of maritime cities can be thought of as a particular “kit of parts” to take advantage of proximity to water: harbors, wharfs and cranes, shipping warehouses, shipyards and rope-making facilities, dry docks, merchant and trading company headquarters, banks and insurance companies, customs houses, markets, supply companies, specialized schools, as well as diverse places to worship and to pursue leisure, suited to the particular traditions and tastes of the individuals moving through these environments. Constrained land area means that it is necessary to build and to organize space in such a way as to maximize programmatic functionality. Maritime cities are often highly manipulated environments created over time through periodic processes of coordinated land reclamation or incremental “wharfing out” (Seasholes, 2003, 3). Historically, they often included a high variation and density of housing stock accommodating the merchant population, the port and seafaring workforce, immigrants and other populations in transit (including today, tourists).

The economic and institutional histories of pre-industrial maritime cities contribute to distinct legacy conditions. Capital maritime cities or maritime city-states served as centers of authority for geographically vast empires. The economies of such cities were inherently local and global in nature, and recognized the tactical importance of information, knowledge and strategic relationships. Reliance on sea routes encouraged innovations in boat building, navigation, mapping, logistics, compact storage solutions and food preservation. Wealth to be gained through long distance trade and mercantilism inspired new forms of risk taking and risk amortization, including share holder models (joint stock companies), insurance, and banking (including the protective financial mechanisms of bankruptcy). These financial activities usually occurred adjacent to, but offset from, the immediate waterfront, used for the loading and unloading of goods. This was especially the case when ships carried vast amounts of hard currency that literally had to be weighed, counted and held secure before it might be shipped back to its place of origin or to other trading ports. Hence, logical programmatic relationships of land uses emerged in such places, the vestiges of which are still seen today, for instance, in the proximity of Boston’s financial district to its waterfront. They include not only the formal locations of work, such as offices of trust companies, but also the informal places where people met, face to face, to discuss the terms of their deals or future prospects for investment. Many maritime cities continue to support thriving banking and insurance industries today.
The legacy of republics and their specific political and economic institutions can be seen and experienced in the urban built environment of these historic maritime cities, both through the presence of specific building typologies, the prevalence of particular functions (such as banks) and the arrangement of buildings and public space. Perhaps this fabric is preternaturally disposed to be appropriate for new entrepreneurial activity, because entrepreneurialism was part of the original function for which it was designed. However, the fact that new entrepreneurial activity is more robust in some places than others also suggests that it is not enough merely to retain particular urban fabric and form, but that contemporary governance and institutional support is also necessary, such that if capacity has not persisted over time, it must be reintroduced.

Many of the oldest archives, museums, and universities are also associated with maritime cities. These institutions are often recognized today as “cultural” or “learning” institutions, but they had and continue to have, diverse economic functions. They are literal repositories of knowledge that often came to be as a result of wealth, knowledge, and artifacts accumulated through trade and exploration. They had a particularly relationship with port activity, supporting record keeping and other regulatory activity. Education, provided by or taking place in the context of religious institutions, has frequently been closely tied to a country’s or kingdom’s economic objectives; many maritime cities have long had naval academies. The use of the word “university” is associated with the emergence of urban guilds in the medieval period. As the concept of formal education continues to evolve, the nature of this relationship has become even more specific. For instance, in recognition of the fact that MIT offers courses in oceanic and naval sciences, the United States government recognizes it as a “Sea Grant College,” a program created in 1966 to promote the conservation and sustainable development of marine resources. This status makes it eligible for particular types of research funding from the federal government and also encourages private industry sponsored research.

Because of port activities and the function of these cities as nodes within trade networks, maritime cities are often more culturally and ethnically heterogeneous than nearby inland cities. Long histories of cultural diversity generally produce some amount of tolerance of difference in cultural customs and, to a degree, laissez-faire attitudes and regulation toward certain establishments (bars, “coffee houses,” gaming houses, brothels). While these activities are usually limited to particular districts, they are

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20 While indulgence in illicit substances (such as opium, in the 19th century) has long been associated with port cities, the sale of cannabis in Amsterdam “coffee shops” dates only to the 1970s and was only legalized in 1980. Recent federal legislation (2011)
often prominent in the narratives about these cities reinforced by literature and information communication.

Patterns of change over time

Port cities were once dense social spaces, with lots of people working in high density conditions, both along the waterfront and on vessels, in activities that required multiple people to work together for a common goal, such as the process of rope making (in which teams worked together). When transport was based upon rowing – hundreds of people might have been on board simply to operate the ship. Vessels under sail often required a large crew. With the advent of steam-powered ships at the beginning of the 19th century and subsequent increases in power efficiency and advances in fuel technology, the number of crew necessary to operate a ship decreased while at the same time trading ships often grew larger. The exception of course, has been cruise ships, which have grown larger and grown to require larger crews. Most of these individuals, however, are working in a service capacity with no direct responsibility for the ship.

The working waterfronts of historic maritime cities were often transformed significantly to accommodate the new machinery of the industrial revolution. This meant, in particular, larger, more robust buildings to accommodate greater supplies of goods, the linkage of railroad lines to wharfs and ports, and new land and harbor infrastructure to construct, maintain and service larger and faster ships. Modern cargo ships utilizing containers, introduced in the late 1960s, once again transformed the way materials are shipped, with tremendous implications for size and configuration of ports. Container ships operate with a fraction of the personnel once required and can move more material at once and under increasingly impressive time constraints. Many modern ports that support them are vast landscapes of containers, raw materials and cranes, an increasingly automated process requiring fewer and fewer people to move vast quantities of materials. These sites are networked globally through complex logistical technology and operated through an impressive deployment of sensors equipment used to track the location of goods. These vast modern industrial landscapes are fundamentally different in scale and function than pre-modern ports in the respect that they are designed for storage and movement of goods and materials by machines, not by people.

has been enacted to address the “nuisance and criminality associated with coffee shops and drug trafficking” which will convert the operation of coffee shops to private clubs with membership eligible only to Dutch citizens. This will effectively make it illegal for tourists to enter coffee shops and is intended to dismantle the infrastructure of “drug tourism.” See: http://uk.news.yahoo.com/tourists-face-weed-ban-dutch-coffee-shops-023932774.html
World events impacting global trade and the relevance of trading cities

Global events impact the strategic location of maritime cities and their ability to link important markets. Some of these events have come about via exceedingly risky expeditions, while others were constructed at great expense (Lavery, 2004). During the period of the Venetian Republic, the “discovery” of the New World by Christopher Columbus (1492), the establishment of the sea route to India around the Cape of Good Hope, South Africa by Portuguese navigator Vasco da Gama (1498) and the sea route from Asia around Cape Horn, South America by Magellan (1519) transformed the global economy. Canal projects have also significantly impacted trade routes and the port cities that exist as part of these networks. The completion of the Canal du Midi (1681) in France, linked the Atlantic to the Mediterranean via an inland route that allowed the Straights of Gibraltar to be bypassed. The completion of the Erie Canal (1825) linked the Hudson River to the Great Lakes, leading to the role of the Port of New York as a node for inland trade, with serious implications for the Port of Boston. The completion of the Suez Canal (1869) linking the Mediterranean with the Red Sea through Egypt was particularly important to Britain’s links to colonial India, as well as French and Dutch traveling to colonies in Southeast Asia, and renewed the role of the Mediterranean and travel through Italy in particular. The Kiel Canal (1895) linked the Baltic Sea with the North Sea, allowing German ships to bypass the need to sail around Denmark. The Panama Canal, constructed by the United States, opened in 1914 to link the Atlantic and the Pacific, dramatically altered global trade.

Challenges to economic transformation

Some port cities that were once among the most important to a particular industry have not yet been able to realize a newly thriving economy in the 21st century. The island of Nantucket, 50 miles offshore from New Bedford, Massachusetts, was the center of the whaling industry in the 18th century, but the island’s harbor was too small to support the increasing depth of whaling ships, and the industry moved to the mainland. New Bedford, Massachusetts then emerged as the center of the whaling industry in the 19th century industry. In the decade before the Civil War, New Bedford was one of the richest cities per capita in the world (McMullin, 1976, 3). New Bedford also developed a highly successful textile industry (that both attracted and employed a large immigrant population). As petroleum replaced

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21 McMullin states, “New Bedford by 1845 had become the fourth port district in the United States in shipping tonnage, surpassed only by New York, Boston, and New Orleans. At the peak of the whaling trade in 1857, the city’s fleet consisted of 329 ships, worth with their outfits $12,000,000, employing 10,000 seamen.” He goes on to explain that the attribution of wealth per capita can be explained in part by the fact that a few powerful families retained most of this wealth and the less poorly paid crews lived at sea.
spermaceti and textile manufacturing moved to regions offering cheaper sources of labor, New Bedford has struggled to find a new economic purpose. It still maintains the largest fishing fleet in North America, but due to overfishing of Georges Banks and new regulation imposed on the fishing industry as a result, fishing as a livelihood, as currently practiced, is quite tenuous.

The fact that New Bedford is not yet thriving in the 21st century, or Detroit, or modern Venice, exposes a common theme: dominance in and then dependence upon a single industry -- whether it is whaling, automobile production or tourism -- can lead to entrenchment and the coupling of an urban identity (and urban narrative) with a singular industry. In the case of the three cities mentioned, each dominant industry was developed in such a way that it generated relatively high paying jobs that did not require advanced education for the majority of its labor force. When such conditions dis-incentivize investment in new or alternate industries, it can stifle the type of innovative thinking that keeps communities agile and adaptable in the context of a dynamic global economy. Each of these cities has remarkable building stock devalued by functional obsolescence, and retains latent capacity and resources that have yet to be tapped. First, a paradigm shift is needed. Some signs suggest that this is underway, but the question remains: how to expedite necessary political and social changes to create economic opportunities based on a more progressive understanding of resilience?

New environmental challenges
While maritime cities may have entrenched economic opportunities by virtue of geographical position, they also face increasing direct vulnerability due to new environmental challenges. The impacts of climate change include not only rising sea levels, but also more intense coastal weather events, increased flooding and pollution from deltas (effluence and debris coming down river), salt water contamination in groundwater, inland flooding due to rising water tables, and a vast array of secondary environmental, economic and social effects. Norfolk, Virginia sits at the lowest sea level of any major city in the United States and is experiencing subsidence due to natural geological forces. It faces what looks to be an extremely difficult choice: invest in the physical raising or the relocation of a vast number of households and businesses. For many cities, making new investments in infrastructure, coastal regeneration, conservation and risk preparedness are no longer optional and will come at a higher and higher price. It is paradoxical, but this is when user innovation, derived from a keen understanding of daily challenges to quality of life, together with an understanding of complex factors shaping major events, is needed most. Venice’s many architectural solutions for dealing with acqua alta and the Dutch
“living with water” strategy, now employed on a large scale in the shaping of land in the Netherlands, are examples of user innovation. As an example of how place knowledge can be transferred to new contexts, the accrued expertise of the Dutch has also been applied to post-Katrina New Orleans, and to post-Sandy proposals generated through the Rebuild by Design competition launched by the United States Department of Housing and Urban Development.

Historic maritime cites as vetting environments for new technology
These cities also offer examples of technological redundancy and technological transformation (see fig. 13). It is not uncommon to see new ships in old parts of the cities, and old ships in newly redeveloped parts of the cities: Venice hosts some of the most advanced yachts in world and some of the largest cruise ships in the world. Amsterdam offers examples of the restoration of 18th century ships and the integration of new technology within; tourists can rent electric boats to explore the city’s canals. The Charles River is a place to see a Moth hydrofoil sailboat flying across the surface of the water at triple the speed of the dinghies around it. These juxtapositions can be exceedingly useful as inspiration, but also as demonstrations of the often uneven and eccentric ways that users adopt new technologies and validate them for others (Kline, 1996).

![Figure 13. Old and new ideas at work concurrently. Left: A vegetable market-boat (the precursor to the food truck?) in Venice. Middle: Manual and digitally recorded navigation logs in use on a restored Amsterdam ship. Right: a conventional sailboat and a Moth hydrofoil sailboat (right) on the Charles River in Boston/Cambridge.](image)

3.2 Key Historical Developments in the Case Cities
Venice, Amsterdam and Boston/Cambridge, each in its own way, provide lessons about urban resilience. While each has been in existence for a different duration, they share common themes in their histories,
which often relate directly to entrepreneurship and innovation. Such themes include: land making, strategies for risk amortization, investment in knowledge management and production, housing challenges, and recovery from depopulation. This makes them valuable for comparison.

**Venice**

![Figure 14](image)

*Figure 14.* An early map of Venice. While not concerned with showing specific interior canals, it displays the spatial relationships between parishes and other key institutions, such as the customs house at the entrance to the Grand Canal. Source: Marciana Library.

**Origins**

The split of the Roman papal empire in 395 between east (Constantinople) and west (Rome) set the stage for the subsequent disruption of order in the Italian peninsula and the arrival of northern invaders. These invasions and vying for power lead many citizens of roman cities from the mainland to the lagoon, for what was perceived as temporary resettlement. Under the duress of continued conflict, the lagoon, navigable only by those who knew it well, served as a defense barrier and a number of distinct communities emerged, engaged in local trade, facilitated by the rivers linking the lagoon into the mainland. The founding of the church of San Giacomo at the islet of Rivoalto (“High Shore”) in 421 is
traditionally and ceremonially the date associated with the founding of Venice. In subsequent centuries, an increasing number of parishes would be formed on nearby islands, literally laying the foundations for the neighborhoods of Venice and their unique identities (see fig. 14). The churches of Venice, of which there were at one point more than 90, are still the most common landmarks when giving directions in the city. A nascent local government also emerged, first in Malamocco before being relocated to the more protected area adjacent to the Rialto in 810. From the 9th to the 12th century, Venice developed as a city-state. It played an increasingly important role as a strategic location between Constantinople and its outpost at Ravenna. Venice dominated the trade in salt, in particular, but realized it potential as a broker for luxury goods, notably silk from Constantinople. Venice’s control of the spice trade, as the critical link between supply in the Islamic empire (what would become the Ottoman Empire after the fall of Constantinople) and demand in European, would assure its relevance for centuries.

Venice developed as an urban maritime environment with traditions, rituals, as well as economic, legal, social and environmental order. The city grew spatially through a mostly incremental processes of land-reclamation in the early formation of parishes and then civic institutions (such as the creation of public market) though major state-sponsored campaigns, such as the filling in of canals under Napoleon and the filling in of land for social housing in Santa Marta and Sant’Elena in the 1920s-30s have also shaped the city in important ways. Venice’s most notable “street” – the waterway known as the Canal Grande -- is not the product of a visionary land developer working in tandem with a singular urban designer. Rather, it a natural form improved upon by many visionary individuals contributions over a long period of time. Timber from the mainland provided the necessary wooden pilings for creating firm land from the mudflats of the lagoon; the Istrian peninsula provide a primary source of hard stone. Early on, the former Roman towns of the Veneto were an important source of building materials, scavenged and transplanted to Venice.

Because its livelihood depended upon it, the Venetian Republic became very good at trading standards (weights and measures) as well as recording keeping about maritime trade and management of its maritime empire. Salt and fish were both important as export – but Venice’s prime role was based in its ability to manage the logistics of a trading empire. As early as the 11th century, Venice produced the commenda system in which wealth investors would provide the capital to seafaring traders - financing and amortizing risk for trading voyages; early economic and political institutions more inclusive than most other European feudal models (but over time become more restrictive). From the 11th to the 13th
centuries, Venice realized wealth from the Crusades by providing ships and serving as a launching point for voyages; in turn this role reinforced Venice’s access to knowledge and capacity in shipbuilding, centered at its naval shipyard, the Arsenale.

Orchestrating the sacking of Constantinople in 1204, Venice affirmed its role as a center of power. Wealth in turn attracted artists and elaborate systems of patronage (and social services) emerged, shaping institutions as well as the form and quality of the built environment. Venice’s distance from Rome and relative autonomy aided its reputation as a more tolerant environment that other papal states. A national library, the Biblioteca Marciana, was established in the 15th century and the archive of the Republic of Venice remains one of the world’s most important knowledge repositories. Throughout its existence as a city-state, competition and changing alliances with other maritime republics served as a driver of innovation, particularly for shipbuilding technology, but also for mapping, record keeping and other forms of publishing, such as those works published by Aldus Manutius.

The idea of a community composed of nobles and commoners -- in this case beginning with nobles fleeing roman cities being invaded and the preexisting island dwellers (fishermen) in the lagoon, has long been a theme of the history of Venice. By the late 13th century, Venice was the most prosperous city in Europe and one of its largest, with a population of about 120,000 in 1300 (Lane 1973, 18). Rising population created more demand for housing. Overtime, Venice became a physically dense environment, as evidenced by its narrow streets and the cantilevered upper stories of buildings. Venice proved its ability to recover population after catastrophic loss in three major plague events (1348, 1577-1577 and 1629-1631), although the catastrophic loss of the 17th century event in which an estimated that one third or more of its population of 140,000 succumbed, likely irrevocably weakened its trade and military capabilities.

The discovery of the “New World” and success in establishing alternative trade roots around Cape of Good Hope at the end of the 15th century forever changed Venice’s strategic access to the East. By this time, however, wealth, capacity and a culture of patronage were acutely present in the city and would resonate for centuries. Venice’s largely trade-based economy was conducive to the emergence of a commercial-residential canal house building typology, as well as guilds under which labor (as well as social customs) were organized and self-regulated. Unique conditions (and opportunities) of the lagoon environment led to specific architectural solutions. Today, these are often recognized as architectural
“styles” but can more broadly be conceived of as ingenious design responses to unique ecological conditions, availability of specific durable materials and specific programmatic needs (where part of the commercial activity of a family was managed from the family residence – business meetings and to some degree, storage of goods.) Beyond single buildings, limited space resulted in building practices to maximize density, but within limits of building on flexible substrate of Venetian lagoon. Buildings worked collectively to differentiate public and private space; to define circulation space and to function as a water management infrastructure, particularly the harvesting of rain water into wells in the center of campi (public open spaces) distributed throughout the city and the release of effluent to canals, which then, under the tidal conditions and an active lagoon, were capable of processing the waste.

A maritime trade economy could mean long periods of dangerous travel away from the city, but it also meant that a safe return to the city (if one returned at all) could mean acute wealth and the opportunity to enjoy this success and a period of respite. In this way, Venice has long played the role as a base of activity for a global economy, and for some, a place to spend accumulated wealth and engage in a wide range of leisure practices. Maintaining a strategic maritime position meant centuries of sea battles to protect colonies and outposts and the formation and reformation of critical alliances. In the 18th century, the leadership of Venice took a position of relative disengagement from global politics in the decades before the fall of the Republic in 1797. While not a time of outward expansion, the 18th century was marked by much cultural display and some noted achievements. Wealth was funneled into even more grandiose palazzos, as well as voluminous production of theater and music. Venice’s role as a festival city reached its arch. Carnival went on for six months, and new music was composed for and endless array of religions/civic/ceremonial processions (see fig. 10).

With the exception of the year 1847-48, in which the republic of Venice was briefly revived, Venice was under French or Austrian rule from 1797 until becoming part of a unified Italy in 1866. It is in this period, in the context of political subservience and the emergence of industrialization globally, that the economic purpose of a seemingly fragile and archaic city started to come into question. Both French and Austrian rulers made an attempt at managing the physical city, but by way of academic restoration and specific interventions to modernize (such as the construction of the railroad causeway to the mainland) rather than regular, vernacular maintenance. This resulted in the “monumentalizing,” as well as significant alternation to some of Venice’s most noted buildings. Foreign rule also disrupted much of the social fabric and social order of Venice – sometimes with deliberate intention, such as Napoleon’s
decree to close and take position of many of the city's religious institutions. The city experienced vast disruption and fracturing of systems for managing knowledge as well as systems for urban maintenance and addressing social needs. Even into the 19th century, visitors remarked about poverty in the city. Housing conditions in Venice declined significantly, with insidious effects on birth rates as well as more general ideas of quality of life.

In the later part of the 19th century, especially as global industrialization produced more wealth in the United States, the United Kingdom and Northern Europe, a growing leisure class found its way to Venice and to the seaside resort of the Lido. The opening of the Suez Canal, linking the Mediterranean to the Red Sea in 1869, led to increased European travel through Italy, including British in route to and from Colonial India, as well as French and Dutch in route to colonies in Southeast Asia. This revived Venice’s role as an important stopping point between east and west, Europe and Asia (but this time not through Constantinople). Venice has long inspired accounts by foreign writers, but this new position further expanded the volume of accounts, as well as Venice’s reputation as a destination and for writers and artists. In the mid-19th century, Ruskin’s Stone’s of Venice celebrated Venice for what it conveyed of about craft and human ingenuity, both of which he feared were lost to Industrialization.

20th century Venice
At the turn of the century, development of large resort hotels on the Lido, one of the barrier islands of the lagoon, introduced a new form and new scale of tourism to the city. Thomas Mann choose Venice, and the newly developed seaside resort of the Lido as his setting for a story of acute love of beauty overtaken by a context of death and decadence. While not a complete portrayal, it prompts questions: how to steward a historic city such as Venice? What (economic) function can it serve in a modern context? Beginning with Austrian investment, industrial activity had been brought to Venice. The construction of the massive mill (Mulino Stucky) and other buildings on the Giudecca, as well as the cotton factory found in the southeast part of Dorsoduro (which now houses part of IUAV, the architecture university) are all evidence of this. Venice industrialized, especially along the outer perimeter of the historic city center, much more directly accessible to transit of goods in and out of the city (see fig. 15). The reputation of Venice as a place for cultural exposition also grew with the creation of the biennale art exposition (1898) and then later the Venice Film Festival in 1932. Both continue as important cultural events, although their economic impacts are often under emphasized. But in the early 20th century, local leaders faced the very real problem of developing an economic strategy for
Venice and the Veneto, at the time one of the poorest regions in Italy (and now one of the richest). Plans for the development of a new port, the Port of Marghera, were first proposed as a salvo in the 1910s, but were delayed by the First World War. By the late 1930s, the modern port, conceived for chemical production, was underway and supported with pride by fascist Italy. Concurrently, the mainland city of Mestre, adjacent to Marghera, was created to provide housing for workers. With the exception of a few bombs dropped near the naval center of the Arsenale, the historic center of Venice was relatively unscathed by World War II. In the post-war 1950s, the Veneto underwent extraordinary growth, known today as “the Italian miracle,” with small family owned firms growing into nationally and internationally owned companies. The port of Marghera became a major employer and tourists returned to Venice, but now in larger and larger numbers, orchestrated by a corporatized global tourism industry.

The catastrophic flood of 1966 served as a wakeup call about the ongoing physical risks to the historic city center exacerbated by transformation of the lagoon through specific industries and practices. This reinvigorated interest in the heritage of Venice happened at the same time the historic preservation movement was growing in the United States and elsewhere. More than 30 countries formed international private committees in Venice to raise funds to “save” Venice. In 1972, the UNESCO World Heritage Convention was created, and soon Venice and its lagoon would be among sites listed (1987). These new eyes on Venice reinforced it both as a city of “universal” heritage and as a tourist destination. The call for a remedy to protect the city also led to the creation of the highly controversial multi billion euro MOSE project, a collective of projects to mitigate the impact of acqua alta (high water flooding due to a combination of meteorological events), of which the largest is the construction of a system of inflatable dams at the openings of the Venetian lagoon to the Adriatic that can be raised during severe conditions of high water, which at this point happen a few times a year. The controversy of the project has been varied, but has long centered in two areas: the environmental impact of further intervening with the lagoon ecology and lack of transparency by the Consorzio Venezia Nuova (consortium of new Venice), a consortium of companies designated by the Italian state to execute the project.  

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22 Concern about the lack of transparency in the operations of the Consorzio Venezia Nuova has proved accurate. In June 2013, more than 30 individuals, including the Mayor of Venice, Giorgio Orsoni and the former Governor of the Veneto, Gianfranco Galan, were arrested on corruption charges related to misuse of public funds. http://www.nytimes.com/2014/06/05/world/europe/venice-mayor-is-arrested-on-corruption-charges.html?_r=0
As the head of government for the Veneto region, the seat of two major Italian (state) universities, and the headquarters (or major locations) for banks and insurance companies, Venice built up major employers beyond the industry of tourism and maintained many of them through the 1980s. With the growth of Mestre and other cities in the Veneto, however, the population of the historic city declined precipitously (from 175,000 in 1951 to less than 60,000 today). Venice and Mestre continue to operate under a joint government and together with other areas of the mainland and lagoon islands, they form the Comune di Venezia. The residents of these areas are politically interdependent, although their economies and social and physical environments are markedly diverse. In 2014, a metropolitan government structure was enacted, replacing the former province-level structure. Some 858,000 residents are counted within its boundary. The next mayor elected (May 31, 2015) will reside over this entire area.

The tourist economy has continued to expand, but with few constraints in place, there has been a diminishing per capita return on investment in each visitor hosted (Da Mosto, 2009, 37). While tourism does provide a base of employment (albeit one that is highly vulnerable to shocks in the global economy), it also has an acute impact on the cost of housing in competition with the use of buildings as hotels or B&Bs, and in the availability of goods and services for the local community. As a result, it is possible to view Venice as a case in which mass tourism has acted as a gentrifying activity – a physical and economic form of point loading -- pushing out residents from the city center, even while it may simultaneously provide them some form of employment and, for some, one time income with the sale of property. This is coupled with other negative externalities of mass tourism: acute traffic in all forms (cars and busses coming across the causeway to park at Piazzale Roma and Tronchetto, boat and pedestrian), the social implications of living in a sea of tourists and existing in a political environment controlled heavily by tourist lobbies, and the threat of environmental risk from having an ever increasing number of cruise ships pass within close distance of one’s doorstep. In all of this, the city center of Venice persists, providing an urban experience – in many ways the most urban of urban experiences – to those who are willing to endure its discomforts and see them as a challenge. It continues to attract artists and architects, musicians and philosophers and other producers and interpreters of contemporary culture. On a good day, Venice epitomizes human creative potential, as well as the interconnection of culture and place. The visceral nature of its environment carves memories deep into the psyche of the inhabitant in a way that few other cities do, especially in a time of increasing
homogenization of place. On days when it exceeds its carrying capacity, it can be inconvenient, oppressive, and even unsanitary.

**Venice: end of the 20th Century to the present**

Even before the flood of 1966, the idea of how to intervene and modernize the built environment of Venice was long debated, with some parties lamenting any modern invention and others calling for solutions that could be understood both as radical and pragmatic, if not also risky, such as the construction of a subway under the Venetian lagoon. As planning strategies were debated, tourism marched on, a fast growing and rather unregulated industry, and was advocated as one of the few viable uses for a fragile historic fabric. Few controls were put in place until noted events, such as the Pink Floyd concert held at Piazza San Marco in 1987, which nearly covered the city in trash, confirmed that there was indeed a limit to Venice’s carrying capacity – not only how much it could handle physically, but also in terms of the social and economic impact of tourism. Criticism emerged for the “tourist monoculture.” It is within this context at the end of the 20th century that a new view of Venice emerged, Venice as a city of ideas that could support forms of intangible production, be they cultural production or new products and services (such as software) emerging in the context of a digital economy. In 1993, Massimo Cacciari was elected Mayor of Venice, with tenure until 2000 (and again for the period between 2005 to 2010). In 1995, a new master plan for Venice was developed and published (though is not yet approved). The plan attempted to address the three critical problems Venice continues to face today: managing its urban fabric and infrastructure, managing tourism, and arresting depopulation. In the introduction, Cacciari confronts the citizens of Venice:

_The fundamental question that every Venetian will have to confront in this plan is the following: do we think that Venice can actually save itself by “reinventing” itself and placing within its delicate (urban) fabric new functions, new sectors of research, new productive activity? If we believe so, then this plan has to be our path of orientation. If we believe, instead, that Venice is simply incompatible with innovative technology, research, development, and production, and that it should be in every case merely conserved, that it cannot support our steps forward, then let’s drop this project. But if we drop it, we should also drop the discussion about the need to stop the exodus, to revitalize the city, etc._23 (Benevolo, 1996, VI)

23 My translation.
At the time this was written, laptops had a fraction of the computing power they have today and smartphone and cloud-based services had yet to be brought to market, so there is a possibility that the idea of "incompatibility" with innovative technology might have seemed a real possibility. Today, perhaps with the exception of concern for Internet bandwidth, it is almost impossible to conceive that the fabric of the city would impose a limitation on the use of the most prevalent tools in the new economy.

In the late 20th century, major companies in banking, insurance and telecommunications that were once located in the historic city center, dissipated (in part due to intra-industry changes). These no longer serve as anchors for high skilled workers in the way they once did. Partially because of the presence of tourism, Venice did not undergo the same transition from manufacturing to professional services that is observable in other places. Mass tourism, which is reliant upon a different skill set than professional services and a far lower educational attainment, is now constraining new economic growth. As research in tourism economics now better explains the impact of urban tourism on a local economy, including the competition for the goods and services it introduces, and the frequency with which the carrying capacities of historic cities are exceeded (Van der Borg and Russo, 2001; see fig. 15 right image).

Evidence from Venice provides ample reason to create new approaches to managing tourism while promoting economic diversification.

Figure 15. Left: a map by Franco Mancuso of 19th century industrial buildings still in existence in Venice in 1980 (Comune di Venezia, 1980, 39). Right: Documentation of main routes through Venice, indicating high tourism activity, in 2008 by COSES (Da Mosto, 2009, 40). Note the relative inverse relationship between the two.
Amsterdam

Figure 16. Map of Amsterdam by mapmaker and architect Daniël Stalpert, showing the development of the Canal Ring in process (1662). Source: http://thebigfoto.com/photocroms-of-holland-from-1890s-to-1900s

Origins to the end of the 17th Century

The history of the Netherlands is one of constant manipulation of landscape through the creation of polders, dikes and canals to direct the flow of water for the safety, convenience and expansion of urban settlements, for agriculture purposes, for the reclamation of peat, for power generation and for recreation. Like Venice, it remains susceptible to the sea, and thus, intimately familiar with it. Without ongoing maintenance to its elaborate infrastructure, it is estimated that 65% of its land would be under water at high tide (Hoeksema, 2007, S113). Amsterdam's emergence in this context is relatively late compared to other Dutch cities. The name alludes to a dam on the Amstel River and the first use of the
A description is dated to a document from 1275 that exempted inhabitants who had built a bridge across the river from paying a toll to Count Floris V, ruler of Holland and Zeeland (1256-1296). In c.1300, Amsterdam was granted city rights and grew as a trading city, at first predominantly by trade with Hanseatic League. Trade with Germany is still critical today. In 1400, Amsterdam became part of the kingdom of Phillip the Good of the House of Burgundy, who desired to unite the regions of the Netherlands. For much of the next two centuries, Amsterdam grew, incrementally expanding as ruling parties shifted and continued efforts were made toward unification. In 1568, the Dutch rebelled against Phillip II of Spain, sovereign of the then Habsburg-ruled Netherlands, based on the imposition of new taxes but also religious persecution of Protestants by the Spanish Inquisition. Amsterdam, initially sided with the Spanish. Revolt escalated into the Eight Years' War, leading to Dutch independence in 1581, although it was not until 1648 that the Dutch Republic was recognized as an independent country. The Dutch Republic becomes known for religious tolerance. Skilled laborers (many persecuted in their own countries) flocked there from throughout Europe as well as from other cities still under Spanish rule.

Independence paved the way for Amsterdam's Golden Age (1600-1700) a period of immense wealth accumulation. In 1602, the government of the Netherlands granted a charter to the Dutch East India Company (VOC), giving it exclusive rights to function as a quasi-governmental global trading corporation. As a joint stock company (and the first of its kind), any citizen – housemaid to regent - could invest in the VOC. Establishing the colony of Batavia (modern Jakarta) in Indonesia, the VOC grew to dominate trade in Southeast Asia and established additional colonies there, as well as in South Africa and South America. Goods brought back to Amsterdam were then traded throughout Europe, making Amsterdam one of the most important ports in the world. Advances in the design and construction of sailing ships greatly expedited trade and Amsterdam became known for its shipbuilding capabilities. The VOC shaped the urban fabric of Amsterdam, most specifically in the East Docklands area that served as its base of operations, where the VOC insignia is still found on the buildings, but also through the wealth that permeated the city. The VOC endured for almost two centuries, before falling victim to corruption and being formally dissolved in 1800.

Rapid growth in the early 17th century necessitated expansion of the city, leading to the design of the Canal Ring (see fig. 16). Begun in 1612, it created a band of development around the central older city, composing a functional yet highly organic fabric completely accessible by boat. The development, much needed to alleviate overcrowding in the center city, was also contingent on private investment: it
depended upon private citizens purchasing sites upon which to build what are today referred to as canal houses. Designed to be mixed use from the start, they supported both private residential and the business functions of wealthy families. The plan also included small streets that cut across the large concentric canals, providing commercial functions and access to the centrum (the historic core of the city). Land immediately beyond the ring was intended for industrial activities and housing of laborers. This ring, still intact, is recognized as one of the great planned city ideas of the world today. Like Venice, Amsterdam was also besieged by plague events, with four major episodes occurring from the 1620s to the 1640s. Compared to Venice, it lost a smaller fraction of its population and due in part to the continued draw of robust economic activity, population rose during the period, largely as a result of the continuing influx of immigrants.

18th - 20th Century Amsterdam

If the 17th century was Amsterdam’s Golden Age, the 18th century was marked by politically complex events implicating all of Europe, and generally limiting the power of the Netherlands to its role as the financier of European exploits and not the leaders of them. It was also a century marked by moments of rampant financial speculation (for instance, in the tulip trade of the 1720s) producing some of the earliest lessons about “bubbles” in the global economy. A long period of expanding wealth had, however, led to the emergence of a middle class that was increasingly educated and hungry for greater access to knowledge. Embracing the transformative ideas of the Enlightenment, new ideas about more inclusive and participatory forms of government led to calls for tax reform and a series of movements aimed at dismantling the power of the ruling class. This activity fomented until a group calling themselves “Patriots”, fled to France, only to return backed by French armies, bringing the Dutch Republic to closure in 1795. French occupation from 1795 to 1813 served to unify the Netherlands in a way that it had not been unified previously, the outcome of which was a negation of power that recognized Amsterdam as the capital of the Kingdom of the Netherlands (1815) with the town hall becoming the residence of the House of Orange while the center of government and royal seat remained in the Hague. Monarchy and democracy found a way to coexist. The constitution of 1848 further limited the power of the king. Subsequently, local governments were also given more autonomy.

During the period of French occupation, however, local government and local institutions were incapable of addressing growing poverty and slum conditions among its poorer neighborhoods. Post
occupation, much effort was made to address slums, to “modernize” and improve sanitation and to consider Amsterdam’s strategic economic role. In 1814, the Netherlands Bank was established and, in 1831, the Netherlands Trading Company moved to Amsterdam, both reviving some of the roles Amsterdam had played as the power center of the Dutch East India Company of the 17th century. From 1820-1824, the North Holland Canal was dug to preserve Amsterdam’s link with the sea, and other improvements to the harbor were made to preserve its maritime functions. Although it would take most of the century, Amsterdam began a process of systematically improving urban infrastructure, especially related to urban sanitation. Private charitable organizations initially led initiatives to improve housing in Amsterdam’s poorest neighborhoods. By the 1830s, new privately funded civic amenities were created, such as the Artis (zoo) (1838) in the green eastern district of the city known as the Plantage. Amsterdam’s most beloved park, the Vondelpark, was developed in the 1860s, in part as compensation for the urban development of part of the Plantage. Industrial factories began to emerge, especially on what was then the periphery of the city.

In the 1870s, a new period of wealth from Amsterdam’s role in global trade began; this is sometimes referred to as Amsterdam’s second “Second Golden Age.” The opening of the Suez Canal in 1869 expedited transport of goods to and from Batavia (today, Indonesia); establishment of German unity in 1870 stabilized a key trading partner. This period also saw the beginning of the diamond economy, with raw diamonds coming from South Africa (Roegholt, 2010, 97-98). Construction of the North Sea Canal took place from 1865-1876, linking Amsterdam to the North Sea by a more direct route that could accommodate even larger ships (Roegholt, 2010, 97-99).

Still functioning as an empire (with colonies that included Indonesia, Suriname, and the Netherlands Antilles) at the dawn of the 20th century, the Netherlands was wealthy, though not so wealthy as it had been during the Golden Age of the 17th century. In 1899, the Amsterdam Centraal, the city’s main railway station, was completed. Located at the edge of the old harbor, the building physically blocks the city’s connection to the IJ River. As Roegholt points out, this had the effect of pushing harbor activities to the east and west peripheries, sparing the center the “mess and pollution that often accompanied a modern harbor in the age of steam” (Roegholt, 2010, 100). It also affirmed, or reaffirmed, the center as a multi-functional zone and entrance into the city. Today Amsterdam Centraal serves as a node for rail,

24 I rely heavily on Roegholt for 19th century history of Amsterdam.
tram, ferry, metro and water taxi service. Thousands of bicycles are parked at the ready, and riverboat and cruise ship terminals are located a short distance to the east. It is without question the multimodal nerve center of the city, and is linked to Dam Square (what is today the symbolic heart of the city) via the Damrak (and the avenue known as the Damrak, a partially filled canal, which becomes the Rokin just south of the square).

New economic opportunity and wealth in the city attracted immigrants to Amsterdam from elsewhere in the Netherlands and beyond. In 1859, the population was 250,000. By 1900 it had more than doubled, to 520,000 (Roegholt, 2010, 96). Expansion of the urban fabric beyond the 17th century canal ring had begun, but was still challenged to keep pace with the growing demand for housing. By 1870, the city had expanded beyond the Biutensingelgracht (the bounding canal of the fully realized canal ring). Development at first did not follow a prescribed plan, producing a wide range in the quality of development completed. In 1901, however, the city passed the Housing Act, setting a course for the provision of new public housing and for a more guided expansion of the city. Driven by a social democratic ethos, many high quality housing projects were well constructed and robust, yet organic in spirit. Designers combined art nouveau ornament and modern details with early modern programmatic elements that convey both confidence and controlled aspiration. Today this architecture is recognized as representing the “Amsterdam School.”

The Netherlands proclaimed neutrality during World War I. Amsterdam was still marred by food and fuel shortages caused by wartime disruption, and the social unrest these brought about, but it was sparred direct occupation or bombing, as other European cities experienced. In 1921, Amsterdam annexed a number of surrounding agricultural municipalities for continued expansion and a new plan was created, intending to be comprehensive in nature. This led to the creation of the City Development department (1928) within Public Work Services, and to the introduction of new, more rational ideas about city making and the relationship between the car and the city. With the global economic crisis of 1929, most development came to a halt, but the city continued to plan. The General Expansion Plan (1935) took both a long range and zoning based approach, mapping out decades of anticipated development. When Hitler invaded the Netherlands in 1940, the depression years of the 1930s had already taken their toll, including on the city’s building stock and infrastructure, through deferred maintenance deferred and disuse.
In the years following World War II, when demand for new housing and the desire to modernize was fervent, proposals were even made to reclaim the central urban fabric through demolition and renewal and to pave its canals to better accommodate automobiles in the city (Stadsherstel Amsterdam, 2011, 5). Amsterdam had suffered brutally in the war, with catastrophic losses to its once large and vibrant Jewish population that amounted to a loss of approximately 10% of the city population (Roegholt, 2010, 121). Unlike Rotterdam, however, Amsterdam was not extensively bombed. The brutally cold winter of 1944-1945 (now referred to as the “hunger winter”) in which the Netherlands was isolated due to the position of allied forces, led to many other deaths. Five years of wartime occupation also led to a different form of urban destruction. Amsterdammers were forced to source wood for use as fuel from wherever it could be found, from abandoned houses (many in the Jewish quarter) and even wooden slats under tramlines (Stadsherstel Amsterdam, 2011, 5).

The pressing demand for housing in the post World War II era emerged partially as a result of physical decline to existing building stock over the prior decades and partially due to the arrival of new immigrants (many from former Dutch colonies) who were welcomed to the country as an important labor force for the redevelopment of the city and renewal of its economy. Continued reliance upon maritime trade made improvements to harbor infrastructure a priority for post-war recovery. At the same time, Amsterdam’s strategic maritime relationships were altered by the war, or soon thereafter, especially as its former colonies achieved independence. Rotterdam and its port, which had been all but leveled in the war, were designated priorities for national investment. The Netherlands invested strategically to ensure that its role as a hub and distribution point for goods and people coming in and out of Europe would be sustained, even as modes of transport have changed. It also strove to modernize a number of its traditional industries, such as agriculture and food production. One major project completed in the post-war era was the 45-mile Amsterdam-Rhine Canal, which opened in 1952 and was enlarged in the 1970s. It is one of the most heavily used canals in Western Europe and is critical to trade between Amsterdam and Germany.

Tensions between traditionalism and modernism continued for the next decades, as Amsterdam sought to define its role and identity in a post-war global context. As Europe was being rebuilt, Amsterdam leveraged its experience in global trade to become one of global host, particularly to American corporations coming into Europe. Generally speaking, however, in the post-war years, Amsterdam was forced to take a more restricted approach to rebuilding. “We are rebuilding, everything is scarce” is the
motto reported by historian Richter Roegholt to have been prevalent at the time (Roegholt, 2010, 128). As new development was implemented (still following the plan of 1935), adjustments were made to accommodate the dramatic increase in automobile traffic not fully anticipated by earlier planners. One solution was to raise traffic arteries above street level; another was the introduction of new roads through, or at the edge of, the historic center. As commonly in many cities in this time period, public policy conceived that substandard housing could be removed to make way for new commercial and cultural functions and more modern housing could then be provided beyond the center. This, in effect, increased the demand for parking, as well as automobile access to and from the center. A combination of forces contributed to a backlog of demand for this anticipated housing, especially for newly arriving immigrants, and by the 1960s a new approach to housing was taken. In 1968, the first modern high rise housing was completed in the Bijlmermeer, a development conceived to house 100,000 people (Roegholt, 2010, 129). The planning strategies put in place, together with the implications for quality of life in the urban center they brought about, set against a backdrop of general social change not taken into account by the city planning authority, coalesced. By 1965, Amsterdam began to lose inhabitants and would continue to do so until 1984.

Beginning in the 1960s, Amsterdam earned a reputation as a place of “counter-culture” that has greatly appealed to individuals looking for a tolerant and creative community, as well as to certain types of tourists and tourist industry operators. Squatters occupied and made use of abandoned buildings awaiting demolition. As part of a series of protest movements, citizens called into question many, if not most of the planning policies being implemented. Vocal outcry emerged as citizens realized that the cultural heritage they valued was under threat. A number of disparate groups, including both squatters and members of old Amsterdam families, aligned to argue not only for the preservation of specific buildings, but also the collective value of the city center. During the course of these events, the Stadherstel was formed as a civic-minded, limited liability company to buy and redevelop historic buildings. Community members and planning staff worked together to develop a more organized plan for regulating squatting in vacant buildings. In 1978, the Amsterdam city council approved an agenda for a more participatory and decentralized form of planning (with many planning responsibilities now managed at the borough level) and committed to maintaining a compact urban center and improving livability in the city. These objectives were affirmed by referendum in 1991 and again in 1998. Russell

25 Ibid, p. 129. The largest population was X. Today it is X. (Source).
26 With much influence from Jane Jacobs, a figure both well known and revered in Amsterdam.
Shorto points to the interesting duality of Amsterdam when he describes it as “the world’s most liberal city” but also one of the most regulated (Shorto, 2013).

Achieving clarity about the intentions for the city center also served to clarify the need for investment in mass transit infrastructure. The development of Amsterdam’s metro system began in 1968 and continues today, with a north extension under the IJ River scheduled to open in 2017. It also led to a decidedly different form of development in the periphery of the city. Construction of the A-10, the Amsterdam Ring Road, the artery encircling the city, began in 1962 and continued in phases until 1990. A series of more auto accessible and transit-oriented development nodes have emerged, many developed for the multi-national companies that Amsterdam began attracting in the 1960s. These include development the area of Zuidas (beginning 1985) and development around Schiphol airport; Sloterdijk (1986) conceived as a hub for telecommunications companies; and the business district (1990s) of Omval, set along the southern extension of the Amstel River, which includes the Rembrandt Tower (at 150 meters and 35 stories, Amsterdam’s tallest building). All are connected to the city center by mass transit and readily accessible to the A-10, as are the business districts that have been developed slightly farther afield in Amstelveen, Diemen and Almere.

21st Century Amsterdam

As of early 2015, approximately 6,300 foreign companies have a base in the Netherlands27. More than 2,500 of these are found in the Amsterdam Metropolitan Area.28 A skilled workforce (comprised of English speaking Dutch and many foreigners) favorable corporate taxation system, geography centrality, and a straightforward, well-organized business environment all are factors.

Amsterdam has continued to be quite experimental and confident in its approach to introducing new architecture into its urban fabric, while simultaneously working hard to retain the human scale maintained over many periods of building. Recent exceptions to note have often been commercial interventions for foreign companies at the periphery of the city, or speculative development intended to appeal to this clientele. Many of these developments, financed by Dutch banks viewing real estate as a commodity and not a form of place-making (or working with a limited understanding of how much concepts of the workplace and demand for class A office space were changing), did not fair well in the

27 (http://www.hollandtrade.com/business-information/holland-information/foreign-investment/)
post 2008 economic climate. Foreign companies based in Amsterdam are relying on an increasing number of contingent, or contract based, worker and the concept of flexible schedules has been introduced.29 Both have impacts on the overall demand for office space. As early as 2006, the City of Amsterdam identified that a vacancy issue was emerging and, in 2010, developed a structural plan to encourage devaluation of the balance sheet value of property, which would then make repurposing of buildings to other uses more palatable. In 2013, the overall vacancy rate for commercial office space was approximately 18%, but with some areas approaching nearly 50%.30 As of March 2014, almost 350,000 square meters had been transformed for student housing, hotels, residences, and creative workspaces.31

More interesting and place-specific has been the redevelopment of former harbor sites along the IJ River, in part because of adaptive use of existing sites and in part due to the more progressive planning concepts employed. These include the redevelopment of Java Island and the Eastern Harbor District (2003), part of Amsterdam’s late 19th century waterfront, as well as the West Docklands, which have seen more incremental redevelopment, producing one of the most architecturally diverse yet cohesive zones of the city. The development of the man-made island of IJburg began in 1997 and is the last planned extension (via land reclamation) into the IJ River. The mid-rise district is conceived as transit-oriented development as well as an eco-district. The redevelopment of the harbor area that surrounds the Amsterdam Centraal has produced a dense concentration of new cultural institutions as well as other mixed-use development. A myriad of projects across the river in Amsterdam Nord including the the Eye (the Amsterdam film institute), the anticipated redevelopment of the Strip Overhoeks area, the Shell Tower and the Shell Technology Center benefit from the city’s free ferry service across the river and will capitalize on the north subway extension.

In 2006, the city of Amsterdam organized an extensive participatory process to create a plan for Amsterdam’s future; the results of which is a document known as the 2040 Structural Plan. More than 2,000 people participated in defining a collection of narratives that outline what Amsterdam is and what it can be. City planners, led by Zef Hemel, worked to synthesize these ideas both conceptually and in relationship to specific areas of the city. Those who finance future projects, whether they are public or

29 Companies in the Netherlands have been impressive in their adoption of four day or four and half-day workweeks, and other policies useful to parents employed outside the home.
private or public-private, will retain a lot of leeway in determining how the ideas presented are realized, and if they are realized. This extensive document coordinates multiple planning objectives and makes clear the quality of life objectives and values of the Amsterdam community as expressed by Amsterdammers themselves, albeit at a particular point in time.

In 2010, the Amsterdam Canal Ring was inscribed on the UNESCO World Heritage List, although not without concern voiced by some parties that inscription would lead to a more conservative preservation than is in place today, as well as to further “museumification” of the city center. There are now more than 50 museums in Amsterdam, many of which are located in the city center. Approximately 8,000 buildings in Amsterdam are listed as monuments by local or national government (Roegholt, 2010, 152).

While Amsterdam’s waterfront has changed tremendously in the last twenty years, it has managed to maintain a strong sense of place. These projects are mixed use, less car-oriented, and increasingly utilized as places to live, work and recreate. They are high density, but mid-rise and mixed use. Within the city center, there were also a number of late 19th and 20th century buildings that had been vacated by banks and insurance companies as part of the front-end process of the speculative real estate development that drove the development of Zuidas in particular. Sites and buildings associated with the modern, but pre-containerized shipping industry also came available. It is easy to understand why companies, especially startups, would be enticed to locate in these districts over the more conventional office districts developed at the periphery.

In the 21st century, culture and technology have taken on new economic significance, particularly as these concepts have been fused in new ways. By the 1920s, Amsterdam was already recognized globally for the new architectural design it was producing, as well as for graphic design and industrial arts. Iconographic traditions present in the city are partially explainable by the fact that Amsterdam, like Venice, has long been a center of publishing and map making. Roegholt points out that the policies for cultural subsidies can be traced to the role of Emanuel Boekman, Alderman of Amsterdam, who obtained a doctorate in 1939 on the subject of “Government and Art,” which has since acted as blueprint for the art politics for the city (Roegholt, 2010, 111). The squatter culture of the 1960s and 1970s included a pronounced tendency for artistic expression and appreciation of the political value of art. In such a context, it is not hard to imagine that aspects of Richard Florida’s Rise of the Creative Class would resonate. Understanding the value of the Creative Industries continues to be a focus of
scholarship and economic development policy in Amsterdam, and for the Netherlands as whole. The squatter culture of Amsterdam has also had a direct bearing on the emergence of Amsterdam’s hacker culture. This is particularly interesting to consider when thinking about the locational relationships between Amsterdam’s cultural industries and its emerging tech, or ICT culture.

Located within the “belt” added to the canal ring in the 19th century, and steps from the Amstel River, is the headquarters of the member-governed Amsterdam Internet Exchange (“AMS-IX”), founded in 1997. In its role as one of the largest Internet hubs in the world, it both mirrors and facilitates the Netherlands’ role as a key hub for the global distribution of products and goods. As an exchange, it manages a network of data centers (including a location at the Amsterdam Science Park) and it works to ensure data transmission is as quick and reliable as possible. AMS-IX is indicative of a pervasive understanding of the value of the Internet as critical infrastructure in the new economy.

In 2011, the Netherlands was named the most active country on Twitter (by number of accounts posting at least one tweet) and was also recognized as having the highest penetration rate on LinkedIn (user per capita). As a result, resonant ideas spread quickly and often with the type of redundancy that is valuable to understanding citizen behavior, consumer trends and the political implications of events. While it may seem that this would mitigate the need to gather physically for the sharing of information, if anything, it has done just the opposite.
17th Century Development

In 1630, settlers of the Massachusetts Bay Colony situated themselves in what is today known as Charlestown, on the other side of Charles River. By the fall of that same year, they had relocated to the Shawmut Peninsula, where Reverend William Blaxton had settled five years before and a supply of fresh water was present. Although the colony was chartered by the English crown and intended as a toehold in New England and an economic asset, freedom from religious persecution was a primary motivation of many of the earliest settlers. This at times lead to conflict within the new community. Before the development of substantial industry, a national banking system or stock market, maritime trade was one of the few things early Bostonians could invest in to grow their wealth. In short order, a merchant class dominated local politics. As a colonial port, trade was initially primarily with England, and Boston heavily dependent upon English goods. Often trade operated as a consignment system, with a purchasing agent (often a relative) in England making purchase of goods to be sold in Boston, while what could be produced locally — often from the sea — was used or sent for export. The central
waterfront of Boston (including Charlestown) was developed, mostly through a process of wharfing out, enabled by a 1641 law that allowed property owners to claim land down to low tide mark (Seasholes, 2003, 3). As wharfs were extended, the spaces between them were also often filled. This process continued into the 18th century. Long Wharf, constructed from 1711-1715, extended out into the sea such that ships could moor in deep water, without having to be piloted into shallow water.

With a few years after settlement of Boston, Civil War in England (1641-1660) dried up the flow of goods between Boston and English ports, leading colonial merchants and privateers to develop alternative trading partners, turning in particular to the West Indies. The development of a triangle trade between ports in Europe or Africa, the West Indies and Boston led to a more expansive trading network, albeit one based upon human trafficking. Often the boundaries between legal trade, privateering, and illicit trade (smuggling) were blurred; an individual or trading company might simultaneously be engaged in all three. Entrepreneurs endured by finding creative ways to amortize financial risk, such as by creating shares of ownership in a trading vessel, such that any gain or loss was distributed.

New trading opportunities led to new investment in Boston’s maritime infrastructure. As Seasholes carefully demonstrates, many of Boston’s major landmaking campaigns had a direct relationship to Boston’s maritime industries; to the original 487 acres of the Shawmut peninsula, some 500 acres were added to it (Seasholes, 2003, 3; see fig. 17). The transformation of the Shawmut peninsula served two related purposes: to support the maritime trade economy and more generalized city-making, to grow and reinforce Boston’s role as an important economic, intellectual and social center of New England. In addition to Boston, adjacent communities of Charlestown and Roxbury were settled, as well as Cambridge, where Harvard had been founded in 1634. Local financial and insurance institutions soon emerged offering a cheaper source of capital than what could be secured in England; these continue to be central to Boston’s economy today. The town developed in a remarkably short time. Adams shares this quote from a letter written in 1654 by an observer of Boston:

> the chiefe Edifice of this City-like Towne is crowed on the Sea-bankes, and wharfted out with great industry and cost, the buildings beautiful and large ... The wonder of this modern Age, that a few yeares should bring forth such great matters by so mean a handful ... This Town," he added, "is the very Mart of the Land, French, Portugalls and Dutch, come hither for Traffique. (Adams, 1977, 7).
18th Century

At the end of the 17th century, with a population of approximately 7000 was the most developed port in North America, with an estimated trade volume four times that of New York (Adams, 1977, 9). The city’s maritime trade allowed for other urban development: soon bustling shops and new residential area emerged, extending beyond initial settlement in the area known as the North End to an area known as the South End in the vicinity of Fort Hill (today’s financial district) and beyond. Successful merchants built stately homes and parlayed some of their growing wealth into real estate development. Growth of trade led to influx of new inhabitants. In 1742, merchant Peter Faneuil paid for construction of a new multi-purpose building: ground floor as open air covered market and upper floor as meeting space. Enlarged over time, this building continues to be an important Boston landmark. Growing wealth also led to planned, speculative developments of residential neighborhoods such as Beacon Hill as well as along the Shawmut Neck (South End). The continue risk of fire led to building codes requiring new buildings to be constructed of brick and granite rather than wood. Large granite warehouses, such as India Wharf were constructed.

By the 1740s, Boston was the largest town in British North America but the city began to stagnate, as relations with England grew more tenuous. Economic stagnation lasted until well after the Revolutionary War (1775-1783), as citizens of the newly independent nation were denied trading rights in British ports (including in its colonies). This led Bostonians to pursue trade with other ports, including Amsterdam. Distance from growing centers of population in the newly formed United States (as population moving increasingly west), further exacerbated the situation. The Embargo Act of 1807 declared by President Thomas Jefferson to keep the newly formed United States out of the Napoleonic Wars, and the subsequent War of 1812, all but dried up Boston’s trade with Europe, forcing its maritime traders to find other ports in which to trade and encouraging the development of local production, both as a source of needed goods and to minimize economic dependency upon England. As a result, Boston continued to look outward for its economic livelihood and found success by inaugurating trade with China. Not dissimilar to Venice’s provision of eastern goods for European markets or Amsterdam’s importation of goods from Indonesia, Boston’s China Sea Trade was time consuming, long distance trade launched by groups of merchant investors who traded with foreign parties for exotic goods that could be brought back for even more profitable sale in the domestic market. It required technological knowledge to build fast sailing ships also capable of navigating in small harbors, as vessels traveled from Boston, around Cape Horn to the Pacific Northwest to obtain sea otter pelts, one of the few tradable
goods accepted at the trading site of Canton (modern day Guangzhou) for tea and silk. The China Sea Trade was predicated on a concept for joint ownership of ships, allowing costs, risk and profits to be shared among multiple parties. This trading pattern lasted from 1783 until the United States government and China formalized trade relations in 1844 with the Treaty of Wanghia. Trade proved lucrative, attracting more people to Boston, and the population of the city almost doubled between 1790 and 1810. By 1810, trade with China had declined significantly, in part due to overhunting of sea otters, but it continued and diversified through middle of 19th century.

19th Century Boston/Cambridge

The need for new land for commercial and residential use led to major projects in the first decade of the 19th century (Seasholes, 2003, 3). Land making soon began to entail dealing with multiple objectives: maritime infrastructure, the need for additional land, and dealing with the sewage load of a growing population. As Seasholes points out, “Expanding to the mainland was not even considered, as the town’s maritime economy was concentrated at its waterfront” (Seasholes, 2003, 2). Maritime trade (and whaling) provided seed capital for the local development of real estate, the creation of railroads as well as other land-based transportation and soon, more complex industry (textile mills and shoe factories in particular). From capital originating in maritime trade, investors in Boston became a major financier for railroads throughout the United States, as well as for mining of copper and other industrial materials.

Development of South Boston and the neck of the Shawmut peninsula (in the area today known as the South End), which had begun in the 18th, were not successful in attracting residents at first. Soon they began to take hold. The partial filling in of the South Cove (1839), resulted in what are today the neighborhoods known as Chinatown and the Leather District. Back Bay, once a part of the Charles River, was enclosed and transformed (1814-1821) by the creation of a dam and roadway (Western Avenue now Beacon Street) for industrial use. Western Avenue, a 50-foot wide toll road ran from Charles Street to Sewell’s Point in Brookline. By 1830s, roadbeds for railroads were built to pass through the bay as well. Seawalls and bridges were added along the Charles River and shortly they would traverse numerous districts in the city, especially before rail operation was consolidated to a few companies. By 1835, railroads ran from the Boston Harbor to New York.
Realizing the need and opportunity for economic diversification and having a network of capital for investment, Boston investors created not only textile mills, but entire industry towns in Greater Boston. Lowell (1826) and Lawrence (1847) both sited to take advantage of the waters of the Merrimack River for hydropower, launching the industrial revolution in the United States. Mill organizers researched systems implemented in England and France, before starting mills in the United States. Textile production (based on supply of cotton from southern states), was at first primarily for the domestic market but soon began to be exported. The mills represent a complex system of innovation-oriented entrepreneurship, one in which ample time and capital, technical knowledge, knowledge of an existing market and land/specialized facilities are brought together to create new industrial production systems. In a way, they foreshadow the development of research office parks along Route 128 in the mid 20th century, and the large biotechnology campuses, such as Novartis Research Institute for Biomedical Research, and others now emerging in Cambridge.

Immigrants looking to leave dire conditions in Europe were attracted by what had been created in Boston and the mill towns, and soon became an important industrial labor base as well as a created intense demand for housing, clothing and food in the local economy. Starting in the mid 1840s, waves of Irish immigration began, with tens of thousands fleeing the potato famine. The Irish presence encouraged further urban development for upper middle class “Yankees” in the area known now as the South End, and then in the filling of Back Bay, as the city was eager to retain them as tax payers and voters and to keep them from relocating to new suburbs being developed, such as in Roxbury, before it was annexed to become part of the city of Boston (Seasholes, 2003, 6). Industrialization of the city lead to development and wealth, as well as the types of unhealthy urban conditions that inspiring zone base planning. Massive social change also shaped future demands for development of new neighborhoods and streetcar suburbs, and eventually suburbs served by automobile and commuter rail.

While New York and other ports grew in prominence, Boston’s role as a major port of trade continued. Donald McKay and others developed important shipyards in Boston. Wood shipbuilding and maintenance endured in Boston, particularly in the shipyards of East Boston, as well as in Salem, Duxbury, and other coastal towns, even after the arrival of steam-powered ships. McKay’s East Boston Shipyard, operational from 1845 through the 1870s, was particular famed as a builder of “extreme” clipper ships (Lavery, 2004, 235). Many were record-breaking vessels, and aspects of McKay’s technological design were soon parlayed into construction of racing yachts that would be constructed in
and around Boston over the next century. Whaling, which had emerged as an important industry in the 18th century, continued, but overhunting took New Englanders farther and farther afield in search of whales, at enormous risk.

In the late 19th century steam-ships would eventually eclipse wooden sailing ships and petroleum would replace whale oil as key source of fuel. Both changed the relevance of Boston as a port city. Other forms of manufacturing emerge, especially as steam power engines began to be even more efficient, and then as electricity was introduced. The Cambridge side of the Charles River (known as Cambridgeport) developed as a thriving center of manufacturing.

Concern about losing trade to New York persisted, due to the lack of bulk export, as well as the physical size of the harbor itself, especially as it had reduced in size due to filling as well as deterioration from the shoaling of shipping canals and erosion of Harbor Islands (Seasholes, 2003, 6). In the 1830s, a harbor commission established lines to dictate the extent of fill possible; this boundary would be changed many times. In the 1830s, the Boston Wharf Company began to develop South Boston waterfront, with land making and extension of railroads along Fort Port Channel. In 1866, the commission recommended building a seawall around the South Boston Flats to direct force of scour, of ebb tide into shipping channels, to maintain them. The massive project for South Boston Flats began, “not as a commercial development project, but as a harbor improvement” (Seasholes, 2003, 7). Although Boston’s port activities have always been distributed around the harbor, the South Boston Waterfront was intended to offer a direct link to rail (and then trucking), a modern port for (bulk, container, passenger travel) and still is engaged in these today. It became the center of wool trade (an extension of textile industry) as well as mass production of shoes and clothing (uniforms), especially for wartime purposes.

Real estate development was also a mechanism for wealth creation. The reclamation of Back Bay (1855-1882; 1900), prompted by need for new residential development as well as public health concern about sewage, was approved by the Commonwealth as a plan to fill in and develop 500 acres of land. As Whitehill points out, the filling and transformation of Back Bay from tidal basin to developable real estate was a capital generating endeavor: “Here was an extremely handsome area on paper, but as no money had been appropriated for the filling, the Commissioners were reduced, as their seafaring ancestors had been, to the technique of parlaying nothing into something by way of exchange” (Whitehill, 2000, 152). The Commonwealth contracted with Goss & Munson for the filling of Back Bay,
leaving the private company charged with finding financial backing for equipment and materials. In turn, they were paid in deeds of land. Whitehill quotes *Ballou’s Pictorial* (21 May, 1859) to explain the highly efficient strategy, which concludes, “It is estimated that the hundred acres will realize to the State, when all completed, the handsome sum of three millions” (Whitehill, 2000, 154). In this endeavor, the filling of Back Bay mirrors Amsterdam’s strategy for the creation of the Canal Ring. This points out a critical functionality that maritime cities have in the context of innovation that other cities do not: *they can manufacture land*. In Amsterdam and Boston, such endeavors have provided a source of immediate capital as well as long-term yield. In the case of Boston, profits from the sale of Back Bay lands provided funds to the Massachusetts School Fund, the Museum of Comparative Zoology, Tufts, Williams and Amherst Colleges, and the Wesleyan Academy in Wilbraham (Whitehill, 2000, 156). Hence, the urban form of Boston – city making in the most literally sense – has been critical to the development of its institutional infrastructure for innovation.

Urban development also continued at the very core of the Boston. The creation of Atlantic Avenue (1860s-1870s) was conceived with the idea that the road and railroads lines would connect depots on the north and south sides of the city and, simultaneously, be a way to address pollution and sewage in this part of the city. In 1866, the city begins to clear out and level Fort Hill (near South Station). The massive fire that occurred in 1872 in the “old” South End made way for the transformation of the district, from a formerly mixed used district (including residential property) in to a new Financial District increasingly dedicated to “white collar” business. In the 1870s, a high death rate within the densely filled city was thought due to odors (miasma), prompting the development of a new sewage system (1878-1884) pumping sewage to Moon Island where it was released (Seasholes, 2003, 8). Concurrently, a park movement promoted the idea of development of health and pleasure grounds to counter the ills of the city, leading to Frederick Law Olmsted’s design of Boston’s “Emerald Necklace” park plan (1870s). The 1873 nationwide depression slowed the program, but park development continued. Marine Park at the far end of the South Boston waterfront, was created as a “pleasure” park adjacent to Castle Island (Seasholes, 2003, 324).

The late 19th century also saw the development of private mass transit (subsequently becoming the city’s public mass transit system) as well as institution building, such as the creation of the Boston Public Library. In the 1890s, the Charles River was dammed to deal with persistent pollution from sewage. Boston’s port also underwent further development. The Russia Wharf Building (1898) as well as Graphic
Arts and Tufts Building by Peabody and Sterns are noted buildings from this period. Extraordinary growth was due not only to continued immigration, but also population (and land area increase) by way of annexation. Boston’s population rose 250,526 in 1870 to 362,839 in 1880. By 1900 it was 560,892.

20th Century (1900-1945)

This rapid rise in population led to political shifts as well. Soon City Hall, long dominated by a Yankee constituency, was controlled by a largely immigrant Irish Democratic party, a political development that was, “a tuning point in the relationship between the public and private sectors” (Kennedy, 1992, 7). Industrialization within Boston and Cambridge continued. In 1901 the Gillette Factory was built along Fort Point Channel. Necco (the New England Confectionary Company) was created by the merger of three Boston-based candy companies, one of which had invented and patented the first American candy machine. In 1902, Necco located in five buildings on Summer Street developed for them by the Boston Wharf Company. (Molasses from sugar cane grown in the West Indies arrived into Boston by ship, making it a logical place of production.) In 1927, NECCO relocated to a new concrete-framed plant located on Massachusetts Avenue in Cambridge. At the time, it was the “largest factory in the world with its entire space devoted to the manufacture of candy.”\textsuperscript{32} The company dominated the US candy business until the middle of the 20th century and in 2003 relocated its headquarters to Revere. Renewed concern about loss of shipping to New York led to new port development, including the creation of large publically owned wharfs served by railroads, including Commonwealth Pier (1912), now known as the World Trade Center, and Fish Pier. In 1915, directors of Port of Boston began filling for a huge dry dock and by 1915, filling East Boston Flats for a shipping terminal – soon taken over by the airport (Seasholes, 2003, 10).

One of Boston’s most colorful mayors, Mayor Joseph Curley, held office on and off from 1914 to 1949, during which time the relationship between Boston’s traditional private sector investors and public sectors eroded. In place, reformers created a city planning agency (1914) and focused on much needed regulation of the build environment through zoning, (developing Boston’s first zoning plan in 1924). Intended to be progressive, it rationally separating households from industry, promoting clear demarcations of uses of the built environment.

\textsuperscript{32} \url{http://lcweb2.loc.gov/diglib/legacies/loc.afc.afc-legacies.200003102/default.html}
In 1920, the far southeast end of the South Boston waterfront was developed as the South Boston Army Base, which operated from 1920 to 1974 and an annex of the Boston Navy Yard (Charlestown), which were most active during World War II. The bases were closed in 1974 and subsequently became part of the Boston Marine Industrial Park when it was developed in the 1980s. Boston’s Conley Terminal, Boston’s container port and Black Falcon Terminal, Boston’s cruise ship terminal both operate out of the park today.

The city continued to transform its urban waterways. In the 1920s, South Bay was filled, leaving only the Roxbury Channel (retained until the 1960s) to serve wharfs along west side. The 1929 stock market crash brought almost all development to a halt. As Kennedy points out, Boston’s economic stagnation between the 1930s and the 1950s, which resulted from the private sector’s distrust of Curley as much as from the Great Depression, had a provide impact on urban development (Kennedy, 1992, 7). World War II necessitated the expansion of the Boston Navy Yard in Charlestown and the annexation of the tip of the South Boston Waterfront for use by the Navy and Army (including the building that has been recently renamed the Boston Design and Innovation Center, described in Chapter Four.)

The war launched MIT’s involvement in defense-related government research, which lasted throughout the Cold War. This research led to the spinoff of companies, including the pioneers of computer science, (a story that has been well documented). While government-funded research continues today, private partners fund an increasing percentage of MIT’s sponsored research. One of Boston’s most important financial innovations was the creation of venture capital and related programs explicitly focused on a form of technology and knowledge transfer, in which technology generated for wartime purposes could be applied for the enhancement of consumer products.

Partially in response to the conditions of an increasingly congested and un-modern city, construction of a new highway, Route 128, had begun in 1917, as a ring road around Boston and Cambridge. A Boston-based real estate developer conceptualized the idea of “research parks” in which the burgeoning electronic and computer industry could locate – efficiency reached by car and with ample space to meet the physical requirements for lab and office space, security, and in some cases, on-site manufacturing. The first wave of development along Route 128 and then later along Interstate 495 developed by the

33 Multiple sources, including the history of MIT and Saxenian.
Boston-based firm, Cabot, Cabot & Forbes who had been developed much property in downtown Boston and was now applying its capital and energy beyond the city. The concept is credited to Gerald W. Blakely, who joined the firm in the late 1940s and would eventually buy out both the Cabot and the Forbes family interests in the company. “It was Blakely’s idea to build garden-type industrial parks, neatly landscaped bunches of manufacturing and research facilities in an almost campuslike setting, just the kind of place for all those academic types spinning out of classrooms and laboratories to try their hands at building companies of their own” (Kennedy, 1977, 288). Blakely, as quoted by Adams, affirmed “The whole secret of Route 128 was the proximity to MIT.” (Adams, 1977, 289). At that time, with less highway congestion, these locations in fact would have been more proximate to MIT. By 1955, there were 40 plus companies; by 1965 there were more than 600 companies along Route 128 (Adams, 1977, 289). Like Venice and Amsterdam, in the decades following World War II, Boston faced massive housing needs and also began losing population, much of which relocated to towns and suburbs now more easily accessible as a result of the new highways. The population of suburban communities in Lexington, Waltham and Framingham, once small towns, grew substantially in the period 1950-1960.

The decline of the South Boston waterfront as distribution hub began with overland trucking (freight), and continued as container shipping emerged. It’s manufacturing economy had already begun to decline before World War II, as jobs in the textile and other industries moves to locations where labor was cheaper. The Massachusetts Port Authority, created 1956, expedited the relocation of industrial away from center of city or to specifically zoned areas of the harbor. It was only after the war that the industries of finance, insurance and real estate (FIRE) began to grow substantially in the city. While the information and communication technology industry, including both hardware and software for computing and telecommunications, emerged as its own industry, they also started to influence the FIRE sectors, as well as other key sectors such as health care and education, as they do today.

Boston’s future looked grim until the 1960s, under the combined leadership of Mayor Collins and Ed Logue, moved the idea of a “New Boston” toward becoming a reality. The West End demolition, completed in 1958, awakened new public interest in the mechanisms of urban planning. Collins and Logue, mindful both public perception and legal complexities the city faced, coordinated federal funds to launch a “$90 Million program” for Boston securing federal funds for the development of Prudential Center and outlining a list of other major redevelopment projects. Although the city was beginning a new phase, the late 1960s and 1970s were contentious times in Boston, marked by busing riots (1974)
and rising urban crime rates rising. Boston continued to lose population from 1970-1980, even while this transition was already underway. Data from Boston in the 1970s cited in a Brookings Institute Report (published in 1982) determined that “Boston and its SMSA were in the most disadvantaged third of all metropolitan areas on twenty-two of twenty-five individual indicators of urban life.” (Bluestone and Stevenson, 2000, 3). Yet, by the time the report was published both the regional economy and demographic indicators were changing rapidly. Companies such as EMC and Data General located along the 128 corridor emerged as major employers and some of the most technically advanced in the world. By the early 1970s, people started to return to the city to live – first a trend of the well to do, either bored or inconvenienced or both by life in the suburbs.

The “Massachusetts Miracle,” describes the transformation that took place from 1975 to 1986 in the Boston Metropolitan area. The state unemployment rate went from 12% to 3% as it transformed from an industrial economy to a “post industrial” economy. Notably, Black family income rose 40%, the fastest of any urban Black population in the country and a testimony to a more broad based resurgence (Bluestone and Stevenson, 2000,5). As the nature of work began to change, it once again became both more convenient and more important to be in the city center. Boston’s financial district saw new office towers developed by banks, as well as the continued transformation of its urban waterfront. Rowes Wharf was transformed from an obsolete port to an attractive mixed-used development. Project such as these greatly enhanced (and for some conceive with) the decade long Boston Harbor cleanup and the massive investment in the Central Artery / Tunnel, which returned downtown Boston to a more cohesive and walkable urban core.

21st Century
At the end of the 20th century, another type of innovation emerged, albeit rooted in the venture capital-backed enterprises that emerged following World War II. The first “dot-com” boom occurred from roughly 1991-2001, with much slowdown due to the economy uncertainty brought about by the events of September 11, 2001. The period saw extensive growth of venture capital firms and the growth in the number of dollars invested in an increasingly wide range of startups, with many tending to self-classify as “internet companies.” While the area around Kendall Square had been transitioning for some time from an industrial landscape to one focused on research and design and hosting corporate headquarters, it was in this period that Kendall Square began to displace Route 128 as the place most synonymous with “tech” entrepreneurship. The concept of “tech transfer” from university research /
knowledge spillover potential of research universities (MIT in particular) took on a new emphasis. Tech transfer broadened and was no longer only about transferring highly complex ideas from the lab to the street, but also those born out of college dorm rooms. Hackers and nerds were newly glorified. The amount of capital invested at this time far surpassed any previous point in history and, even though venture capital deals have grown larger, the total capital invested in 2014 was only a fraction of the amount investment in the 2000-2001 period.

At the start of the 21st century, Lawrence Kennedy, wrote of the role of the Boston waterfront:
“Improved public access to the city’s historic harbor also makes good business sense in attracting tourists and conventions.” Kennedy in (Whitehill, 2000, 295). This perspective misses some key points, that the rehabilitation of the maritime waterfront remains a place in which people can productive, even if the present day productivity of Boston is more closely linked to the offices and counting rooms of its warehouses than to its wharves or ropewalks. Not long after this assessment was made, the launch of Facebook by Harvard students in 2004 marked another phase of robust startup activity, and this time into wholly new activities, such as social media, that defy traditional industry classification. New technology has played an important role in the continued development of Boston and Cambridge as a center for health care, with emergent biotech industries leading to much development in both in Boston and Cambridge. The development of Massachusetts General Hospital over the course of the 20th century (still Boston’s largest employer), along with other medical and medical research institutions has been integral to this, sustaining Boston’s place as a global leader in a rapidly transforming health care industry.

Today the Port of Boston is small in comparison to later ports (such as the Port of Newark, Long Beach) and distributed across multiple locations in the harbor in an almost organic fashion, reflecting its pre-industrial development. Along the South Boston Waterfront, Fish Pier is still in active use as a wholesale distribution point for seafood. Others, such as Fan Pier, remain only as a legacy. The footprint of the federal courthouse building that now occupies the site maintains the fan shaped form. While the rail lines have been removed, some elements of wharf infrastructure remain, as do several blocks of finely built warehouse, manufacturing and office buildings constructed by the Boston Wharf Company (1882 and 1929) in what is today know as the Fort Point Channel Historic District or simple, “Fort Point.” The 55-acre district, which includes 87 historic loft structures, was listed on the National Register of Historic Places in 2004 and is currently undergoing significant adaptive reuse. It serves as an anchor for new
development now underway on surrounding land that once functioned as rail yards and storage areas. The planning and execution of site redevelopment has taken place incrementally since the 1970s, first organically with the arrival of an artists’ community, who began to make use of many of the empty loft buildings. This led to the development of artists’ live workspaces and the coalescing of a community who formed the Fort Point Neighborhood Association. An important arrival to the district was in 1979, when the Boston Children’s Museum moved into a former wool warehouse that provided them more space and greater accessibility than their previous site in the Jamaica Plain neighborhood. The museum has played a key role in activating the district, bringing visitors with young children to the area, thereby demonstrating the versatility and the sociability of the urban landscape.

The regeneration of this 1000-acre urban industrial site, identified by the city of Boston as the largest undeveloped urban site on the Eastern Seaboard, has the potential to define the city in the 21st century. The central zone of the site is under the ownership of MassPort and serves a number of key transit-related functions developed during the Central Artery/Tunnel project, including the Ted Williams Tunnel connecting downtown Boston with East Boston and Logan Airport, and the Silver Line bus-rapid transit system. These infrastructure improvements have no doubt been critical in developing access to the site. In the early 1999, the Boston Redevelopment Authority, working with Cooper, Robertson & Partners, developed a public realm plan covering the entire zone. By this time, land had been purchased by a number of developers keen on undertaking large-scale development projects on the site. In 2004, the first phase Boston Convention and Exhibition Center opened. The 516,000 square foot facility was built at a cost of $850 million. This community at Fort Point, who saw themselves as stewards, also became involved in the interpretation of the area and a number of planning efforts. The mixed-use Channel Center development, completed in 2004, combines new construction plus adaptive use of an industrial warehouse building, was one of the first projects to receive special funding from the Boston Redevelopment Authority to include live-work units for artists. The Institute for Contemporary Art relocated to the waterfront in 2006 to a new building by architecture firm, Diller Scofidio + Renfro. A new precedent for high quality development was set by the FP3 project completed in 2009, also combining adaptive use and new construction.

Many of the large redevelopment plans for the South Boston Waterfront created by private developers in the late 1990s and early 2000s for individual focused on “luxury” concepts for primarily residential and commercial waterfront development. This prompted the Boston community to voice several
concerns: the developments would limit access to the waterfront; the emphasis on luxury would result in missing an opportunity to increase supply of affordable housing; and the “luxury” concept would result in uninteresting placemaking, and erase evidence (and use) of the working waterfront, generating a tepid enclave like the Canary Wharf development in London. Large scale projects that were completed include the 504,000 square foot World Trade Center East (2000) and the 586,000 square foot World Trade Center West, developed by the Drew Company and Fidelity Investments, primarily as commercial office space, as well as the 426-room Seaport Hotel. The Drew Company and Fidelity also redeveloped the historic Commonwealth Pier as the World Trade Center, with 830,000 square feet of office and meeting space. Other projects stalled because of the economic downtown that began in 2008.

The Boston real estate economy began to recover by 2010, at which time a number of major technology companies began relocating from locations in urban periphery to more central locations. At the same time, Boston declared the South Boston Waterfront to be the “Boston Innovation District” (discussed in Chapter Four). New biotechnology companies arrived to Cambridge, specifically area in and around Kendall Square, but also to the South Boston Waterfront. Many venture capital firms that used to be located along route 128 have relocated to Cambridge or Boston. Concurrently, many areas along Route 128 and 495 are also experiencing a net growth in jobs, (also resulting in further traffic congestion). A generally robust economy has unleashed more demand for space, contributing to both new construction and adaptive use. New ventures devoted to consumer technology, included wearable and/or smart devices are newly devoted to integration of hardware and software concepts, some of which are based in the very center of Boston and Cambridge.

Boston’s current population is now at approximately 80% of its peak in 1950, but it, like Amsterdam, has demonstrated that urban recovery is possible and is much dependent upon an urban core that is conducive to living, working and recreating. The tensions that can and do arise in an urban environment – whether between public and private sectors, or long time residents and new arrivals – must be diligently managed – on top of the constant management that the infrastructure of a maritime city requires. When attended to, the payoffs in terms of quality of life, productive capacity, and collective identity are numerous.

34 “Shifting center; Venture capital firms that moved to Boston and Cambridge from the suburbs.” December 21, 2012, Boston Globe.
3.3 Contemporary Conditions in the Three Case Cities

Capital city status in the preindustrial era
Each is a maritime city that was, for a period in time, a capital city (The Republic of Venice, c.697-1797; Dutch Republic, 1581-1795) or a politically powerful city (Boston, 1630-to the present) from which the control of a vast trading or colonial empire was maintained, marked by a high degree of wealth accumulation and significant financial investment in urban development and infrastructure, through public, private and institutional spending. These legacies have contributed to a strong sense of civic identity in all three cities and resulted in some parallel institutional development and institutional innovation – finance, record keeping, education, communication, environmental conservation, and water management. The histories of these three cities are, however, complex, particularly when addressing events such as the role each played in institution of slavery, and in the case of Venice and Amsterdam, colonialization. This should be kept in mind when discussing the wealth that has been accumulated, even if it has been invested in high quality urban fabric and infrastructure, as well as institutions that have brought enormous benefit to subsequent generations.

Population and geographic area
Amsterdam and Boston/Cambridge are comparable both in contemporary urban population (roughly 800,000) and geographic size, while Venice’s population is much smaller (roughly 60,000 in the historic city center, and totaling 230,000, including the mainland areas and other islands of the Comune) (see Table 1). In Venice, the historic city center’s unique setting within the lagoon (only connected to the mainland by causeway in the 19th century) results in a relationship between the city center and noncontiguous mainland centers of Mestre and Marghera, along with other “suburbs,” former province areas now forming part of the Venice Metropolitan City (as of 2014). It retains some characteristics of a monocentric city, but it is also useful to think of it as a polycentric urban environment. Given Venice’s relatively smaller size compared to the other two cities, it may not be reasonable to expect the same scale of programmatic infrastructure or allocation of resources to certain initiatives, such as specialized industry organizations found in the other two cities (see fig. 18).

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35 I include Cambridge as part of the Boston case for two reasons: first, it is part of Boston’s historic waterfront (altered by the Charles River Dam); second it allows for engagement with extensive analysis of contributing conditions to cluster formation associated with Kendall Square, for which proximity to universities has been greatly emphasized. As such, it will be useful to compare firm emergence here with those emerging in other parts of Boston, and the South Boston Waterfront in particular.
Figure 18. Center cities at comparable scale: 1”= approximately 4.5 miles. Venice, Amsterdam and Boston. Source: Maps by author based upon Google Maps.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Venice</th>
<th>Amsterdam</th>
<th>Boston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (City)</td>
<td>270,660</td>
<td>813,562</td>
<td>645,966</td>
</tr>
<tr>
<td>Historic center (est.)</td>
<td>60,000</td>
<td>60,000</td>
<td>n/a</td>
</tr>
<tr>
<td>Population (Province or Urban)</td>
<td>847,983</td>
<td>2,200,000</td>
<td>4,590,000</td>
</tr>
<tr>
<td>Gross Area, City (square miles)</td>
<td>160</td>
<td>84</td>
<td>90</td>
</tr>
<tr>
<td>Gross Area, Metro/Province (square miles)</td>
<td>952</td>
<td>700</td>
<td>1,770</td>
</tr>
<tr>
<td>GDP (PPP) (millions)</td>
<td>25,611</td>
<td>92,400²</td>
<td>336,232³</td>
</tr>
<tr>
<td>Labor force</td>
<td>388,240</td>
<td>499,530⁴</td>
<td>2,721,153⁵</td>
</tr>
<tr>
<td>Employed</td>
<td>354,051</td>
<td>482,638</td>
<td>2,599,000</td>
</tr>
<tr>
<td>Job Seekers</td>
<td>34,189</td>
<td>17,484</td>
<td>122,153</td>
</tr>
<tr>
<td>Unemployment</td>
<td>8.81%</td>
<td>3.5%</td>
<td>4.7%</td>
</tr>
<tr>
<td>% of jobs held in top three employment sectors (as defined by locality)</td>
<td>Services: 72%</td>
<td>Consultancy and research: 17.3%</td>
<td>Health care: 18.6%</td>
</tr>
<tr>
<td></td>
<td>Industry: 18.3%</td>
<td>Finance and Insurance: 17.3%</td>
<td>Prof, Sci, Tech Services: 11.5%</td>
</tr>
<tr>
<td></td>
<td>Construction: 6.3%</td>
<td>Health Services and Welfare: 13.7%</td>
<td>Government: 11.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade: 11.6%</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
(1) With exception of city population and area statistics, reporting for Venice is at the Province level. The Province includes Venice, Padua and Treviso.
Venice data: based on 2010 (available as of 2013); Amsterdam: 2014; Boston (May 2014)
(2) Based upon 2012, with Amsterdam as 12% of the 2013 Netherlands GDP at 770.07
(3) GDP for the Boston Metropolitan Area, 2013
(4) Amsterdam labor as at the city level, 2011
(5) Boston labor and unemployment is reported at the Boston area (US Bureau of Labor Statistics)
Sources: Venice Chamber of Commerce (Province of Venice), ISTAT, Amsterdam O+S, lamsterdam.com website, Amsterdam Economic Board website, Amsterdam In Business: “Amsterdam ICT market” (c.2012), Boston Redevelopment Authority, Boston Indicators Report 2012
The role of tourism as an economic sector

Over the last fifty years, each has developed a tourist industry (at a much larger scale than historic rates of visitation) and is faced with deciding how best to manage the associated problems and opportunities that this industry engenders, including, for instance, the impact of tourism activity on affordable housing. For the year 2008, COSES estimated that the Venice city center received 16.5 million tourists, of which 12.5 million were visiting just for the day (Da Mosto, 2009, 31). It is also an important issue for Amsterdam and Boston/Cambridge. In 2012, Amsterdam recorded 10.6 million bed nights (Amsterdam O+S “Tourism sector in Amsterdam continues to grow.”) As of February 2014, Boston reported 12 million annual visitors. 36

Port activity

Table 2 summarizes the contemporary port activity for the three cities. In all cases, petroleum products, including liquefied natural gas represent a substantial portion of the inward tonnage. Note the substantial difference in the reported number of cruise passengers among the three cities.

Table 2

<table>
<thead>
<tr>
<th>Port Activity in Venice, Amsterdam and Boston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seagoing Vessels arrived</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Port of Venice (2013)</td>
</tr>
<tr>
<td>Port of Amsterdam (2012)</td>
</tr>
<tr>
<td>Port of Boston (2013)</td>
</tr>
</tbody>
</table>

Notes:
(1) Each city reports activity for multiple port sites under the management of the port authority.
(2) For this number, the Port of Venice reports that “of which cruise passengers” = 1,841,477
(3) Includes container ships, auto vessels and cruise vessels, but not bulk cargo, which is a substantial number. (Bulk cargo is reported by metric ton.)

Sources: Venice Port Authority, The Port of Amsterdam, The Port of Boston

Heritage Management Policy

Venice, Amsterdam and Boston/Cambridge have developed as a remarkably historically diverse urban environment. Each maintains large districts of pre-modern buildings associated with maritime trade and shipping activities, as well as boatbuilding and boat maintenance. Each maintains some contemporary industrial uses of the urban waterfront but is undertaking, or plans to undertake future redevelopment. Each has established regulations to protect historic cultural patrimony, shaping (and sometimes limiting) adaptive use of historic buildings. In Venice, in addition to the Office of Territorial Development, the Superintendent of Monuments, the IUAV (architecture university) and a number of International Private Committees through UNESCO play key roles in heritage management. In Amsterdam, the Bureau of Monuments and Archaeology (together with the Office of City Planning), the Aesthetic and Monuments Commission and various civic organizations hold the primary responsibility. In Boston, the City of Boston Preservation Office (through the Boston Redevelopment Authority), together with the National Park Service, the Boston Preservation Alliance and other civic organizations represent the major parties. Venice and its Lagoon were inscribed on the UNESCO World Heritage List in 1987 under criteria for cultural and natural heritage. The city center of Amsterdam, within the 17th century canal ring, was inscribed on the UNESCO World Heritage List as a cultural heritage site in 2010. No historic sites in Boston have to date been inscribed, not for lack of significance but for lack of application.37

Major investments in flood and water management

Each city is a highly man-made environment, shaped over time and offering a different story of dynamic management of water and city. In the 20th and 21st centuries, expensive, regional scaled environmental management strategies have been required to ensure the viability of each of these cities. A defining factor of these cities has been willingness to invest in infrastructure over time, both as mentioned to maintain competitiveness of port but also for larger, more comprehensive (environmental) reasons. This has meant significant improvements on land and to the water system. Major investments with national (or European Union) funds are shown in Table 3. These are the most recent interventions in each city’s long history of environmental management efforts.

37 The United States has played an on again off again role in UNESCO World Heritage Convention. Site nominations have been limited due to the need for consent of participation by private landowners (even though inscription is non-binding and has no impact on ownership rights) as well as other political reasons. US sites that have been inscribed tend to be on public lands (Grand Canyon National Park). In 2013, the San Antonio Missions were nominated. This is changing. In 2015, multiple buildings designed by Frank Lloyd Wright were nominated.
Table 3

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Reported Cost (US $)</th>
<th>Dates / Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venice MOSE Project</td>
<td>$9.4 billion</td>
<td>1987-2016 (est.) / Ongoing</td>
</tr>
<tr>
<td>Amsterdam Netherlands Zuiderzee Works*</td>
<td>$945,000 million</td>
<td>1920 - 1975</td>
</tr>
<tr>
<td>Amsterdam Netherlands Delta Works*</td>
<td>$7 billion</td>
<td>1950 - 1997</td>
</tr>
<tr>
<td>Boston Boston Harbor Clean Up</td>
<td>$3.9 billion</td>
<td>1985 - 2000</td>
</tr>
<tr>
<td>Boston Central Artery/Tunnel “Big Dig”</td>
<td>$14.6 billion</td>
<td>1982 - 2007</td>
</tr>
</tbody>
</table>

Source: Various

* Note: national-level projects, but included as they specifically implicated Amsterdam.

Climate Change adaptation planning

The effects of future storm surge activity and sea level fluctuations, as well as other conditions directly associated with climate change, may be particularly disruptive to these cities if not addressed. In January 2014, Governor Deval Patrick unveiled a $50 million plan on climate change for the State of Massachusetts. (The Boston Globe, January 14, 2014)38 This is a minor amount compared to what is likely required for thorough research, as evidenced by the costs incurred as a result of record snowfall (resulting in a mass economic loss to the state) during the 2014-2015 winter season.

Tracking Startups, Venture Capital Investment, ICT and CI Sector Development

In each of the three cities, approaches for counting and classifying new form formation or “startups” vary, based upon the intentions of collecting entities, such as public agency statistics offices or private sector industry organizations. This makes precise comparisons difficult. Generally speaking, the amount of entrepreneurial activity (based on new firm starts of all kinds) currently observable in Boston/Cambridge and Amsterdam is far greater than Venice, even when normalizing for overall population or working age population. Further, Boston/Cambridge supports more individual venture capital firms and its startups attract more venture capital; venture capital investment is also tracked by multiple sources.39 Investment by venture capitalists is often contingent upon pre-existing social relationships formed in local proximity to where venture capitalists are based. Venture capitalists reply upon their own social/professional networks, which often also display local preferences (Castilla, 2003).

39 This includes, among others, the National Venture Capital Association, the New England Venture Capital Association, the Kauffman Foundation, the Boston Globe and the websites Crunchbase and BostInno.
So while venture capital is theoretically fluid and sometimes venture capitalists do actively seek out talent in under acknowledged markets, there is compelling evidence for cities to be attentive to the idea of supporting venture capital, as a component of the infrastructure necessary for promoting entrepreneurial activity.

From 2008 to 2013, the growth rate for firm starts in Amsterdam has increased significantly and new venture capital firms have arrived to the city. While Venice has supported fewer firm starts in the same time period, some emergence is still evident. Additionally, (as described in chapter three) new resources have been dedicated to tracking startup development. This makes the firms currently found in Venice all the more important to understand. In many regards, these have not had the level of broad public, private and institutional support from which firms in Amsterdam and Boston/Cambridge have benefitted. Amsterdam hosts a growing number of active entrepreneurs (especially SMEs but recently some fast growing IDEs have emerged) as well as the European headquarters for a large number of multi-national companies. Tom-Tom, which provides navigation software and devices, was the last company founded in Amsterdam (in 1991) to reach a multi-billion dollar market value. It now employees 4,000 people globally. Seventeen Dutch companies are listed on the Deloitte 2014 Technology Fast 500, ranking growth of companies in Europe, the Middle East and Africa, with Improve Digital, the highest Amsterdam-based company, landing 21st on the list. Of the seven Dutch companies listed on the FT 2014 Global 500, the only in the “tech hardware & equipment” sector is ASML Holding, which was founded in Eindhoven in 1984. (Phillips Electronics, founded in 1891 in Eindhoven and now a diversified company also makes the list.) While market value and growth rankings are not the only useful metrics for measuring company growth, these do suggest the need to focus on helping companies who intend to be IDEs reach the next levels of development. Eindhoven continues to be better known for the development of new technology than Amsterdam, while Amsterdam is perhaps better known for insurance and banking, health care and the creative industries. Concerted efforts are being made to further develop applied technology capabilities in Amsterdam at the Amsterdam Science Park (described in Chapter four). That it is possible to see new industries emerging that rely upon expertise that cuts across “silos” — suggests that specialization is important, but so is interaction among these individual areas of knowledge.
ICT and the Creative Industries

Available data and reporting about ICT and CI sectors vary widely for each of the cities for the period under study. In each case, methodological approaches for identifying ICT and CI enterprises and the scale of the workforce varies, particularly in relationship to the scale at which data has been aggregated; no study has yet undertaken comparative analysis of these localities at the metropolitan area scale or smaller; most analysis continue to focus on the city-region scale. Still, findings from broader and more general studies provide some context for my research. The statistics below provide an indication of activity at or near the year 2009, representing the start of the time period with which this research is most concerned.

Global / OECD

In the ranking of the 27 OECD member countries, the Netherlands ranks 6th in shares of ICT employment in business sector employment, the U.S. ranks 15th and Italy ranks 17th. The report points out, “the United States accounted for more than 30% of total OECD ICT sector employment in 2009, by far the largest share, followed by Japan (16%) and Germany (9%)” (OECD, 2012, 9).

Europe

In the ranking of Europe’s top regions for creative and cultural industries employment clusters, the West-Nederland (Amsterdam) region ranks 4th overall in 2009 and was reported to employ 195,646 people in the creative and cultural industries employment cluster. The Veneto (Venice) region was reported to include 63,024 total jobs in the creative and cultural industries, ranking the region 23rd. For the Venice region, this represents a lower than average share of employment compared to other regions (Power and Nielsen, 2010, 5).

By Region, Metropolitan Area or City

In 2010, enterprises in the creative and cultural industries numbered 1,899 in the City of Venice, 3,364 in the Comune of Venice, and 9,678 in the Province of Venice. The total number of enterprises in the province was 29,206 (Sistema, 2010, 17).

In 2008, the Amsterdam Metropolitan labor force consisted 432,338 active workers, with 41,887 in ICT, or 9.7% of total employment. 34,482 jobs, or 7% of the employment in the municipality in the Amsterdam is in the creative industry. There were 64,015 total businesses enterprises and the number
of startups in the creative sector was reported to have increased by 64% from 2007 to 2008 (OECD, 2009, 66-67).

For Boston and Cambridge, estimating from 2006 Dun & Bradstreet data, Randy Cohen identified 13,777 “arts-related” businesses and 73,003 employees based upon Boston Metropolitan Area data (Markusen, 2008, 33). Lazonick and Quimby found that in 2003, high-tech employment in ICT represented 1.51% of the Massachusetts labor force, compared with 1.07% of the U.S. labor force. They noted that, at that time, approximately three-quarters of Massachusetts ICT employees worked in the Route 128 “high-tech district,” a condition that has since changed as some ICT jobs have been relocated to countries with cheaper labor costs (outsourcing) and others have been lost to firms in other regions, Silicon Valley and Central Texas in particular (Juravich, 2007, 102).

3.4 Conclusions: Challenges to Resilience and Opportunities for Regeneration

Can Venice be compared with Amsterdam and Boston? The answer is both yes and no. Venice is much smaller in population than the other cities to which it is being compared, yet there is no evidence to suggest there is a particular “population minimum” required for an entrepreneurial ecosystem to develop and thrive; rather research on this subject concludes that having key actors and key conditions, organized in relationship to each other, is more critical (Reynolds, 2008; Katz, 2013). In fact, from a networking standpoint, there may be benefits to interacting socially in a smaller group. The challenge more acutely centers on capacity. While Venice’s population decline could be definitely tied to relocation in the 1950s, today an aging population, a declining birth rate, and fewer people moving to the city, mean fewer people to be part of, or to replace the existing workforce. The combination of factors identified as contributing – the high cost of housing (and housing maintenance), limited job opportunities outside the tourist sector, more frequent and more severe acqua alta, inconveniences associated with mass tourism, and a decreasing range of services and amenities – have yet to be resolved. Still, Venice has important conditions that make it interesting to compare to Boston and Cambridge and suggest that it offers opportune conditions for entrepreneur in certain industries. It has numerous museums and important universities, and it serves as an important destination for traveling.

40 One objective of the paper by Markusen (2008) is to compare the variation in results of three different methods for counting participants in the creative industries (based upon establishment data and occupation data) as well as based upon more inclusive and exclusive selection of categories. Note: this data does not include Cambridge.
students. It hosts cultural events on a reoccurring basis that attract people from around the world. Its former capital city status mean it continues to be well networked; it also has industrial areas former industrial areas ripe for redevelopment and a proven ability to attract major state investment. The historic city center’s fundamental structure as a group of islands in the middle of the Venetian lagoon connected by a causeway to a mainland, rather than a city center connected directly to land shaped by later periods of developed, means that its development patterns are fundamentally different than Amsterdam and Boston/Cambridge. All three cities, however, face their own challenges in conceptualizing the relationship between development on one side of a water body and the other (or more accurately, in conceptualizing how all development around a water body can work to complement all other development). This is an extremely common planning challenge for maritime cities, as well as other cities located on rivers or lakes.

Historic maritime cities share many interesting conditions that challenge their ongoing existence while also providing distinct economic opportunities. Maritime culture persists in the knowledge, identity and form of cities. Though the presence of the relationship with the sea varies by space, activity and individual, it continues to be a powerful force in the shaping of these places. The economic history of these cities reveals that they have frequently achieved innovation through re-invention, displaying a willingness to respond to new opportunities, especially when global economic events have dramatically eroded their strategic position within an industry. This does not negate the economic value of legacy industries, rather just the opposite. Encouraging new variants of activity to locate where ready sources of knowledge and people with acute expertise are already assembled may be a way to unlock latent economic potential and to carry forward knowledge (and the workforce) from traditional industries into new endeavors. Linking real estate and economic development initiatives effectively has long been critical to promoting entrepreneurship in these cities.

As I will investigate in the next chapter, all three cities offer contemporary examples of the need to carefully consider when objectives for developing entrepreneurship and innovation and objectives for real estate development align in a logical way and when they do not. It is quite possible that goals will be in sync, but it is also important that the concept of innovation not be applied merely for the purpose of project promotion, or to access special funds. Physical development shapes, on many levels, a city’s reputation as an innovator.
Chapter 4: Analysis of Current Initiatives to Promote Entrepreneurship and Innovation

4.1 Diversity in Approaches to Promote Entrepreneurship and Innovation

As discussed in Chapter Three, these historic maritime cities not only have a long history of entrepreneurship and innovation emerging from their mercantile roots, but in tandem, have produced innovation in governance, finance, art, education, environmental management and other scientific and technical disciplines. This suggests that entrepreneurial and innovative thinking is without boundaries, and that innovation in one discipline may lead to, or facilitate, innovation in other areas. Further, these cities present a paradox: the land area of each is or has historically been physically constrained by water, resulting in the emergence of physically dense urban places (with a tolerance tested by population gain and loss over centuries). Citizens have needed to be innovative in planning and management of local conditions, as well as in the ability to forge a livelihood that is not reliant upon an abundance of immediately available physical resources, which has often meant turning to intangible modes of production, and/or looking globally for new opportunities. Innovation, in myriad forms, has been necessary just for these cities to survive, let alone thrive.

Within the last twenty years, each has created a specific set of policies intended to promote innovation and the generation of new creative and knowledge industries. In each city, new activity is emerging both with and without the direct assistance of economic development programs. Looking across cities reveals how real estate development can drive economic development in some places (by creating specific types of sites to support entrepreneurship and innovation), and when in fact real estate development (privately or publically funded) may drive site development in ways that are not helpful to supporting entrepreneurs and innovators, particularly the kind that are the focus of this study. In this chapter, for each city, I describe a selection of eight emblematic projects, including how they make use of specific places, and/or have a particular relationship with age-diverse urban fabric. Maps for each city, showing the locations of sites discussed, can be found in Appendix One. I conclude this chapter with a summary matrix (see Table X, page X) indicating how projects in all three cities compare by type, and I outline critical point that can be made by looking across the cases. First, a few definitions of location types are offered in preface to the discussion:
Key definitions

A science park or research park is usually a master planned site conceived with the idea of hosting a number of research and science related activities, often including the participation of multiple companies and/or university partners or other non-governmental organizations. The development of such sites is usually driven by real estate development objectives as well as the space and facility needs of users. They are often conceived as large scale, phased development of new construction with the intention that initial development will drive up the value of adjacent land that can be garnered in subsequent phases of development. Because of the scale of such projects, they have frequently occurred as greenfield development, on previously undeveloped sites. Sometimes a real estate developer serves as a primary owner and financier of such sites, but often, in part due to the magnitude of such projects, multiple parties undertake them jointly. This may pave the way for access to public funding either for site development and/or for research projects undertaken. Science parks often draw from university campus architecture and urban design concepts with the intention to promote ideas of collegiality and synergy. They often include iconic elements (sometimes entire buildings) representing ideas of science and technology. Many sites, particularly those first developed in the 1950s, were designed to be efficient for automobile-based access and circulation, and only secondarily for pedestrian scale activity. Further, they are frequently designed with the idea of supporting proprietary research; as such the physical framework of these places often promotes secrecy and ensures security. Depending upon the nature of research and work undertaken, some tenants may require new, custom highly technical laboratory or manufacturing space with specific security requirements, sometimes legally mandated.

An incubator is a space and program usually developed and operated by a public entity to promote economic development. Sometimes they are also co-funded by industry associations in the private sector. Incubators usually provide space for a number of companies at a time, with the idea of promoting synergy and community among them. There may be a predetermined length of time that a company can reside in the incubator. Entrepreneurs usually make an application to the incubator and often must be a new business. Terms often include below market rate and access to common services (administrative, printing, etc.).

The following serves as a useful definition of an innovation district:
“Innovation districts” are economic development tools that utilize partnerships with higher education institutions, business, and government to fuel job growth and redevelopment in targeted locations. Innovation districts are based on the premise that collaboration and productivity result from proximity, and therefore job creation and innovation can be fostered through the intentional clustering of businesses, institutions, ideas and people (Sharma, 2012, 3).

In most cases, innovation districts have discrete physical implications, either in the form of a district boundary or by the declaration of a network of distributed physical sites identified as participating in the “district.” Similar to the development of research parks, the goals behind the creation of innovation districts include not only economic development and promoting innovation, but also direct objectives for raising the value of real estate and catalyzing further development.

An accelerator is similar to an incubator, but usually funded by venture capital investors in the private sector who play more explicit roles in the development of participating new companies (startups). Similarly, candidates usually apply or pitch to be selected. Usually terms offer space for a set amount of time, services, mentoring and seed funding in exchange for an equity position (7-10%) in the company being developed. There are an increasing variety of accelerator strategies being developed.

Coworking is a catchall term to describe managed workspace that provides shared workspaces and programmatic amenities (and usually also the option for private workspace) to individuals or companies. Lease and/or membership terms are much more flexible than traditional commercial leases; many offer month-to-month leasing options. The locational benefits, architecture and amenity profiles of coworking spaces vary greatly, from the bare minimum to high-end, all-inclusive servicing. Similar to incubators and accelerators, coworking services providers often promote the communities they foster (sometimes emphasizing sector specialization) and the networking opportunities that results from them. Many also provide or coordinate optional social/learning programs, such as happy hour sessions. Some coworking service providers also proffer services and learning opportunities to entrepreneurs, as well as membership in virtual social networks that they manage. Many coworking service providers have locations in multiple cities are offer multi-city memberships. Because of the opportunity to provide membership services in a way that does not reserve set square footage, as well as the opportunity to charge for add-on services, well run coworking locations can make more on a dollar per square foot.
basis from real estate than traditional square-footage based leases. Although usually "membership" based, the potential market for coworking space is usually much broader than incubators or accelerators. It may include entrepreneurs, as well as companies, freelancers and others looking to have access to well run locations, and who often appreciate the availability of services and possibility to make short term commitments. Flexibility in terms also allows service providers to charge higher rates.

Myriad different coworking cultures are emerging. Some are more corporate in nature; some feel like summer camp.

4.2 Venice: Initiatives to Promote Entrepreneurship and Innovation

Figure 19. Map produced by the city of Venice showing locations of projects included in the Venice District for Innovation. Project compilation based upon web site content. Source: Comune di Venezia website.

1) Venice District for Innovation and 2) the Consorzio Incubatori

Location: distributed, with incubator sites on the island of Giudecca
When Mayor Massimo Cacciari first came into office in 1993, Special Laws passed by the Italian government had already put forth funding for the MOSE project. Italy was also anticipating the jubilee of the Catholic Church in the year 2000, and a massive amount of funding was allocated to restoration of religious sites in anticipation of attracting Christian pilgrims and tourists. The imposition of aggressive environmental regulations in Europe also placed new limitations on the chemical industry in the port of Marghera, essentially forecasting its demise, adding an additional imperative for new economic strategy for the city. With the arrival of the personal computer and the Internet, the idea of an economy based on immaterial production no longer seemed far-fetched. In this context, Venice was able to obtain European Funds and other forms of public funds for a number of new initiatives. These initiatives included the creation of a Center of Intellectual Property, Restoration Knowledge, and the marketing of the Venice District for Innovation, which included the Venice Cube / Consorzio Incubatori, a program of business incubators established at three sites within rehabilitated historic buildings on the island of Giudecca, just south of the Dorsoduro neighborhood in Venice (see fig. 19). The Venice District for Innovation was more a marketing strategy of a number of existing projects than a strategic vision for innovation.

Because projects were so distributed across space, the program essentially designated the entire area of Venice as the district for innovation. Perhaps marketing would have been more effective if this had been said directly and engaged people to discuss the idea. Implemented from the top down, not much support was garnered to sustain the innovation district concept. None of the three universities (Ca’Foscari, Istituto dell’Architettura di Venezia, IUAV or the Venice International University) based in Venice were formally named as partnering institutions in the Venice District for Innovation.

The specific sites utilized as incubators include the Ex-CNOMV (Cantieri Navali ed Officine Mechcaniche di Venezia), part of a complex of formal naval offices; the incubator it hosted was named the “Ex-CNOMV.” The Ex-Herion Incubator occupies the deconsecrated church of SS. Cosma and Damiano (part of a former textile factory known as “the Herion”) and also includes another building and three level building connected by a courtyard. Adjacent to the Ex-Herion incubator is the site the former 15th century Benedictine convent, which abutted the church. It was rehabilitated as an incubator for artists, along with arts-related functions and apartments. The total cost of the business incubators projects was roughly 13.8 million euros ($18 million), with approximately 65% funded by the European Union and
35% of the funding coming from the Special Law for Venice (national funds). The project generated 58 workspaces along with shared facilities: a computer lab, a conference hall, and meeting rooms.

Figure 20. The “Ex-Herion” Incubator in the deconsecrated church of SS. Cosma and Damiano. Opaque walls and minimal signage make it difficult to “read” interior activity from the exterior. Photo by author.

The business incubators have operated with some success, but initial problems from the outset have also not yet been overcome. The two sites that were redeveloped (there were originally more in the works) are both in robust buildings, structurally suitable for this type of intervention, but closed to the public space in front of them. The design solutions for the ex-Herion incubator demonstrate that it is possible to adapt 15th century architectural fabric to 21st century needs, but whether this represents a strategic use of funds is debatable (see fig. 20). The project unites two potentially disparate objectives: restoration of a monument building (already transformed by previous uses) and the creation of an incubator space. In this case, there is really no physical or programmatic conflict, other than the fact
that the complex is closed off to its surrounding neighborhood – a condition that could be dealt with by the introducing some transparency or even simply by leaving the doors open. It is possible, however, to criticize the fact that the architectural program – the allocation of space – is rigid, with each occupant allocated a distinct, fixed space. As such, the incubators were set up more as low cost workspaces than as interactive and flexible work environments. The more challenging issue, however, is that the end results are rather costly incubator projects, especially when calculated based upon a potential per worker or per/firm rate. The funds allocated for restoration of the Ex-Heron building were likely restricted to physical building improvements and could not have been allocated for the types of programs (event hosting, training, networking and marketing) that are necessary to operate and sustain incubators. If this were the case, the city of Venice and partners should have anticipated that physical improvements and light marketing alone would not be sufficient to realize a dynamic place of new company incubation. Both physical conditions, together with programmatic strategies are critical; and it is also important that projects be supported by leaders that can advocate for the continued financial and political support of such projects, especially in cases where funding is coming from multiple entities and may come with use stipulations. In this case, the city has been the primary voice and promoter of the projects.

3) VEGA: Venice Gateway for Science and Technology (1999 – 2006; ongoing development)

Location: Port of Marghera

In the same period, funds were also allocated for redevelopment adjacent to the Port of Marghera, in the form of the VEGA complex, a campus of massively-scaled new construction together with the recuperation of some mid-century buildings that abut the south side of the main roadway leading to the historic city center (see fig. 20). Surrounding the site are other light industrial buildings. Closer to the waterfront, a number of chemical port functions persist. Some sites are abandoned and some new low quality office buildings have been introduced but the majority of the site awaits remediation. VEGA is marketed as a “science and technology gateway” to the historic city center of Venice. It was another of the projects listed as composing part of the Venice District for Innovation.

The total site area is 250,000 square meters with development of approximately 153,000 square meters planned to take place over several years. The total value of the planned investment was 200 million Euros, of which an initial 40 million euros were obtained as European funds, administered by the Veneto
Region, and 50 million euros contributed from the private investment company Nova Margera Srl. The site itself has been run by VEGA-Parco Scientifico Technologico di Venezia Scarl, composed of 34 partners including "local authorities, two banks and several large industrial groups." The complex includes office space along with a central restaurant and support space, and the business incubator program. The Region of the Veneto is an anchor tenant. VEGA was constructed where land was available and where certain interests wanted to see development occur, but as it would turn out, not where companies wanted to be.

Figure 21. The VEGA Science and Technology Gateway. Massively scaled buildings, extensive hardscape and driveways create a hyper-industrial sense of place.

Shortly after I visited VEGA in July, 2013, it was publically announced that the facility was operating at a deficit and the long-time director resigned. Soon after, a tender was released for private management of the incubators, as no more public funds were available for their operation. At the end of 2013, it was announced that city of Venice would suspend applications to the Ex-CNOMV incubator, as well as the Ca

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41 Venice District for Innovation, promotional material, Comune di Venezia, obtained c. 2003.
Emiliani incubator in Marghera. When I visited the ex-Herion site in March, it was operating at about \( \frac{1}{2} \)
to \( \frac{1}{3} \) capacity. The global economic recession of 2008 hit Italy hard, in part due to its dependence upon tourism as a major industry.

There has been a general mismatch from both sides: prior to these projects, Venice at first focused too heavily on attracting existing large software companies rather than cultivating SMEs or more risk-oriented innovation driven enterprises (IDEs). The incubators were created without the intensive programmatic components (networking events, mentoring, interaction with potential funders) that can be observed in other cities. Although the interior space in the incubators was of relatively high quality and rent subsidized, the application process was time intensive and arduous (only new companies were eligible) compared to low barriers for entry in programs developed in other cities. Each incubator is literally walled off from the street. One must gain entry by buzzer, and it is impossible to gain a sense of the activity inside from the street. Two other issues are also critical. To reach the incubators on Giudecca, it is necessary to arrive to Giudecca, a separate island from the historic city center, by boat. This presents a small but additional transit necessity. For these locations to be considered “convenient,” a person working there would ideally live on Giudecca or at least in the historic city center. Here the issue of affordability of housing directly implicates the potential success of such projects.

42 http://www.comune.venezia.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/16334. Accessed August 10, 2014. The Ca’ Emiliani incubator, at the Port of Marghera, was developed with European funds beginning in 2000, but under a different program than the other incubators mentioned here.
4) Telecom Italia Future Centre

Location: Venice city center, San Marco district

This project demonstrates the pros and cons of involvement from a large telecommunications company. The Future Center was created in the 1980s together with a center of economic studies with the idea of studying technological evolution to understand how and what influence it would have on markets trends. The Centre is housed in the monumental 15th century convent adjacent to the Church of San Salvador (see fig. 22). The complex was extensively restored to house the Centre as well as a telephone and Internet service infrastructure for the city center. The location is centrally located in the San Marco sestiere (district), a short walk from the Rialto Bridge. Thousands of tourists each day pass by the complex. The Center is conceived as an international think tank and network of research excellence and currently focuses on the idea of ecosystems, with the objective of finding new opportunities for telecommunications in many contexts. The center was conceived brings together researchers, students, scholars and experts in a wide variety of disciplines – from industry as well as institutions to work in collaboration to “identify, develop and improve models of development.”

The convent is located on one of the oldest developed sites in Venice, purportedly dating to 633. The built has had many lives following its years as a convent. Under Napoleon the complex was transformed for military use, then as a dormitory before being reacquired by the Ministry of War prior to 1994.

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43 Telecom Italia was created in 1994, through the joining of several state-owned telecommunications companies and privatized in 1997.
44 Telecom Italia Future Centre, promotional booklet, undated. (My translation and summary).
to World War I. In 1925 it was acquired and restored by the Società Telefonica delle Venezia, the telephone company of Venice, which eventually became part of Telecom Italia. Following the affiliation of Telecom Italia and the creation of the Future Center program the building was renovated for its current program which also includes the installation of some thematic interpretive elements: a display of old telephones and the installation of computer monitors installed in rows with fixed seats, in a rather formally arranged internet café that was not operational when I visited. Telecom Italia also funded the restoration of the painted ceiling (2011-2012) in the room that now functions as the main convention hall and small booklet was published to explain the technical aspects of this restoration.

The Centre includes a multifunctional program: hosting site for events, conferences dedicated to the topic of ICT as well as other topics, as host of cultural and artistic events and for book launches. Interior courtyards are open to the public (free) and include a multimedia exhibit about telecommunications technology. Promotional literature indicates that it is also possible to arrange for a guided tour of the complex. The two mid-summer days that I visited, however, there were very few people on site. I was fortunate to tour most of the facility with Ottone Grasso, a strategy team member and to speak to a few people who were present. The facility is impressive. While the program outline on paper is equally compelling, there is simply not enough activity present and taking placed on site. Grasso explained that complex was going through a change in program strategy as Telecom Italia decides how to make the best use of the site and what type of committee to an operational program they want to make. Grasso mentioned that a recent partnership had been made with organizers behind the project to digitize the archives of the Venice, but implied that the company was likely open to other partnerships as well.

The promotional booklet I received also mentions a number of partnerships, including with the European research network GÉANT and Internet 2020, it is also affiliated with the Communications Society at IEEE (the Institute of Electrical and Electronics Engineers) and part of the Communications Future Program at MIT. Clearly great effort was made to establish these links (and a research agenda is outlined in the booklet), but there appears to be a disparity between the outline of partnerships and what the center has been able to sustain over time. Here the center offers an important lesson for all would-be complex partnership-based research institutes: they require both sustained energy and sustained funding. It also suggests that some of the formal showpiece intentions of the site may be mismatched with the more casual and pervasive ways telecommunication is now a part of daily life. In

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45 Ibid.
46 Interview and site visit, July 8, 2013.
striving to create something emblematic of the future, it succeeds in conveying a time capsule of ideas from the early days of the Information Age. Restructuring the uses of the site to focus on more local networks – particularly those linked to the thousands of tourists who pass by (most of whom are utilizing Telecom Italia infrastructure without thinking it) Telecom Italia could realize an extraordinary opportunity to study ICT usage in real time. There is also an implicit idea conveyed in the corporate and institutional research oriented character of the site: that innovation moves in one direction, from expert to customer. Utilizing some of the vast complex to house start ups, especially if operated as a vibrant accelerator with “open door” engagement with the public would go a long way in transforming the site into a much more dynamic place, and likely one manifesting the future, in increments, on a daily basis.

5) H-Farm

Location: Quarto d’Artino

At the time of writing, no privately operated startup accelerator program was operating in the historic city center of Venice. There is, however, an important program located on the mainland in Quarto d’Artino, about 25 minutes away from the historic center by car. H-Farm, founded “on the outskirts of Venice” by Riccardo Donadon and Maurizio Rossi in 2005, is one of the most architecturally pleasing and well-programmed startup campuses I have seen (see fig. 23). It runs a number of “in-residence” programs, an affiliated startup school, Digital Accademia and an accelerator, H-Camp, that provides funding to startups. As such it functions as a hybrid model including: a startup education program, a coworking space, a sponsored accelerator and a venture investor. It also runs a program called “H-ack”: an industry topic focused two-day hackathon open to participation by application, which provide a chance for participants, invited business representatives and investors to interface, with the idea that a hackathon winner may be selected to participate in H-Camp. Such events may be sponsored by industry organizations or individual companies. The H-Farm website reports that since its inception, it has also

47 Given how fast ICT changes, anyone attempting to create exhibits or installations conveying “the future,” using current technology at hand, would likely arrive at the same result.
48 The site is used as one site of Telecom Italia’s program to teach senior citizens how to access the Internet, in which home Internet rate plans options are also explained.
50 Terms listed on the website: “+50,000 euro in services, 10% equity stake, up to 15,000K in cash.” This includes living and working space for the three-month period of the program.
opened “offices” in the United States (Seattle), India (Mumbai) and the United Kingdom (London).\footnote{H-Farm also has a long term plan to develop adjacent agricultural real estate that is part of the family estate out of which it was carved.} The website offers some other basis statistics:

\begin{quote}
We are more than 350 young people who believe this dream; We have invested in over 54 initiatives since 2005 and we grow every six months; We are proud of the 7 initiatives that have been successfully completed through H-Farm; We have revived 7 old rural properties located within an area of 18 acres.\footnote{http://www.h-farmventures.com/en/h-camp/. Accessed July 31, 2014.}
\end{quote}

They state on the website: “We firmly believe that the greatest opportunities lie in specialization ... and in being able to focus on those aspects that are distinct of our own territory.” (my emphasis). “We want to hack new and traditional businesses with the help of technology.”\footnote{http://www.h-farmventures.com/en/who-we-are-2/. Accessed July 31, 2014.} The focus areas they list include: 3-D printing, fashion, tourism, food, home automation and design.\footnote{Ibid.} Though admittedly broad, each can logically be associated with contemporary industry and wells of deep knowledge in the Veneto region.

I visited H-Farm in July 2013 for part of a four-day hackathon that involved a number of startups in residence or program participants, as well as regional representatives from the fashion industry, the Fiera di Vicenza and the London-based industry organization called Not Just a Label, founded to promote emerging fashion design talent. (Stefan Siegel, founder of Not Just a Label, spent part of his youth in Venice and was present for the event.) A small group of emerging fashion designers from New York and Shanghai were invited to present a design or business problem for the participants to solve or “hack,” so to speak. The program represents an effort to foster startup activities in a logical way: in an industry for which there is already an acute knowledge base and infrastructure in the Veneto, and a need for new talent if the Italian fashion industry is to maintain a leading global position. The program is commendable. Two other attributes are somewhat troublesome, but not insurmountable: first, because this activity takes place in the idyllic countryside, it functions well as a retreat site but may sequester entrepreneurs in ways that prove problematic. On a day-to-day basis, opportunity for direct feedback is limited, primarily to peers but also to program operators and invited guests. Second, due to its remote location, the fostering of relationships is largely controlled by H-Farm. The potential for...
serendipity -- running into someone while grabbing coffee -- is limited to those already invited into a closed site. I inquired about plans to create satellite locations or to partner with institutions in Venice, such that H-Farm could have a complementary urban presence. My understanding was that this was somewhat in the works, but that no such sites had yet been created. If it were to happen, it would provide a whole other dimension to the program. One can imagine a storefront in Venice – something transparent and permeable – that could serve as a place for entrepreneurs to gain real time feedback – the crowd sourcing of ideas, literally drawing from the crowds.

Figure 23. Left: workspace units for startups at H-Farm in the countryside location of Quarto d’Altino. Right: a commercial space for sale in Venice. Photos by author.

6) Venice Biennale sites

Locations: Gardens of Venice, Arsenale and distributed sites

The Venice Biennale, the biannual international exhibit of contemporary art, continues to be one of the most notable events that take place in the city. This is in part due to the increasing reliance on installation of temporary exhibitions in locations that extend beyond the traditional biennale site at the Venice Gardens in Castello. Additional sites include the Arsenale, as well as various buildings distributed throughout the city, public and private outdoor space, as well as the surface of the lagoon. These distributed exhibitions serve to demonstrate the types of temporary new uses, or re-use of buildings in the historic city center that are now possible (see fig. 24). Visitors are often captivated by the juxtaposition between old and new. Many of these installations are digital in nature, a tradition that dates back at least as far as the work of video artist Bill Viola who exhibited in the 1995 biennale.

55 The Venice Architecture Biennale alternates annually with the art biennale and uses many of the same spaces.
These exhibits bring new ideas and activity into the city without demanding that existing architectural frameworks be permanently altered. Rather, exhibits often intentionally apply new layers of meaning to the sites they occupy. Most artists and curators who install seem to understand the opportunities such sites present. Works often articulate themes related to continuity and transformation of culture. Many sites are operated outside the formal biennale program and are open free to the public (while some require purchase of the multi-site entrance ticket). The biennale event has continued to show Venice’s relevance both as source of inspiration and as host and curator for critical dialogue about contemporary art and culture. The city also plays host to many other cultural events, smaller conferences and education programs (such as study abroad programs) engaged in valuable discourse about culture and in particular, about cities. The economic impact of these events may be more challenging to trace and aggregate, but not impossible. They are, in a sense, already a manifestation of Venice as a location of “intangible production,” as envisioned by Caccari and investigated by others (see Rullani and Michelli, 2001). While not formally utilized as locations for entrepreneurs, some of them are well equipped to play this role.
Figure 25. A northern entrance to the Arsenale with site rehabilitation underway. Photo by author.

7) Arsenale

Location: Castello neighborhood, historic city center

Comprehensive redevelopment planning for the Arsenale has been in process in one form or another for the last few decades. One positive outcome of the Consorzio Venezia Nuova project has been its funding of the partial physical rehabilitation of the Arsenale complex and the use of part of the complex for the administration of project management and research facilities (see fig. 25). In 2012, Venice hosted the America’s Cup race, with the Arsenale as the event headquarters (see fig. 26). This was one of the first times a significant portion of the complex was open to the general public – and to much acclaim. The success of the event can be understood on many levels: a continued affinity between Venetians, including those living on the mainland, and a symbolic part of the city; a desire for contemporary events outside the tourist mainstream; and the ability of certain areas of the city to host large scale events, a lesson in the success in matching crowd size and the carrying capacity of a particular district. All should affirm the potential to create a more economically and socially sustainable version of the tourist industry Venice is presently hosting.
In July 2014, the event weeklong event, “Digital Venice,” took place in the Arsenale and at sites distributed throughout Venice. Held in conjunction with the 2014 Italian Presidency of the Council of the European Union, it brought together more than 300 policy, industry and innovation leaders to “trace the road to a growing, sustainable digital economy” for Europe. While many of the speakers listed are public officials or hold position in the public sectors, there are also names such as Mike Butcher, editor at Large for TechCrunch, and Eze Vidra, Head of Google for Entrepreneurs Europe, people with a global view of entrepreneurial ecosystems emerging in very different contexts.

In addition to presentations, round tables, and site visits, the program included a “Camp” program for 30 students, which served as a demonstration of an incubator model. The camp program took place on [56](http://www.digitalvenice.eu/digital-venice-2014). Accessed August 8, 2014.
the island of La Certosa\textsuperscript{57} (just off the eastern edge of the Castello neighborhood of the historic city center). The camp took place next to a site already recognized as an inventive and entrepreneurial (a mixed-use harbor, hotel and sailing program called Vento di Venezia)\textsuperscript{58} and was run by the InnovActionLab. The appearance of the InnovActionLab project in Venice is promising: it is a non-profit structure that runs on a sponsor model, making it possible for participation to be free, though by application. This low financial barrier for entry is a good model for encouraging more new startup activity. The primary focus is on helping participants get their ideas in front of potential investors. As of March 2013, program alumni had been part of startups that had successfully raised over 4 million euros from venture capital and angel investors. The InnoActionLab program, founded in 2011, is headquartered in Rome and operates in several Italian regions.

Figure 27. The Consorzio Cantieristica Minore Veneziana includes crane access to the South Lagoon. Brass nameplates at workshop entrances reveal the range of companies found in the complex. Right: a gondola is against the backdrop of rehabilitated industrial buildings used as workspace. Photos by author.

8) Consorzio Cantieristica Minore Veneziana

Location: Giudecca

Other developments in the city center demonstrate the potential for creative adaptive use and "placed-based innovation," building off knowledge the city already possesses in traditional industries. Located on Giudecca is the site of the Consorzio Cantieristica Minore Venezia, which translates loosely as the consortium of small shipbuilders (see fig. 27). The development was the result of the decision of a group of small-scale craftsmen to rehabilitate a site including 3,000 square meters (32,000 square feet)

\textsuperscript{57} La Certosa is the site of the project Vento di Venezia, one of the entrepreneurial projects I profiled in my 2010 paper and which I also discuss in chapter 4.

\textsuperscript{58} See Zapalac (2010).
of brick shipyard buildings and shipyard facing the South Lagoon. The consortium invested approximately 15 million euros in the project, and the dock now includes 15 workshops and storage for 350 boats. Three cranes, together with a number of shared resources, are in service to boat owners, while a dedicated staff is available 24 hours a day. The tenants of the 15 workshop spaces provide a range of specialty services. Additionally, a restaurant and bar run by members introduces a mix of uses and takes advantage of the picturesque site. Several things are remarkable about the site: simple but elegant rehabilitation of historic buildings on a permeable site, the ability to introduce new functionality into the historic fabric, the interesting co-location of tenants in workshop spaces, and the fascinating juxtaposition of boats of every variety. This is one of Venice’s most rooted and compelling models for future startups and coworking spaces.

Other policy to promote entrepreneurship
In December 2012, Italy passed law 221/2012 to promote development and economic growth of the country. Section IX of the law defines a new type of firm designation: the innovative startup, defined as firms with the exclusive or prevalent objective of “the development, the production and the commercialization of innovative products or services with high technological value.” Firms awarded this status receive tax breaks on business registration and dues for the first year of operation; can utilize a special form of hiring contract (minimum six months that at the four year mark must be converted to a conventional contract if the employee is to stay with the company), can pay employees and contract labor in stock options. The law also provides tax breaks through year 2016 to entities investing in startups, introduces regulations on crowdfunding and creates a credit fund for startups that certified incubators can also utilize. Additional support is available to firms seeking international capital investment at the early stages. As of July 28, 2014, there were 2392 registered innovative startups in Italy and 26 certified incubators. Certified incubators participating in 2013 included: Boox, Fondazione Filarete, H-Farm, I3P, LUISS Enlabs, M31, Seedlab, The HUB and VEGA. The law also provides support for a number of competitions under the “Premio Gaetano Marzotto” program. Winners receive prize money or services (such as residence in a participating certified incubator

59 It is also the location of the fabrication workshop of Ski Stradivarius, one of the firms I interviewed for this research.
60 Promotional materials use the word “incubator” although it is to be noted that some of these entities also operate accelerator programs.
program), with the total value of all awarded prizes for the 2013 round estimated at 800,000 euro (of which 350,000 euros was in kind services). Observing the status of sites already developed with public funding while continuing to hear references to the need for European Union funds, or additional funds from the Italian national government, led me to consider what role public funds should play in fostering entrepreneurship, and whether it might be more useful to focus on addressing underlying issues, such as tax reform or affordability of housing. From an American perspective, government as a direct (or semi-direct) source of funds seems almost counter to the idea of entrepreneurship. I turned the question to historian Matteo Casini, who lives and works in both Venice and Boston. His assessment proved helpful on several levels:

The big problem here in Europe – and in Italy in a very big way – is that to obtain these funds requires a “know how” that is distinct from that of a private entrepreneur. You have to have political connections; you have to have a good disposition for bureaucracy, because Europe is hyper-bureaucratic. You have to develop competencies that are not exactly management competencies, or they are management, but distinct from those for operating in the market. Here in Europe the private sector is never truly private. There is always some involvement of the public sector ... it is another form of political and economic system. We have social states and therefore the state is much more involved in the life of a citizen than in America. ... We always think, “I hope that some help can be found.” ... But as we say in Italian, it is a double-edged weapon.62

This explanation is specifically helpful in considering the incubator sites, which should be dynamic enough to respond to the needs of the firms they host. They are, however, the product of many diverse objectives, some of have which limited the ability to recognize and serve the immediate needs of the emerging entrepreneur. Many of the locations reviewed get close to putting the right conditions in place, but none has yet realized the full potential to leverage the location conditions Venice offers to make up for the many structural challenges (tax burden, bureaucracy, transparency, labor laws) a company faces today when starting a company in Italy. The innovative startup law mitigates some of these challenges temporarily, but in doing so, it may actually make the system more complex, not less. The entrepreneurial ecosystem of Italy should be appropriate to Italy. Still, the reality is that Italy is in

direct competition for startup talent, with an increasing number of countries, therefore must be able to strategize in this context, while highlighting what they offer that is unique. In doing so, perhaps a better process of matching between location offerings and talent needs could emerge.

**Concurrent Investment in Venice**

While Venice and Italy in general still have a far more limited venture capital infrastructure than other countries of a similar GDP, significant private and institutional capital continues to be invested in the city. This was the case even at the depth of the recession that began in 2008. Much of this capital has gone toward the development of major luxury hotel projects and projects for contemporary art, including the triad of projects funded by the Pinault Foundation (the foundation of the CEO of the Paris-based conglomerate Artemis S.A.): the reopening of the Palazzo Grassi as a contemporary art museum (2006); the adaptive use of the Punta della Dogana, the former customs house, as a contemporary art center (2009); and the new construction of the Palazzo Grassi Theater (2013), all of which were designed by Japanese architect, Tadeo Ando. In 2011, the Prada Foundation opened a center of contemporary art in another palazzo on the Grand Canal, the Ca’ Corner, by agreement to fund the restoration of the palazzo in exchange for a 6-12 year lease.\(^6^3\) Benetton is now funding the restoration and adaptive use of the Fondaco dei Tedeschi, which it purchased for 53 million euro in 2008. The building will house a new flagship store designed by Rem Koolhaas.\(^6^4\) In its beauty, its complexity and its brand power, Venice continues to attract international interest and capital, but these have not yet been linked to its startups.

Projects such as these have the potential to bring new talent and new capacity to Venice, but also potential problematic secondary effects. The systemic nature of tourism and its impacts, first and foremost, on the local community are still far from understood. Transformation of the tourism industry into a more sustainable version of itself, a fitting challenge for entrepreneurs, could mean enormous opportunity to render new economic and social benefits. If Venice can achieve this, it will play an important role in the revival of the Italian economy. Tourism will continue to be part of the Italian economy for the foreseeable future. For that reason, it should be managed so as to return the maximum social and economic benefit to those who are the stewards and producers of a combined natural-cultural heritage the rest of the world continues to find attractive.

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4.3 Amsterdam: Initiatives to Promote Entrepreneurship and Innovation

In Amsterdam, projects to promote entrepreneurship and innovation have taken many formats, involving the public sector, the private sector, academic institutions, non-governmental organizations, as well as citizens and visitors. The range reflects the presence of both corporate and bohemian elements in Amsterdam’s culture. At times this also plays out as a tension and spatial separation between scientific/technical communities and creative communities. Overall, there is an awareness of this tension and the need to promote cross-pollination to take full advantage of Dutch talents and to connect the different forms of knowledge necessary to be successful in all stages of the innovation process.

1) An important catalyst: hackers gather in the Vondelkerk (1990)

Location: Amsterdam, Old South

The Vondelkerk is a neo-Gothic church designed by noted Amsterdam architect, P.J.H. Cuypers, and completed in 1875 (see fig. 28). By the 1980s, the building had fallen into disrepair, leading to the creation of the Vondelkerk Foundation to raise money for restoration. After some initial efforts, it was determined that the best way to save the building was to purchase it outright. Committed citizens engaged the Stadsherstel to do so and hired the office of Architect Van Stigt, responsible for many sensitive restoration and adaptive use projects in the city. The strategy conceived was to introduce
workspace of a type that could function as part of a multi-use program that involved continuing to use the central octagonal space for events. Similar to the adaptive use of SS. Cosma e Damiano in Venice, this rehabilitation involved the introduction of a transparent “floating tank” to add floors within the tall interior space, increasing the amount of floor space that can be rented (Wijn, 2007, 40). The quality and spatial configuration of the building inspired an adaptive use strategy that made it possible to increase the range and density of productive uses within the building. Affordable rent for a relatively central location and the program of the building were well suited to hackers-cum-software developers starting to self-organize in Amsterdam, especially as they were less dependent upon and less interested in the traditional office “infrastructure.” Wouter Glaser, founder of Glasnost, who started one of the first gaming platforms in the Netherlands at age 16, recalled traveling from his hometown outside Utrecht for a job interview at the Vondelkerk in 1997.

The strategic adaptive use of the building meant that it could continue to play an important cultural role in the city, while taking on a new role as a location for emerging companies – that these were not mutually exclusive activities. It set a precedent for adaptive use possibilities, manifesting the potential to link heritage conservation with new productivity and achieved a potent juxtaposition of a new hacker culture (now increasingly finding ways to monetize and share its talent) emerging from a recognized cultural landmark. In the process, it broadened the collective imagination of what both could be.

Location: Centrum

Founded in 1994, by Marleen Stikker and Caroline Nevejan, the Waag Society is an institute for art, science and technology that develops creative technology for social innovation. Originally named “The Society for Old and New Media,” the name was changed to the Waag Society in 1996 as it took occupancy of the Waag, one of the city’s most continually used buildings (see fig. 29). In 2014, the administration of the Waag Society relocated from the Pakhuis de Zwijer (see below) and took occupancy of the Pinto House, saved by activists in the 1960s and subsequently restored by Stadsherstel.

The Waag building was constructed as a city gate in 1488. It has since served as weigh station, anatomical theater, the first home of the Amsterdam Historical Museum, the Jewish Historical Museum, and countless other uses. Its location on Niewmarket Square places it in one of the city’s most dynamic squares, used as a market for centuries until Nazi occupation and now revived as one of the great shared spaces of Amsterdam, frequented by residents and visitors alike. The Waag Society coordinates

a number of collaborative research labs, manages the Fablab Amsterdam (fabrication lab), provides courses to the public (made by possible through a subsidy from the Creative Industries Fund NL), hosts learning events and serves as a clearinghouse for information on global events focusing on creativity and innovation. They are currently engaged in a multi-year, multi-city open data project for the European Union, in which they are collaborating with the Department of Infrastructure, Traffic & Transportation on strategies for making transit and mobility-related data available to inform a wide range of problem-solving. A restaurant and café also operate out of the ground floor space and make use of the adjacent square for café tables.

Director Marleen Stikker was also a co-founder of the project De Digitale Stad, the digital city (1993), one of the first experimental initiatives to create a virtual analog to an actual city, and PICNIC, an annual festival launched in 2006 and “dedicated to blurring the lines between creativity, science, technology and business in order to co-create the future.” The Waag Society promotes critical dialogue about the relationship between technology, creativity and society. They lend support to the formation of creative and tech communities in Amsterdam, both through the Fablab, as well as the programs and events that they run or support. In doing this, they have added another layer of meaning to Waag as a landmark, or iconic architectural element in the city. They have played a specific catalytic role in the adaptive use of three of Amsterdam’s historic buildings, demonstrating the continuing relevance of these buildings by linking them to emerging industries.

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67 http://www.picnicnetwork.org/history
3) Amsterdam Science Park (1996)

Location: Amsterdam East

The Amsterdam Science Park is located in Amsterdam East, south of the East Docklands, on a site reclaimed by polder method in 1629 (see fig. 30). The first scientific institute to move to the area was in 1946 was the Institute for Nuclear Physics Research, predecessor of Nikhef, located at the park today. Elements of the site are still partially gated and surrounded by moated embankments. In 1960, several other research institutes joined the site, including the University of Amsterdam, which purchased part of the site for its Faculty of Biology. In 1980, the Center for Mathematics and Computer Science (CWI) and SURFsara relocated to the Science Park. In 1996, the City of Amsterdam designated the Amsterdam Science Park as a major project. The “business” component of the site includes a group of office buildings managed by the Matrix Innovation Center.

The building capacity is estimated at 500,000 square meters for businesses and institutes, of which 157,000 square meters is intended as office and laboratory space. Significant development taking place from 2007 to 2013 included 1,870 units of housing for students and the addition of new institutional partners, a number of new faculty buildings, as well as the arrival of new institutional and private partners. The University of Amsterdam has opened a Technology Transfer Office on the site. Steps have
also been taken to improve access and experience of the site -- once very much on the outskirts but since 2009, connected to Amsterdam Centraal by a 15-minute tram ride. The park reports that it is now “home to one of the largest concentrations of beta sciences in Europe” and that it houses “120 companies, 40 of which are the product of a scientific discovery.” The primary building on site to date is the University of Amsterdam faculty of science building (2009-2010). Its massive proportion is imposing, perhaps especially evident due to the fact that much of the land around this building has yet to be developed. Specific programmatic elements have been added to make the site a bit more *gezellig.* A Quonset hut, complete with chicken coop, has been home to the “Café Polder” since 2009. A public art program integrates art throughout the site, while a number of newly added buildings contribute a formidable architectural presence. The Science Park holds an annual open day to welcome visitors to the site and in 2014 launched SPAFF, the Science Park Amsterdam Film Festival.

The challenge for the future development of the Science Park is to make it a “people place” by populating it with enough activity (and quality places to encourage it) that it feels -- if not like a city -- at least like a more cohesive and permeable campus. The site is in need of further enhancement and many buildings are actually rather closed off. This is particularly critical for the success of the business components of the site and the ability to compete with other office space in the city. The quality and programming of the interior architecture of the newest Matrix buildings are notably well conceived. The latest addition to the Matrix complex includes the “innovation lab chemistry Amsterdam (ILCA)” geared to startups in “sustainable chemistry” and has a formal partnership with the Port of Amsterdam. This differentiation and programmatic specialization is important as an anchoring concept in that it provides something that many centrally located coworking sites do not.

In 2014, the City of Amsterdam announced that the new Amsterdam Institute for Advanced Metropolitan Solutions (AMS) would be based at the Science Park. The institute is a public-private institutional partnership including the City of Amsterdam, TU Delft, Wageningen UR, MIT and other private sector partners. It should add yet another layer of complexity and use to the city — but it is far from what many people would consider an “urban” location, and there is some contradiction in this. Should it matter? It matters if locating at the science park means missing the opportunity to share

68 Amsterdam Science Park promotional brochure.
69 A Dutch concept that loosely translates to “cozy and sociable.”
Dutch know-how with anyone visiting Amsterdam, whether on business or as tourist, who might be interested. This is important not only for the sake of promotion, but also for the sake of gaining a type of feedback – few other cities offer the quality of access to the visitors’ mind (or more generally, the public’s mind) than the conversational streets and canals of Amsterdam.

Like the VEGA in Venice, the Science Park demonstrates that to realize a project of this scale, partners must be willing to commit to long-term investment and that the quality of site development matters greatly. Perhaps the metaphorical value of science + park, even when loosely interpreted, has lost its meaning? Certainly the point is still to create a place that equips scientists to engage in focused research. To be successful in promoting innovation, however, it is also necessary to support the first step (problem definition) and last step (delivery to market) aspects of innovation. What the science park will be if it is successful is not a “park” at all, but a valued and specialized extension of Amsterdam’s urban fabric. This is a tough challenge given that some research facilities do have specific programmatic requirements for functionality and security. It should be possible to accommodate these, especially on a large site, and give primacy to making the experience of the site as welcoming, social and engaging as possible, while celebrating its scientific purposes. If this can be achieved, perhaps it will also set a new precedent for bringing creative and technical talents of Amsterdam together to engage in a deep understanding of pressing problems to be solved.


KennisKring Amsterdam is a network of companies and institutional representatives that gather regularly to share ideas. In 2004, leaders of the organization who had been discussing ideas around clusters and the idea of promoting innovation worked together to start the Amsterdam Innovation Motor as a small organization. In 2006, the City of Amsterdam provided additional funding and a public-private partnership was organized to promote the concept of innovation around the following themes, or “clusters,” relevant to Amsterdam: creative industries; life sciences, financial services; information technology; and sustainability, with the logistics cluster covered by Schiphol airport. Unlike the Venice Innovation District and the Boston Innovation District, the AIM project was not conceived to develop specific sites or a specific district, but rather to function as an organizing framework and catalyst for

Note: these themes were reconceived and reorganized in the first few years of the program to allow some existing programs to carry out work already underway. Schiphol Airport committed to covering logistics, which freed up AIM dedicated to focus on financial services. Interview with Ger Baron, May 29, 2012.
activities, wherever they were found to already be taking place. This also meant giving further support to existing organizations, such as the Waag Society, that were associated with specific sites or in the process of developing them. Inspired by the work of Michael Porter and other scholarship in economic geography, the clusters identified related to recognized sectors of economic activity. AIM focused on reporting these and, to some degree, on documenting where they located spatially. In taking the approach and relying heavily on industry classification codes to identify cluster activity, there was the general consensus that the approach was useful for answering the question of where Amsterdam was and where it had been, but less so for projecting, or directing where it might go. Ger Baron, who oversaw the development of a number of cluster initiatives, observed:

> We are flexible … we don’t have a real plan with steps for how to develop a cluster because the clusters are so different. And the people who started to work over here were even more different…. Per cluster we have a totally different focus. You can have these pretty radical frameworks, but in the end, it’s all the people executing it and interpreting it.⁷²

Ger went on to explain how their general approach to thinking about clusters has shifted more toward an ecosystem perspective. This is an important change in paradigm. He described how collaboration across sectors at the front end of a project, in which different forms of knowledge are combined, can inspire new solutions, and leading to new products and services:

> We now work much more on ecosystems to get a whole chain involved. Another great example is what Phillips is doing. They have some challenges in the next years … but a tremendous amount of IPR (intellectual property rights). Now they are looking for new business models and new innovations. Phillips Light … is working on the lighting of a national museum, but they have a team of three people who are art experts and three people from Phillips, and they are collaborating … These are new ways of organizing clusters, or ecosystems.⁷³

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⁷² Ibid.
⁷³ Ibid.
AIM’s transition to a more ecosystem-based approach places more emphasis on demand side aspects of the innovation process, and the value of combining knowledge in unique ways to develop new market opportunities. This seems a strategic approach for the development of a diversified local economy. It is in many ways much more progressive than national level economic development policy, which takes a decidedly more supply-based view of innovation. In 2011, the Netherlands launched a “top sectors” approach in which it identified nine top sectors: agri-food, chemicals, creative industry, energy, high tech, horticulture and propagation materials, life sciences and health, logistics, and water. A host of objectives informed the policy, including:

Promote innovation, private R&D investment and closer science-business links, as well as faster industrial renewal by providing suitable incentives in the context of the enterprise policy, while safeguarding accessibility beyond the strict definition of top sectors and preserving fundamental research.

While ICT was recognized as a “cross sectoral” element at the national level, the creative industries were not. There have been mixed responses to this approach, in part because 97% of research and development funds in the Netherlands are allocated to these identified sectors. The return on investment by sector is actually quite variable as well. As an example, 2013 research and development investments in “life sciences” was 671 million euro and resulted in 12.6 billion euro production return, while investment in the “creative industries” was 21 million and resulted in a 22.6 billion euro production return. It is important to consider that the horizons for return on investment vary by sector, but this also demonstrates that the most profitable elements in the Netherlands economy of the future may not be found in its traditional sectors, but perhaps instead in new sectors or at the crossroads between them.

The research and data assembled by AIM began to paint a picture that articulates the increasingly dynamic interrelationships across clusters as well as the way broad trends are impacting all sectors. In forming AIM, Amsterdam expanded its participation in the global dialogue about “smart cities”

75 Presentation, ERAC ML, March 21, 2013, p. 4. Accessed online: August 5, 2013. This is similar to a presentation I attended at the Dutch Ministry of Economic Affairs in The Hague, in January 2012.
76 Ibid, p. 5.
77 Ibid, p.10.
concurrent with previous commitments to carbon reduction and sustainability. The City of Amsterdam has launched Amsterdam Smart City, providing a platform for information sharing on smart city ideas and projects around five key themes: living, working mobility, public facilities, and open data. Amsterdam hosted the first World Smart Capital conference in 2012 and served as the model World Smart Capital in 2013. Part of the credit for the range of programs developed, the commitment to a broad interpretation of innovation and particularly, the contextualizing of innovation into Amsterdam culture can be attributed to the ability to link all these elements to the city’s inclusive brand, "Iamsterdam" developed under the leadership of Carolien Gerhels prior to her election as Alderperson in 2006 and re-election as Deputy Mayor in 2010. She has also been a driving force behind the creation of the new Institute for Advanced Metropolitan Solutions. In discussing the idea of leadership related to building upon the knowledge of a historic maritime city, she explained:

There is a way people behave around each other in groups and in urban systems. ... A city is built on its DNA and its core values. Amsterdam struggled against water, against fire, against diseases. If we didn’t succeed, we wouldn't be here. Because we are 5 to 6 feet below sea level. We had to work together to put the water out. We really had a collective action problem. And we found the solution: it was water management -- the dikes, the levies, the pump stations, the canals. The canals are not there because “It’s so nice” -- it’s systemic. ... We worked together. We had to work together. ... And we were not popes, we were not generals, we were not kings or queens, just people from Amsterdam, entrepreneurs, working together. Amsterdam is a bottom up city.

The narrative of Amsterdam as a “bottom up” city is critical because it places emphasis on participation as well as organization. It also is inherently place-based. This seems to appeal greatly to Dutch entrepreneurs as well as expat entrepreneurs who have chosen to make the city their home. The impact can be seen and experienced in the entrepreneurial activity now taking shape in the city.

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78 Interview with Deputy Mayor Gerhels, Amsterdam, May 11, 2013.
5) Pakhuis de Zwijger (2008)

Location: Amsterdam waterfront, East Docklands

Creative Amsterdam, a dedicated program within AIM not only provides support for new endeavors, but also cultivates its network of participants through events such as Creative Amsterdam 2011, an event organized to host leading Dutch creative entrepreneurs operating outside the Netherlands. These dispersed entrepreneurs are brought to the city not to be tourists, or even for traditional conference activities, but specifically to strengthen the networks between new activities emerging in Amsterdam with established companies already globally dispersed.

The location of this event and others like it is often the Pakhuis de Zwijger, which advertises itself as a “platform for creativity and innovation.” It has become both a functional as well as an inspirational setting for such interactions to take place and for a new, but historically rooted cultural milieu to

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79 Pakhuis de Zwijger, brochure zaalverhuur (undated) c. 2011
develop (see fig. 31). Four users came together to develop a program for the site: Salto (Public Broadcasting), the Waag (Programming), the Cultural Factory (events, operational and catering) and the Amsterdam Art Fund. The users engaged the Stadsherstel to manage the transformation of the 1934 refrigerated shipping warehouse, which holds a prime waterfront position along the IJ River, into a multiuse space for conferences and media events (900 person capacity), which also operates a bar and restaurant on its ground floor and outdoor patio. The early modern concrete building (which also includes a roadway running underneath it) was rehabilitated from 2006-2008 in a project led and designed by the Van Stigt architectural practice (with the group Heren 5) and carried out at a cost of 11 million euros. The City of Amsterdam and the Department for the Preservation of Monuments also contributed to the project in fee wavers and funding.

Figure 32. Map identifying locations of Broedplaatsen sites as of August 4, 2014. Source: City of Amsterdam.

6) Broedplaatsen (2000)
Locations: distributed throughout Amsterdam
One way in which Amsterdam has been successful in responding to the question of what to do with vacant buildings was the creation of the Bureau Broedplaatsen ("breeding ground" or "hatchery"), which
brokered available space to artists at a low rent, and in effort to make use of buildings until anticipated future redevelopment. This program emerged out of protests from a group of squatters who were to be evicted from abandoned buildings in East Docklands. The program brought them formally in to the market system. The program has proved appealing to a rapidly growing number of startups and sole proprietors in the creative industries, and also other types of startups. The mix of activities at these sites demonstrates the degree to which it is becoming more difficult to assign activity in a clear manner to one sector or another. A website and map managed by the bureau show the 62 sites currently participating in the program (see fig. 32).

The City of Amsterdam has developed aspects of this program over time in such as way that it serves both building owners, and tenants, quite effectively. The program has played a role finding tenants for a wide range of building types. The introduction of a more dynamic sensibility to the adaptive use of property, especially on a temporary basis, has no doubt informed the city’s strategy for more permanent adaptive use strategies of vacant commercial property. It has also been the breeding ground for many of the interesting programmatic concepts seen in privately developed coworking sites and in new forms of mixed use and multi-use retail.

One of the most inventive examples of a broedplaats is the former site of the NDSM shipping company in Amsterdam Nord (see fig. 33). After the company went bankrupt, a plan was devised to allow interested parties to pay a subsidized rent and build their own offices (most of out shipping containers), which they were then allowed to resell, but with the caveat that the project would be torn down in ten years for site redevelopment. Ger Baron estimated that there were probably between 50 and 60 companies in residence. When I visited, I was surprised to see the extent to which users had created a streetscape within the covered massive warehouse structure, which also includes an elevated skate part near the roof of the building. It is an extraordinarily interesting view of a self-formed entrepreneurial community and one that describes itself as a “selfmade city.” The question, perhaps, is whether or not

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81 Interview with Ger Baron, May 29, 2012.
the flow of knowledge among members is of the type that is useful for understanding how to run a business – as much as how to scale it up."
7) “Spaces”: a private-sector developed coworking concept

Locations: Herengracht (Canal Ring) and Zuidas

Amsterdam also boasts a number of privately developed coworking spaces that do not cater solely to startups. Rather, they state “mobile workers, corporate workers, international workers, freelancers, start-ups, established companies, project teams, business nomads. We welcome them all.” One example is Spaces, which occupies a prime location in a 1919 office building on the Herengracht (the most highly regarded of the canal ring streets) (see fig. 34) as well as a second location that repurposes a 1980s high rise in Zuidas. Spaces operates a business model that offers membership access to common work areas, conference rooms (leased on a per hour basis), and staff that performs basic administrative services included in the membership fee, which can paid by month or by year (at different rates). At each site, a canteen functions as a social center point and provides coffee, lunch, and drinks. The design is elegant but also more informal that most corporate office spaces. It is also custom to each location.

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Spaces Promotional material, obtained on site, July 2012.
(Zuidas, for instance, has a memorable collection of contemporary art.) Beyond the common areas, private, dedicated office space is also available for rent in the upper floors of the buildings. Designers of the locations also seem to understand the importance of the relationship between interior building activity and street. In each case, effort has been made to capitalize on transparency. Paul Somers, one of the project managers, described what is envisioned in the concept as we were having coffee in the canteen at the Zuidas location:

We believe in a distributed network. So if you want to get your child from day care or have lunch with a friend, you can go to the (site on the) canals. If you are from the office over here, you can work there on your remote desktop ... People can just work everywhere.

We really believe in buildings as a facilitator, but to channel — so our buildings are much like a Facebook or a Linkedin. We believe that we are a “real life” network. So you’ve got virtual and real life and the blend. We are blending it here because you see people are doing business here with each other. We are now making a digital portal, so then you will get a sort of “building LinkedIn” or “mock eBay” where people can do business with each other. But they are also doing business with each other on the ground floor, in actual real life. So people can see who is in and whose is not in. Or you will see that Victoria is in the Herengracht and say, “oh I thought she was at the Zuidas today.”

We are looking very much to “retail-ish” locations. It’s all about the client and the user. User-friendly. Real estate is normally not really user friendly. So we are going to look at a location in different ways. .... We are an urban concept. We believe in cities. Urban cities have this distributed network … you will have also more markets. We want to have the variation. In Spaces, it’s all about the suits and the jeans. We believe that we can mix it up. (Paul Somers, Spaces)

In outlining this strategy, Spaces has realized the extent to which the quality of place matters both for the worker in his or her independent work, and as a setting for knowledge sharing. For the virtual network to succeed, it must be reinforced by the physical (and vice versa). The two are interdependent.
8) Rockstart: an accelerator program plus events company and coworking space (2012)

Location: Herengracht, Canal Ring

The last category of specifically place-based initiatives in Amsterdam that I will cover is representative of accelerator programs, of which there are a growing number in Amsterdam, as well as coworking spaces, such as “The Hub,” specifically geared toward providing services to startups. The commonality is that they both aim specifically at startups as their market. Rockstart is a buoyant, fast-paced, energy drink of an accelerator. When I visited in May 2013, they were operating out of a late 20th century office building located within the Canal Ring on the Visjelstraat, a central spine street running from the Dam Square south toward the Zuidas. It is a busy thoroughfare currently undergoing significant redevelopment. Since that time, Rockstart has relocated to a 17th century building on the Herengracht with monument status (see fig. 35). Rockstart now functions in three areas: as an accelerator that operates based on a “lean launch” model, as an event planning company, and as a provider of

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85 Right now a number of buildings that temporarily housed startups are undergoing redevelopment, which can be interpreted as an indication of success of the Broedplaatsen program.

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coworking space. They have plans to expand into new arenas, including a startup academy. Like some other accelerator programs, Rockstart functions as a broker of relationships between startup participants and existing companies, who pay a fee to sponsor the program. This is a relationship that can be as beneficial to the existing companies as it can to the startups themselves. Their “lean start up” model is based on a they set schedule (or curriculum) for a 100-day program. In the 2012 program, this included a trip to Silicon Valley in which startups were able to meet potential investors and to pitch their ideas.

Rockstart offers a more American style approach to startups and entrepreneurship operating largely on a venture capital funding model. Although Amsterdam is a center of finance, and has long been innovative in amortizing risk, it is still more common for young entrepreneurs to rely upon what might be considered more traditional access to capital: funding from family members through familial relationships, if they seek investment capital at all. The upside of the introduction of this new model is that it is a literal jolt to the system, and one that spreads a good deal of tacit knowledge about what it means to be a startup. Rockstart has promoted its participant companies aggressively, providing them a public relations boost that sometimes is essential to attracting capital. The downside is that in a nascent environment, the entrepreneurial frenzy that results is in part based upon perception of access to capital, and/or the allure of “rock star” status. Given how new this program is to the system, it will take time to understand the performance outcomes. There is one other important point to be made: when I asked Oscar Kneppers about the location on the Visjelstraat, which is extremely close to the most touristic parts of Amsterdam, he replied that they wanted to be in the middle of the tourist activity, not set apart from it. For an accelerator looking to establish an international identity and one that has focused largely on consumer technology and a lean launch model, such a setting would be enormously valuable. Having a location in a monument building on the Herengracht likely provides an “affinity value” that would be impressive to startups operating on a higher risk / higher reward model, who see themselves as innovation driven enterprises, and to some types of potential investors.

**Amsterdam themes and conclusions**

Amsterdam provides numerous examples of the strategic linking of heritage preservation objectives with the provision of space for institutions supporting entrepreneurship and for certain types of

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86 http://rockstart.com/earlydays/where-we're-going/
87 Interview with Oscar Kneppers, May 5, 2013.
entrepreneurs themselves. These projects also demonstrate the degree to which the collective value of the city center, not merely individual buildings, is important to the usability of the center by new entrepreneurs. The degree to which key figures in public, private and institutional roles have worked to make this happen is affirmed in part by the repetition of names found throughout these examples. To date, the private sector and private institutions have played a significant role (much more than in Venice) in supporting or even driving this activity, but the City of Amsterdam has been critical in its roles as a facilitator and organizer of information, rather than a developer of sites, with the exception of the Amsterdam Science Park. Also unlike Venice (and Boston), Amsterdam has managed to keep housing relatively affordable (aided by the continued presence of 30% public housing in the city center) throughout most of the city center. This in turn helps to maintain a "ready supply" of young would-be entrepreneurs, particularly in a down economy when there may be fewer opportunities for jobs. In Amsterdam, the barriers for entering the entrepreneurial ecosystem have all but been removed. A different question is what it will take, or how long it will take, for Amsterdam to produce its next company to go public or to become an OEM ("Original Equipment Manufacturer), or if it is even constructive to think in those terms as economic structure and opportunities continue to rapidly evolve. Perhaps looking forward, a network of highly versatile small and medium sized companies working as a collective innovation driven enterprise might be more resilient and more beneficial to Amsterdam than the emergence of a dominant company or industry.
Figure 36. Visitors to MIT have their picture taken in the lobby of building 7, one of MIT’s grandest and most inspiring places. Photo by author.

1) An urban university in the science park role: MIT

Location: Cambridge, MA

It can be argued that Boston and Cambridge have no need to develop a contemporary science park because the more than sixty colleges and institutions distributed in and around the metropolitan area already contribute many of the activities that a science park might. Plus, these institutions are integrated effectively with resources and systems that make up the form and fabric of the urban environment. Within central Boston/Cambridge, the recent development of Kendall Square is, perhaps, the closest in program and scale of buildings to science park strategies found in other cities, but due to its permeability, it might more accurately be described as an innovation district that has coalesced over a long time period.\textsuperscript{88} The relocation of MIT from Boston to Cambridge in 1916 played a particularly

\textsuperscript{88} In Venice, the university buildings of Ca' Foscari and the IUAV in Venice are distributed through the city. The neighborhoods in which these buildings are located do not provide the opportunity to introduce new large scale buildings, but smaller scale intervention and adaptive use is possible. In Amsterdam, most of various departments of the University of Amsterdam are well integrated into the fabric of the city, and in some cases, have recently
important role, as it knit together three disparate entities: the city of Boston and its bustling enterprise, the academic community already established in Cambridge at Harvard, and the industrial waterfront of Cambridge, already in a process of economic transition when MIT arrived to the site. Like the VEGA in Venice and the Amsterdam Science Park, the first buildings designed for MIT were also massive in scale (see fig. 36). However, these buildings, in classical revival style and spatial configuration, borrowed from Thomas Jefferson’s design for an *academical village* at the University of Virginia, and were designed to inspire, not merely to impress. Architectural design relied upon natural light and natural ventilation. Some later period buildings were successful for different reasons. MIT’s Building 20, known as the “Rab Lab,” was designed as a temporary building, and as such, highly alterable. Its role as a place for innovation and its association with hacker culture is well documented (Brand, 1994, 28). As MIT developed over time, the Institute placed more emphasis on technical functionality and mechanical systemization; alterations, such as the addition of florescent lighting, were also made to older structures. This may have rendered buildings modern, but it has not always made them enjoyable to inhabit. Thankfully, many recently constructed buildings have successfully combined technical requirements for labs and research spaces with more fundamental requirements for human comfort.

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added new and interesting buildings within the urban fabric. The Vrije University is located on a contained campus just south of the A-10 ring in Amsterdam Zuid (South), in the direction of Amstelveen.
Figure 37. Juxtaposition in Cambridge: Well-built old buildings anchor the site as new buildings are added to the urban landscape, on land owned by MIT. The 19th century brick building now houses the coworking space named Lab | Central. Photo by author.

A similar evolution is observable in many of the new buildings constructed around MIT in the last five years, but also important is the adaptive use of many of the area’s late 19th century and early 20th century industrial buildings. For instance, the Novartis Institute for BioMedical Research adapted the former Necco candy factory. After Hubspot grew out of its initial space at the Cambridge Innovation Center (discussed below), it relocated a short distance away to the Davenport building in East Cambridge, an industrial loft building from the 1860s constructed as a furniture factory. New emphasis on mixed-use development in Kendall Square and on enhancement of the public realm has helped to increase the density of functions and flow of activity in a district that ten years ago was a ghost town at night. This not only makes better use of urban assets, it further integrates MIT with the life of both Boston and Cambridge, and in so doing, builds an even more effective urban network through which knowledge can flow. When considering the role of academic institutions such as MIT in encouraging entrepreneurship and innovation, it is more than a matter of spatial proximity and the inclusion of key resources such as technology transfer offices, or even programs to study entrepreneurship and innovation. The quality of integration between the university and its communities as a whole is important. The fact that MIT acts as both an anchor institution and a major landowner and land developer cannot be over emphasized when analyzing the success of sites such as Kendall Square. The
enhancement of the public realm and attention to developing a more high quality mixed-use district is now raising the base value that is implicit to being central and proximate to MIT. It is also redefining Kendall Square as a place that supports new types of cross-pollination. Local engagement can also provide a way for entrepreneurs to stay focused on applying their talents in ways that matter; the cities serve the Institute (and its role as a cultivator of entrepreneurs and innovators) as a grounding force and source of feedback. It also makes it easier for networks to extend globally, given that the flow of people in Boston and Cambridge (like Venice and Amsterdam) is rarely just local, but usually an ever-changing mix of residents and visitors, true to its maritime roots.

2) Coworking spaces: a rapidly growing range of specialization and quality choices

Locations: Boston and Cambridge

The Boston/Cambridge startup community crowdsources information on available coworking spaces. As of July 2014, the site Bostonstartupsguide.com documented nine locations in Cambridge, sixteen in Boston and four in Somerville, with per month rents (or “memberships”) ranging from $100 a month at the low end, to $750 a month (by a site that only offers dedicated desk space). Most range between $300 to $350 a month. I visited a number of these spaces, as some of the entrepreneurs I interviewed work from these locations. I will discuss only a few to make key points.

The Cambridge Innovation Center (CIC), founded in 1999 is a privately owned real estate service company and one of the earliest coworking sites developed in the Boston metropolitan area. It proclaims to host “more startups than anywhere else on the planet.” Since its inception, it has grown several times over and shown itself to be remarkably attuned to its users and to the value of the center as a community of “entrepreneurial” practice. The qualitative attributes of the 1970s office building, (low ceilings, inoperable windows, heavily manufactured materials) contrast with many of the other coworking sites I visited; from a building type/era standpoint, this location appears to be an outlier. The proximity of the location to MIT, Kendall Square (and the Kendall Square T) no doubt provides numerous benefits, as does the month-to-month rent structure, offering both open workspace and dedicated offices (at different rates), along with a well curated schedule of networking events organized by CIC. As the first large-scale coworking site in Boston/Cambridge, it also has some first mover advantage, a

position it has worked hard to maintain. In 2014 CIC opened a location at 40 Milk Street in Boston’s Financial District and co-located with Impact Hub (part of the international franchise called “The Hub”).

In the last five years, specialization in the types of coworking spaces offered has increased dramatically, without the influence of any external organizing force or explicit public policy. This guild-like co-location is useful from a technical programmatic standpoint (the ability to share the cost of technical equipment) and can also be helpful to the development of specialized communities of practice and identity building. Greentown Labs, a coworking space dedicated to clean technology / green energy started in the basement level of a loft building on Summer Street in the Fort Port Channel Historic District (now referred to more generally as the Boston Innovation District), but was eventually priced out of the market.91 (It have since relocated to Somerville and plays an important role as an anchor there.) Other specialized coworking sites include those organized around food related sites (the Food Loft), social entrepreneurship (Space with a Soul), sustainability/social impact (Hub Impact), maker spaces (Artistan’s Asylum) and women-owned companies (Collaboratory 4.0).

Lab|Central, which opened in late 2013, bills itself as a “launchpad for high-potential life sciences startups.”92 The 28,000 square foot location, including permitted labs and office space, is notable for the high level of design of its non-technical shared spaces. It also notable for the fact that it is located an industrial loft building where the first telephone call (1876) was received by Thomas A. Watson from Alexander Graham Bell, calling from Boston (see fig. 37). The building later housed the office and color Lab of Polaroid founder, Edwin Land. Lab|Central was organized as a private, nonprofit institution funded in part by a $5 million grant from the Massachusetts Life Science Center, with support from its real estate partner, MIT, as well as from founding sponsors representing private industry.93 Startups must apply for admission as a tenant, to ensure they are in keeping with the mission of the organization. Lab|Central promotes the quality of its services as well as its “historic” location.94 Is this coincidence, the power of legacy to attract, or are there a larger combination of forces at play?

91 Interview with Emily Reichert, Executive Director of Greentown Labs, December 5, 2012.
Another aspect of this phenomenon has been the integration of coworking spaces within districts that are already highly mixed-use and well known, but for which certain space may be more affordable, such as upper stories or side street locations. An example of this is Oficio, one of several coworking spaces now located on Newbury Street, one of two primary mixed-use streets in the Back Bay neighborhood (see fig. 38). The street is better known as a destination for shopping and restaurants than for offices, although many offices, as well as residences, are present on Newbury, particular in the upper stories of buildings. There is 65' construction height limitation for new construction on Newbury, intended to maintain the pedestrian scale of the street. Coworking service providers usually contract for a large amount of space; therefore they operate with different selection criteria than individual firms, but since they often select space with the needs of entrepreneurs in mind, it is helpful to observe the qualities of place associated with these locations. These will be explored in more detail in the next two chapters.
3) **Boston Innovation District (2010) and 4) District Hall (2012)**

**Location: South Boston Waterfront**

The South Boston Waterfront possesses a much-desired condition of real estate: central location, coupled with waterfront access. As discussed in Chapter Three, it was created through a process of land reclamation of the “South Boston Flats”, or “Commonwealth Flats,” that began in the 1830s and that continued through the 1890s, to support the linkage between rail and shipping that was critical to Boston’s economy in the 19th century (see fig. 39). The recent development of the site, discussed in Chapter Three, is notable in part because only in 2010 did a unifying vision for the district emerge from the city, by way of the office of Mayor Thomas Menino. In declaring it the “Boston Innovation District,” the city outlined a vision intended to promote the creation of a robust aggregation of creative, high tech and entrepreneurial activities. Site centrality, including physical access to both the financial district and the waterfront, are deemed important, as are promoting both the character and inherent flexibility of the late 19th century buildings that anchor the larger site. The city has also taken steps to cultivate a social community and associate an entrepreneurial spirit with the district through a dedicated web site and blog, as well as to organize networking and cultural events. As the district is composed of real estate owned by multiple developers and contains infrastructure controlled by a number of separate
jurisdictions, much remains to be seen as to whether a coherent physical development strategy will emerge, and whether it will indeed become a breeding ground for innovation, but there are a number of positive indicators, including the findings presented here and in the following two chapters.

The initiative has operated with “live, work play” as its core message. The expressed willingness of the Boston Redevelopment Authority to act as a partner, in dialogue with developers willing to bring new ideas to the table, has also been viewed positively. The 2008 recession may also been good overall for development, by giving time for some development concerns to be discussed and for key ideas to gestate. Construction is now underway on a number of the new development projects, many originally slated to start just before the 2008 recession. The Boston Innovation District has been successful in attracting new companies to occupy new construction. Many of the recent arrivals to the Innovation District, such as LogMeIn and Session M, who self-identify as innovators, have chosen the historic loft buildings of the Fort Point District. The restaurant Row 34 recently completed an elegant rehabilitation of the ground floor of one building, retaining the essence of its loft architecture; upper floors have been covered to (loft style) apartments. A few blocks away, another building has been converted for micro-housing – small apartment units supported by an oversized “lobby” provides common, quasi-public space in which to work and socialize. These buildings also offer the extra advantage of being closest to Boston’s Financial District, just on the other side of Fort Point Channel.

The most deliberate intervention to promote innovation is District Hall, a civic space and multifunctional building completed in 2012. It includes meeting spaces and a restaurant, comparable in program to the Pakhuis de Zwijger in Amsterdam, although in metal and glass, angular, techy looking new construction by architect David Hacin. Developer John Hynes financed the design and construction of the project, and it is located on land that is part of a large parcel slated for development as “Seaport Square.” At a symposium on innovation districts in 2013, Nicola Fischera, Program Manager of the Boston Innovation District (for the City of Boston) reflected on what has been achieved:

When I talk about the Innovation District: Place is important. Right? It’s a place where we need to develop, the South Boston Waterfront, and there have been a lot of false starts down there. And the innovation district is sticking – and it’s working – because it’s a way of pushing development in a direction that says: we can be more than Anywhere USA, we can be more than a luxury commercial waterfront; we can be some place that’s
going to keep Boston and Cambridge and the Greater Boston Area on the leading edge of what it means to be an innovation city. So yes it’s a place. It’s also — I think in innovation districts in general — they’re a call to action, right? On a lot of levels -- to think better -- and faster -- about how we can create environments on every level that fully can support creativity and innovation that truly is diverse. ... we have a big opportunity to talk more about the diversity that is happening in innovation already. It’s not just tech; it’s not just biotech; it’s not just life sciences. It is robots but also it’s chocolate, and it’s painting, and it’s incredible the diversity of companies that are truly innovating and I think that conversation should come out more.95 (Nicole Fischera, Program Manager of the Boston Innovation District (for the City of Boston)

Perhaps because the Boston Innovation District was never viewed as a “blank slate” type of project, it has come together in a seemingly organic way and, in the process, is encouraging a broader and more interesting view of innovation, and perhaps one that will also prove to be more inclusive.


Location: Boston Design and Innovation Building, the Boston Innovation District

MassChallenge is an international accelerator programming aiming to “catalyze a global renaissance by connecting high-impact startups from around the world with the resources they need to launch and succeed as rapidly as possible.”\(^{96}\) MIT graduate John Harthorne and Harvard graduate Akhil Nigam founded the program, first held in 2010 and in which 111 startups were accepted as finalists. The structure and prize money for the competition is made possible in part by corporate and institutional sponsorships. Similar to other accelerators, there is a clear understanding that sponsors benefit through access to new ideas, the chance to get a first look at companies they may acquire or fund, and participation in the community. Participation for startups is by application at a cost of $99 or $49 for early applicants. Unlike other accelerator programs, MassChallenge participants relinquish no ownership of their company by participating. (No equity is taken.) These two attributes effectively lower the barrier for entry, and the program participation numbers reflect this. For the 2014 program, MassChallenge received 1600 applications, from which they selected 128 finalists. There is specific

emphasis on the idea that this is an international competition, and many applications come from overseas. The program is designed as an intensive four-month program that begins with a “boot camp,” but participation in subsequent programs, events and presentations is optional. Mentors, judges and guest speakers represent a wide range of relevant expertise and draw heavily from the Boston Metropolitan Area business and research communities. Each team works with approximately three mentors, though Mass Challenge does not formally match them; matching is left to the discretion of participants. The program places heavy emphasis on community building and networking, especially through public events. For the 2014 program, approximately $1.5 million in cash awards was distributed to 10-20 winning teams who passed through several rounds of judging; in-kind contributions (available to all finalists) are estimated to be valued at $10 million.97

First housed within a newly constructed building that is part of the Fan Pier development in the Innovation District, MassChallenge now operates from the (recently named) Boston Innovation and Design Building, a 1920s industrial warehouse loft building, constructed for the South Boston Army Base and located at the end of the Marine Industrial Park (see fig. 40).98 The seven-story building is composed of three sections, two of which were purchased by Jamestown Development in 2013. These include the Boston Design Center (564,000 square feet, western section) along with a central portion previously know as the Bronstein Center (826,000 square feet). Jamestown Development is providing MassChallenge approximately 25,000 square feet of space for five years, for free.99 The location not only provides ample space, but also plus co-location with other design companies and innovation driven enterprises. For instance, Next Step Living, founded in 2008 and currently one of Boston’s fastest growing companies (now employing more than 500 people), is headquartered there.100 MassChallenge emphasizes three aspects about their new space: location in the innovation district, importance of building design for community building and knowledge sharing, and the importance of design for productivity, including task-oriented work spaces as well as the provision of a hardware lab within the building.

98 The Boston Design Center, a wholesale and retail showroom of for architectural and interior design products and services, has operated in part of this building for over twenty-five years. http://www.bostondesign.com/about-us/
6) Blade: A technology foundry / night club

Location: Fort Point Channel, Boston Innovation District

Boston and Cambridge are now home to a number of accelerator programs. Increasingly, these are showing up in Boston, in some of the oldest commercial districts in the city, often taking up residence in late 19th and early 20th century buildings. Notable accelerator Techstars, which came to Boston in 2008, is located in the Leather District behind South Station. Bolt, an accelerator focused on the development of hardware, is at the edge of Downtown Crossing / the Theater District. One of the most recent additions is Blade, a “technology foundry” created by Paul English, Bill O’Donnell and Paul Schwenk, part of the team who created the travel website Kayak. Co-founded by English in 2004, Kayak held an initial public offering in July 2012, and was acquired by Priceline in May 2013 for $1.8 billion. The group behind Blade has raised $20 million for initial investing and will focus solely on the development of consumer technology by working with a small group of companies at one time. The 6,000 square foot site is located at basement level in a loft building constructed by the Boston Wharf Company in 1922 (see fig. 41). The view from its windows looks directly out to Fort Point Channel. Programmatically, Blade seeks to do something that other accelerators have not: to intentionally merge the technical and the creative communities of Boston through a series of events that bring together a diverse swath of the Boston
community, including, as English refers to them, those designated as “VIPS.” The space, which was last used as part of a Chinese restaurant, has been carefully rehabilitated and made luminous through light colored floors, walls and ceilings. It has been wired for sound and projection, and all furniture can be relocated to a storage room so that the main space can be transformed. There is a green room for performing artists and a bar at one end of the main space. It has been designed for day use, but also for a separate (but related) night use. What is behind this hybrid concept? Paul explains:

*Because I want to create consumer brand companies ... I need to make a statement. I wanted to run events where the word “Blade” as an incubator, becomes familiar to many people. I want every engineer in Boston to know about Blade. I want every user interface designer to know about Blade, every marketer. So I wanted to make a big statement for the space itself and then run networking events that have DJs or live bands, and sometimes performance art. Those are the two things that happen during Blade events. I want it to be memorable so people think about us, that we’re doing something bold in terms of a new way to think about technology in Boston. (Paul English, Co-founder of Blade)*

English does not mince words. Certainly the concept is about creating “buzz,” but it also points to confidence in the ability of Boston talent to tackle a problem -- to become successful producers of consumer brands, which takes not just technical skills, but also a keen understanding of society’s changing relationship with technology and zeitgeist. The Blade space serves as a model of transformation. Bringing disparate parts of the Boston community together, to promote a new type of technological-creative interaction, may well generate the hybridity he intends to cultivate.
7) Small Business InnoLoft, an in-house accelerator program hosted by Constant Contact

Location: Waltham, MA

Constant Contact, which provides email, social media, and event marketing tools to small businesses, was once a startup itself, launched in an attic in Brookline in 1998. It went public in 2007, and now employs approximately 1,100 people globally. Key members of its founding team continue to play leadership roles within the company. Today, the company is based in Waltham; from the standpoint of core criteria, it stands as a counterfactual to my hypothesis about the value of age-diverse districts (and at this point, it has evolved far past the startup stage). In 2014, Constant Contact converted 30,000 square feet of space to accommodate an in-house accelerator program that hosts four to six small businesses for a four-month period and specifically sets out to help established, small businesses scale up. What Constant Contact is doing with the InnoLoft concept and the redesign of existing space—which is not a 1920s loft building, but rather a sprawling office building in an office park developed in the 1980s—is quite informative to this research. The InnoLoft draws from many of the programmatic elements of programs such as Mass Challenge. The reconfiguration of space includes a number of thematically designed task oriented workspaces (conference rooms and other spaces) anchored by an open floor work area separated from a main gathering space (made available for use by community...
groups) by transparent glass walls. It draws inspiration from the aesthetic of industrial lofts (although this is more visible on the web site, see fig. 42 than in the actual space). The interior design of meeting spaces takes thematic inspiration in a playful way from the identities of various clients: small businesses and community organizations that are emblematic of the myriad ways in which Constant Contact’s tools are essential. The InnoLoft confirms that ideas percolating in central Boston and Cambridge also impact companies located in the Route 128 corridor, just as some individuals from companies that are located along the Route 128 corridor serve as essential resources (as mentors, judges and advisors) for programs such as MassChallenge. It also confirms, however, that the significance of “loft” changes when it lacks its setting, and this speaks to the power of the relationship between the typology of a building and district, or environment, in which it was generated. Still, new value may be created from the variant, which may still lead to the intended goals of fostering innovation, but perhaps by different paths. This, and other projects, suggests that an increase in coworking spaces (similar to Spaces Zuidas in Amsterdam) within in the urban periphery is likely on the horizon. The ability for these places to provide community, resources, and increased live-work proximity to suburban or exurban residents will be a very good thing. Increased competition will likely put even more pressure on providers to deliver high quality space and services. Such locations are not likely to subverting the city center as the prime location for the exchange of ideas and relationship building; rather, they can function as complementary elements within a more effective network-based system.
8) The Roxbury Innovation Center (located in the Headquarters for the Boston Public School System)

Location: Roxbury Neighborhood, Boston

In July 2014, the Boston Redevelopment Authority issued a request for "ideas, interest, innovation" (RFI) from potential operators of the Roxbury Innovation Center, to be housed within a dedicated space in the new headquarters of the Boston Public Schools (see fig. 43). This project entails an inventive combination of rehabilitation and new construction at the site of the historic Ferdinand Building (1890s/1922) on Dudley Square in the Roxbury neighborhood of Boston. The RFI stated:

As part of the rethinking of the Boston School Department, the City is planning to create The Roxbury Innovation Center ["Innovation Center"] as the first step of looking comprehensively at how innovation could be integrated across all of Boston’s
This project represents the city’s first concerted effort to create a resource dedicated to fostering innovation in a historically underserved neighborhood and could represent a whole new approach to linking “innovation” strategy and community development objectives. The fact that the center has been located within a landmark building (now being transformed to extremely high design specifications) is also significant. It can be seen as a parallel to redevelopment projects in Amsterdam (particularly the Waag and the Pakhuis de Zwijger) that directly link the adaptive use of landmark heritage sites with objectives to foster innovation. In early 2015, Venture Café, the entity that runs the events program at the CIC and District Hall, was selected as the vendor to run the program.

4.5 The Three Cases: Key Lessons, Commonalities and Differences

Table 4 organizes the projects reviewed across all three cities by type and groups them by the sector or sectors leading the efforts: public, private, or public-private-institutional. The first important finding from this analysis is that while there are some noted omissions of project types, a range of project types can be found across all three cities; and many include some degree of cross-sector support or involvement.

Coworking service provision plays a critical role and is one of the most dynamically response site typologies observed in these ecosystems. The absence of private-sector developed coworking space and services in Venice is important to note. The closest a coworking model that is found is the Consorzio Cantieristica Minore Veneziana on Giudecca. This offer a strong model, but it is based on longer-term occupancy of space (following more of a guild-likes organization) than coworking locations found in Amsterdam and Boston. It is also important that Venice lacks a permanent accelerator program (equity or prize-based), in part because these can actively draw in entrepreneurs from other locations. (H-Farm is located beyond the city center.)

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101 Roxbury Innovation Center Request for Ideas, Interest and Innovation from Potential Operators, Issued by the City of Boston, July 9, 2014.
102 The late Mayor Thomas Menino described this as one of the most important projects to his legacy as mayor. Boston Architectural College exhibit opening, September 4, 2013. The project is led by the Dutch architecture firm, Mecanoo, in collaboration with Sasaki Associates.
Table 4. Comparison of project types across all cities

<table>
<thead>
<tr>
<th>Project Types</th>
<th>Venice</th>
<th>Amsterdam</th>
<th>Boston/Cambridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Catalytic projects</td>
<td>Not found</td>
<td>Vondelkerk redevelopment (19xx)</td>
<td>Roxbury Innovation Center at BPS Headquarter (in development)</td>
</tr>
<tr>
<td>NGO led site and program development with public support</td>
<td></td>
<td>Waag Society (1994)</td>
<td></td>
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<tr>
<td>2) Innovation districts</td>
<td>Venice District for Innovation</td>
<td>Amsterdam Innovation Motor District</td>
<td>Boston Innovation District</td>
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<td></td>
<td></td>
<td>Note: not site specific</td>
<td></td>
</tr>
<tr>
<td>3) Temporary occupancy programs (single or multi-site)</td>
<td>Arsenale / Biennale locations discussed as potential sites</td>
<td>Broedplaatsen</td>
<td>None found</td>
</tr>
<tr>
<td>4) Publicly funded incubators (beyond university programs)</td>
<td>Consorzio Incubatori</td>
<td>None found</td>
<td>None found</td>
</tr>
<tr>
<td>5) Science parks (or university-related development functioning as such)</td>
<td>VEGA Science and Technology Gateway</td>
<td>Amsterdam Science Park</td>
<td>MIT</td>
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<tr>
<td>Often involves public &amp; private sectors, plus universities, other NGOs</td>
<td></td>
<td></td>
<td>discussed as a version of the concept</td>
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<tr>
<td>6) Single building multifunctional meeting sites (for meetings/conferences) Public-private-NGO funded</td>
<td>Not found</td>
<td>Pakhuis Zwijger</td>
<td>District Hall (in the Boston Innovation District)</td>
</tr>
<tr>
<td>7) Corporate sponsored innovation sites (participation by agreement or application)</td>
<td>Telecom Italia Future Centre</td>
<td>Not reviewed, but likely present</td>
<td>Constant Contact InnoLoft</td>
</tr>
<tr>
<td>8) Accelerator – equity taking (Often running and collocated with startup education programs as well)</td>
<td>H-Farm in Quarto d’Altino, not Venice</td>
<td>Rockstart (several others noted)</td>
<td>Blade (many others noted)</td>
</tr>
<tr>
<td>9) Public/private sponsored accelerator or competition: prize-based</td>
<td>Digital Venice Camp (2014) run by InnovActionLab</td>
<td>Likely present but not reviewed</td>
<td>Mass Challenge</td>
</tr>
<tr>
<td>10) Private-sector developed coworking and/or colocation sites and services</td>
<td>None found / closest: Consorzio Cantieristica Minore Veneziana</td>
<td>SPACES Herengracht SPACES Zuidas (Numerous others) Distributed locations</td>
<td>CIC, Lab Central, Officio Food Loft, Wework, Workbar, Greentown Labs. (Numerous others) Distributed locations</td>
</tr>
</tbody>
</table>
There is a fundamental difference between “science parks” and similar projects when they are set in an age-diverse context vs. a non-age diverse site that follows highly rationalist planning principles. Certainly sometimes specialized large-scale space is required for research or production activity, but this provides all the more reason to create interstitial space that is attentive to human comfort. It is also important to recognize the real estate development objectives often drive the monumental scale and spatial configuration of such places as much or more than users’ programmatic needs, let alone the broader objective that these places perform as city-like places. For a site to be successful, these interests must be well reconciled. Activities as well as sense of place encountered at the VEGA and the Amsterdam Science Park, both of which have relied primarily on large-scale new construction for development, are radically different compared to the area of Cambridge around MIT. They do not support near the level of casual interaction that occurs around MIT (as well as around the other universities situated in the more urban and more diverse parts of these cities). To encourage it will require much more layering of planned activities, and concurrently, interventions that ameliorate hype-scaled and rigid buildings and places, making them better internally connected as well as interconnected with urban fabric and activities in their broader urban contexts.

The selection of historic places of production and other iconic buildings (often in age diverse districts) for new sites -- especially those chosen for development led by the private sector -- to support entrepreneurship and innovation suggests that associative value is important in this context and/or that the qualities of such locations is persistently recognized as important to performance. It suggests that places layered with meaning are useful to new forms of productivity and entrepreneurial thinking in ways we are only beginning to understand. The Waag, Pakhuis Zwijer and others buildings in Amsterdam; the Lab|Central building in Cambridge; the Design and Innovation building in the Boston Innovation District; and the Ferdinand Building are all representative of this phenomenon. In Venice, the Incubator Ex-Herion and the Telecom Italia Future Centre seem to have this potential, but lack important programmatic elements.

Each city offers examples of how cities function as overlapping networks. Locations that possess permeable borders and dynamic sites, akin to what Jacobs, Lynch and Alexander advocate for, improve social network functionality. Investment in umbrella programs to create and strengthen links between places and their networks may be one of the best ways to help a community build its capacity, so that
physical and virtual components of networks can be even more symbiotic. There is today a vast amount of information available online about how to be an entrepreneur, but because of the force of this deluge, having access to individuals in the real world who can help you navigate, who can connect you to other useful people, or who even go on the journey with you, becomes all the more important.

**Contemporary initiatives, especially when considered in a more comparative context, suggest strategic roles for the public and private sectors.** The three cases raise questions about what roles the public sector and private sector should play in providing funds and program expertise for the development of private enterprise. Without the presence of vested private companies and investors as part of program infrastructure, emerging entrepreneurs will miss the chance to learn from experienced entrepreneurs who have competed successfully in the private market. This is not merely about limiting (unnecessary) spending of public funds. Rather, the larger concern is that programs deliver expertise about operating in the private sector. The public sector can coordinate this, but should not try to be the source of such expertise. This also argues for engaging mentors from different countries (not just from Italy or the Netherlands or the US) who can help entrepreneurs understand the challenges and the opportunities of very different markets.

**These cases affirm the importance of taking an integrated approach, not separating economic development objectives from physical and social objectives of city making.** It really is not possible to promote a strategy to promote entrepreneurship without also addressing fundamental conditions of business, as well as the primary needs of citizens, such as affordable housing, equitable opportunities for education or even functionality of mass transit systems. Entrepreneurship does not happen in a vacuum and its outcomes are not limited to economic outcomes. Now it is important to ask: are entrepreneurs choosing to locate in relationship to organized initiatives? Is it possible to see and even predict the types of districts or urban areas for which entrepreneurs display a disproportional preference? In the next chapter, I will focus on the Boston/Cambridge case and take a more quantitatively analytical approach to these questions. Then in Chapter Six, I will draw evidence from interviews with entrepreneurs and other knowledge holders in Boston/Cambridge area, as well as in Venice and Amsterdam, to gain additional insight about the process of location selection and the value of the locations they choose.
Chapter 5: Analysis of Activity in the Boston / Cambridge Case: Firms and Their Distribution in the Built Environment

5.1 Applying A New Lens

Focusing on the Boston/Cambridge case, the objective for this step in the research is to go beyond analysis of the spatial characteristics (such as centrality, density and proximity to other firms) of firm locations, to also address their relationship to the age-diversity of proximate buildings. In doing so, this step focuses more on describing the qualities of the built environment -- the “context” part of the ecosystem -- than it does on the firm. Building age diversity is important to consider in relationship to specific physical qualities of architecture and the urban environment. As background for this, I describe how qualities of architecture have changed over time and introduce a general strategy of looking at broad changes by era of construction, such that it is possible to generalize about differences between buildings constructed in one era or another. Age diversity is also important, as Jacobs has pointed out, because it often provides the necessary conditions for a robust mix of uses to emerge within a particular district, including new entrepreneurial ventures (Jacobs, 1961, 188).

For a subset of firms in Boston/Cambridge, I will provide a direct answer to the first part of the research question: Are firms disproportionally choosing historically diverse districts? First, however, it is necessary to discuss some general difference in building quality and construction that are observable over time, as these underpin my hypothesis and my analytical approach. Then I outline the key steps in my investigation. Then for each step, I provide further description of the step and reveal the findings it generated. I begin the steps by presenting evidence at the regional level to show findings for all firms and to confirm a general trend of an increase in the proportion of firms locating centrally, before looking explicitly at new firms identified (by way of industry classification code) as belonging to the information and technology (ICT) and/or the creative industries (CI) sectors.

5.2 Returning to the Hypothesis

From my field observations, it appears that ICT and CI firms may be choosing age-diverse districts. I hypothesize that such districts are important to entrepreneurial firms in part because they offer a particular set of qualities, or quality of place. Further, I believe these firms may actually be displaying a
direct preference for districts that include higher than average counts of commercial and industrial buildings from the 1880-1935 era because such buildings possess particularly desirable qualities, while also often indicating (and contributing to) certain district level qualities: relative centrality, mid-rise density and proximity to the maritime waterfront, all of which bode well for encouraging a mixed-use, walkable environment.

One way of examining historical diversity is by looking at buildings by era of original construction. Given general changes in characteristics of architecture over time, it is possible to define five eras dominated by different general construction and systems characteristics (see Table 5); these will be the basis for my investigation of building age diversity. Changes over time are not merely about building technology (including construction materials, methods, scale, building systems) or “style,” but rather are also indicative of the “total performance” of architecture, which includes environmental, economic, technical, social and aesthetic aspects (see fig. 44). Additionally, technological changes happen, or are incorporated, at different rates in different locations. Thus, not all buildings from these periods possess the identified characteristics. Still, the fact many common attributes in building stock are found makes it useful as a construct. As maritime cities, technological changes in boat and ship construction often have an impact on the development of the built environment in these cities. For example, the need to advance technology for ships used in a military context has produced certain innovation in construction (welding instead of riveting; mass production of ships), energy production and distribution, as well as electronic sensing (radar/sonar, GPS systems), which have been subsequently utilized in construction of land-based, non-military building construction or development of urban systems.

Figure 44. Examples of buildings in Boston/Cambridge from different building eras. Note the office tower far right sits atop loft buildings from the 1890s.
<table>
<thead>
<tr>
<th>Year Range</th>
<th>Classification</th>
<th>Construction and System Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-1825 (more than 55 years)</td>
<td>Pre-industrial</td>
<td>Buildings made by hand and with manual machinery; impact of steam power not yet present</td>
</tr>
<tr>
<td>1825-1879 (55 years)</td>
<td>Industrial</td>
<td>Wood frame and load bearing masonry; building construction and building uses impacted by steam technology</td>
</tr>
<tr>
<td>1880-1935 (55 years)</td>
<td>Industrial and early modern</td>
<td>Larger scale factories and warehouses; iron and steel frame construction become more common (curtain wall technology); building construction and building uses impacted by electricity; elevators</td>
</tr>
<tr>
<td>1936-1991 (55 years)</td>
<td>Modern</td>
<td>Lighter and faster construction, pervasiveness of elevator supports taller buildings; HVAC impacted building envelope design; electronic communication systems (telephone and television/video) and nascent computing impact building construction and building uses.</td>
</tr>
<tr>
<td>1992-present (22 years; 21 years of data)</td>
<td>Digital</td>
<td>Digital computing, electronic mail, the internet and cloud-based systems impact building construction and building uses. Also: LEED building rating introduced</td>
</tr>
</tbody>
</table>

**Why buildings from the 1880 to 1935 era may be particularly attractive**

The shift from the Industrial to the Modern era can be thought of as a series of changes, many occurring between the 1880s and 1920s. While World War I (between 1914 and 1918) ushered in much technological change, it was not until after the war that cities were able to focus on urban development to implement these changes, either through dedicated rebuilding (after war-time destruction) or to address pent up demand for new buildings, when labor and building materials could be dedicated to urban development (and infrastructure) rather than war-time readiness and defense.

Several important points can be made about the general characteristics of buildings constructed during the time period from 1880-1935:

1) This was period of notable wealth and global access to natural materials, particular for Amsterdam and Boston. As a result, the general quality of construction and quality of materials is often higher than, for instance, buildings constructed after the 1929 global recession.
2) Predating modern building systems such as HVAC, industrial and early modern buildings often relied upon load-bearing construction, natural light, natural ventilation, and the use of natural materials.

3) Buildings serving warehouse or manufacturing functions were robust and usually not highly decorative (though this could vary) but they often possessed modest ornament conveying iconographic meaning and are noted for the quality of construction, particularly in the case of masonry that was, for the most part, still set by hand. Tall ceilings, large open floor plates (punctuated only by structural piers) and sturdy structure now make these buildings highly flexible for the accommodation of new uses. Stores, workshops and other services of this time period were often smaller in scale and were distributed throughout cities for convenience.

4) The architecture of office buildings and of banks from this time period was often “proto-modern,” reflecting emerging concepts of management theory (Taylorism) that resulted in distinct and hierarchical organization of interior space, but still often relied on passive systems (such as operable windows for air flow). They often included extensive iconographic ornament. Many of these buildings have persisted in use, but as Modernism began to permeate society, the functionality of these buildings was often deemed “out of date,” and the companies that occupied them often relocated to newer, modern buildings. Disuse of such building also often reflect broad organizational changes in particular industries, such as in the commercial banking industry, which has, since the 1970s, shifted to a more disaggregated model of branch banking.

5) Often large and important merchant homes or institutional buildings from earlier time periods were retained in this time period (in part due to their familial value or social legacy), though they may have been modified to incorporate new technology (such as electricity) and new stylistic concepts. New homes and institutions were also constructed in Amsterdam and Boston/Cambridge in this time period, while many fewer were constructed in Venice by comparison. Tenement housing and other small scale, but high density housing (often wood construction) existed during this period, but was gradually replaced with masonry construction as a result of devastation from fires and/or because land occupied was deemed valuable for real estate development.
5.3 Key Steps in the Model

The primary steps in this investigation are as follows:

1. Define entrepreneurial firms and identify them in available data. (These will now be referred to as “firms”.) Assembly a dataset comprised of the individual addresses of firm locations. These individual locations can then be utilized as “point data.”

2. Source base data about the region city (geographic features, municipal boundaries, roadways, etc.) and cities (building and parcel data, etc.).

3. Examine the distribution of firms (point data) at the regional level.

4. Narrow the point data to only those firms located in Boston or Cambridge.

5. Moving to the city level, define equitable “bins” by applying a polygon grid over the entire area of Boston and Cambridge parcels.

6. Identify key variables about land use and building stock.

7. Aggregated data about the built environment so that it describes “bin level” parameters.

8. Overlay the point data with built environment data aggregated at the bin level, so that both types of data can be used in a statistical model.

9. Analyze the relationship between chosen locations and location variables (including building age diversity) using a discrete choice statistical model.

Below I describe additional details and the key findings revealed at each step.

Step 1: Define entrepreneurs and identify them in available data.

The first question is how to identify ICT and CI entrepreneur in available data? I utilize a set of code groups established by Rutten (2011), to identify ICT and CI firms in data assembled by the Netherlands, translating these to the American equivalents in the North American Industry Classification Code (NAICS). I then further identify in the data those firms that were established from 2009-2013 (the last year of fully available data at the time I assembled the model). The parameters used for selecting an initial set of firms from the Reference USA dataset include (see Table 6):
Table 6

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
<td>Identified as a Headquarters or Single Location</td>
</tr>
<tr>
<td>Distance from Center</td>
<td>Location within 30 miles of the center of Boston (designated at 69 Beacon Street, the address for the west edge of the Boston Common)</td>
</tr>
<tr>
<td>Industry</td>
<td>Possessing a primary North American Industry Classification System (NAICS) code corresponding to one of the 47 codes matching, via indexing, the Dutch (SBI) codes determined by Rutten (2011) to identify ICT or Cl firms.</td>
</tr>
<tr>
<td>Veracity</td>
<td>Verified and Unverified. This descriptor is designated by Reference USA. Most of the data that Reference USA makes available is unverified; I therefore opt to include both verified and unverified data.</td>
</tr>
<tr>
<td>Time</td>
<td>All time periods. I then further filter from these results to compare the initial results with results for firms established 2003 or later, and then with firms founded only in the 2009 to 2013 time period.</td>
</tr>
</tbody>
</table>

Step 2: Source base data about the region city (geographic features, municipal boundaries, roadways, etc.) and cities (building and parcel data, etc.).

For data about the built environment, I accessed regional level data, as well as parcel data and property tax information, along with other key GIS data layers from the City of Boston and the City of Cambridge, along with other data about the built environments. (See appendix for details.) A major time allocation in this process was formatting the parcel data of the two cities so that it could be combined into one common dataset, so that Boston and Cambridge could be viewed and analyzed collectively.

Step 3: Examine distribution of firms (point data) at the regional level

I report locations by five-mile wide concentric zones, in order to determine if there are discernable patterns of distribution. Reporting by zone (0-5 miles from center, etc.), the following results are produced (see table 7):

---

103 See appendix 2 for the code index and some discussion about its usefulness.
Table 7

**Tallies of Companies (headquarters and single locations) listed as located in 30 miles of Boston**

<table>
<thead>
<tr>
<th>Headquarters + Single Locations, All Industry Codes</th>
<th>All Time</th>
<th>Subset: 2003 to 2013</th>
<th>Subset: 2009 to 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-30 Miles (Zone 6)</td>
<td>50,676</td>
<td>557</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>20-25 Miles (Zone 5)</td>
<td>61,139</td>
<td>623</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13%</td>
<td>8%</td>
</tr>
<tr>
<td>15-20 Miles (Zone 4)</td>
<td>60,040</td>
<td>686</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>10-15 Miles (Zone 3)</td>
<td>71,448</td>
<td>916</td>
<td>219</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16%</td>
<td>14%</td>
</tr>
<tr>
<td>5-10 Miles (Zone 2)</td>
<td>79,490</td>
<td>868</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>0-5 Miles (Zone 1)</td>
<td>134,217</td>
<td>1,850</td>
<td>688</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>457,010</td>
<td>100%</td>
<td>1,551</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Headquarters + Single Locations, limited to 47 &quot;ICT &amp; Cl&quot; codes</th>
<th>All Time</th>
<th>Subset: 2003 to 2013</th>
<th>Subset: 2009 to 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-30 Miles (Zone 6)</td>
<td>8,112</td>
<td>125</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12%</td>
<td>5%</td>
</tr>
<tr>
<td>20-25 Miles (Zone 5)</td>
<td>9,422</td>
<td>137</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14%</td>
<td>7%</td>
</tr>
<tr>
<td>15-20 Miles (Zone 4)</td>
<td>9,419</td>
<td>169</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>10-15 Miles (Zone 3)</td>
<td>11,114</td>
<td>222</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16%</td>
<td>14%</td>
</tr>
<tr>
<td>5-10 Miles (Zone 2)</td>
<td>12,401</td>
<td>188</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18%</td>
<td>13%</td>
</tr>
<tr>
<td>0-5 Miles (Zone 1)</td>
<td>18,096</td>
<td>504</td>
<td>216</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26%</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>68,564</td>
<td>1,345</td>
<td>456</td>
</tr>
</tbody>
</table>

|                                                                  |          | 100%                 | 100%                 |

*Source:* Data obtained from Reference USA, based upon primary NAICs (NAICS 2007)

*Note (1)* Based on Rutten, 2011.

**Finding:** This reveals an increasing preference for central locations over time, especially for ICT and CI firms. Examining by all industry codes, I observe a greater proportion of firms located in Zone 1 than in other zones and the proportion increases when the time filter is applied, first limited to firms founded in 2003 or after, and then limited to firms founded in the 2009 - 2013 time period. Firms established in 2014 are not yet reported in the data set. When I add the additional filter to limit results to firms with
industry classification codes in the Rutten code group, I see similar trending that, on a comparative basis, is more pronounced, with 47% of firms founded since 2009 choosing Zone 1, equivalent to the sum of all other zones combined. Since I did not track relocation for all firms, it is not possible to assume that firms choosing a central location (or any location) stay there over time, but this analysis at least confirms a general patterns regional level distribution as well as shift in preferencing over time. Further, it should be pointed out that although the zone bands are sized to consistently five miles in width, the actual area of zone coverage increases as the zone number increases, as these are concentric zones. Thus, in zone 1 the largest proportions of firms in observed in the smallest (most central) area analyzed.

Based upon this initial finding, I further limit analysis to the 431 ICT and CI firms founded since 2009. I map this data so as to undertake complementary visual analysis. Since some points cover others, it is made more legible by “binning” the data, to reveal areas of aggregation, which results in the following map. Note that there are firms beyond the 30 mile radius; they are not included on this map due to the data download limitations (see Appendix Three, Research Methodology) (see fig. 45). Pockets of suburban concentrations and some concentration along major roadways, such as route 128 and 495, are visible. These include locations of many research/industrial parks developments from the late 1940s to the present.

104 At this scale, the binning is based only upon a desire for visual legibility. The size of the hexagons does not hold specific value.
I then focus on the more limited 277 located within ten miles of the center of Boston, which comprise 61% of the ICT and CI firms founded since 2009. One additional step is necessary to isolate only those firms located in Boston and Cambridge (for which parcel data is available).

**Step 4: Narrow the point data to only those firms located in Boston or Cambridge**

Now I isolate those firms that overlay to Boston or Cambridge parcels. Here, the mapping plays a key role, because Reference USA lists “city” at a sub-set level for certain localities (such as Roxbury) that are now part of the City of Boston and included in the parcel set. (Another way to confirm inclusion would be to filter by zipcodes, but inspecting by city names is helpful from an interpretive standpoint because it is more visually expedient.) I then inspect the list of firms within a ten-mile radius to ensure the radius extends beyond the parcel boundaries of the city (see fig. 46). From this, a dataset totaling 195 firms is generated. The firms are matched to the parcel data; one is removed because while it listed in Boston, it actually resides in Brookline and for which no parcel information has been obtained for the model (see Table 8).
<table>
<thead>
<tr>
<th>By Location</th>
<th>Firm Counts</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamaica Plain</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Roxbury</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Charlestown</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Roxbury Crossing</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Dorchester</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>West Roxbury</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Roslindale</td>
<td>4</td>
<td>1.5%</td>
</tr>
<tr>
<td>Allston</td>
<td>6</td>
<td>2.2%</td>
</tr>
<tr>
<td>Brighton</td>
<td>6</td>
<td>2.2%</td>
</tr>
<tr>
<td>Boston</td>
<td>107</td>
<td>38.9%</td>
</tr>
<tr>
<td><strong>Adjusted Count, Boston</strong></td>
<td><strong>135</strong></td>
<td><strong>49.1%</strong></td>
</tr>
<tr>
<td>Cambridge</td>
<td>59</td>
<td>21.5%</td>
</tr>
<tr>
<td><strong>Boston + Cambridge</strong></td>
<td><strong>194</strong></td>
<td><strong>70.5%</strong></td>
</tr>
</tbody>
</table>

**Remaining Locations**

<table>
<thead>
<tr>
<th>Location</th>
<th>Firm Counts</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belmont</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Braintree</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Chestnut Hill</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Dedham</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lynn</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Melrose</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Milton</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Newtonville</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Revere</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>West Newton</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Winchester</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Auburndale</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Everett</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Malden</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Medford</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Needham Heights</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Newton Center</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Newton Highlands</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Saugus</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Woburn</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td>Arlington</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Stoneham</td>
<td>3</td>
<td>1.1%</td>
</tr>
<tr>
<td>Needham</td>
<td>4</td>
<td>1.5%</td>
</tr>
<tr>
<td>Newton</td>
<td>4</td>
<td>1.5%</td>
</tr>
<tr>
<td>Waltham</td>
<td>5</td>
<td>1.8%</td>
</tr>
</tbody>
</table>
| Location   | Count | %  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quincy</td>
<td>7</td>
<td>2.5%</td>
</tr>
<tr>
<td>Watertown</td>
<td>7</td>
<td>2.5%</td>
</tr>
<tr>
<td>Somerville</td>
<td>8</td>
<td>2.9%</td>
</tr>
<tr>
<td>Brookline</td>
<td>11</td>
<td>4.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>275</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Data Source: Reference USA

Notes:
1. Names that are italicized are actually *neighborhoods* of the City of Boston and are therefore included in the Boston to the summary count for Boston.
2. The difference in the total (277 in Table 6 vs. 275 in Table 6) is due to the removal of duplicates in the inspected data for Boston/Cambridge and one firm location actually in Brookline instead of Boston.

This analysis reveals that 70.5% of the firms from the assembled dataset that are located in a ten-mile radius of the center of Boston reside within the cities of Boston or Cambridge. So while not all firms that are choosing central locations are evaluated here, the majority are considered.

Figure 46. The application of the grid over Boston and Cambridge, after trimming. Map by author.
Step 5: Define equitable “bins” by applying a polygon grid over the entire area of Boston Cambridge parcels.

With a diameter of 2000 feet, the hexagon size is intended to be reasonably emblematic of an urban district, roughly a 15-minute walk across. This size generates a ground area of 2.5 million square feet. The process generates 667 “bins” of equivalent size that any firm might choose when locating Boston or Cambridge. Each bin is assigned an identification number.

Step 6: Identify key variables about land use and building stock.

In this analysis, all building use types are included for analysis -- not merely commercial space or space that is actively available on the market. As many workers now have a higher degree of choice about where to work, some traditional uses of real estate are changing (and in some cases taking on additional uses), including the possibility of operating a business from home, so it is important that all kinds of real estate be considered.

It is difficult to generalize about the frequency of building renovation; long lasting buildings may in fact be renovated several times over. Data about renovation is unavailable or inconsistent for most cities. Even in renovation, fundamental qualities (building structure material and technology, orientation, and other character defining features) are often retained or rehabilitated, such that the majority of internal and site-related performance attributes are still present. There are of course exceptions, but by working with a very large dataset, it is possible to draw conclusions even accounting for the inclusion of such exceptions and some amount of error in the data.

As shown in Table 9, I use the five distinct eras discussed at the beginning of this chapter and link them with six distinct land use codes aggregated from the parcel data to generate a composite variable type based upon building era + land use. I name this ERALU. The composite structure generates 30 types. Types 14 and 15 most directly correspond to my hypothesis and will henceforth be referred to as ERALUHOT for which a distinct variable has been created to count the number present for each district.
## Table 9

*Categorical variables created to describe building use and era of building construction*

<table>
<thead>
<tr>
<th>Type</th>
<th>Era</th>
<th>Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1700-1824</td>
<td>Residential</td>
</tr>
<tr>
<td>2</td>
<td>1700-1824</td>
<td>Commercial (Office + Retail)</td>
</tr>
<tr>
<td>3</td>
<td>1700-1824</td>
<td>Industrial (Factory + Warehouse)</td>
</tr>
<tr>
<td>4</td>
<td>1700-1824</td>
<td>Tax-exempt</td>
</tr>
<tr>
<td>5</td>
<td>1700-1824</td>
<td>Mixed use</td>
</tr>
<tr>
<td>6</td>
<td>1700-1824</td>
<td>Agricultural / Horticultural</td>
</tr>
<tr>
<td>7</td>
<td>1825-1879</td>
<td>Residential</td>
</tr>
<tr>
<td>8</td>
<td>1825-1879</td>
<td>Commercial (Office + Retail)</td>
</tr>
<tr>
<td>9</td>
<td>1825-1879</td>
<td>Industrial (Factory + Warehouse)</td>
</tr>
<tr>
<td>10</td>
<td>1825-1879</td>
<td>Tax-exempt</td>
</tr>
<tr>
<td>11</td>
<td>1825-1879</td>
<td>Mixed use</td>
</tr>
<tr>
<td>12</td>
<td>1825-1879</td>
<td>Agricultural / Horticultural</td>
</tr>
<tr>
<td>13</td>
<td>1880-1935</td>
<td>Residential</td>
</tr>
<tr>
<td>14</td>
<td>1880-1935</td>
<td>Commercial (Office + Retail)</td>
</tr>
<tr>
<td>15</td>
<td>1880-1935</td>
<td>Industrial (Factory + Warehouse)</td>
</tr>
<tr>
<td>16</td>
<td>1880-1935</td>
<td>Tax-exempt</td>
</tr>
<tr>
<td>17</td>
<td>1880-1935</td>
<td>Mixed use</td>
</tr>
<tr>
<td>18</td>
<td>1880-1935</td>
<td>Agricultural / Horticultural</td>
</tr>
<tr>
<td>19</td>
<td>1936-1991</td>
<td>Residential</td>
</tr>
<tr>
<td>20</td>
<td>1936-1991</td>
<td>Commercial (Office + Retail)</td>
</tr>
<tr>
<td>21</td>
<td>1936-1991</td>
<td>Industrial (Factory + Warehouse)</td>
</tr>
<tr>
<td>22</td>
<td>1936-1991</td>
<td>Tax-exempt</td>
</tr>
<tr>
<td>23</td>
<td>1936-1991</td>
<td>Mixed use</td>
</tr>
<tr>
<td>24</td>
<td>1936-1991</td>
<td>Agricultural / Horticultural</td>
</tr>
<tr>
<td>25</td>
<td>1992-2013</td>
<td>Residential</td>
</tr>
<tr>
<td>26</td>
<td>1992-2013</td>
<td>Commercial (Office + Retail)</td>
</tr>
<tr>
<td>27</td>
<td>1992-2013</td>
<td>Industrial (Factory + Warehouse)</td>
</tr>
<tr>
<td>28</td>
<td>1992-2013</td>
<td>Tax-exempt</td>
</tr>
<tr>
<td>29</td>
<td>1992-2013</td>
<td>Mixed use</td>
</tr>
<tr>
<td>30</td>
<td>1992-2013</td>
<td>Agricultural / Horticultural</td>
</tr>
</tbody>
</table>

*Note: Land Use is based on property type (land use) codes used by the City of Boston and an indexed version of State Land Use Codes (Property Occupancy Codes) used by the City of Cambridge.*
Step 7: Associate point data with the defined bins and perform counts

![Map of Boston/Cambridge with number of firm counts by bin indicated. Map by author.](image)

Figure 47. Map of Boston/Cambridge with number of firm counts by bin indicated. Map by author.

**Identify and examine bins (and underlying districts) with high firm counts**

Having combined parcel data for Boston and Cambridge, I examine distribution of firms by bin and generate a table for those bins with the highest firm counts (see table 10). Here the variation of parcel counts should be noted; it should also be noted that parcel count is not necessarily correlated with building density. I have identified district names commonly attributed to the areas upon which I have overlaid the hexagonal bins. A one-to-one relationship is not implied. Some hexagons include areas commonly attributed to one or more “real” districts or neighborhoods. It is also the case that the boundaries of many named districts, such as Kendall Square or Downtown Crossing, are debated. As Lynch revealed in the *Image of the City* (1960), this is true in many cities. The point here is to start to obtain a relative idea of differences in bin attributes, especially since these are arbitrary constructions.
### Table 10

**Firm Counts by Bin/District**

<table>
<thead>
<tr>
<th>Bin ID #</th>
<th>Firm count</th>
<th>Names commonly attributed to bin areas</th>
<th>City</th>
<th>Parcel count</th>
<th>Density (Total SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1670</td>
<td>10</td>
<td>Downtown Crossing</td>
<td>Boston</td>
<td>194</td>
<td>11,846,403</td>
</tr>
<tr>
<td>1751</td>
<td>10</td>
<td>Fort Point</td>
<td>Boston</td>
<td>83</td>
<td>4,635,731</td>
</tr>
<tr>
<td>1508</td>
<td>10</td>
<td>3rd &amp; Main Street</td>
<td>Cambridge</td>
<td>44</td>
<td>1,596,270</td>
</tr>
<tr>
<td>1711</td>
<td>9</td>
<td>Financial District / International Place</td>
<td>Boston</td>
<td>169</td>
<td>19,386,794</td>
</tr>
<tr>
<td>1587</td>
<td>8</td>
<td>Newbury / Boylston</td>
<td>Boston</td>
<td>179</td>
<td>8,183,834</td>
</tr>
<tr>
<td>1671</td>
<td>7</td>
<td>State Street / Government Center</td>
<td>Boston</td>
<td>110</td>
<td>10,818,119</td>
</tr>
<tr>
<td>1222</td>
<td>7</td>
<td>Harvard Square</td>
<td>Cambridge</td>
<td>105</td>
<td>2,120,560</td>
</tr>
<tr>
<td>1710</td>
<td>6</td>
<td>Ladder District / South Station</td>
<td>Boston</td>
<td>62</td>
<td>10,508,315</td>
</tr>
<tr>
<td>1672</td>
<td>5</td>
<td>Bulfinch Triangle/Blackstone Block</td>
<td>Boston</td>
<td>244</td>
<td>5,240,187</td>
</tr>
<tr>
<td>1466</td>
<td>5</td>
<td>Marriot Complex near Kendall Square T</td>
<td>Cambridge</td>
<td>42</td>
<td>1,009,217</td>
</tr>
<tr>
<td>1669</td>
<td>4</td>
<td>Chinatown / Ladder District</td>
<td>Boston</td>
<td>289</td>
<td>5,288,449</td>
</tr>
<tr>
<td>1343</td>
<td>4</td>
<td>Cambridgeport (West Cambridge)</td>
<td>Cambridge</td>
<td>279</td>
<td>1,740,211</td>
</tr>
<tr>
<td>1509</td>
<td>4</td>
<td>Upper Third Street (East Cambridge)</td>
<td>Cambridge</td>
<td>518</td>
<td>2,105,126</td>
</tr>
</tbody>
</table>

**Finding:** eight of the highest count bins are found in Boston, five are located in Cambridge.

Bin #1711, which includes the buildings known as “International Place” has the highest cumulative square footage of any bin, at 19.3 million square feet, while the mean square footage for all bins is 9.8 million square feet. In fact no other bin surpasses 12 million square feet. Further, the range of square footages for bins with the highest firm counts is quite variable. Both facts lend further support to the idea that, while density plays a role in predicting firm counts, other conditions besides building density are important. Further, it suggests that there is a range of density that is more likely to include high count firms, and that the relationship between counts and density is not linear.
In the center of the map above (see fig. 48), Bin #1670 ("Downtown Crossing") is visible; it is one of the three bins in which ten of the firms from the dataset are located; is also surrounded by many other high-count bins. Here is it possible to start to see visually the discrete locations of firms (shown as red points or red and green when co-located). Aside from the extreme centrality and transit accessibility of this location (including proximity to South Station), as well as relative proximity to the maritime waterfront and the Common, it is important to note the presence of the ERALUHOT building type (industrial and commercial buildings from the 1880-1935 period), color coded in pink.
Bin #1751 ("Fort Point") is shown at center in the map above (see fig. 49). Compared to bin #1670 ("Downtown Crossing"), this location is less central and less well served by transit, although relatively well served. It maintains a direct relationship to the waterfront and, may also benefit from surface parking and direct access to the highway. Further, it contains more buildings of the ERALUHOT type, including the industrial loft buildings constructed by the Boston Wharf Company.
Figure 50. Bin #1508 ("Third and Main") in Cambridge is another high-count bin, with the majority of firms located at the Cambridge Innovation Center. Map by author.

Bin #1508 ("Third and Main") is shown at center in the map above (fig. 50). It is the only Cambridge bin among the three with the highest counts. Like the other two areas, it is well served by transit and includes direct waterfront access. The Broad Canal remains a major orienting device in the urban landscape. Here the urban fabric is quite different and contains far fewer ERLUHOT buildings, although some are present. It is also important to note that this bin, is proximate to MIT and forms part of the linkage between Kendall Square and East Cambridge. Further includes the building in which the Cambridge Innovation Center (coworking space) is located and a number of firm locations -- in fact, the majority shown -- are associated with it. This suggests that what they offer programmatically, combined with the advantages of proximity to MIT and other resources, as well as good transit access, is substantial enough that it makes up for certain qualitative conditions at the building level and district...
level. This will be investigated further in Chapter Six, as several entrepreneurs interviewed worked from and/or discussed the role of CIC in the Boston/Cambridge ecosystem.

**Step 8. Create additional bin-level variables and examine descriptive statistics for bins**

Once the dataset for all bins is assembled, I generate a variable for mean age of each bin, based upon reported building years within the bins and a variable for the count of distinct building years by bin.\textsuperscript{105} This method of measuring building age diversity does not preference diversity associated with a particular era or determine the distribution, or standard deviation, of building years. It is just a raw count. It is assembled this way for several reasons: it is designed as a starting point for investigation; it avoids the problems of skewed distributions arising from missing building years, and because the ERALUHOT variable is also included in the analysis.

**Create additional categorical variables based on age/diversity**

I generate a second set of composite variables, based upon the mean of the bin year compared to the mean of all other bins, as well as the count of building years compared to all other bins (see Table 8). This allows for a broad-brush comparison of bins in which it is possible to categorize all bins into one of four groups. It generates the following results (see Table 11).

<table>
<thead>
<tr>
<th>Group A: “Olddiv”</th>
<th>Group C: “Newdiv”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older than mean bin age +</td>
<td>Newer than the mean bin age +</td>
</tr>
<tr>
<td>More age diverse than the mean bin</td>
<td>More age diverse than the mean bin</td>
</tr>
<tr>
<td>14% of bins</td>
<td>24% of bins</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group B: “Oldnotdiv”</th>
<th>Group D: “Newnotdiv”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older than the mean bin age +</td>
<td>Newer than the mean bin age +</td>
</tr>
<tr>
<td>Less age diverse than the mean bin</td>
<td>Less age diverse than the mean bin</td>
</tr>
<tr>
<td>43% of bins</td>
<td>19% of bins</td>
</tr>
</tbody>
</table>

Source: Based upon parcel data from the City of Boston and the City of Cambridge

\textsuperscript{105} In the appendix I describe why not normalizing by parcel count is the preferred option.
The descriptive statistics for all bins can now be reported (see table 9) and correlations between key variables observed (see table 12).

Table 12

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>firmcount</td>
<td>667</td>
<td>0.2908546</td>
<td>1.099805</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>dist_center</td>
<td>666</td>
<td>21441.61</td>
<td>11048.47</td>
<td>817</td>
<td>48844</td>
</tr>
<tr>
<td>dist_ocean</td>
<td>666</td>
<td>11356.75</td>
<td>8959.973</td>
<td>17</td>
<td>32943</td>
</tr>
<tr>
<td>parcounter</td>
<td>667</td>
<td>168.4978</td>
<td>153.9917</td>
<td>1</td>
<td>769</td>
</tr>
<tr>
<td>land_sf</td>
<td>667</td>
<td>2004426</td>
<td>4116417</td>
<td>0</td>
<td>1.02E+08</td>
</tr>
<tr>
<td>gross_area</td>
<td>667</td>
<td>981935.4</td>
<td>1326746</td>
<td>0</td>
<td>1.94E+07</td>
</tr>
<tr>
<td>grossdec</td>
<td>667</td>
<td>0.9819354</td>
<td>1.326746</td>
<td>0</td>
<td>19.38679</td>
</tr>
</tbody>
</table>

ave_yrbltz  625  1929.403  20.5478  1880  2004
older        625  0.568    0.4957512 0     1
numofdistyrs 667  28.65067| 21.27673 0      94
more_distinc 667  0.3583208| 0.4798669 0      1
eralzhot     667  101.8291| 110.8032 0      615
eraluhot     667  7.026987| 14.00812 0      123

olddiv       625  0.1408  0.3480937 0      1
oldnotdiv    625  0.4272  0.495068 0      1
newdiv       625  0.2416  0.4283959 0      1
newnotdiv    625  0.1904  0.3929311 0      1

Note: Not all buildings ages are reported in this dataset, in which case the parcel is simply not included. For this reason, results are reported for 625 of the 667 districts. No imputing was undertaken at this time.

The mean year built for buildings in bins, based upon year-built information for parcels aggregated at the district level, is 1929, with a standard deviation of 20.5. The year built range is between 1880 and 2004. (When calculating mean year built based upon all parcel data for Boston and Cambridge, but not aggregating at the bin level, the range of building years reported is between 1700 and 2013, while the mean year built for all parcels 1921, with a standard deviation of 30.) The mean parcel count by bin is 168, with a standard deviation of 154. This high standard deviation is emblematic of the great range in the size of buildings present in the Boston and Cambridge, but is also indicative of the fact that some bins are partially sited over parks or water. All districts have at least 1 parcel, or were otherwise
omitted from the choice set. The count range for ERALUHOT buildings by bin is between 0 and 123, while the mean 7 and the standard deviation is 14; this suggests the presence of some critical outliers.

Table 13.

<table>
<thead>
<tr>
<th>Correlations between key variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>-0.2976</td>
</tr>
<tr>
<td>-0.1391</td>
</tr>
<tr>
<td>0.4187</td>
</tr>
<tr>
<td>0.0224</td>
</tr>
<tr>
<td>0.031</td>
</tr>
<tr>
<td>0.0285</td>
</tr>
<tr>
<td>0.0002</td>
</tr>
<tr>
<td>-0.0639</td>
</tr>
<tr>
<td>0.6471</td>
</tr>
</tbody>
</table>

Interpretation of correlations

Of the correlations observed (see Table 13), the largest positive correlation is between firm count (FIRMCOUNT) and gross building area (GROSSDEC), which is not unexpected. The correlation coefficient is .6471. Firm count is inversely correlated with distance from center and distance from ocean, as expected. The correlation between firm count and ERALUHOT, which is .4187, is also high compared to other observed variables. The correlation coefficient for ERALUHOT is also greater than any categorical variables associated with mean age + mean count of building years. This suggests that it is not merely age diversity that may be important, but in this case, preferences for buildings of the ERALUHOT type, and/or districts containing them.

The mean age + mean building year composite variables do not produce strongly positive or negative correlations, although it is interesting to note that the variable (NEWNOTDIV) that serves to identify 106 Both the variables of “distance from ocean” and “distance from water” were considered. Distance from ocean is more relevant to this research. Also note: transit access is so addressed, to some degree, by the distance from center variable.

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districts that are newer than mean district age and less age diverse than the mean district has a negative coefficient, that is, it shows a slight inverse relationship to firm count.

Step 9: Analyze the relationship between chosen locations and location variables (including building age diversity) using a discrete choice statistical model.

My analysis will be limited to the use of the Poisson model (see Appendix Two for background on this selection) and I have elected to apply the “Zero-inflated” Poisson model, a particular type of Poisson model that is applicable when there is an excess, or large number, of choices (bins) in the choice set that receive a count of zero. That is the case for Boston/Cambridge, where some bins have high firm counts and many bins have no firms at all. Using this model ensures that I can maintain the entire geographic area of Boston/Cambridge as possible location choices without the risk that these zeros will disrupt the model. Keeping the zero count bins in the choice set is important, especially when examining relative “boundaries” of entrepreneurial activity, and so that it is possible to distinguish between expected and unexpected zeros. For instance, a count of zero firms would be expected for bins that are predominantly residential, whereas a count of zero firms would be unexpected for a bin that is mixed use. That noted, a low firm count may also be an indication of newly emerging activity (or decline); in order for either such conditions to be confirmed; it is not possible to say from this data. It would be necessary to examine the firm location data in the context of other data. Preserving the zero count information is also useful so that the base dataset can be used for (future) longitudinal analysis, to see how activity changes over time.
Table 14

Description of Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROSSDEC</td>
<td>Gross building square footage, measured in millions of square feet</td>
</tr>
<tr>
<td>DIST_CENTER</td>
<td>Distance from center, measured in feet</td>
</tr>
<tr>
<td>MORE-DISTC</td>
<td>Building Age Diversity, a categorical variable (yes=1, no=0)</td>
</tr>
<tr>
<td>ERALUHOT</td>
<td>The numeric count of commercial, industrial, or mixed use buildings from the 1880-1935 period (Types 14, 15, and 17 from table 7)</td>
</tr>
</tbody>
</table>

Based upon the preliminary analysis and review of reported correlations, I select variables for inclusion when applying the Poisson model to predict firm count (FIRMCOUNT) by bin (see Table 14). In effort to limit the degrees of freedom in the model, I omitting the distance form ocean variable (DIST_OCEAN), because is correlated with distance from center (DIST_CENT). Using the Zero-inflated Poisson Regression model,\(^{107}\) I generate the following results, starting with the vuong option to provide a test of the zero-inflated model versus the standard Poisson model (see Table 15).

Table 15

Zero-inflated Poisson Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Base model</th>
<th>Model with robust standard errors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>Std. Error</td>
</tr>
<tr>
<td>GROSSDEC</td>
<td>0.111</td>
<td>0.018</td>
</tr>
<tr>
<td>MORE-DISTC</td>
<td>1.012</td>
<td>0.189</td>
</tr>
<tr>
<td>ERALUHOT</td>
<td>0.015</td>
<td>0.003</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>-0.637</td>
<td>0.192</td>
</tr>
<tr>
<td>DIST_CENTER</td>
<td>0.0001194</td>
<td>0.0000176</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>-0.753</td>
<td>0.324</td>
</tr>
</tbody>
</table>

Total number of observations 666
Zero observations 581
\(\chi^2(3)\) 76.00 (p<0.000)
Vuong test \(z = 3.96\) (p<0.000)

Note. The dependent variable is FIRMCOUNT. Logit link function is used for the inflation model. The DIST_CENTER variable is used in the model for the inflated zero component.

Interpreting results

The total number of observations reported is 666, of which 85 are districts that have firm counts that are not equal to zero. The model, as a whole, is statistically significant, and the Vuong test produces a significant Z-test, indicating that this data is better suited to the zero-inflated model than a non-zero inflated model. I rerun the model with the vce(robust) option. The coefficients can be interpreted as follows: for each unit increase of gross area in square feet (GROSSDEC), the expected log count of the firm count increases by .11. Being a more age distinct district increases the expected log count by 1.01. For each unit increase in the ERALUHOT count, the expected log count of the firm count increases by .015. The inflated coefficient for distance from center (DIST_CENTER) suggests that for each unit (ft) increase in distance, the log odds of an inflated zero increases by .0001. This also suggests it might be useful to change the scale of distance from center to miles or to treat it as a categorical variable.

Table 16

<table>
<thead>
<tr>
<th>Variable</th>
<th>Expected firm count</th>
<th>Std. Error</th>
<th>p</th>
<th>Evaluated at</th>
</tr>
</thead>
<tbody>
<tr>
<td>MORE_DISTC</td>
<td>= 0</td>
<td>0.092</td>
<td>0.018</td>
<td>0.000</td>
</tr>
<tr>
<td>MORE_DISTC</td>
<td>= 1</td>
<td>0.254</td>
<td>0.058</td>
<td>0.000</td>
</tr>
<tr>
<td>MORE_DISTC</td>
<td>(difference)</td>
<td>0.162</td>
<td>0.054</td>
<td>0.003</td>
</tr>
<tr>
<td>ERALUHOT</td>
<td>= 1</td>
<td>0.132</td>
<td>0.024</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>= 2</td>
<td>0.282</td>
<td>0.040</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>= 3</td>
<td>0.603</td>
<td>0.172</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>= 4</td>
<td>0.362</td>
<td>0.069</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>= 5</td>
<td>0.775</td>
<td>0.199</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>= 6</td>
<td>1.659</td>
<td>0.684</td>
<td>0.015</td>
</tr>
</tbody>
</table>

I then use margins so that firm count can be related to age diversity and the presence of the ERALUHOT type, while holding other variables constant (see Table 16). I compute the expected counts for the categorical variable describing building age diversity (MORE_DISTINC) while holding the continuous variables for gross building square footage (GROSS_DEC) as well as ERALUHOT and distance from center (DIST_CENTER) at their mean values. The expected count for the number of firms in a bin that is less age diverse than the average bin is .0924982, while for bins that are more age diverse than the average, it is

108 The 667th hexagon district, by virtue of program error or user error, was deleted from the GIS model and therefore received no parcel assignments. I identified its location; it is composed primarily of exempt land and has a firm count of zero.
.2544214 at the means of the other variables. *Holding other variables constant, the age diversity of a bin predicts more firms.* Computing the difference in expected counts for bin based on age diversity while still holding the other variables at their means generates the following results: The difference in the firm count by not age diverse and age diverse districts is .16, which is statistically significant based upon a P value of .003. When interpreting this result it is useful to keep in mind that the range of firm counts represented in the dataset is low, between 0 and 10 (and only represents entrepreneurial activity in ICT and CI sectors as documented by ReferenceUSA). Finally, using the margins command, I determine the expected firm counts for values of ERALUHOT across a range of counts (0, 50, 100) for the Boston/Cambridge bins, while also considering age diversity.

The predicted firm count increases as the ERALUHOT count goes up, both for bins that are more age diverse than average as well as for those that are not. Based on the reported margins, the combined effect of building age diversity along with a higher number of the ERALUHOT building type further increases the predicted firm count. Both age diversity and the presence of the ERALUHOT building type play a role in predicting firm count.

### 5.4 Final Analysis

This model serves as a starting point for understanding location choice of firms in relationship to building-age diversity and other qualitative attributes of the urban environment, defined at the district level. I find that districts that are more age diverse on average will present a higher firm count. I also find that when this is combined with higher counts of industrial and commercial buildings from the 1880-1935 era, the predicted count is even higher. The explanatory power of these results are limited, suggesting that much more than just district age diversity and the presence of buildings from a particularly era are at play. Still, these finding are statistically significant and suggest that when considering the location choice or entrepreneurs in ICT and CI, specific qualities of the built environment matter and should be taken into account.
Comparing locations by sector grouping: ICT, CI or both sectors

An additional point raised in this analysis is whether it is possible to differentiate between the preferences of firms based upon their ICT or CI categorization. The map above (fig. 51) shows firms associated with ICT and CI sectors or both (based on code groupings by Rutten, 2011). Little difference is found by way of visual analysis; if anything it suggests a high level of colocations among the types. This also raises questions about the frequency of colocation and where firms are collocating, as the presence of coworking spaces seems to be having an increasing influence on firm locations. In the next chapter, I provide evidence based upon interviews with entrepreneurs and other knowledge holders to further guide interpretation of this data and to consider what consistencies and differences emerge regarding location choice in the other three cities.
Chapter 6: Interpretations of Location Choices

Don’t look at buildings. Watch them. — John Ruskin to his students.109

6.1 Places as Entrepreneurial Ecosystems

In chapter five, I demonstrated that it possible to observe empirically a relationship between the location of entrepreneurial firms and building age diversity of the urban fabric of Boston/Cambridge. Further, I reveal a disproportional preference for locations in districts containing a higher than average number of industrial and commercial buildings from the 1880-1935 period, determining that this relationship is not due solely to lower lease cost, as reflected in data on commercial lease rates. In fact, some districts with high firm counts garner higher dollar/square foot commercial lease rates than the average for Greater Boston. It may be that entrepreneurs are finding cost-effective ways into these high value districts, for instance, by paying month-to-month membership fees at coworking spaces, rather than committing to multi-year commercial leases, and/or by adaptively using locations (such as Blade’s takeover of a well-lit basement level, waterside space) not previously considered, or priced as, traditional class A office space. Even if this is the case, it supports the idea that entrepreneurs see value in locating in these age diverse districts.

In this chapter, I turn to the entrepreneurs themselves, as well as other knowledge holders, to investigate how entrepreneurs select their locations, whether they show a consistent preference for certain qualities, or sets of qualities, and whether these are consistent across these three cases. To explore this, I conducted 77 semi-structured interviews, 54 with entrepreneurs and 23 with other knowledge holders in the three cities. A list of all interviewees is included in Appendix Three. Additional visits and informal conversations at coworking sites, attendance at social events for entrepreneurs and conferences (involving entrepreneurs, policy makers, real estate developers and academics) also proved enormously valuable. (See Appendix Three for a list of interviews and site visits as well as a description of the research methods utilized.) While I primarily focused on interviewing entrepreneurs whose work is associated with ICT and the creative industries, I also interviewed some entrepreneurs co-located with them, and other individuals selected with the intent of providing some counterfactual data.

109 Quoted by Norwich in Ritter, 1994, 10.
In Venice, I conducted a total of 25 interviews; of which 15 were with entrepreneurs and 10 were other knowledge holders and/or explicitly choice counterfactuals. In Amsterdam, I conducted 28 interviews, of which 20 were firm representatives and eight were other knowledge holders. In Boston/Cambridge, the process included both purposive sampling and interviewing from within the subset of firms identified and described in chapter five. I conducted a total of 24 interviews, 19 with entrepreneurs and five with knowledge holders. On the Boston/Cambridge map, I have identified those firms that were selected via random sampling from the dataset utilized in chapter five. Although the size of the sample of firms interviewed is not statistically significant, interviewing from within this set of firms provides a way to contextualize the statistical findings reported in chapter five.

Similarities in interview responses in the three cities suggest that it is possible to compare, in the aggregate, the responses to questions about key tasks of contemporary knowledge-based entrepreneurship, location choice, and the importance of the quality of the built environment. Responses from interviews are therefore presented collectively, though city affiliations of respondents are noted. When responses vary significantly by city, I discuss this. I begin with three examples to illustrate the different ways in which technological, creative and specialized knowledge is being combined in new entrepreneurial ventures. I follow with an overview of modes of production observed. I then discuss entrepreneurial motivations, an area where some variation was detected. This is important, as motivations are key determinants of location choice. I outline ideas about how entrepreneurs are working and with whom, before turning to the specifics of where these activities are taking place. I describe the location choice process and provide in table format a summary of the types of locations chosen (with counts for each city). Analysis of interview data reveals a set of commonly cited attributes in location choice, six of which may generally be considered district scale attributes and four which apply primarily at the building scale and scale of the individual workspace, though many of these concepts are in fact multi-scalar. I determine that entrepreneurs are relying upon their environments to contribute to certain desired outcomes, such as inspiration and serendipity, in their day-to-day activity. Six stand out from the interviews. I then discuss how these findings relate to findings reached in chapter five, as well as key differences observed. Synthesizing these findings, I determine that, in the context of entrepreneurial location choice, “satisficing” reflects three nested concepts -- biophilic, flexible and sociable -- that describe why quality of place matters to entrepreneurial performance; all other concepts described can be related to these. In Appendix Two, I also include a proposed set of entrepreneur-location relationship typologies.
6.2 **Entrepreneurs in the New Economy in a Historic Maritime Cities**

Here are three more specific examples of dynamic entrepreneurial activity I found in these cities:

![Alberto Gallo of Forma Urbis, screenshots of their work for managing the canals of Venice, Fabio Carrera at work in the field. Photo on left by author; screenshots and photo on right, courtesy of Forma Urbis.](image)

**Figure 52.** Alberto Gallo of Forma Urbis, screenshots of their work for managing the canals of Venice, Fabio Carrera at work in the field. Photo on left by author; screenshots and photo on right, courtesy of Forma Urbis.

**Venice:** Started by Fabio Carrera and Alberto Gallo in 1998, Forma Urbis is a contemporary equivalent of Venice's Renaissance mapmakers (see fig. 52). The firm focuses on the mapping, documentation and management of urban infrastructure and environmental resources, based upon the concept of City Knowledge (Carrera, 2008). Since launching Forma Urbis, they have created spinoffs (such as City Knowledge, 2004, based in Massachusetts) and engaged in partnerships (such as Ideagroup, based in Italy) to leverage their knowledge and skills. Like many entrepreneurs interviewed, they are simultaneously involve in other endeavors; Alberto also operates an architectural practice in Venice and Fabio is a professor at Worchester Polytechnic Institute in Massachusetts. Focusing on alliance-based structures of collaboration rather than internal growth has also been a way to comply with Italy's rigid labor laws.\(^{110}\) Though based in Venice, Forma Urbis and its partners have been active in other cities, in part due to Fabio's role as the founder and director of three of Worchester Polytechnic's city-based Project Centers. Projects range from documentation of public art (a form of embedded knowledge) to guide heritage conservation, to *Street Bump*, an app for Boston's Office of New Urban Mechanics that collects real time data about street conditions from users of the app as they drive. A similar concept is now in development for Barcelona. Solutions utilize technology to manage large amounts of data, to see system complexity at the urban scale and to engage citizens in resource stewardship.

\(^{110}\) As described in Chapter Three, the Italy's "Startup" Law 221/2012 now at least partially addresses this issue.
Figure 53. Left: The interior workspace of DUS Architects. Middle: The team standing in front of their 3-D printer, which they named the "Kamer Maker." Right: A model of the canal house façade and site. Photos by author.

Amsterdam: DUS Architects was founded by Hans Vermeulen, Martine de Wit, and Hedwig Heinsman in 2004. Focusing on the creation of Public Architecture, which they describe as "design that consciously influences our daily life," they have worked on a wide variety of projects in the Netherlands. In 2011, they conceptualized the making of a 3D print canal house and, with support from other companies, have assembled a large-scale three-dimensional printer. They describe the project as an "exhibition, research and building site for 3D printing architecture." When I asked why they choose the canal house typology for their project, Heinsman offered: "Canal houses were a place for trade, storage, shops; all kinds of things came together there as a place for innovation. We are asking, 'what should the city of the future be? Can different sciences and industries come together?'" The DUS studio is located in Amsterdam Nord, five minutes from central Amsterdam via free ferry service on a site flanked by two 19th century canals, which was developed as part of the first major exhibition of Dutch shipping technology in 1913 and subsequently purchased by Royal Dutch Shell Laboratory (see fig. 53). DUS organized the adaptive use of the early modern building (c.1938), wanting to create a physical "conflict model" where people would be forced to encounter one another. Now bohemian in character, their office space flows freely into space operated as a café. The production office for a magazine, a graphic designer and a social media company, along with an open data foundation advised by a hacker community, are located in surrounding buildings. "It's a nice mix," Heinsman offers. Outdoor green space, accessible from a well-traveled path for pedestrians, bicyclists and cars, is used for demonstrations of the printer and social events. Heinsman is also an advocate for further integration of creative and technical learning at Dutch institutions. "Why isn't fashion put next to astrophysics?" Of their own work, she offers: "We're process designers. Ten years ago, people didn't understand this."
**Boston/Cambridge:** Founded by David Friedman in 2009, Boston Logic is the creator of the Sequoia platform, a scalable and integrated database, web design and marketing product for real estate brokers. The use of the platform in diverse real estate markets across the country not only results in a new aggregation of place-specific knowledge, but also provides valuable feedback for future refinement of the product and support services. The precursor to the company, Boston Logic Technology Partners, was founded in Somerville in 2004 as a more general information technology consulting firm, upon landing a large contract for database services with a New England real estate company. As business grew, the founders realized that there was an opportunity to serve the real estate industry not as a service provider but by providing a platform. In 2008-9 they built the Sequoia platform. Soon after, they relocated to a former spindle factory (that had been subsequently used for meat processing and warehousing), located on a site in Boston’s South End (see fig. 54). The building was part of an industrial district connecting railroads, factories and warehouses to the Fort Point Channel waterfront via the South Cove and Roxbury Canal, until these were completely filled in the 1960s. Realizing that their square footage needs (1500 square feet and growing) was under the threshold of what many real estate brokers were willing to service, David focused on finding a suitable space himself, in the neighborhood in which he was already living, when he noticed a sign while driving by. The 4,000 square foot space, has been altered but remains quite raw in appearance. It is highly suitable to this rapidly growing team and its casual company culture.
Activities and Modes of Production, New Products and Services

Forma Urbis, DUS Architects and Boston Logic illustrate the potential for innovation that emerges when design expertise and new technology, together with knowledge of particular built environments (i.e., place knowledge) are ingeniously combined. These entrepreneurs are active in highly dynamic sectors, with little set agreement from industry analysts on their boundaries (see Markusen 2008, Rutten, 2011). I focused on entrepreneurs participating in the “sectors” of information and communication technology (ICT) and the creative industries (CI), using industry classifications codes as the starting point for my investigation, and also relying directly on the way firms described themselves via their web sites, affiliation and print materials. Firms interviewed did not always turn out to fit the sector to which I initially perceived them to be associated (or in the way I had perceived them), and/or they sometimes relied heavily on expertise not traditionally associated with the named sector; both conditions reinforce how dynamic these sectors are under the influence of new technology.

The firms I interviewed are charted (see fig. 55 and their locations are shown on the locator maps included in Appendix One), followed by key observations about the firms and their associations. Although the samples are not statistically significant, I do believe them to be emblematic of the activity in and comparative differences among the three cities. In the Venice sample, there was a distribution between ICT and CI firms, though more could be more closely associated with the Creative Industries; the relationship to traditional local craft industries, and tourism, was also quite clear. Firms in Venice employed fewer people than in the other two cities; with the exception of Xyze, no firm I interviewed had received venture capital funding. Two firms interviewed provide consulting services to startups and I interpret this as a positive indicator of potential future development. In the Amsterdam sample, I saw much more activity at the intersection of the ICT and CI sectors. Beyond this, I observed more firms in the Creative Industries, although the one firm I interviewed that was a venture capital recipient was from the ICT sector. The Boston/Cambridge sample, which includes ten firms selected from the subset of 194 firms whose locations where mapped in Chapter Five, included more firms associated with ICT, as well as many more firms who had secured venture capital funding. Their relatively rapid grow is likely at least partially explained by this.
Figure 55. Entrepreneurs interviewed by city, year founded, employee size, and ICT vs. CI sector.
Entrepreneurs are transforming “traditional” industries. The paper conservator in Venice, the illustrator in Amsterdam, the architect in Boston: entrepreneurs in age-old professions are deploying digital technology in advanced ways, both to perform work and to organize professionally. Digital technology has enhanced their ability to be entrepreneurial and creates a form of leverage, allowing them to operate independently rather than as part of a larger firm or institution. Rapidly transforming creative and technology products and services means the ability to revitalize and transform existing, traditional industries. The application of place knowledge, including implicit or explicit relationships to legacy industries (and to maritime culture in particular), can be seen in the media programs of Studio Camuffo, the renderings of Your World 3D Solutions, and even in small details in the video games produced by Guerilla Games. This also lends support to the idea that knowledge of legacy industries is valuable in a new technological and creative context. In Venice, Ski Stradivarius’s application of traditional boat building technology to the design and fabrication of all wood, custom-designed Nordic skis is a compelling example of knowledge transfer from one industry to another.

Entrepreneurs are combining knowledge to launch new industries, or industry specializations. The activity of some entrepreneurs can be situated in entirely new and profitable subsectors, or at the crossroads of traditional industries in newly named industries often labeled to reflect fusion or hybridization between existing and new industries. For instance, drawing from their long histories of health care institutions, Boston/Cambridge emerged as a center of biotechnology, starting in the mid 20th century. Similarly, from its legacy as a center of education as well as publishing, new firms (such as Learn Launch and EdX) are emerging to define the education technology, or “Ed Tech,” sector. Michael Boezi, a publishing industry veteran and now adviser to entrepreneurs, observed about the rise of Ed Tech in Boston/Cambridge, “basically you go to any place here and someone is either associated with a hospital or a research institution or education. That’s what we have here. So you start to think of -- with LearnLauch -- basically it’s tech and education. They’re trying to build this thing and they’ve got this amazing set of resources, right here.” Many name their companies to convey knowledge-related themes and combinatory thinking. Forma Urbis, Cuseum, and Modo Labs have all devised map-based wayfinding strategies for cultural institutions and cultural sites, leading the way in what might be considered a field of cultural heritage technology. Cuseum’s easily launchable social media application which it markets to cultural institutions, utilizes Wi-Fi enhanced beacons placed within the institutional environment. Building on an “internet of things” concept, it helps connect people to an institution’s cultural artifacts as well as other to individuals also connected to, and interested in, those artifacts.
Some are focused on urban innovation, in particular. Some entrepreneurs are directly engaged in new technology and place knowledge in the creation of new products and services to facilitate management of the urban environment and/or to enhance experience in the urban environment. In addition to often using (and sometimes developing) mapping and three dimensional design software; many are also analyzing data about the built environment and/or providing products and services to understand human behavior in the built environment, and to enhance consumer experience. One of the most literal examples of entrepreneurs using new tools to access accrued place knowledge (what might be considered an age-old form of big data) is Forma Urbis’ involvement in a project to digitize the archives of Venice. Each of these cities has a long history of professional activity related to architecture and urban design and sustains communities of specialized practices. They continue to be attractive places to study and to visit. They are natural breeding ground for new ideas about architecture and about cities and these entrepreneurs are taking advantage of this.

They use the physical world as a model for the virtual. Many entrepreneurs are using their urban environments as a model for the design of what is often referred to as “virtual architecture” – the intangible code structure and sequence that is the basis of software design. Software developers and others engaged in computer science commonly use the term “virtual architecture.” No one used the term “virtual engineering,” even though many of them are, technically speaking, engineers and not architects. Writing software code is described as elegant when it simply and economically does its job, especially when that job is complex. As one blogger advises, “The best code you will ever write is ... code you never write. No matter how good of a developer you are, the simple truth of the matter is: any code you write will add complexity to your software system” (Sonmez, 2010). A physical environment resolved over time can serve directly as a model, metaphor and inspiration for virtual creations.

They anticipate the social impacts of technological change. The integration of multi-media, the importance of user interface, including visual engagement, the functionality as well as aesthetic appeal of consumer technology all rely heavily upon both creative and technical knowledge and skills. In addition to creative or design thinking as an important part of system design, media and product design become more important as providers of products and services now try to compete, increasingly, in and for a global market of varying cultural groups with diverse styles and languages of communication as well as aesthetic preferences. The quality of design for products and services, as well as creativity in
marketing and public relations strategies, take on new importance in this context. Consumer
technology is contingent upon successful integration of virtual design and physical design, based upon 
an understanding of user experience and user tendencies. Session M’s mobile loyalty and advertising 
application connects users with advertisers by incentivizing the user.

They are dynamic actors in dynamic sectors. Frequently I encountered entrepreneurs engaged in more 
than one venture at a time, sometimes functioning as a consultant or service provider to other 
entrepreneurs. I started to call these people, informally, “alsos.” Journalist Sheila Marikar describes 
something similar when she references urban millennials as the “slash” generation (Marikar, 2014). This 
phenomenon is particularly prevalent among co-located entrepreneurs and may extend well beyond the 
millennial demographic (ages 18 – 34 in 2015). Some “alsos” may be hedging in a couple of different 
areas simultaneously and seeing which, if any, show extraordinary promise. This is a manifestation of 
the importance of the market being a critical source of feedback in the innovation process (Christensen, 
1997). It is not to say that entrepreneurs do not focus on developing new technology and shift in 
response to it; rather perhaps they are almost continuously absorbing technological change (and market 
changes) and thus these are sometimes difficult to trace by specific events. One example is Sourced 
Capital -- formerly Source City -- a web-based crowdfunding site for real estate investment that has 
continued to tweak its model in the context of extreme competition in crowdfunding. OnCorps is 
another company that pivoted after launching initially. In this case, the decision was based on critical 
feedback from their venture capital investors. A location facilitating access to different kinds of 
knowledge enhances the ability to pivot based upon rapid feedback.

Some entrepreneurs focus on other entrepreneurs as clients. A number of SMEs, and sometimes IDEs, 
service other startups; they often found where startups are most densely located. These include 
companies such as A4 Smart Innovativa in Venice, as well as coworking service providers such as Spaces 
and Rockstart in Amsterdam, and Coalition in Boston. They are entrepreneurial about the industry of 
entrepreneurship. Even if not striving to become high growth companies themselves, they promote 
knowledge flow and interaction, especially among diverse groups. They equip new startups to build 
rapidly and add to the overall aptitude of a startup ecosystem.
6.3 Why: Entrepreneurial Motivations

Why become an entrepreneur? Several key motivations emerge, and these are important to consider because they often influence location choice and determine how entrepreneurs measure their success. Rarely did individuals interviewed point to a singular motivation for becoming an entrepreneur. Rather, they usually cited a combination. The motivations most frequently mentioned include: to realize a personal identity (as a maker or creator); to be a change agent; to have a sense of control (including making a reasonable and secure salary) and attaining work-life balance; to be engaged in constant learning (often via life-hacking); to be part of a community (and to collaborate); to build a legacy; to gain power or influence; to attain an extreme financial payoff. Dustin Nolan’s explanation is emblematic of the fact that the decision to become an entrepreneur is often informed by a combination of factors:

My father stated his own company and had done well for himself. I guess “entrepreneurial spirit” was always kind of there, just because I watched him do it. It was something that I had been exposed to... I didn’t see myself always working for somebody else. I’d rather be my own boss.

I think there were a few things when I started my own firm. One, is there were things that I saw at my last firm that I thought, I want to operate a little bit differently than that. Not that they were bad ... there were certain things that I wanted to do differently ... smaller things within the business. I wanted to operate differently. I saw that it could be done, differently. On top of that, commute was important ... it’s a move that I was making for myself, but also for my family. That became a very critical piece of the puzzle. I live right around the corner. It’s a 2-minute walk to work. And it’s a great neighborhood. So that’s kind of important. And I wanted exposure, so, storefront space -- even though it’s not on Charles Street -- to make something visible. People are usually intrigued by architects and sometimes have no clue of how an office works. ... even now when people see it, they go, “You can work in this space? It’s not a very big space. Don’t you need to lay out papers all over the place?” No, that’s what they used to do. They used to have the big drafting desk. Now a lot of its done on computer and I have plenty of space in here to work. (Dustin Nolan, founder, DNA Architecture)
The idea of being a change agent, while learning, was commonly expressed. Sanjay Sarma, an MIT professor who is also an entrepreneur, explains:

*When we have an idea, we see real world application as a true test of achievement.* ... *For us, applying it in the real world is very exciting and once you do that – it becomes – you really sort of fight for it. I believe in entrepreneurship. I find it exhilarating – you get addicted to it. ... My entrepreneurship gives me immense knowledge and insight, not just in terms of my industry, but also in terms of things like: How do you negotiate a contract? How do you manage people? What are the standards by which the real world measures people? Things like this.* (Sanjay Sarma, Co-founder, Essess)

A central motivation was control, or the perceived autonomy of working for oneself and determining one’s own schedule, location and goals, including some form of “work-life balance.” Desire to earn a “sufficient Income” was more commonly conveyed than the aspiration for extreme financial payoff. Being an entrepreneur is hard work and inherently high risk. Often, the possibility of monetary reward is deferred far out in the future. Yet many people interviewed still reported that they derive an acute sense of control and fulfillment from having a high degree of choice in their daily routine and from being more autonomous in their decision-making. I asked Bob Suh, the CEO of OnCorps, specifically about the number of hours he works now compared to his previous job with a large consulting firm, and the risk of burn out that might result. He explained,

*You know how people riding in the passenger seat get carsick but the driver doesn’t? It’s not the sheer workload that is the problem; it’s feeling out of control. When you feel more in control, the amount of work you do is different. You don’t feel as stressed as you do when you work for a boss.* (Bob Suh, CEO, OnCorps, Cambridge)

Perhaps the most intriguing motivation was continuous learning, often via “lifehacking.” Some entrepreneurs emphasized learning about one’s own capabilities and limits, as a process of self-discovery and self-improvement. This often frequently included a quest for simplicity, including selective use of technology to monitor productivity and to eliminate much of the “noise” and paperwork associated with contemporary existence. Brendan Ciecko, who even uses a service to process his physical mail in part because it gives him peace of mind while he is traveling, offers “I’m all for a
paperless existence and having things as digital and clear as possible.” Careful decision-making – the willingness to make tradeoffs – then enables time, financial resources and creative energy to be channeled into performance.

**Variation in motivations by case city**

While motivations themselves vary across individuals and across time, it is possible to generalize about the difference. In Venice, interviewees valued entrepreneurship as a personal, creative process. This was particularly evident among individuals, trained in the creative industries, who are integrating new digital tools and processes over time. As such, these individuals play key roles in transforming traditional industries. These entrepreneurs are often more of the SME variety than the IDE, with a limited focus on scaling up, but dedicated to their craft. Two examples are companies located in the Ex-Herion Incubator. Paper conservator (and sole proprietor), Mara Guglielmi, her name is her company. She is an independent consultant with prior experience working within major cultural institutions. Highly dedicated to craft, many of her clients are in Venice but she has also worked for institutions in New York and Japan. Venice is a center of expertise in paper conservation, so it would be feasible for her to scale up. Rather, she seems to focus on dedicated application of individual craft, working repeatedly with noted institutions. FM Games, a graphic design service company for gaming companies, includes partners Francesco Nepitello and Marco Maggi. Despite so much growth (and competition) in the gaming sector, FM Games tends to work on small projects (and focus on a particular niche of fantasy games.) They value their craft, independence and work-life balance more than growth potential. This orientation may be changing, as many young Italian entrepreneurs are participating in startup learning programs (in Italy and beyond) and seem to have interest not merely in being an entrepreneur but also in startup culture. Further, Ennova Research and Teleart (which was acquired by Best Union) are both located in the VEGA (in the Port of Marghera) do come closer to fitting the characteristics of an IDE.

Particularly strong in Amsterdam is the notion that entrepreneurship is a participatory, collaborative practice. This culture is evidenced in part by the large numbers of entrepreneurs who have co-located at Broedplaatsen sites and other coworking locations, as well as the frequency with which individuals gather for conferences and meetups (see fig 54). The idea that being an entrepreneur is a creative act and one that introduces a greater ability to “design one’s life” is also strong, but different from Boston, in Amsterdam the idea seems to be tied to the idea of dedicating effort to a project and committing to its long term development. In some sense, this might lead to the interpretation that entrepreneurship is
a means to fulfill a pre-determined life path, but there is also a great deal of energy devoted to reflecting on how technology is influencing societal change and what this means personally, as well as from the standpoint of new market opportunities. In this regard, the attention to thinking about the “design of daily life” and lifestyle is done intentionally, in an active and often even experimental way. There is also an increasing presence of venture capital activity in Amsterdam, including the presence of American venture capitalists now investing in Amsterdam-based ventures, such as Shamrock Ventures (based in Amsterdam by American entrepreneur and investor, Dan Harple) and Greylock Ventures. This is a validation of the talent developing in Amsterdam. As new, but well-connected actors they are drawing the attention of other investors (venture, banking, and corporate) to this scene, while educating Dutch startups about competing in the American market.

Boston/Cambridge entrepreneurs possess a level of tacit knowledge about what is entailed in starting a company that others may invest in, especially what it means to promote a startup idea in a competitive context) and ways to access capital. This sets them apart from the other two cities. They are, on the whole, much more “exit-strategy” oriented, meaning that they place much more emphasis on having a plan for ending their time as a startup and can articulate their value to investors. David Friedman offers:

*If you’re not planning for an exit, you’re not really running a company. This is something I learned from my board – my financials are really to be handed to any potential buyer any day they walk in the door within 30 minutes and they’re less than 30 days old. .... And they’re in a way that is completely presentable and shows that we’re completely on top of our cash flow. If you’re not, you’re not really running a company.* (David Friedman, CEO, Boston Logic)

For a location choice standpoint, these seems to suggest that entrepreneurs in Boston/Cambridge may be less likely to “settle in” at any particular location for a longer period of time, but at the same time, those who find success navigating the Boston/Cambridge entrepreneurial landscape often take on new and important roles. The classical example is an entrepreneur who then becomes a venture capitalist, funding and advising other companies. One of the strengths Boston/Cambridge entrepreneurs benefit from an active mentor community (through venue-based programs such as Mass Challenge, but also Venture Café and District Hall, among others) as well as sophisticated media coverage of the innovation
economy, including Boston Globe's columnist, Scott Kirsner, and the website BostInno, and well followed blogs, such as OnStartups, created by Dharmesh Shah, cofounder of HubSpot.

Figure 56. Entrepreneurs at work in Venice, Amsterdam, Boston / Cambridge. Photos by author.

6.4 How They Work and with Whom - Entrepreneurial Work Processes and Tasks

Entrepreneurs are rarely doing just one thing. The day-to-day activity of an entrepreneur often varies greatly, depending upon where he or she is in the development of the venture. While some do work independently, any aspiration to grow usually means finding the right people with whom to collaborate. Network, even, perhaps especially at the outset, is a key part of entrepreneurship. Paul English offers "I think the co-founders are most important, a really good founding team of two people or more – strong as individuals and together. 90% who go to VC (venture capital) and fail, the reason has nothing to do with the idea. It's that the team is not strong enough."
Communication is critical and especially during key phases of development, they often operate with limited insight by which to make decisions. The concept of innovation as a process was described in Chapter Two; entrepreneurship is a process as well, and in many regards it is more variable because more of it takes place publically and can be directly influenced by market conditions. One of the most interesting things to observe was how entrepreneurs determined when it was necessary to be physically present (or physically gathered) for particular tasks, and when they found they worked better by working virtually. With whom they were working or interacting was a significant determinant. Table 17 summarizes key actors mentioned and compares the difference between physical interaction and virtual interactions entrepreneurs reported. The important takeaway is that many activities, especially those that are relationship-forming, still take place in the physical world, while those that focus on refining or following up on established objectives are more likely to be organized virtually. Limited interactivity is sometimes appropriate from a time and cost standpoint, though it is different from a real world experience – think for instance of the difference between attending a conference (with all of its peripheral activities) compared to watching a TEDtalk online.

Entrepreneurs regularly engage in highly introverted tasks, as well as those that require an individual to be social and highly extroverted. Entrepreneurs often spend many hours a day at their computer (see fig. 56). This means a lot of sitting and staring. Tasks such as long hours of coding require certain physiological conditions for sustained focus. While, generally speaking, people manage to work in suboptimal conditions, entrepreneurs focused on high growth are often competing intensely in a race to bring a specific type and better operating product to market before someone else does. It is not uncommon to see many similar products and services (ride-sharing applications, for instance) arrive to market at the same time and then a sorting out takes place. In this context, even small improvement in performance can have a huge impact.

Modes of working are not always "the highest and latest tech." Sometimes it decidedly low tech, but high touch. Entrepreneurs who are bootstrapping may not have the funds available for expensive tools; other times they realize more can be done with less and that simple tools allow for more flexibility. Getting feedback is real time is critical. Entrepreneurs affirmed that one reason access to venture capital is important is because of the direct access to mentors it usually provides. Networking remains essential, in part as a way to supplement individual experience.
Access to capital / types of capital

One of the important conditions impacting entrepreneurial activities today is the increasing amount of venture capital being aggregated to fund entrepreneurial ventures. In the United States, venture capital has played a tremendous role in the fostering entrepreneurial risk taking. Over the past twenty years, venture capital has become a more common way of financing enterprises in other countries as well, but there remains a great amount of variability in access to capital by country and by city. While the infrastructure of venture capital, including its connections to angel investors, angel networks to private equity has grown, other forms of financing play an important role as well. Traditional debt-based financing, such as small business loans provided by commercial banks, continues to be a source of financing for entrepreneurs, especially those who desire to launch a venture without distributing ownership to co-investors. More recently, more “entrepreneurial” modes of fundraising have emerged in the form of web-based crowdfunding, in which anyone can donate to the launching of a venture. Legal structures have been put in place (such as the United States’ JOBS Act) to allow for crowdsourcing of investors, particularly for real estate investment. Even with these new web-based tools and the increasing use of the Internet to promote emerging companies, access to capital proves to be highly place- and network-dependent. It often relies on unscripted interactions. Brendan Ciecko, who raised $1.5 million at the launch of Cuseum, offers:

For entrepreneurs raising money, face-to-face — that human quality — is very important. You don’t have people making investments in a person or a team without being face to face. You hear stories ... of great venture capitalists and investors saying [when asked] well why did you invest in them? “It seems like they had just the --- I loved the team, I loved the founder, the energy, the way they conveyed their vision or their bigger vision was so important and that’s what sold me.” (Brendan Ciecko, CEO and Founder of Ten Minute Media and Cuseum)

Beyond pro formas and user projections, investing in an entrepreneurial venture requires an extraordinary amount of trust, based upon limited information, so investors must rely upon their intuition and this, more often that not, means face-to-face interactions.

\[111\] See, for instance, The Venture Capital and Private Equity Attractiveness Index: http://blog.iese.edu/vcpeindex/
Table 17. Key entrepreneurial ecosystem participants mentioned during interviews

<table>
<thead>
<tr>
<th>Actors</th>
<th>In person interactions</th>
<th>Virtual interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentors</td>
<td>Meeting locations vary: at the primary work location; off site in &quot;third places&quot;</td>
<td>Advice via blogs (OnStartups; Paul Graham); limited interactivity.</td>
</tr>
<tr>
<td></td>
<td>Almost always face-to-face</td>
<td></td>
</tr>
<tr>
<td>Mastermind Group</td>
<td>Both in person and virtual (Google Groups; E-mail)</td>
<td></td>
</tr>
<tr>
<td>Seed Investor / other investors</td>
<td>Direct personal relationships critical</td>
<td>Some mention of crowdfunding; Xyze: campaign in Spring 2015.</td>
</tr>
<tr>
<td>(friends and family)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venture Capitalists (VCs)</td>
<td>Direct relationships and referrals critical. Key meetings at the office of the VC or</td>
<td>Review meetings may be virtual once contact/trust has been established</td>
</tr>
<tr>
<td></td>
<td>the firm. Use of third places for relationship building</td>
<td></td>
</tr>
<tr>
<td>Traditional Commercial Bankers</td>
<td>Presentation at bank</td>
<td></td>
</tr>
<tr>
<td>Co-Founders / Key Personnel</td>
<td>Often found through physical proximity / previous co-location / networking at events</td>
<td></td>
</tr>
<tr>
<td>CEO for hire</td>
<td>Sourced through VC investors or past professional relationships</td>
<td></td>
</tr>
<tr>
<td>Technical In-house engineering</td>
<td>Most often co-located unless predicated on long-term relationships</td>
<td>Varies significantly. Examples:</td>
</tr>
<tr>
<td>(coding) and data analytics / data</td>
<td>Sourcing new talent happens in a number of ways, but often through referral</td>
<td>OnCorps: intentionally not co-located “too introverted to work together.”</td>
</tr>
<tr>
<td>scientists or creative-technical</td>
<td></td>
<td>TenMinute Media: Long term relationships with coders and graphic designers in Poland.</td>
</tr>
<tr>
<td>design team</td>
<td></td>
<td>E-Builders: Long term relationship with staff in Ukraine (founder is Ukrainian).</td>
</tr>
<tr>
<td>One other entrepreneur mentioned</td>
<td></td>
<td>One other entrepreneur mentioned outsourcing coding in the Philippines</td>
</tr>
<tr>
<td>outsourcing coding in the Philippines</td>
<td></td>
<td>Animatron: Team travels; comes to site for two weeks at a time</td>
</tr>
<tr>
<td>&quot;Talent&quot; (general) / Other</td>
<td>Sourcing new talent happens in a number of ways, but often through referral</td>
<td>&quot;gatherings&quot; that include teleconference calls with physical gadget (talking stick)</td>
</tr>
<tr>
<td>Entrepreneurs</td>
<td>Friendly competition; tacit knowledge sources, sources of inspiration; community.</td>
<td>with other remote team members (&quot;family style&quot;)</td>
</tr>
<tr>
<td>Key Consultants</td>
<td>By referral</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>(Legal, Accounting, Branding)</td>
<td>Through networking events</td>
<td></td>
</tr>
<tr>
<td>Key Vendors</td>
<td>By referral</td>
<td>Not mentioned</td>
</tr>
</tbody>
</table>

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Key Distributors

<table>
<thead>
<tr>
<th>Clients</th>
<th>Use of third spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use of networks, conferences, referrals for finding new clients</td>
</tr>
<tr>
<td></td>
<td>Distinction: when clients are merely “users” they can be cultivated via the Internet, but this still usually begins by relying on pre-existing social networks.</td>
</tr>
<tr>
<td>Industry Organizations</td>
<td>As organizers of events</td>
</tr>
<tr>
<td>Research Institutions</td>
<td>Sources of talent (to hire)</td>
</tr>
<tr>
<td></td>
<td>Sources of expertise (consulting)</td>
</tr>
<tr>
<td></td>
<td>As organizers of events</td>
</tr>
</tbody>
</table>

Notes: (1) No interviewee mentioned private equity funding although this is also a known source of capital.

6.5 Choosing an Entrepreneurial Work Location

Prerequisite Programmatic Conditions

Certain conditions, which can be thought of as *prerequisites* for starting a venture, were mentioned in the interviews. Many of these are highly influenced by federal laws. While these prerequisites were not the focus on this research, they are important to acknowledge. Governmental and societal stability, safety, as well as Intellectual property (IP) protection, were for the most part assumed (most likely due to the fact that entrepreneurs were operating primarily from an EU and US context). Trust and transparency, including limited bureaucracy, were also viewed as essential, as was access to capital (discussed above). Several entrepreneurs in Venice mentioned the need for more reasonable labor laws and favorable, or at least a non-punitive tax code. In Venice, competition from an abundance of public-private (or quasi-public) Italian entities was also cited as a concern. Access to talent and expertise emerged from the interviews in two arenas. Young, high skilled workers, viewed as important, were often discussed in the context of concern about the impact of cost of living, and housing in particular, on a city’s ability to attract and retain talent. Annalisa Ballaria, Founder of Relactions, mentioned this as a concern in Venice; soon after she relocated her company to Rome. In Venice, as well as in Amsterdam, the desire for more direct access to seasoned entrepreneurs and mentors, including the connections to capital they often bring, was vocalized and is also reflected in the way the American startup scene is followed from afar. The quality of support from research institutions and business organizations, including public relations and exposure, was also mentioned. Incentives, such as tax breaks offered by some cities in attempt to lure existing companies to relocate from one city to another, were not mentioned. This speaks to the fact that entrepreneurs are usually more focused on foundational conditions to ensure their businesses will launch and thrive, than with longer term cost cutting. The overall point to be made is that if prerequisite conditions are substantially lacking, the quality of
buildings and conditions of the urban environment, no matter how well suited to new entrepreneurial activity, will not make up for their absence. It is sometimes possible to begin to address certain deficiencies with creative physical-programmatic solutions. One example (not from these cases) is the development of Cowork Buffalo, a coworking space and program crowdfunded by entrepreneurs themselves in Buffalo, New York.

Distinguishing between two types of location choice
First, it is important to consider that entrepreneurs, as well as other increasingly mobile workers, face two types of choices about location, and these are interdependent. First, there is traditional concept of location choice -- choosing a “base” such as the location of an office or studio. As discussed in Chapter Two, this entails a process of satisficing, based upon limited information about the choice set. Ideally, a chooser will select a location in an environment offering a robust choice architecture, meaning many options for all of the subsequent choices to be made on a daily basis. In an entrepreneurial context, the choice is usually up to the individual entrepreneur, choosing for himself or herself, but it may also be dictated by some other party, such as an investor.

Second, in the day to day, they make any number of task-specific location choices, choosing locations both within, and many times, beyond their formal “official” workplaces. No longer tethered to a set of industrial machinery, a typewriter or even a desktop, many contemporary entrepreneurs can in theory “work from anywhere” but in actuality they face a new and more complex challenge: finding an optimal location for the specific task at hand. This usually also means being mindful of choosing one location in the context of choosing a location for the preceding and following tasks, which may in fact be radically different from the specific task (as entrepreneurs wear many hats). This makes the location choice process far more complex, with as much chance for getting it wrong as getting it right.
Table 18. Primary Types of Work Locations Reported and/or Observed

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Where</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home office</td>
<td>Office cost embedded in cost of residence</td>
<td>Convenient, but may conflict with home responsibilities; risk of isolation</td>
</tr>
<tr>
<td>Informal locations such as cafes and bars as primary work location</td>
<td>No direct cost; cost based upon items consumed</td>
<td>No guarantee of workspace availability; may be too loud; no support services</td>
</tr>
<tr>
<td>Dedicated space (including storefront-studios)</td>
<td>Conventional lease; often 3-5 years but may be annual</td>
<td>Allows for customization of workspace; may be difficult to match space leased to growth needs; rent may be high due to competition with retail, especially in touristic areas</td>
</tr>
<tr>
<td>Business incubator</td>
<td>Often application based; discounted rent with flexible terms; lease duration may be time-limited.</td>
<td>Customization of workspace is usually restricted; some support services usually provided</td>
</tr>
<tr>
<td>Location-based accelerator program</td>
<td>Negotiation based; location and services often provided as part of terms of investment in company (in exchange for equity position)</td>
<td>Benefit of working in close relationship with mentors and other startups; support services usually provided</td>
</tr>
<tr>
<td>Coworking location, open desk</td>
<td>Membership-based; month-to-month terms usually available</td>
<td>No guarantee of specific workspace availability; support services provided as well as meeting rooms; may include access to multiple locations; co-location with other companies and freelancers</td>
</tr>
<tr>
<td>Coworking location, dedicated space</td>
<td>May be membership-based and/or cost square/foot based; month-to-month terms usually available</td>
<td>Allows for some customization of space use and storage; support services provided as well as meeting rooms; may include access to multiple locations; co-location with other companies and freelancers</td>
</tr>
<tr>
<td>Shared office arrangement / self-arranged co-working</td>
<td>Often “sub-let” based at below market rate; length of terms varies</td>
<td>Allows for some customization of space and storage; services vary; benefits of co-locating with friends and/or colleagues</td>
</tr>
<tr>
<td>Storefront retail space / combined retail-studio</td>
<td>Conventional lease; often 3-5 years but may be annual</td>
<td>Allows for customization of space; rent may be high due to competition with retail, especially in touristic areas</td>
</tr>
<tr>
<td>Totals, all types:</td>
<td>17 20 22</td>
<td>(Results higher than interview totals due to some using two primary locations)</td>
</tr>
</tbody>
</table>

Notes: (1) Beyond Venice in Quarto d’Artino but the accelerator advertises as being affiliated with Venice. (2) Cuseum was initially located in the Paypal/eBay accelerator, Start Tank, but relocated to a coworking location (Wework, in the Boston Innovation District) when Paypal/eBay ceased running the Boston Start Tank program.
Types of locations utilized

Table 18 shows the range of locations mentioned by interviewees. With the exception of H-Farm, which is beyond the city center of Venice (entrepreneurs there were interviewed as counterfactuals), I found no co-location of entrepreneurial firms and venture capital firms. Another important condition to consider is that while the historic city center of Venice retains many pre-modern industrial buildings (see fig. 15 in Chapter Three), many of them have been adaptively used for institutions, such as the conversion of the Ex-cotonificio for the IUAV, as well as the Punta della Dogana (customs house) as a museum of contemporary art, or as hotels (the conversion of the Mulino Stucky into a Sheraton), while others are public buildings or owned by the Catholic Church, and awaiting adaptive use. Many smaller pre-modern industrial buildings have been skillfully converted into design studios and showrooms. In all three cases, more than half of the entrepreneurs interviewed were working somewhere other than a “conventional” office. This is testimony the proliferation of what can be considered “workspace” today. It suggests that age diverse districts likely have more value in the context (following Jacobs’s theory) because they tend to offer a greater range of options from which to choose.

Explanatory preface: the concept of biophilic design

Entrepreneurs and other knowledge holders provided a wide range of insights about location choice preferences and qualities of place. These frequently link multiple qualities when describing location preferences, as will be seen below. Many concepts can be applied at multiple scales and some describe the relationship between scales. Some are more easily measured than others and include sub-attributes that could be quantified in discrete follow up analysis. While less well known than some of the other concepts mentioned, qualities relating to biophilic environments were mentioned numerous times relative to the district or neighborhood scale, as well as the building scale and the scale of the individual workplace. The definition of the concept is detailed below, followed by comments from the interviews. As Kellert points out, biophilic design is a timeless concept:

*Although we present biophilic design as an innovation today, ironically, it was the way buildings were designed for much of human history. Integration with the natural environment; use of local materials, themes and patterns of nature in building architects; connection to culture and heritage; and more were all tools and methods used by builders, artisans, and designers to create structures still among the most functional, beautiful, and enduring in the world.”* (Kellert 2008, vii)
Kellert identifies two basic dimensions of biophilic design:

The first basic dimension of biophilic design is an organic or naturalistic dimension, defined as shapes and forms in the built environment that directly, indirectly, or symbolically reflect the inherent human affinity for nature. The second basic dimension of biophilic design is a place-based or vernacular dimension, defined as buildings and landscapes that connect to nature and ecology of a locality or geographic area. This dimension includes what has been called a sense, or better, spirit of place, underscoring how buildings and landscapes of meaning to people become integral to their individual and collective identities, metaphorically transforming inanimate matter into something that feels lifelike an often sustains life. (Kellert, 2008, 6).

Further describing the biophilia taxonomy, he identifies six biophilic design elements: environmental features, natural shapes and forms, natural patterns and processes, light and space, place-based relationships and evolved human-nature relationships (Kellert, 2008, 6). These are composed of 72 biophilic design attributes, resulting in a complex framework with multiple internal linkages (Kellert, 2008, 5). For example, convenience is a biophilic design attribute. (It is possible to say that all location qualities have biophilic implications to some degree.) Based on this structure, they relate the idea of biophilic design to performance and productivity, pointing out:

Most of our emotional, problem-solving, critical thinking, and constructive abilities continue to reflect skills and aptitudes learned in close association with natural systems and processes that remain critical in human health, maturation, and productivity. ... People’s physical and mental well being remains highly contingent upon contact with the natural environment, which is a necessity rather than a luxury for achieving lives of fitness and satisfaction even in our modern urban society (Kellert, 2008, 4).

Many biophilic attributes that are critical to human comfort, such as sound levels and air quality, can be discretely measured, while others, such as the impact of views to nature, are more difficult to define. Importantly, sensitivity or tolerance among people varies (and may be cultural as well as physiological). Not all people will be affected by environmental conditions in the same way, but research has identified what constitutes, on average, tolerable and intolerable ranges for health and welfare, in turn shaping
policy and laws (see, for instance the United States’ Noise Control Act of 1972). Some conditions, such as indoor air quality, has even been codified in design standards or identified as benchmarks in program such as the United States Green Building Council’s Leadership in Energy and Environmental Design (LEED) building rating system. Far less well understood is the combined impact of sensory qualities on physiological and psychological comfort and in turn, the way these impact the ability to focus, or more complex concepts, such as human creativity. Also less well understood is the negative impact of common substitutes for natural conditions. For instance, the flicker effect of many forms of artificial light has been associated with “headaches, visual effects, and both neurological and physiological symptoms” (Inger et al, 2014, 2).

**Neighborhood and Districts Level Preferences**

While it should not be assumed that all old buildings are intensely biophilic, there is a good chance that those that have been intentionally retained hold biophilic value. For a location to serve biophilic needs, it must surpass a minimum threshold for a number of qualities; it is not sufficient to merely perform well in one category. Related to this, choosing a location is a process of looking for a “bundle” of interrelated qualities, not just one dominant condition and it often means evaluating choice options at multiple scales simultaneously. Rarely is a location available (in supply) that will meet all the pre-existing criteria of the chooser (especially since some criteria may be ill-informed or unreasonable). An astute chooser will realize that some criteria are more important than others and will be willing to pay to ensure that these criteria are met. A critical technological change can result in a major “shift” in the emphasis on certain attributes in the bundle, which is what seems to be taking place currently. Speaking of conditions in Boston, Sanjay Sarma offered his interpretation:

> A lot of startups used to be out there in the beltway ... route 128 – that’s more suburban. But what’s happening is these very cutting edge things ... it’s a very huge trend to see now, that the startups have moved from the suburbs. Also, there’s a demographic shift – the younger people are doing startups now because technology’s reached a point where you don’t have to work on it for ten years to master it. You can work on it for four years and master it. And the creativity that comes from being somewhat younger and more frisky gives you a big advantage. And younger people prefer the city. (Sarma, Co-founder, Essess)
The development of digital technology, including the tendency for geometric scaling to bring about smaller and smaller products – even to the point that physical things (such as a hard drive) are sometimes replaced with virtual things (such as cloud space) – has reoriented location requirements away the need to accommodate physical tools and equipment, and back to the physical-spatial-social needs of the knowledge producers themselves.

I will discuss additional preferences relating to biophilia at the building level in a moment, but first I turn to the six key conditions that emerged as contributing to location choice at the neighborhood or district scale, many of which implicitly relate to concepts of biophilia. These include: convenient (for the entrepreneur), dynamic, accessible, mixed-use, walkable and affordable (though this is not to say that entrepreneurs choose the cheapest options available to them).

Figure 57. Central Amsterdam offers many of the conditions that entrepreneurs favor. Photos by author.

(1) Convenient (Contributing to Flexibility)
Convenience was usually described as the relationship between the home and the workplace, and often, close proximity between a work location and a childcare location; being close to shops and services was mentioned as well. Both travel time and modes of travel were referenced in this context. Workers also talked about the importance of access to parks and water for activities of repose, exercise, socialization, and contact with nature (see Fig 57.). Convenience is a relative concept, not absolute. It depends upon
how the rest of an entrepreneur’s life is organized. It is also contingent upon a district offering certain conditions, such as workspace proximate to housing that is actually affordable to workers, and to other amenities. Dustin Nolin describes the value of live-work proximity he gained after relocating his work to the district where he lives:

As far as the service I can provide my clients, it has not changed, but one of the things that I think has helped – not only do I get to spend that time with my family, but the nights that I need to work late, that I have deadlines, I can walk home -- three minutes -- I can spend two or three hours at home, and then after I put the little one to bed, I can come back to the office and work until whenever. Not [officing] so close to home, it wouldn’t provide me that flexibility within my family and work schedule. That’s something that being close to home has offered me. I can actually strike a better balance between the two then adding a commute in there. It’s just a lot more flexible for me to work close to home.

(2) Dynamic
Entrepreneurs often stated that they like to be located in an environment that conveys a sense of change. They made reference not just to cyclical activities in urban environments, especially those that support a mix of uses, but also to ideas of contrast, juxtaposition and continuity, such as when a new business opens in a very old building. Others also mentioned the enjoyment of being among different people, or “a different combination” of people in the urban landscape.

For me what is inspiring is the dynamic atmosphere of the city and the fastness. For example, I live next to the Haarlemmerstraat and on the Haarlemmerstraat, every month there are new shops – shops are going and coming. This inspires me a lot. You get a lot of new concepts and ideas. It doesn’t stay the same for a month, actually. That gives me energy. Then I have the feeling that I’m living in an environment that keeps on changing. The change is what I like. (Doron Nethe, Founder, Peoples’ Playground)

Offering evidence of change, and signifying creative potential, seems to closely relate to the “change agent” motivation. Sanjay Sarma, when talking about the Seaport (what is now the Boston Innovation District, and notably, one of the three highest count areas revealed in analysis in Chapter Five) made
reference to one of MIT’s most famously innovative buildings, Building 20, known as the Radiation Lab, a durable, heavy timber building constructed in 1943 in “wartime haste” to support the development of radar technology (Brand, 1994, 26). Intended as a temporary building, it endured until 1998, when it was demolished to make way for the Ray and Maria Stata Center, designed by Frank Gehry. Known as the “Rad Lab,” it housed numerous scientists and tinkerers:

MIT Rad Lab – it had a similar thing ... both a materiality ... combined with a dynamism that you see there in the Seaport. You don’t see that in these (other) buildings here at MIT/Cambridge. And the fact that it’s half done and you feel like change is okay. It seems to sanction change. (Sarma, Co-founder, Essess, Boston)

Paul English expressed something quite similar describing his choice to locate Blade in the Boston Innovation District:

It’s not that the district is new, it’s that there is change going on. ... Startups are about change and startups are about challenging the status quo. ... If as a startup you’re getting sued by someone, it’s probably a good indicator that you’re changing rules – for example, Uber, Airbnb, Tesla ...

When you start with a clean slate it’s not that exciting to me. Because it’s not really about change. It’s about creating something new. When you start in a place that has the history this neighborhood does and you’re evolving it, that tension is healthy tension, and I think that tension can lead to innovation. (Paul English, CEO, Blade, Boston)

A firm evolving in a dynamic district also acts as a force of change on the district. The relationship is iterative. This “okay to change” sentiment was not, however, articulated by entrepreneurs in Venice, even though they (and other knowledge holders) talked a lot about the way the city is changing under the influenced of tourism, demographic change and environmental conditions.

(3) Accessible
Entrepreneurs differentiated their own needs for convenience from the need for a location to be generally accessible. This was often described as “commutable” and some made reference to the
importance of having parking relatively near their workplace, in particular for clients. Accessible also was used to reference concepts of exposure to the market or to general activity relative to the venture. Importantly, have access to sources of informal information was also mentioned. Albert Gallo of Forma Urbis described that if he needed to meet with someone from city hall or a colleague, it was standard procedure to meet at one of several cafes/bar along a particular campo (open space). This eliminated the need for a large meeting space in their office. Utilization of particular public space, bar/cafes and even hotel lobbies for this type of communication was described and observed in all three cities.

(4) Mixed Use (Buildings + Districts)

Ideas about change and convenience and accessibility almost inherently imply a mixed-use urban fabric. Venice and Amsterdam have a rich stock of buildings constructed to support a mix of uses, as do some streets in Boston and Cambridge. In all three cities, entrepreneurs who reported selecting their locations in part due to the mixed-use nature of the district have also introduced news in buildings that were either underutilized or had outlasted their prior use (see fig. 58). For instance, Studio Bressanello combines a digital photography production studio with its store space, which was being used as a storage room for produce before the adaptive use was performed. In Amsterdam, E-builders took up residence in a former printer’s shop and in Boston, DNA Architecture occupied a building that had last served as an antique store. Martijn van Hoek, co-founder of Smart.pr in Amsterdam describes the benefits of the mixed used nature of the Amsterdam centrum and it is apparent that is has direct implications on their individual space needs:

Figure 58. Examples of small, ground floor space converted for new productive uses. Left: the location of Studio Bressanello in Venice; center: the location of E-builders in Amsterdam; right: DNA Architecture in Boston.
“That’s also part of why these companies want to be in the center. Because there are so many places nearby. You can use them as part of your shared office space. You can hop by and have a sandwich – the other week we were having a meeting with some fellow entrepreneurs and talking about investment stuff and whatever. And then we went to this small bakery and then we ran into a lot of people from this building as well. It’s just – it’s not in the building, but it’s really part of the ecosystem I guess.

I ask him about the services that usually come with newly constructed office building, such as a lobby, a café, etc., to which he replied, “We don’t care about them.” Clarifying, I ask, “You already have them in the city?” His reply:

Yeah. There are two reasons to be in the city: one is that it is convenient, but also it’s very inspirational. Like, the old buildings – knowing that you are in the center of our country – inspires me, inspires us a lot. It’s just really cool. It makes you want to work.
(Martijn van Hoek, co-founder, Smart.pr)

Giorgio Camuffo talked about the accessibility of his location in a different way. He pointed out that traveling by boat to the airport, it is easily accessible to many major European cities, facilitating the easy of working with people in London, for instance, and largely because of the tourist industry, there are regular flights. Whereas auto traffic congestion coming in and out of Venice can sometimes slow travel to nearby mainland locations. Additionally, Venice has the sustained the ability to draws people (“human capital”) in, even if on a temporary basis, as tourists.

(5) Walkable
Even in Amsterdam, where biking is the norm, a distinction is made about increasing live-work proximity and walkability. Martijn van Hoek explained that, after moving their office to its location on the Rokin, one of the mains streets in the centrum:

Where we were before was still a ten or 12 minute bike ride [from home], which is not far, but now I can walk! It’s easy to be early in the office and stay longer – to go for coffee and stay longer – to go for lunch – it’s so cool.
Brendan Ciecko, the founder of Ten Minute Media, described selecting his office location within walkable distance from his home:

*The thing is – I never want to take public transit. I only want to work where I can walk to. I think that’s a really important life goal, and I know that there are statistics about happiness level with commute and time of commuting and so I love the fact that I can walk to my office.* (Brendan Cieko, Founder, Ten Minute Media and Cuseum)

In September 2014, Brendan Ciecko launched a new company, Spotzer, which was accepted to Paypal/eBay’s Start Tank accelerator program and he relocated to its location in the International Place building in the Financial District of Boston. In February 2015, Ciecko change the name of the company to Cuseum and, at about that time, Paypal/eBay ceased operation of Start Tank. Ciecko then moved the company to WeWork, a coworking site in the Fort Point Channel Historic District, part of the Boston Innovation District. He and his family then relocated to a residence in the district as well.

Walkability reinforces convenience and accessibility, but has other values beyond these traits, including directly promoting sociability, physical health and mental health, and access to sources of inspiration. Direct proximity to water or being able to walk to be near water was mentioned by some, but not all. Among those who did mention it, proximity was valued not because it meant “pretty views” but because of a sense of relaxation it inspired and often because it meant easy access to recreation. A “walkable distance” provides many of the benefits of water without have to pay the premium.

(6) Affordable

For entrepreneurs, location choice is often value-based, with evaluation factored not just as a cost per worker, but also based on a more comprehensive notion of cost and benefits. For instance, Graham Sibley, the CEO of Collabware, explained that they initially used a Regus coworking location in Cambridge and then leased space in Burlington, MA. Now they are in the process of relocating to a more permanent location in Cambridge. Of this impending choice, he says:

*We would be looking to relocated to a renovated old building as its suits the culture of our organization (from a creative personality perspective) and would enable us to build out an innovative character filled office space that would attract talent.... We haven’t ruled out any areas, but will likely be driven more by the location/space and less by the*
price (excluding massive pricing discrepancies). When it comes time to search in earnest for our new space, we’ll entertain all areas of Cambridge as long as we can meet our baseline requirements. (Graham Sibley, CEO, Collabware)

Locations are often found directly and not through brokers. Many entrepreneurs reported that they found their locations by walking or driving by, (which itself suggests that choosing in not a wholly rational choice among all possible choices, but bounded by some predetermined conditions.)

In regard to new construction in age diverse districts, one entrepreneur who is based at a coworking space located in a 1990s era building in the Leather District in Boston (one of the districts with higher than average building stock from the 1880-1935 time period) remarked about his new location in its age diverse setting, “It’s cool and edgy but with no rats coming out of the walls. It’s the best of both worlds.” Selection of new construction in historically diverse districts does not discount the value of older buildings in the district, rather just the opposite.

Choosing a Building and Individual Workplace
Entrepreneurs also explicitly addressed sensory and spatial qualities of interior architecture, including internal configuration. These can be understood as performance values of architecture. In some case, the qualities described also speak to the attributes of the urban environment at the district level. These fall under three main categories: the first is biophilic conditions, including three aspects: environmental conditions, raw vs. refined space, and the biophlic role of “iconic” architectural elements. The second is space configurability, which is often determined, to a degree, by the structural system of a building but also by the way the building is regulated (through building codes) and managed. The third is rather straightforward: the availability of fast, reliable Internet. As discussed above, cost is evaluated at multiple scales, including in relationship to specific building-level conditions so I will point out how some entrepreneurs addressed this.

(1) Biophilic
As described above, biophilia can be thought of as a reflection of how fit a location is for the support of human life. When considered in relationship to the myriad small decisions an entrepreneur makes daily, biophilia suggests that choosers reach toward that which they perceive as optimal, in this case, not merely satisficing. If, for instance, their initial selection of a “base” for their workplace situates them in
conditions that provide helpful feedback, from which they can learn, then they can effectively move closer and closer to self-optimization for repeated activities. A good choice should allow for a faster rate of cumulative learning, or refinement of practices, than a poor one. There are many ways the biophilia concept can be applied, for instance, to explain aesthetic preferences. Here I am most concerned with its relationship to productivity. Work is still a physical practice; and therefore physiological conditions are important -- especially in relationship to what we understand about sociability in the context of learning and knowledge production. Basic conditions such as quality of light, indoor air quality, mitigation of background noise, and temperature control matter. Many of these attributes have, for instance, been addressed by the USGBC LEED rating system on account of how they impact energy efficiency as well as human health and comfort, but actual conditions among buildings vary widely. Getting the basics of human comfort right is a lot harder than most architects, engineers and building managers would like to admit, especially when trying to anticipate how new technology will implicate building design and construction, as well as use.

Figure 59. Natural light and a “raw” quality, common attributes referenced at the building level. This space is simply outfitted to provide a number of key qualities: light, technology, a whiteboard, minimal storage, and individual space as well as space to collaborate and to have coffee/lunch. Photos by author.

Environmental Conditions. Entrepreneurs referenced natural light with great consistency when describing why they chose a building. Interior office configurations usually directly reflected preferences for working in areas with natural light (see fig 59). This is a near universally desired condition, and one that many Modern buildings do not provide. Why is natural light so important to
work, even in the context of 21st century production? Entrepreneur and Blade Accelerator founder, Paul English offered this thought:

*Just to make humans happy. If you look at evolution, 99.9% of the existence of our species was an outdoor animal. And it’s only in a blip in time that this species has been living inside and I don’t think our bodies were designed for that way. So I think the more you can simulate the natural environment, I think we will execute better because we are in our natural state. Unfortunately to do engineering, you need to be at a desk at a computer, but you want to make the environment as light and lively and fun as possible.*

(Paul English, Blade, Boston)

Discussing performance and creativity in industrial buildings, Sanjay Sarma identified two qualities in particular: natural lighting and texture (in relationship to exposed brick and beams). When I asked if he thought there was something about that set of conditions that impacts creativity, he responded, “Absolutely. You feel open, you feel airy -- you feel like you want to build something. It’s pretty tangible and palpable.” (Sarma, Co-Founder, Essess) Doron Nethe, Founder of Peoples’ Playground, an app developer for connected tv, mobile and the web, expounded upon the benefits of light, and transparency introduced during the retrofit of the building, which involved the removal of many surface materials:

*The building fits with our company and the way we think about doing business. It’s very honest to us. It’s stripped down, what you see is only the walls and some glass. We liked the transparency – because we want to be a transparent company as well. You can see what we are working on, the people that are in our space, but we can also see all the other companies – it makes it easier for us to step in another space and say hi, to share work with other companies. That was the part we liked. And the industrial look and feel. It gives you the feeling that everyone is working together. You feel the energy of the other companies; it gives you the feeling that we are all working on new products, or new solutions. That is an energy that I think every entrepreneur likes. But the other part of light: it is interesting because light gives a lot of energy, especially for the developers. They need a lot of light! We did some tests: in our room, we have a light part and a bit darker part, not next to the windows. We had desks stationed in the dark part. Now
that the developers are sitting in the light, they are more productive. (Doron Nethe, Founder of Peoples Playground)

Further, negative environment conditions (especially when combined with other conditions) can become a critical factor inducing relocation. Bonnie Burgett, co-founded of Source Capital, describes their experience at the Cambridge Innovation Center and their decision to move to the new CIC location in downtown Boston:

We started in the coworking space. It was amazing because we met all these people. We met our developer through it; we’ve been introduced to attorneys. We’ve been able to say, “Hey do you guys have a resource?” In terms of the first six months of starting, it was phenomenal. But it’s so insanely crowded up there right now that I was having trouble concentrating. Right at that time that, our immigration attorney had advised us to get an office [to facilitate hiring]. So we got this office right here. It has no windows. It’s literally a closet with a light box. My co-founder is like, “I’m so depressed. I need light. This is awful.” But it’s so expensive here in the CIC. Coworking is $350 a head, which is a phenomenal deal. But each office has a minimum number of people that you have to pay for. Now we pay a base fee of $1200 plus $450 per person on top of that. So it was a big jump in price. My co-founder just moved downtown, right by Downtown Crossing. He was next door [to CIC], but he hated living in Kendall Square because it vacates at night. So, now he’s within a couple blocks of the new CIC space [in downtown Boston]. I can take the orange line from Charlestown. (Bonnie Burgett, Sourced Capital, Boston/Cambridge)

Raw vs. refined. Natural materiality was referenced numerous times, frequently manifest in descriptions of buildings as “raw” where the structure and components of the materials was visible and understood. Natural Materials is another biophilic design attribute identified by Kellert, for which he states:

People generally prefer natural over artificial materials, even when the artificial forms are close or seeming exact copies of natural products. Part of the aversion is likely due to the inability of artificial materials to reveal the organic processes of aging, weathering,
and other dynamic features of natural materials, even in organic forms like stone. ...The patina of time may provoke an intuitive understanding among some people of the benefits flowing from the movement of nutrients and energies through natural systems (Kellert, 2008, 7).

Many workers expressed that they liked that the buildings they occupy possess a raw quality, lending a sense of informality as well evidence of the past use of the building, and structural materiality. This was often described in contrasted to “slick” or “cold” corporate office environments. Martijn van Hoek said of the office they now inhabit, that it “used to be like one of those extremely boring insurance companies” but that as the developer was rehabilitating it, some drywall was scraped by accident. As they too occupancy, they conditioned the process, further removing drywall and exposing the brick underneath. “We started cutting it off. It looks cool.” At many sites visited, layers of building materials were removed to reveal the building structure, such as concrete or brick, sustaining the scars or other forms of evidence of the use and alteration of this structure over time. This, too, seems to relate to the image of the entrepreneur and his or her identity as a change-agent.

In Amsterdam, several startups, as well as more seasoned entrepreneurs, and affiliates of large companies can be found at the Spaces locations on Herengracht. As touched upon in Chapter Four, the building alternation was done to create a “refined” interior that would be a warm, inviting, natural space (see fig. 59, center image). Noted British workplace designer Sevil Peach led the design effort. Film producer Robert Roosenstein, who uses the location as his main office, enjoys the “pleasurable” interior design, finding that it conveys a level of professionalism while still maintaining a casual atmosphere. Importantly, the design does not come across as thematic, which is an approach seen in other environments designed with entrepreneurs in mind. The Ebay/PayPal Start Tank space is one; it had large format images of iconic Bostonians meant to inspire -- Barbara Walters, Tom Brady -- that were etched on the glass wall of each meeting room (see fig. 59, right image). Though not entirely mutually exclusive characteristics, these do play out differently. By far the most commonly praised were those attributes described as “raw.” In contrast, the static and predictable nature of traditional Class A office space was not just described as not all that interesting, but as representative of a type of business culture that many entrepreneurs -- especially those who had transitioned from a corporate environment -- were averse to. As a Boston-based entrepreneur put it, in regard to his staid perception
of Class A office space and its cultural connotation, “That’s like death to me.” Paul Gertman, Director of Aedes Real Estate, which has redeveloped a number of buildings in Amsterdam, offers this:

Appreciation of the “raw” is not just a trend in this market, it is basically a counter trend of the overkill in design in the past years. Nowadays, people tend to appreciate more straightforward, simplicity, re-use of materials, and authenticity. This need has been reflected in new style in architecture and design, more raw. ... Some creative people prefer to be in raw places, other creative people tend to stay in more designed places, as long as they are authentic. Creative people hate fake and superficial.

The biophilic role of “iconic” architectural elements. Authenticity seemed to be an important idea for many entrepreneurs in this study. Some in the startup world choose to look bigger or more cash flush than they are for the sake of attracting talent, capital and attention. Alexia Tsotsis, co-editor of Techcrunch, part of Crunchbase, one of the most actively followed websites for startup activity and venture capital status, has written soberly of the “cult of startup excess, exacerbated by the spin” (Tsotsis, 2013). Especially in this context, it is notable that many interviewees knew about the past lives of the buildings they occupied. It seems that these iconic traces of productive heritage offer affirmations about production, even after some alterations had been made, serving to reinforce the new inhabitants' role as producers. David Friedman, founder of Boston Logistics, described the industrial context around them:

If you look outside – these big windows – arches – originally were there because things got hoisted on the outside ... and there is still a hoist – with the hardware! On a nearby building, there is one beam that is actually still there with the hardware, which is amazing. It has to be 70 years since that’s been used. A couple of them just have the end of the beam broken off. So all these were like that; they were obviously taking wares from that canal, whether they were right on it or not. That is what was going on here. It was a spindle factory and then this space was turned into a processing plant for sausage casings. That happened probably into the 70s – 60s or 70s. When we moved in, or when we were looking at the space, the plumbing was still on the walls. Where we are right now was a walk-in freezer. Literally to where that wall is, all of this was insulated as a walk in freezer and then there was a middle area. There was a foreman’s
(2) Flexible

Flexibility was discussed in relationship to building form and space configurability, but also in relationship to the stringency in the way a building was regulated and managed. So long as space is flexible, entrepreneurs can do more with less. Openness, permeability and transparency were all mentioned, relating both to important interior quality and building to street relationship. In most instances, entrepreneurs do not desire to be “open all the time” but only when they choose, and are doing their most extraverted tasks.

Other key aspect flexibility is are allude to in comments about desiring room to grow. Sanjay Sarma shared three reasons why he likes old industrial buildings:

First of all, highly finished space -- I find it actually gets in the way of creativity. I find the unfinished spaces -- loft space, etc. -- you just feel more creative, actually. Number two, the open spaces are more aligned with the way we operate our teams now. Our teams are much more -- it’s not like this [office in which we conducted the interview]. It’s more open... The mills/warehouses actually support that better. And the third is [they offer] room to grow. (Sarma, Co-Founder, Essess)

I inquired if in Cambridge, with the concentrations to date, might in some ways mean that if you are not a biotechnology or pharmaceutical that you would be at a disadvantage. He answered,

No, I don’t think so. It’s just that Cambridge doesn’t have contiguous space. It doesn’t have the sort of warehouse buildings. It’s more sort of spotty -- except for the Cambridge innovation Center. What you really need to do is take a bunch of warehouse spaces and turn them into startup spaces so that the startups are sort of next to each other, the coffee shops, the sort of crowd gets together. Cambridge is much more, um,

112 There are large warehouse and factory buildings in Cambridge, but at this point most of them have been occupied (by companies such as Novartis and Hubspot). On average, the lease rates are also more expensive in Cambridge than lease rates in the Fort Point district.
distributed. There isn’t a contiguous space that you can grow into. You get a lease and then you are out of the lease, and then you get kicked out. It’s like that. (Sarma, Co-founder, Essess, Boston)

Similarly, flexibility allows not merely for mixed use, but also multi-use activity, which can then raise the overall diversity of uses found in a district. Merel LeCogné Kleyn is a real estate lawyer who started DeCamer, an interior design service and retain venture. After finding an ideal canal-side gallery space available, “I wanted an older building or something authentic,” she says, she took it about herself to organize a coworking group composed of a diverse group of startups (see fig. 60, left image). There were three main conditions: she looked for people with past professional experience who were “serious” and willing to sign a year lease; they had to be agreeable to working in a shared space; they also had to be willing to move work materials aside once a month for Merel to host a pop-up shop related to her venture. She says of the community that has formed, “you can really help each other. A lot of times it is interesting to get the opinion of someone who is not in your industry.” This type of extreme spatial flexibility may not work for all ventures, but seems to be of little concern for many. Everybody is really helpful because they are all startups, although some work in totally different fields.”

Figure 60. Examples in the range of interior quality. Left: the more “raw” and “historic” space of DeCamer, in Amsterdam. Center: the more refined interiors of Spaces on the Herengracht, Amsterdam. Right: themed conference rooms at PayPal/Ebay’s Start Tank in Boston. Photos by author.
(3) Fast Internet

Internet was the only technical condition mentioned, which speaks to the incredible potential for mobility among these entrepreneurs; the need to accommodate specific fabrication tools or technology has little bearing on where these firms might locate. (There are exceptions and some did speak about wanting to be proximate to other more fabrication-oriented firms.) One entrepreneur located at the Ex-Herion incubator in Venice said in regard to dealing with unreliable internet service and having to call the city, who, at the time, was managing the incubator: “We call, but there is no urgency to fix it. It’s as if they do not understand the needs of someone running a business.” Mike Miello, founder of Webodew, is an American entrepreneur who is based in Amsterdam. He is also an avid traveler, often planning his travel so that he can work from a place for an extended time period. This means evaluating access to Internet, even on a country level, before deciding where he can temporarily relocate. The City of Amsterdam’s investment in its internet service generates a substantial return when it comes to giving entrepreneurs almost open choice about where to locate, knowing that almost any location will offer access to reliable, high speed Internet. (Most cafes do not have a paywall.) Brendan Ciecko confessed:

I lived in Europe for a little while and I would work from various cafes. I like that kind of like “living and breathing” in that environment and watching the world move while you’re focusing on your work. ... I think about this romantic idea of writers and artists back in the day, working from cafes, meeting at cafes, it being a social center and a great place to just kind of focus, spot on. So there’s that element. But truth be told, part of it is that while living in Warsaw, I needed access to the fastest Internet that I could find within walking distance of my apartment.

(4) Affordable, or “Cheap” with Caveats

Explaining the process by which Boston Logic came to be located in an affordable, but quirky 125-year old spindle factory, David Friedman explained:

We did look at cheap space and just sort of said, “We don’t want a cheap, carpeted, low ceilings, florescent light no windows, outside of town location.” I think there is sort of this confluence of – go where it’s cheap, so long as it’s commutable, and so long as we could feel ourselves in the space. And the rest is kind of like, the rest is – “I’ll deal with it.”
We would love to have more lunch options around. But you know what — it is low on the list when considering (a location). (David Friedman, CEO, Boston Logic)

The way David Friedman expresses this gets at a central conundrum of location choice: what is the value of “feeling yourself” in a space? Rather than cheap, the objective seems to be to find the most affordable building with the attributes that are most necessary to the various aspects of entrepreneurial performance. This is a fairly direct example of what it means to satisfice and it suggests the close connection with the need to think carefully about what constitutes entrepreneurial performance. Asking about where he meets with potential investors:

I’d rather they come here. They all walk in and they smile from ear to ear and say, “This place is really cool. Great startup environment. Love what you guys have done here.” I love having interview candidates come here. I’ve had potential acquirers meet us here. I want them to see — honestly — you walk into a lot of startups and they don’t even look this professional. Or, the CIC looks pretty professional, but everybody knows it’s the CIC and you could be just leasing two desks. There is a difference between “hey, we’re a couple of guys running a few desks from a shared space” and “hey, we have 20 odd folks.” I can give the tour … this pod is development; this pod is support; these guys are project management. I can give that tour and they conclude, “yeah, there’s a real company here.” (David Friedman, CEO, Boston Logic)

Discussing whether it is the district or building level attributes (of rehabilitated buildings) that matter most and whether the value can be untangled, Graham Sibley, CEO of Collabware offered:

My take on it is that many of my employees appreciate the industrial feel that some of the older buildings provide, but each of them takes something different from it. Some enjoy working in a location with extensive history, some enjoy the aesthetics of brick and wood beam with large open areas, some enjoy the areas where these buildings typically are located, and some just enjoy anything that doesn’t make them feel like they are working a 9 to 5 job in a stuffy office. Overall though, it’s hard to pinpoint if they like the building because of the building, or because of the area it is located in. The two are typically very tied together (from my experience) … (Graham Sibley, CEO, Collabware).
Choosing a workplace beyond the office: being a (temporary) mobile worker

It is clear from this research that many people are making use of a variety of locations for work. Some of these third places (Oldenberg, 1989) are embracing this change. New types of hybrid work-leisure spaces, such as Hutspot in Amsterdam, which now has two locations, includes a retail store, restaurant, event space and gallery all sharing the same space (see fig. 61). Uses are intentionally blended. Others are attempting to counter or control this change, by not providing wifi or by imposing a “no laptop between 10am and 2pm” rule, such as at Flour Bakery in Cambridge. What is clear is that many of places are providing environments well matched to the needs of some knowledge workers.

Mike Miello was one of the entrepreneurs who described his decision to work from home, or from various coffee shops in Amsterdam, as a way not to be tied down to a particular office, as well as because he liked changing locations. Sometimes the decision is practical, for Internet, as described above. As mentioned above, the degree and nature of biophilic sensitive varies by person. Many entrepreneurs reported enjoying being able to work in a crowded, social environment (whether a dedicated office, coworking space or café) by virtue of using headphones and playing music to block out distracting sounds. Michael Boezi, reported that he often met with clients at particular cafes. As for doing introverted tasks at cafes and using headphones to block out distraction, he noted, “That doesn’t
work for me. As a musician, I get distracted and start thinking about the music.” The takeaway for entrepreneurs, as well as the rest of us, is to be aware of the conditions under which we best operate, and for the particular task at hand, realizing that these may be quite different from a “conventional” workplace.

6.6 Desired Location Outcomes and Their Relationship to Building and District Qualities

Beyond desiring explicit quality preferences in location choice, it became clear that entrepreneurs are ultimately looking for their location to play a role in fulfilling certain objectives, or desired outcomes. Like the qualities identified, many of the outcomes identified are also (explicitly) multi-scalar. Events that take place in a particular locality – for instance, the serendipitous event of running into someone in a lobby – is the result of a set of influences occurring at multiple scales. Further, they are not
determined by architectural or urban design alone, but are heavily informed by formal (planned) as well as informal (organic) programmatic activity. The outcomes, which are described below, include: 

**relationship fostering; inspiration; flow; serendipity; rejuvenation; and balanced life.** All of these contribute to an overarching idea -- *fulfillment*. These have varying degrees of interdependency; that they are interdependent explains why it is difficult, to design for them outright – though specific design and programming strategies can be utilized to increase their likelihood. It is useful to think of them as indicators of high functioning places. Many have a direct relationship to entrepreneurial motivations.

**Relationship fostering.** Answering the specific question of why work at a coworking space as a startup, the importance of community was often emphasized. “You have other geeks and creative around you,” said one entrepreneur in Boston. He went on to say that he did not actually interact with people from other firms all that often, but that just knowing that they were there was affirming. He pointed out that it was one key difference between working in a more isolated fashion at home. Being an entrepreneur can be a lonely, isolating endeavor, especially compared to working for a large company that invests in building its corporate identity and in affirming this identity as part of a talent retention strategy. As described above, one of the most important relationships many are seeking to foster is with family, but relationships with community, with university partners, with investors and more broadly with one’s entrepreneurial network were also mentioned (see fig. 62).

**Inspiration.** Many entrepreneurs interviewed made references to the importance of the environment in providing inspiration for new ideas or solutions to a particular problem. This suggests a high level of environmental sensitivity and sensory engagement (sight, sounds, smell, touch, taste, as well as spatial awareness). This brings to mind Elaine Aron’s findings about the concepts of highly sensitive persons (HSP), first described by Carl Jung (Aron, 1997). In Aron’s study, she concludes that many individuals use their sensitivities to their advantage professionally, as designers of the built environment and in other sensory-based pursuits, such as music. Often when the importance of beauty in architecture or the cityscape at large was mentioned, it was in the context of inspiration. I asked Dustin Nolin, of DNA Architecture in Boston if he thinks there is an added value from being located in a neighborhood that has historic architecture. He responded:

*I’m constantly cataloguing design ideas. You see things that can work and sometimes as you are walking around, you might look at something and realize that that could be a*
solution to a problem that you are running into on a project. I’m always looking at that, and being in an area (Beacon Hill) like this, you know, there are a lot of beautiful buildings to look at. Each time, you notice different details. That’s kind of what I start to pick off from it, instead of, or opposed to an entire building. It’s really more the details. That is great about being in this location. I can walk out the door and find design influences all around, as opposed to being in an area that is more suburban and that is not as dense – that you know, you’re traveling by car, everything passes you by very quickly. You don’t get to examine it intimately like when you walk by it. That’s a very valuable thing -- that you are in a much more creative area.

This also provides an example where place knowledge that is embedded in the environment is translated into new design and, thus, has a present economic value. This embedded knowledge is transmitted or passed on via tangible as well as intangible heritage, but it is not imposed; the receiver must seek it out. As a digital photographer in Venice, Fabio Bressanello produce three different types of photographs: beautiful black and white images of iconic Venetian architecture (for the tourists market), portraits (of Venetians and tourists), and large format abstract images created from plaster details found on Venetian houses. It is the third that he says is art, noting, “These are what I’m really passionate about.” (Zapalac, 2010, 24)

Location and the diversity it offers can be an important source of inspiration for solving complex problems (especially when these problems are understood as “design” problems). This may be particularly true for “user innovators” (people solving problems to enhance their own quality of life or fulfill their own needs), especially in the realm of urban innovation. While different things inspire different people, Doron Nethe’s comments suggest that the age diversity itself serves as a source of inspiration for knowledge building:

I live next to the canals, it’s not very inspiring actually. If you are a tourist you think, “oh that’s nice - old canals!” I like more the modern houses next to the old houses, I like modern houses located in an old area. I like the mix. I think it’s very interesting, I like the idea when you keep something in the state that it was ... you keep the old and maybe you strip something down, but you try to use what other people thought of and make it new in some kind of way. (Doron Nethe, Founder, Peoples’ Playgroud)
While it is difficult to precisely control or pre-determine sources of inspiration, people often know, to some degree, the conditions that engage and inspire them.

**Flow.** The word flow was used numerous time by entrepreneurs and often to mean different things: time flow - flexible work schedule, but also idea and creative flow, capital flow, deal flow, and even talent flow. Other related ideas and themes, such as staying relaxed under pressure, subconscious processing, a relaxed culture, bicycling, and rowing, were also mentioned. This emphasis on flow may further explain why walkable locations and locations near water are particularly valued: in addition to serving multiple other objectives, they are also metaphorical. Stewart Brand, in a chapter entitled, “flow,” inverts Louis Sullivan’s famous adage that “form follows function” to observe “function reforms form, perpetually” (Brand, 1994, 3). To be a change agent, one must be immersed in flow.

**Serendipity.** Entrepreneurs who spoke of the idea of serendipity referred to seemingly random encounters and interaction with people, as well as ideas, in the built environment. Serendipity is a potential outcome of design, program and schedule. Serendipity or happenstance seems to be valued based on novelty factor, but also the idea that it will lead to cross-pollination of ideas. Entrepreneurs seemed to know that some environments or locations were “more serendipitous” than others, while others were known as active, but not highly interactive, that is they may be too frenetic to promote substantive interaction or even “too introverted” to condone interaction. For events to be serendipitous, people must also be willing to improvise – to amend a preset schedule when they run into an acquaintance unexpectedly. A robust choice architecture allows for such improvisation to be indulged in, without throwing off a whole system or schedule.

During the interview with Sanjay Sarma, I observed that the founders of Essess could have chosen to locate the company in Alewife, which has buildings that offer room to grow, is accessible by mass transit as the last stop on the MBTA Red Line (and is convenient to Boston suburbs). I surmised that exposure and the “serendipity factor,” however, would go down, in part due to fact that the district is neither very pedestrian friendly nor mixed use. This might mean that a company located there would be even more reliant on social media and its website, but that the “pinging” or interaction between virtual and physical environments would not be as robust. Sarma concurred: “That’s right, it goes down. And it
used to be the case that people sort of didn’t mind it, but now – especially at the really young stage -- you want the physical and the virtual to be together. (Sanjay Sarma, Co-Founder, Essess)

**Rejuvenation.** Researchers have only just begun to reveal the physical impact of spending many hours a day at a desk, staring at a computer screen, concentrating on what may be increasingly abstract tasks, like coding for applications. If there is a risk, it is that entrepreneurs will push themselves too hard, and until either “burn out” or tunnel vision takes over. Exercise, rest and rejuvenation are not merely lifestyle choices, but a key to overall performance, especially when it is increasingly difficult to stop working. Biophilia is also manifest in the desire to be close to nature or to spend time in nature. Proximity to urban waterways was often described as a means of experiencing nature, both passively and actively. It did not, however, emerge as a disproportionally preferred attribute in the location analysis of firms in Boston/Cambridge (described in Chapter Five). So much of the urban fabric of these and other maritime cities provides some access to water, that it is a nearly pervasive or assumed attribute of these cities.

Urban natural experiences were not, however, the only natural experiences that the individuals sought out. Others reported that the ability to *conveniently* immerse themselves in nature by simply getting on a boat, but also by biking, walking, and *driving* to natural destinations as a necessary and deliberate counterbalance of urban life. According to Doron Nethe, CEO of Peoples’ Playground in Amsterdam, time spent *not working* is important to his self-optimization because it allows some subconscious processing to take place: “In nature, that is when I get my best ideas.”

**Balanced life.** There is significant debate on the idea of “balanced life” taking place within entrepreneurial communities, as to whether balanced life is even a possibility. Dharmesh Shah suggests that “work + life” is a more logical (and less polemical way) to think about it. Brad Feld emphasizes the importance of protecting relationships. Here again, the concept was also alluded to reference to both the physical and programmatic conditions of a workplace.

David Friedman mentions that once a month, employees propose and vote on an investment in an office improvement item. “That is why we have two grills out back,” he says. But he continues: “We’ll do three million dollars in revenue this year and literally the voting on a $100 - $200 dollar item is a big deal. Friday breakfast is like a huge morale builder for like $100 a week. You know?” What is purchased is
important, but being located in an environment that can be constantly adapted helps give employees some decision-making power. This is equally, if not more important. Not to say that having fun and blowing off steam isn’t also an important to being part of a startup. It’s just that the accouterments are not what make a company entrepreneurial. Friedman seems to understand this, when explains, “Every once in a while, they’ll be a nerf gun fight that goes on. And it’s like, ‘oh yeah!’ There is a candy bowl that’s half empty and it gets refilled every day. Things like that.” At this point, I interject as ask if they have a foosball table. He continues:

We do! And a wii – and they never get used. This is the really funny thing. We also have cornhole and there is a lot of fun stuff that never gets used because we’re pretty darn busy. You know what does get used? The cappuccino machine gets used a billion times a day and we get fresh fruit delivered. These things matter.

6.7 Commonalities and Differences between the Cases

One of the most striking conditions I can pick out across the cases is the frequency with which activity is taking place along, or very nearby a pre-modern canal, and often although not always in a pre-modern era loft building (see maps in Appendix One). This affirms an important combination of factors: building level attributes, walkability, proximity to water and relative affordability, or rather – high value. Based on the Boston/Cambridge sample, the least canal intensive city of the three, this seems to hold true even when firms move: LeveragePoint Innovations was located at the Lechmere canal in East Cambridge before moving to a loft building in Somerville. Janys Analytics was founded in a loft building in East Cambridge and is now in a building in East Cambridge overlooking the Charles River (and is collocated with an investing company). Culture: the Word on Cheese, moved from Cambridge to the same building in which Boston Logic is located. Boston Logic was located in Somerville before moving to their current location. In all cases, none moved more than three miles from their original location.

Other findings were fairly consistent across all three cases. Proximity or convenience to the founder’s place of residence (whether located in the suburb or the city) continues to strongly influence location choice, but this seems to be even more the case for entrepreneurs choosing age diverse districts than for those choosing locations in the urban fringe or beyond. In Venice, those living in the historic city center usually reported a 25-minute commute on foot/by vaporetto, if not less. (One employee of a firm who worked at the Ex-Herion commuted in by bus/vaporetto from outside the city center.)
firms I interviewed at the VEGA in Marghera reported that their employees came from a much more geographically distributed area, with the majority driving to work. In Amsterdam, the idea of a 15-minute commute by bike is standard. (A telling piece of testimony about livability: no one I interviewed in Amsterdam regularly traveled by car, although some reported it being important for clients to access their office by car.) In Boston/Cambridge, the threshold of a convenient commute seems to be about twenty-five minutes or less, and there was more variation in the how people traveled – on foot, by bicycle, by T (metro), by car, etc. Once commute is measured in driving time, the actual distance between home and workplace often increases, with the resulting impact that transit mode options (the choice of traveling by car, bike, on foot, etc.) are restricted. For instance, Modo Labs, when founded in 2010, was located in central Cambridge (at 100 Cambridge Drive #17). As the company grew, they relocated to Alewife (finding their current space through a real estate broker). Founder and former CEO of Modo Labs, Andrew Yu, located in Alewife, reported that he and his family had just relocated to Andover, Massachusetts, nearly an hour a way by car. Acknowledging that the factors that go into residential relocation decision are as complex as workplace location choice (if not more so), it is important to consider that the relationship between the two is important to performance.

I found no major difference in the district-level preferences of those companies categorized as participating in information & communication technology (ICT) vs. those categorized at participating in the cultural industries (CI). At the building or workspace level, there is a greater variety in the respect that some entrepreneurs in the creative industries also use their space for some type of physical production and/or operate it as a retail venue. While much emphasis has been placed on the differences between IDEs and SMEs, I think what this research reveals is two different strategies now being utilized by high growth companies: one is represented by those who intentionally look for flexible space in age-diverse districts, with the intention to stay in their chosen district as long as possible, favoring the type of talent (including skilled workers who live in the urban periphery) who sees themselves as most productive when situated in the urban environment. The other strategy is represented by firms that continue to equate employee growth with something closer to a 1:1 increase in necessary square footage and who perceive stronger advantages in locating somewhere convenient to a more spatially distributed talent pool, some of whom may not desire to commute into the city center. This also seems to mean an emphasis on hiring more experienced workers, including those who may be looking to work part time. It also likely means more emphasis on knowledge sharing within the company, rather than between the company employees and other actors. This strategy more closely
resembles what Saxenian described in *Regional Advantage* about the culture of companies along Route 128 in the 1980s and early 1990s (Saxenian, 1994). Not to say that either is inherent better, only that they have different implications regarding access to knowledge and access to certain types of talent. In Venice, there are far fewer firms that could be categorized as taking the first approach (though other factors complicate this and are discussed below). In Amsterdam as well as in Boston/Cambridge, the majority of entrepreneurs interviewed can be categorized as taking the first approach.

Demographics are important. These cases demonstrate that it is not just young people who are choosing to become entrepreneurs and choosing to locate in these cities. In each case, I encountered variety: young people, serial entrepreneurs, people leaving the corporate world behind, even retirees starting a new career. Ages ranged from the early twenties to the mid 50s and included both male and female entrepreneurs (though in my samples, males far outnumber females). The most significant absence, across all cases, was ethnic diversity among conventional “startup” communities. Demographic diversity was something I was mindful of when contacting entrepreneurs to be interviewed and when observing attendance at events. This leads me to conclude that there is much more these cities can do to promote diversity of participation, and that their entrepreneurial ecosystems and local economies will be all the more resilient for it.

**Key differences observed and interpreted**

Not only do motivations differ, as described above, but some specific location choice preferences. These are reflected in differences in the demand for locations in age diverse districts (over non-age diverse districts). Some of these are closely linked to differences in supply (the location options available within the historically diverse districts of these cities and beyond them) as well as broader contextual differences.

Venice supports a great deal of entrepreneurial activity related to tourism, but among the three cities, it is where the least tech related “startup” activity is found (and very little of it is visible to tourists). The city is clearly effective as a place that provides inspiration (as evidenced by tourism) and serendipity. There is a paradox in that the tourism market and the second home market are pricing many people out, but then many buildings empty, or empty for part of the year. Beyond the most well traveled streets, this had led to closures of many of stores and services located in traditional ground floor storefront buildings, for which there is no longer a local market to sustain them. Empty buildings of this nature are
particularly visible. While there are multiple options for arriving to the historic city center of Venice, it is harder to drive into, compared to the city centers of the other two cases. At certain times of year, the flow of tourists creates much more problematic congestion. This, compounded with the fact that the Veneto lacks what might be considered a “commuter rail” system (though it has good high speed rail) means that a larger portion of the Veneto population is highly car dependent. Limited accessibility from the mainland is impacting location demand is Venice’s age diverse districts (in the historic city center).

In Venice, entrepreneurs did not discuss or emphasize as much the importance of the task-specific workplaces. Those entrepreneurs who were most discerning were in individual locations (not incubators). This is indicative of a lack of supply of the right types of spaces: specifically well managed, privately operated coworking locations, but also noticeable is the lack of third spaces – cafes – specifically where entrepreneurs are able to locate, regularly and for long periods of time. Most cafes in Venice are either focused on bar service and/or serving tourists (including that they charge a table service fee). There are some exceptions, such as in the Campo Santa Margherita that focus more on the student population. In Amsterdam and in Boston/Cambridge, entrepreneurs are generally more discerning about the quality of the built environment, because they can be.

In Venice, limited availability of venture capital and conservative attitudes toward risk taking, coupled with other general conditions, have resulted in less demand by entrepreneurs for age diverse locations, or any locations, compared to the other two cases, even taking the population size differences of these cities and regions into account. The high cost of housing cost, mismanagement of mass tourism, and an aging population, have all contributed to population decline in turn, limiting some types of entrepreneurial potential and entrepreneurial diversity. Currently only one incubator site is operating in the historic city center. I found no active coworking service providers offering membership-based services in the historic city center, along the lines of the numerous providers found in Amsterdam and Boston/Cambridge. (Such locations are now popping up in many small cities and towns.) The closest to the history city center that I have found, CrazyLab, which bills itself as “the first ecobator in Italy – the first incubator and ecosystem mixed together,” operates a coworking space and learning course program located about 40 minutes away (by car) from the city center of Venice. Their website states: “We built CrazyLab in the hearth of Saccisica, an historic area with strong commercial and artisan background. In fact, Saccisica was part of the Venetian empire and the trade center between Western Europe and the rest of the world.” (http://crazylab-ventures.com/about-us/).
One example from the Venice case that demonstrates the contextual difference regarding access to capital: Xyze, is a startup, based at H-Farm, (discussed in Chapter Four) which has created a fashion technology device named “On.” Drawing from rich Italian sartorial tradition, it is a digital measuring tape and system designed to ensure the user selects the right size when ordering clothing online. Founders Paolo Andrea Mazzon and Paolo Spiga have participated in the H-Farm accelerator’s learning program and as an H-Farm backed venture. They have built a compelling web site, received coverage in national and international press and won development awards. They have traveled to European startup events to learn and raise awareness of their company. After two years in development, they launched a visually polished crowdfunding campaign on Indiegogo, targeting to raise 60,000 euros, a nominal amount compared to what consumer technology startups in other markets raise in seed funding. Unfortunately, they did not meet their goal. They are emblematic of the enthusiasm of many young Italian entrepreneurs and the fact that access to capital in Italy (even in the fairly capital rich Veneto region) is still a much more challenging pursuit.

In Amsterdam, the centrum (the very heart of the city) is not just a tourist domain, but also home to some 60,000 Amsterdaamers. Its rich multi-modality, coupled with greater housing affordability, contributes to a robust mix of uses. In Amsterdam limited availability of venture capital and moderately conservative attitudes toward risk taking have not resulted in less demand for high quality workspace. Rather, a (perhaps more community-oriented) culture of creativity and collaboration combined with an emerging culture of entrepreneurship, if not yet “high growth” entrepreneurship, has gone a long way in creating demand for age-diverse districts and launching both self organized colocation, as well as numerous coworking sites supported by a large number of small companies, some high growth companies, and some established companies that need easily accessible, well serviced remote locations. These have in turn helped the coworking service market to become more competitive and nuanced. Based upon sites visited, Amsterdam outpaces both Venice and Boston/Cambridge in the spectrum of coworking locations available, although the Boston/Cambridge market is catching up quickly. In Amsterdam, there are still fewer entrepreneurs actively focused on rapid growth (or equipped with capital to undertake it), although this appears to be changing. The high occupancy rates of recently constructed office buildings in the urban periphery, many of which where likely targeting the multinational corporation market and secondly, emerging Dutch companies, together with stated preferences of interviewed entrepreneurs, suggest that when city-center companies do growth, they are
increasingly looking to stay in or near to the central, age-diverse districts that have proven to nurture their performance.

Extremely compelling is the innovation that Amsterdam demonstrates in “finding space” and synergy as a result of new co-location strategies and multi-use programming (changing uses of space by times of day, or layering on secondary uses during non-peak hours). Instead of a one-to-one ratio between function and location, now a location may serve multiple functions at once: art gallery and barbershop; bank and café. The result of such space utilization strategies is a net gain in space available; the enrichment in offerings, results in new conveniences and potentially, additional income raised from lease of space. Importantly, it also offers a way for entrepreneurs to launch while minimizing their real estate costs and commitments. This is not a new strategy at all, but one that is returning to prominence as the walkability of cities comes into focus again. It is enhanced by a growing number of digital applications (present in a number of cities) seeing place utilization as a way to create new revenue streams and to think even more dynamically about place. Applications that facilitate the process of making a reservation (OpenTable), that publicize and sell tickets for events (Eventbrite), and that realize new markets for excess space inventory (Hotel Tonight, Hotdesk) are all emblematic of the new economic potential that can be created.

Working through deduction when examining the high count districts in the Boston/Cambridge dataset, I confirmed a relationship between firm locations and coworking spaces and accelerators, many of which have been started by entrepreneurs who also are involved in other ventures. (Knowing who arrived first in these districts, however, is not possible without additional research). Entrepreneurial real estate entities providing coworking locations and services (as well as those creating accelerators) are well aware of needs of entrepreneurs, often because they have had the experience themselves. Other commercial property owners and developers are also now trying to attract startups, coworking companies and accelerators to their spaces, in part due to their potential to “incubate” future tenants.

The presence of multiple discernable nodes of activity in the Boston/Cambridge is a testimony to Boston increasingly becoming as a place where startups want to locate, and not only in the Innovation District, but also in other dense, central and historically diverse districts. In fact, looking even more closely (to examine all startups in these districts), it might be possible to discern different types of specialization or diversity emerging. While MIT and other universities play a central role in fueling innovation activity,
the distribution of firms suggests that proximity to a university is but one important factor of many. Further it also indicates that it is possible for different types of entrepreneurial communities to emerge and flourish within the same city, and this bodes well for other age-diverse districts, both within and beyond Boston/Cambridge.

Examining the relationship between SMEs and IDEs in all three cases me to conclude that more traditional SMEs are still highly valuable in an entrepreneurial ecosystem, for at least three reasons: first, they may provide key services to fast growing IDEs. Second, they help diversify the nature and disposition of an urban economy. Third, over time, these entrepreneurs may choose to transform from service providing to more scalable (but higher risk) product-providing enterprises. An example of this in Boston is Brendan Ciecko, whose first company, Ten Minute Media, is a highly successful web design and marketing company primarily serving the music and entertainment industries. Some months before the launch of Cuseum was announced publically, Brendan made these comments:

I'm in the service sector ... there is limited scalability to an agency model. There is infinite scalability to a product. ... I'm in the city, with the network that I have and the people that I'm constantly in touch with ...with this being such a startup focused city, it would be a shame for me not to try and experience that. I hate to say it – everybody has a startup – but that's the best thing you could ask for – more people trying, taking that route, rather than the professional 9-5 route – and creating some idea, some product. That's a beautiful thing. It makes a city like a laboratory of people. Not that the city is the laboratory, but it attracts people who think about things like a laboratory. (Brendan Ciecko, Founder Ten Minute Media and Cuseum)

This type of transformation – an entrepreneur who has led a successful SME shifting to launch an IDE -- can happen. It is a sign of a mature and effective entrepreneurial ecosystem, in which entrepreneurs can, with some effort, gain access to peers and mentors (and their technical knowledge, industry knowledge and business knowledge), as well as to a network of potential investors and clients, and these, in turn, are being facilitated by an increasingly competitive workspace service market, frequently found in age diverse environments.
6.8 Conclusions: What Entrepreneurs Gain from Quality of Place

As these entrepreneurs report, choosing an effective base of operations, in part because choosing when and where to execute a task or set of tasks has become more complex and more important, not less. As more knowledge is produced, and innovation occurs faster than ever, having access to the right kinds of knowledge becomes even more important. The concepts elucidated from interviews and site visits can be distilled down into three interrelated concepts: biophilic, flexible, and sociable, all of which are evaluated, consciously or subconsciously, when an entrepreneur considers the total costs (not just rent) and benefits of a particular location (see fig. 63). All other concepts discuss inform these core concepts.

![Diagram of three interrelated concepts: biophilic, flexible, and sociable.](image)

**Multi-scalar in nature, these concepts function in relationship to one another:**

**Desired outcomes:**
- Flow
- Serendipity
- Inspiration
- Rejuvenation
- Relationships
- Fulfillment

**B) FLEXIBLE / CONVENIENT**
- Flexibility makes multiple uses possible
- Convenience from mixed use and multiuse
- Both produce a robust choice architecture

**A) BIOPHILIC**
- Architecture as habitat for the human species
- Sensory oriented, human scaled
- Evidence of time suggests durability / resilience

\[(A+B) \text{ + programming = SOCIABLE}\]

Qualities + program (planned uses as well as unplanned uses), including how digital technology is allowed to impact the experience of place.

The three primary concepts build upon one another, with biophilic conditions working as a foundation. While these are all relative concepts – they exist on a spectrum – a minimum threshold of biophilic conditions must be met in order it to matter whether the location is flexible and convenient to the needs of potential users. The higher the biophilic quality of a location, the more likely it is that it will be used for myriad purposes. Flexibility at the building level results in a mix of uses (and/or multi-use strategies) that in turn generates convenience at the street or district level. The social quality or
sociability is predicated on biophilic qualities as well as the flexible qualities of the location. Unlike the other two conditions, which are products of the design of space, form and materiality, the sociability of a location is determined by unplanned uses as well as intentional, *planned* activities.

Flexibility is predicated in a large part on live-work proximity, as well as the scale, mix of land uses and transit options. It is also determined by how dynamic a location is, which can mean a changing urban environment (changing form and uses) and/or a changing program of activities at the district and building levels, as well as the ability to change or reconfigure one’s environment, or change locations within it to suit specific task needs. Collectively, these create a robust choice architecture. Because key tasks are different (and in some cases, because the entrepreneur is wearing many hats rather than engaging in or merely responsible for one task), conditions are radically different than for non-entrepreneurs. Choice architecture, which recalls Alexander semi-lattice concept described in Chapter One, is more valuable when variability in tasks is greater and may change from day to day.

One way to think about the relationship among the identified conditions and outcomes for quality of place is to consider that entrepreneurial performance and its relationship to place is analogous to theatrical performance and the many components that contribute to it. Biophilic qualities are largely determined by the building and its setting within a particular site — analogous to the architecture of a theater building and its stage. The flexibility and, in turn, convenience, are greatly determined by the stage set (and other interior elements), though these are influence by the building itself (which has determined, for instance, the height of the fly space). This framework shapes the sociable quality of the environment, but it is the content of the play and the talents of the actors (constrained by stage, set, special effects and play content) that bring it life, together with the reaction of the audience, that collectively render the performance.

Digital technology is powerful because it has the potential to influence the biophilic, convenience and sociability of a location. It is becoming more and more common for digital technology to be utilized to enhance the biophilic properties of buildings (one example is Nest, an intuitive climate control application, linking one’s calendar app and home thermostat) as well as the flexibility/convenience (configurability) of a particular location. The use of meeting scheduling applications can improve the rate at which space is utilized and it can also be used to generate important feedback about how to further enhance flexibility. The risks, however, are that systems may become overly complex and costly.
to maintain and that they will not accurately anticipate the rate or nature of future technological change, whereas proven low technology solutions (such as operable windows) may provide more intuitive and enduring solutions.

Digital technology is often particularly impactful on the sociability of a location, whether as installed media or portable devices. The flow of information and messages via digital media has become so pervasive that we are often increasingly accepting of the imposition and sometimes feel almost powerless to deny it. When used strategically, however, it can help engage imagination, provide access to critical real time information, and positively transform the way a place is experience.

Proximity value is not sustained or enhanced without quality of place. Quality of place is not determined by any singular attribute. Transactions by immersive experience are exponentially more meaningful because they are both social and improvisational. They are creative, generative exchanges, not mere transmissions of information — and this makes construction of knowledge more robust. **How can the key attributes of quality of place -- biophilic, flexible, and sociable -- be linked to the concepts of place knowledge and real virtuality?** I explore this in the next chapter and consider what it suggests about the value of age-diverse urban environments (and historic maritime cities, specifically) as locations of new production.
Chapter 7: Why Quality of Place Matters To Entrepreneurial Performance

“I’m watching #StartupClass Lecture 3 - Before the startup by @paulg. Thanks to the internet I’m taking a Stanford class while in Zimbabwe.” -- Tweet by Lennex Zinyando, @zinyando, October 13, 2014

7.1 Introduction

In this final chapter, I undertake three tasks. First, I briefly review the findings of the previous chapters. While the idea of valuing building age diversity in urban districts is not a new concept, it now exists in the context of digital technology, which was in a nascent stage when mid-century theorists were advocating for the value of diverse, human scaled, well-networked urban districts. As Jacobs pointed out, buildings rendered obsolete for their original function play a specific role by offering more cost-efficient environments in which to develop new ventures. Beyond cost efficiency, I find that the biophilic, flexible and sociable attributes of pre-modern industrial and commercial buildings also explicitly contribute to the value of age diverse districts, resulting in a quality of place that is valuable in the context of entrepreneurial performance. Digital technology greatly expands the range of options about when, where, and how work is performed, making it possible, for instance, to take a Stanford course while situated in Zimbabwe. It also offers ways to complement and improve upon legacy environments, such as historic maritime cities, raising the value of the qualities and conditions, shaped over time. In an increasingly competitive context, it has become even more important for entrepreneurs to situate in, or be based from, locations providing access to multiple types of knowledge as well as a diverse set of knowledge holders. For emerging entrepreneurs, this includes locating where he or she can interact with those who have direct experience as entrepreneurs. Second, based upon these findings, I offer a theoretical framework for interpreting the phenomenon of new productivity -- entrepreneurship and innovation-- in historic maritime cities. The era of thinking of such places as “non-producing” urban environments, or as environments only capable of supporting tourism, is over. Third, I outline some general recommendations for fostering entrepreneurial communities and encouraging place-based innovation in all historic maritime cities, and share some specific observations about opportunities for Venice, Amsterdam and Boston/Cambridge.
7.2 Review of Findings: New Value Potential for Age Diverse Districts

To examine emerging entrepreneurial activity in these three historic maritime cities and the location choice preferences of entrepreneurs, I used a number of lenses. In Chapter One, I identified that my intention was to investigate the practices of certain kinds of entrepreneurs now visible in Venice, Amsterdam and Boston/Cambridge, with the hope that it will further our understanding of the way these entrepreneurs work and the contemporary value of the historic built environment. Recognizing that there is a value to age diverse districts is not new. It has been a concern of scholars who saw the automobile, urban renewal and modern architecture dramatically altering the built environment. The context, however, has changed. Not only have many cities become more geographically dispersed over time, but also their building stock now includes many buildings constructed since the time that Jacobs and others were issuing their critiques. The spectrum of choices about where to locate is now much wider. The nature of productivity is changing rapidly under the influence of digital technology. Knowledge production is increasingly important to, and part of, almost any contemporary form of economic productivity. A growing number of entrepreneurs and freelance workers also means individuals, especially at the early stage of their companies, are directly choosing their work locations rather than having the location determined by a company for whom they work. The idea that innovation is linked to density has gained significant currency, but the importance of quality of place has been only loosely probed. Startups and entrepreneurship are popular; innovation is a buzzword and many cities have launched campaigns to create “innovation districts.” There is also renewed interest in rehabilitating legacies cities (noted places of past industrial production that still retain numerous assets). Understanding why place matters to entrepreneurs and innovators is extremely important for guiding urban development policy. It is from this context that I derived my research question: Do entrepreneurs associated with new industries prefer to locate in historically diverse districts? If so, why?

In Chapter Two, I determined that recent analysis of entrepreneurial ecosystems, focused at the regional level, has been too abstract, relying more on spatial analysis than place-based analysis, while quality of place studies have most often been conducted based upon a rather limited number of observations. In regard to quality of place at the building level, research on high performance workplaces in management scholarship and by the workplace design industry, and to a limited degree, the real estate industry, looks almost exclusively at interior elements of architecture, interior design and furniture (such as the benefits of standup desks). These point to the importance of biophilic qualities and configurability, but rarely consider how the building’s relationship to its neighborhood or district

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also plays an important role in enhancing the individual and collaborative performance of workers. The concept of biophilia (Wilson, 1984) has not yet been evaluated in studies of entrepreneurial location choice. Considering how choices are made, I conclude that it is not sufficient to examine just the regional or district scale because people choose based on multi-scalar comparison and analysis: evaluating options at the city, district and building scale simultaneously, or at least in an iterative manner. I conclude, as other scholars have, that Simon’s conceptualization of most decision-making processes as “satisficing” based upon limited information available (Simon, 1956) is extremely relevant to thinking about the way entrepreneurs choose a location.

In Chapter Three, I root the research question in relationship to a specific city typology: the historic maritime city. I consider how historical events have set the stage for current conditions. Many historic maritime cities have similar urban conditions due to environmental and economic legacies. They also have institutional resources and access to capital that, when effectively channeled, can serve to draw or retain entrepreneurs. There are many of these cities present in the world; they often have common planning needs (such as planning for climate change) and the need to manage port resources and tourism while also promoting new forms of productivity—all of which present challenges for entrepreneurs to solve. I find that Amsterdam and Boston show that it is possible for tourism to play an important economic role without it dominating an economy. I also observe that there are important clues (and data) to be gained from each city’s tourism activity about its potential to further develop its entrepreneurial ecosystem. This includes appreciation for dense, mixed use, human scaled, walkable urban fabric that is near water. Many historic maritime cities were part of colonial empires, either as outposts or as capitals. One underappreciated condition of these post-colonial environments is that they tend to be more culturally and ethnically diverse than other cities, even inland cities located just a short distance away, and tend to retain strong connections to other places across the globe. This can be a tremendous asset to an entrepreneurial ecosystem, both from the standpoint of providing a supply of ideas and by offering existing networks through which new solutions can be easily and rapidly disseminated, and the demand for these solutions can grow rapidly.

In Chapter Four, I examine contemporary policies and place-based initiatives used in each of the three cases to promote entrepreneurship. These cities reveal vastly different definitions and approaches to making of “innovation districts.” Comparative analysis suggests that coordinated planning of people, place and programs is essential. It shows the importance of persistent local leadership, development of

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places with certain qualitative attributes (which are described in chapters 5 and 6), and programs that promote the flow of tacit knowledge (peer to peer) to building community. Creating conditions in which it is possible for experienced entrepreneurs and investors, who often play the role of mentors, to transfer knowledge to new entrepreneurs through non-exclusive (non-predatory) relationships is also important, as is recognizing that emerging entrepreneurs have something to offer in return, whether it is a new perspective on old problems or technical skills. For entrepreneurs, combining specialized knowledge with knowledge of the market (or markets) in which they are entering is essential. For this to happen, it is essential that key roles of the private sector and public sector, where each manages and provides its own expert knowledge, not be confused. Analysis also suggests that incremental site developments coordinated with programming to promote learning and networking, rather than large scale, multi-year efforts, prove most responsive to the primary needs of entrepreneurs and, simultaneously, to changing opportunities in local real estate markets. Then after demand for space has been nurtured and confirmed, more sophisticated physical site development can be undertaken.

In Venice, I found that it is more commonly the case that entrepreneurs are not focused on rapid growth but instead on carving out and sustaining a particular niche. They also do not feel as supported by public policy or even private industry associations; strict regulation (labor laws and taxes) has generated a brittle business environment. While public entities are a large source of contracts, a large number of quasi-public companies are also competing for contracts with private companies in a wide range of sectors. This is seen, understandably, as unfair and particularly contradictory to the ideas of entrepreneurship. This impacts the supply of entrepreneurs, and in turn, the demand for space.

At the same time, some private industry groups (such as the groups behind the Consorzio Cantieristica Minore Veneziana and H-Farm) have shown a remarkable ability to organize and develop sites that host a variety of entrepreneurs. Although H-Farm is not located in Venice, but in its rural mainland periphery, much of its success can be attributed to the fact that it has focused significantly on quality of place – combining simple, elegant, human scaled site development, with learning and networking programs and events, and affiliations with industry associations as well as successful entrepreneurs who can share knowledge and give feedback. These sites are likely good models for future development within the historic city center of Venice, where they can more fully engage flows of diverse activity, as well as in mainland areas of Mestre and Marghera.
In contrast, the entrepreneurs I interviewed in Amsterdam and Boston generally reported feeling encouraged by their communities and positive about ample opportunities to gain knowledge about entrepreneurship. Especially in Amsterdam, they also reported feeling that it is possible to achieve their quality of life goals while undertaking an entrepreneurial venture. Even though many entrepreneurs work hard and take financial risks, on average, they seem to perceive that the efforts are worth it in exchange for control over their own schedule, a sense of achievement, camaraderie, and in some cases, a significant financial payoff.

Entrepreneurs in Amsterdam appear to be moving rapidly up the learning curve and increasingly discerning about European vs. American cultures of entrepreneurship. Martijn van Hoek’s differentiation between their current application and the one in development, Nouncy, makes this clear:

*With our new tool, the new proposition, we’re already building a prototype. We’ve hired new people for it. We like smart.pr -- the tool -- which we still think is cool but which we see will not make us ... worldwide successful because it’s not scaleable enough and it has a lot of downsides. But this tool and what else we can do with this tool makes it possible. I read this article a little while ago. It says, “you’re idea sucks, but do it anyway.” So if you start entrepreneuring, you start building stuff, and you’ll learn really quickly what works and what doesn’t. It brings you new ideas. We started off with a nightlife guide. I had no idea that it would lead to a software company or an Internet company or whatever you want to call it.* (Martijn van Hoek, co-founder, Smart.pr)

While entrepreneurs in Amsterdam and Boston/Cambridge both described selecting locations with the idea of having “room to grow” it seems that American entrepreneurs think on a much larger scale. The entrepreneurs in Boston/Cambridge can be categorized as the most risk oriented and conversant in the advantages and disadvantages of being backed by venture capital. They came across as “more competitive” and were also more connected to other entrepreneurial communities, namely in Silicon Valley and New York City, but also on the back end – working with teams in Eastern Europe and the Philippines to complete certain tasks, usually coding. They were also more “exit-oriented,” often seeing their current venture as one step along a continuum of activity. Overall they seem to move faster compared to entrepreneurs in the other two cities. They were also very mindful of forging strategic connections (not just social connections) with universities, the venture capital community, other
founders and the press, all of which speak to the specific challenge of bringing innovative ideas to market.

In Amsterdam and Boston/Cambridge, the presence of coworking providing turnkey services as part of month-to-month membership packages (and even for a daily membership rate) is expanding the supply, or range of options, an entrepreneur might consider. Often these are calculated on a per person basis (or a time basis) rather than a dollar per square foot basis. This has tremendously important implications for the way potential location options are compared in the choice process. It also introduces new ways to derive revenue from real estate. From an analytical standpoint, it alters the significance of rent and suggests that analysis should focus more on understanding the total costs and total benefits of a location.

In Chapter Five, I take a more quantitative approach to analyzing entrepreneurs’ location choice. Focusing on the Boston/Cambridge case, I find that the distribution of startups in sectors recognized as information and communication technology (ICT) and the creative industries (CI) revealed a number of important conditions. Comparing location data for firms founded before 2009 with those founded from 2009-2013, I determined a discernable increase in the percentage of all types of firms choosing locations within a five mile radius of the center of Boston/Cambridge and finding that the increase is even more significant when calculated just for ICT and CI firms. Then examining the locations of firms in Boston and Cambridge in relationship to the age diversity of the building stock, I found that the distribution revealed preferences for districts that are age diverse when examined in two ways: based on a higher than average number of distinct building as well as when this characteristics is combined with the presence of commercial/industrial buildings from the 1880-1935 era. The analysis revealed three districts with particularly high firm counts; I was then able to find out more about entrepreneurs located in these districts by interviewing them. Industry data on lease rates revealed that these districts are not the cheapest, and in some cases are significantly more expensive than others. This refutes the idea that entrepreneurs are merely choosing cheap space, or cheap central space and supports the idea that they are attracted to particular qualities that offer advantages to their performance.

In the interviews, I found that the innovation driven firms (IDEs) I interviewed that were located in the least age diverse area (in this case, Alewife) emphasized its convenience for a larger and more experienced talent pool. In contrast, those IDEs located more centrally, not only suggested that they are
more reliant on younger (and perhaps more mobile/international talent), but placed more emphasis on the benefits that all workers get from being in a more “creative” and “dynamic” environment.

Entrepreneurs that can be considered small and medium sized enterprises (SMEs) particularly affirmed the “community” value of colocation; some also see it as a way to tap potential clients and to network. Further, many choose colocation sites that they perceived to be convenient to their home. Some SMEs in Boston/Cambridge and in Amsterdam who relied upon a home office as a primary workplace, reported using a variety of central city locations for important meetings.

The mapping analysis revealed that many ICT and CI firms have similar parameters of location choice, and many areas of colocation were found. Interviews revealed a good deal of crossover in the modes of production performed by ICT and CI firms, with many firms relying on both creative as well as technical expertise. This lends support to the “diversity thesis” and the Jacobs spillover idea.

In Chapter Six, findings from interviews and site visits confirmed that qualities matter in relationship to production, though individual preferences and priorities do vary. For entrepreneurs, the quality of built environment is valued as a source of competitive advantage; it matters to entrepreneurial performance in several ways. Frequently mentioned location preferences can be can be summarized as three interrelated concepts: biophilic, flexible, sociable environments. I also conclude that the noted preference among many entrepreneurs for buildings that convey a “raw” quality is not just about being economical and nor is it simply an aesthetic taste. Rather, the well designed and well built architecture of such buildings are what make them an excellent platform for layering in, and then easily reconfiguring, that which is essential for entrepreneurs to do their work. Flexibility and soundness at the building level then also contributes to the mix of uses at the district level, expanding amenity choices and sociability at the district level.

Further, many places formerly identified as “third places” – places that served primarily as locations of consumption beyond home and work, now play an important role in communities, or ecosystems, of new knowledge production, both as preferred work places for a growing number of freelance and mobile workers, and more traditionally, as important nodes -- social places in knowledge networks where information flows readily and new relationships are formed. These findings confirm that it is not sufficient to focus merely on attractiveness of cities (to entrepreneurs and other skilled workers) as places of consumption, but rather to take a more holistic view, to see that consumption and
(knowledge) production are integrally linked. In the context of a knowledge economy, when so much of what is produced is intangible in nature, these tangible places even become new landmarks for these communities – replacing the symbolic role of the office building or the factory – and even newly emblematic of the possibilities of social and economic change, where the only limits are those imposed by the individual’s creative problem solving abilities. Sanjay Sarma, describing the location of Essess among the mix of uses in the adaptively used warehouse buildings of Fort Point, offered:

*It is also just a vibe - the vibe is important as well. The coffee shops – the food places – there’s a Flour Bakery right next to (the location). The people who serve you the coffee, strangely enough, they sort of have the same vibe. It’s very interesting. Like people collect. That really builds on itself.* (Sarma, Co-Founder, Essess, Boston)

The statement that “like people collect” is not so much to imply homogeneity, but rather the district level colocation of people who are united by, and excited by, an openness towards new ideas, and not merely accepting the status quo. Perhaps in being more aware of their environment and often quite aware of the potential in new technology, they see potential in these environments where others may not, to mix things in processes of hybridity and to produce new things. The recombinant quality of the environments to which they gravitate seems to play an important role, demonstrating the idea of change potential, while it encourages engagement and knowledge sharing within a community of actors.

**Surviving and thriving as an entrepreneur**

In even the most robust ecosystems, not all entrepreneur ventures that are started will survive. In fact, many will not. Entrepreneurship entails an ongoing process of learning and improvement. The entrepreneurs and other knowledge holders I interviewed suggest that three pervasive challenges exist: the challenge of staying mentally astute and focused on the task at hand, especially for long periods of time; effective communication; and access to the right types of knowledge, including knowledge of how and from whom to access capital. Location choice plays a significant role in each. To survive, entrepreneurs must learn what makes them most productive and understand what threatens them. I asked the founders gathered at Smart.pr, “What’s the worst thing that could happen to your company?” One replied, “The worst thing would be if Tim’s girlfriend breaks up with him.” While half joking, this remark was also spot-on in the respect that physical and mental health are critical to knowledge production. These are things entrepreneurs sometimes inadvertently sacrifice while pursuing their
goals, especially while operating in a context that is increasingly competitive. For entrepreneurs for whom an increasing amount of “work” relies on the use of their brains and social skills, not brawn, they never really stop working. As one entrepreneur said, “It is very difficult to turn your brain off.” The ubiquitous presence of technology can make it difficult to be completely focused on one singular task. Many do not really draw boundaries; everything and everywhere is part of their “work” environment. This is one reason why place knowledge embedded in the urban built environment holds value.

Many entrepreneurs appear to be particularly communicative about entrepreneurship and interact as part of a community of practitioners both on and offline. This includes actively sharing tacit knowledge on the topic of thriving as an entrepreneur and “life hacking” in general, as well as sharing practical and technical aspects of running an innovative business. They are self-aware, with the ability to articulate what keeps them creative and high performing. Many, though not all, seem to know how to take effective breaks and actively use the urban environment to do so. With so much work performed in the virtual realm and for the virtual realm, the importance of the physical realm as a place to pause and rejuvenate – to be fully human – becomes all the more important. Gaining and retaining competitive advantage means constantly working to enhance entrepreneurial performance. In this context, cost savings in rent is a relatively minor concern; astute entrepreneurs (especially those backed by outside funding) are willing to pay for access to knowledge, whether produced internally or acquired externally.

Thus, I find it is important to differentiate between primary location choice as a process that is satisficing (based upon limited information) and daily location choice and routine development as self-optimizing, based on much more feedback and thus allowing it be a process of learning and constant refinement. Both shape performance. If an entrepreneur makes a good choice in selecting a primary location, it should facilitate self-optimization over time.

7.3 The Beta-Tested Urban Environment: A Theoretical Framework

In this section, I offer a theoretical framework for interpreting key findings and organizing the various theoretical ideas I have discussed.

For entrepreneur and innovators, the premium in location choice is about access to different kinds of knowledge and this is something many age diverse environments readily offer, not only because of legacy conditions (such as proximity to institutions) but also because these places convey ideas about
change. Knowledge is what enables an entrepreneur to survive and then succeed. First and foremost, this means securing the conditions that enhance their own abilities to produce knowledge. Second, it means choosing locations that provide access to different kinds of knowledge, especially those that are identified as those which the entrepreneur needs to acquire: about business, about risk, contacts, support, sales and marketing, as well as about technology. In a non-hierarchical culture, where information is shared for readily from peer to peer rather than from top down, social space for formal as well as informal information exchange becomes more critical. This does not mean that all entrepreneurs should locate near the concentrations of greatest technical knowledge. More often, it should mean locating in places with a high propensity for different kinds of knowledge and knowledge sharing. This includes, for instance, knowledge about how to access capital.

Often, age diverse districts provide a set of desirable conditions that result in biophilic, flexible and sociable environments. As a result of being places of incremental change, age diverse districts often retain important legacy conditions such as walkability and multi-modality. Biophilic conditions amount to all environmental conditions – including those created by architecture and its relationship to the natural environment - that impact physical health and human comfort, including a sense of well being. They directly impact the ability to focus and to think creativity and they function as preconditions for flexibility and sociability. The benefits of a flexible building include: the ability to easily modify or rearrange interior architectural elements to suit the needs of particular tasks and/or users. It also includes the ability to optimize space utilization, which can allow for a more intense mixing of uses. Beyond this, flexibility allows for the ability to accommodate multiple activities within a particular space, based on explicit schedules of use, resulting not only in mixed-use buildings, but also in “multi-use” building that can provide more revenue and confirm the location as a place where compelling things happen. Flexibility also renders the ability to support the growth of a company, by allowing for adjustment to different occupancy densities and expansion. All of these conditions contribute to the economic value of a building.

Building flexibility, mixed use occupancy and multi-use operation, in turn, promotes a greater density of activities at the district scale. Such density vastly enhances the choices offered by such environments, eliminating time loss and promoting “flow” – easy transitions from one activity to another. This is important for productivity – being able to operate efficiently with minimal time costs -- as well as to performance, eliminating the distraction, unpredictability and stress of commutes, for instance. Beyond
this, a rich mix of uses further enhances access to knowledge, by way of expanding access to diverse individuals, activities, and institutions that act as stewards of knowledge.

The sociable quality of buildings and districts is important for a number of reasons, but three stand out in the context of entrepreneurial performance: community, access to knowledge, and contribution to work-life balance. Entrepreneurship can be a lonely business and an isolating endeavor. Diverse places support entrepreneurs’ needs for social contact, even when this contact seemingly has no direct benefit to production. Usually, however, there are discernable benefits, as entrepreneurs are, by nature, constantly learning. Age diverse urban environment, especially when utilized as the location for explicit programs to encourage networking and the sharing of formal as well as tacit knowledge, become critical locations to present ideas in progress, to obtain feedback, and to discover or be introduced to particular types of knowledge holders, be they potential co-founders, mentors, technical advisors, providers of capital or even clients. Situating one’s base of operations in such an environment also supports the building of familiarity and trust, such that nascent relationships can be shaped into formidable ones.

The new value of place knowledge

In my hypothesis, I suggested that historic maritime cities function as repositories of knowledge, as frameworks for creative thinking, and as settings for knowledge sharing. I found, for instance, that urban environments inform creative processes critical to different types of work, particularly in ICT and the creative industries. In some cases they literally serve as a metaphorical model for the creation of virtual architecture. Findings suggest that the value of place knowledge is even broader than initially perceived, that is, it can be both directly and indirectly put to use by entrepreneurs. Place knowledge can be considered in both a general sense and a specific sense. For all entrepreneurs, the general is important. Currently there is much emphasis on entrepreneurship as a global pursuit. Applications “going viral” via the Internet, amassing millions of users and then being acquired for huge sums do happen (and the press loves them). These are the lottery winners. It is more often the case that growth, which reaches global proportions and sustains it for any length of time, starts locally and moves first through pre-established social networks. The process of learning to become an entrepreneur and discerning when faced with dilemmas is, as Christensen points out, highly depended upon the ability to work quickly to produce new knowledge to inform decision-making (Christensen, 1997). This means situating -- working locally -- being deep enough in the trenches somewhere to be able to take into account many forms of information at once, form knowledge from them, and make decisions. Age
diverse districts can function as platforms for analyzing problems and testing solutions in a way that is socially situated and primed to deliver immediate feedback. This makes it possible to refine new ideas infinitely more quickly and in a way that will give them a better chance of being understood and applied by friends, neighbors, strangers, and other people who find them relevant. The concept of quality of place being contingent upon biophilic, flexible and sociable attributes can also be applied to new places (such as new districts) that are developed – and they should be applied. Also needed are planning, design, and budgeting approaches that operate with the expectation that time is necessary for such places to evolve and take is necessary for new place knowledge to be produced within these places.

For a growing number of entrepreneurs who might be broadly categorized as “urban entrepreneurs” active in urban management, consumer tech, real estate, tourism tech, heritage tech and myriad other emerging industries, place knowledge is also a form of knowledge from which economic value can be directly derived. For some entrepreneurs, age diverse districts, functioning as a repository of solutions for the built environment, serve as explicit model of good design. Age diverse environments are often technologically variable places. They often represent a range of possible solutions, from the very low tech, to those that are more reliant on technology. This can be explicitly valuable to entrepreneurs who are focused on consumer technology or other activities that require a keen understanding of the way new applications of digital technology are shaping culture.

Place knowledge is closely related to both tangible and intangible forms of cultural heritage. For this reason, the ideas of historic urban environments and new forms of knowledge production are closely linked. Historic urban environments are not merely passive places to be preserved for posterity, but as environments that have been beta-tested for human habitation and refined – they are key settings for new knowledge production.

**Knowledge production remains a physical and social process**

The firms and sites profiled reinforce the idea that knowledge production remains very much a physical and social process, even as technological tools and options change. Even though much work is performed on computers and outputs are often virtual, our minds are still connected to bodies, and bodies still interact and are connected to society and place. As technology can be used to carry out more tasks, entrepreneurs (and skilled workers in general) carry more of the responsibility for being effective producers of new knowledge. They can rely upon an increased number of tools to help process
information, but they are still the decision makers. At times, entrepreneurs can and will be self-contained and independent in their production. Sometimes this is necessary as a way to focus, especially given the plethora of information now vying for attention. Participating in a global economy means increased competition and often more complex problems to solve. This often requires not just putting more information together, but accessing more diverse forms to knowledge and working collaboratively to analyze and solve complex problems. Where entrepreneurs locate has a tremendous bearing on access to other knowledge holders, as well as access to knowledge that has been produced by others in the past.

American entrepreneur and venture capitalist Dan Harple, who resides in Amsterdam and in Massachusetts, remarked about running successful entrepreneurial ventures, “It’s all about people.” That high skilled workers tend to be found in particular localities with concentrations of people that enhance their productivity, not just their consumption, is important. It suggests that one of the most important things entrepreneurs can do is to take the time to understand how their environment influences them. It also suggests that firms choosing to relocate to where pools of talent are already established are, most likely, selecting environments that are sustaining high performance.

Rethinking the “performance value” of buildings and the urban environment
Entrepreneurial communities in one place may look very different than another, but be equally as robust. The purpose of emphasizing the quality of the built environment in this context is because places shape and are shaped by the communities that emerge within them. After the bombing of the British House of Commons in World War I, Churchill called for the restoration of the building, stating,

We shape our buildings, and afterwards our buildings shape us. Having dwelt and served for more than forty years in the late Chamber, and having derived very great pleasure and advantage therefrom, I, naturally, should like to see it restored in all essentials to its old form, convenience and dignity (Winston Churchill, October 28, 1943)

I reference this quote to draw attention to Churchill’s keen understanding of the performance of architecture. In a similar vein, in his Ten Books on Architecture, written in the first century BC, Vitruvius argued that architecture must offer firmness, commodity and delight (Moffett, 2003, 1). It is possible that Churchill may have been making reference to this in praising “form, convenience and dignity.” Both
descriptions affirm that architecture, and extending this idea to city making, is more than just engineering. In well-crafted solutions, beauty and functionality are inextricably entwined, like the fibers of a rope. Understanding quality of place requires a deeper understanding of architectural performance that encompasses not just formal or technical aspects of architecture and urban design, but also a more complete understanding of architecture and its interrelated roles of firmness, commodity, and delight. Without considering these intangible values, many of the most important biophilic attributes will be missed. Hence, understanding quality of place also means thinking about the development of cities as a process of refinement. Cities and places that have been occupied for many generations have often been refined along the way. It means shifting the view of historic urban environments from “old” to “refined” and understanding that intelligence (knowledge) is reflected in the built environment. Districts developed over time have built in nudge factors, an intelligent framework that encourages sensible, life- and community-affirming choices. These are not products of the buildings themselves, but those who built them and shaped them (see fig. 64).

Historic cities are crowd-sourced solutions, shaped by many experiences and many individuals over time. Whereas in new cities (particularly in developing countries), entire districts may be conceived in one broad brush, in the case of existing cities, most often, change occurs incrementally, usually one building at a time; only occasionally are entire districts redeveloped at once. Urban regeneration can then be viewed as a select process to further enhance and refine existing urban environments and urban systems, rather than to replace or even “restore” it. Many entrepreneurs do not need flashy

Figure 64. Examples of confident adaptive use in Venice. Left: conversion of a boatshed into a home/studio. Center and right: conversion of a boatshed into the Boselli Showroom. Photos by author.
environments to be successful, but they do need biophilic, flexible, sociable places. The recognition for
the value of convenience over presentation, and appreciation of the raw in interior environments are a
testimony to this.

**Real virtuality drives up demand for quality of place**

Defining the concept of real virtuality, Manuel Castells described many of the implications of the digital
age and network society. What implications does it have for the value of place knowledge and quality of
place? How does it help us to understand what cities offer to entrepreneurs and innovators and – in
turn – what these individuals offer to the cities that host them? New digital tools provide new way to
multi-task and to schedule time. New digital capabilities present a whole new set of choices, not all of
which are in our best interest (driving while texting, for instance). Digital technology makes it possible
to share information – and knowledge – across time and place in more ways than ever before. It is still
necessary that new ideas be applied in a manner that is appropriate to local physical, social, and
economic conditions. Local conditions remain relevant.

As digital technology and new virtual tools facilitate knowledge creation and knowledge sharing, so do
the attributes of well-honed physical architecture and urban form. We don’t exist in one world or the
other, but both, often simultaneously. To achieve the outcomes we desire, we must be aware that both
shape our potential for success not only to self-optimize, but also to connect to the people and
institutions that will contribute to the refinement of our ideas. With more options than ever before, it is
up to the user to decide the most suitable environment for the task at hand. Location choice has more
meaning than ever before. Understanding high performing places in the real world may even equip
individuals to generate high performing "places" in the virtual world as well as applications (used in the
broad term) that rely on both physical and virtual infrastructure to enhance the user’s ability to navigate
this two-track existence -- simultaneously participating in the real world and the virtual world. Virtual
experiences are changing the value of real environments, under some circumstances leading society to
become less tolerant of places that do not suit contemporary needs. One example of this is newly
constructed office buildings in Amsterdam that were never occupied and that have now been
redeveloped as housing for students, notably a group that often has less direct choice about where to
live due to cost constraints.
7.4 Historic Maritime Cities as New Places for Entrepreneurs and Innovators

In this final section, I focus on how the theoretical ideas outlined above may be applied through practical approaches to foster entrepreneurial communities in historic maritime cities. I offer both broad recommendations and some specific recommendations for each of the three case cities.

An important first step is for cities to manage GIS-based data so that systematic identification of age diverse districts is possible. Studying age diversity should also lead to further analysis of the density gradients of the built environment, including how places of high, medium and low density interact and support one another, and dialogue about how “quality of density” might be defined. Mapping productive activity (based on traditional economic sector classification) at the district level, and identifying locations of new forms of production (both tangible and intangible) is essential for understanding “natural” processes of industrial change and opportunities to enhance new growth there. With this information, it is then possible to focus on the fundamental enhancement of the building through adaptive use, including ensure sufficient – which means easily upgradeable - Internet bandwidth, and resisting the tendency to “over restore” or “over design.” Let this framework do its job,
and use what is often limited capital to ensure that complementary programs are developed and sustained, including the possibility of operating such sites for coworking. Coworking locations provide one of the most facile and economical ways for would-be entrepreneurs to “enter the entrepreneurial ecosystem.” Subsequent alteration and enhancement of a building can be identified and tackled after the building has been put back into use and again proven its productive relevance. This may present planning challenges, as historic preservation guidelines, especially for publicly funded projects, are often not geared towards incremental improvement, but rather towards comprehensive approaches. Similarly, it requires a more incremental or phased approach to architectural production. Countless projects realized in private development demonstrate how this can be done; in many ways, the private sector may be more geared to deliver such projects to the market and to keep them operating in a way that is both competitive and profitable. If a city decides that facilitating private sector development is the best strategy, then they can identify buildings for reinvestment and offer support in the development of programs to promote entrepreneurial learning by being a partner with private industry in organizing events that promote networking and the forging of key relationships. The ability to understand and differentiate the potential of a particular place in an authentic way, and to promote place-based innovation, are two other important roles that cities can play.

As discussed in Chapter Four, public-private initiatives can play a vital role in developing an entrepreneurial ecosystem. These programs can help address critical prerequisite conditions (discussed in Chapter Six). They call attention to the unique conditions a city has to offer, including its physical assets and knowledge profile. They also organize at scale marketing and public relations, formal educational programs, and networking events and conferences. This is particularly important for smaller cities such as Venice, where a key component of the ecosystem, such as access to venture capital, might be missing. This might mean creating a local venture capital fund and finding ways to “tap in” to capital and expertise in other external networks.

The legacy conditions of these and other maritime cities are valuable assets, but physical planning alone is not sufficient to encourage the growth of entrepreneurial communities. Venice is indicative of this. Taking full advantage of these environments means strategically considering the interrelationships of people, place, policy and programs in entrepreneurial development. Acting with the view that all citizens are potential entrepreneurs and innovators, it also requires understanding the influence of broader urban conditions, such as affordability of housing and quality of education. Cities and
communities must be attentive to creating and safeguarding inclusive economic institutions, and to promoting trust and building capacity, objectives made doubly difficult by conditions of increased economic inequality that can emerge from skill biased technological change.

**Venice: extraordinary untapped opportunities, but prerequisites are critical**

The first recommendation for Venice is to invest in making building year data available digitally. Then, use the model developed for Boston/Cambridge as a starting point for conducting systematic analysis of building-age diversity. This is important to show that Venice is “not just old” and, in fact, is more age diverse than many people presume it to be — and to show that what is old offers important lessons about why certain buildings endure (see fig. 65). Along with this effort, a readily updatable inventory of unused building space should be developed. This will provide a rich platform for then overlaying information about sector activity and identifying districts with high potential for further development, including in the form of temporary interventions. It is also important to analyze changes in retail activity — both from the standpoint of understanding where services are declining and to see and categorize the variety of new retail ventures emerging, some of which are highly creative and innovative in important ways, such as in physical product delivery.

The private sector can develop coworking spaces that meet demand from entrepreneurs, contingent workers, sabbatical takers in Venice (of which there are many) and other people who come to Venice and choose to combine work and leisure. This can also include an accelerator component around key emerging industries: urban management, and most specifically cultural heritage tech and tourism tech. One example of this is Tummel, “an accelerator for urban innovators” in San Francisco. Glass, fashion (including consumer technology “wearables”) and furniture, are also strong candidates because of regional knowledge legacies and the presence of a direct consumer market — in the form of tourists.

Incentivizing housing for entrepreneurs, even if on a temporary basis, would likely go a long way toward keeping entrepreneurs in the historic city center and encouraging others to relocate there. This is something the City of Venice could help to approve from a regulatory standpoint, but strategy and management might be most effectively developed in collaboration with local real estate companies, and perhaps also companies working across multiple markets, such as AirBnB, which already has a presence in the city. The city of Venice is uniquely positioned to invite other municipal leaders to share ideas, especially about promoting new forms of incremental redevelopment. The city and the private sector
can work collaboratively to connect to venture capitalists (and other types of investors) already coming into the city on a temporary basis. Bringing successful Italian entrepreneurs back to Venice to share their stories (along the lines of the Creative Amsterdam program) is one way to link Venice-based entrepreneurs with Italian talent working beyond Italy.

The City of Venice can also work with the private sector and the many non-governmental organizations that have a presence in Venice (some of whom have robust global networks and access to significant capital) to develop and promote narratives about entrepreneurs and innovators. This should build on important achievements of longstanding events, such as the Venice Biennale, as well as newer efforts, such as Digital Venice, both of which have made highly creative, temporary use of buildings and outdoor spaces. Directing the tourism narrative away from “mass tourism” and toward “tourism tech” (ala biotech, edtech, etc.) is a critical opportunity for Venice to develop as an industry leader; if Venice does not seize it, another city likely will. These entities can work collectively to show the many facets of entrepreneurship and innovation in Venice, past and present. Finally, they can hold specific challenges about Venice to draw other new entrepreneurs and innovators to Venice, even if on a temporary basis. Such programs can create “aspirational pull,” helping others to see Venice as a place ripe for cultivating innovation and where they may have an important impact.

Amsterdam: building upon a remarkable foundation
Within a short time, Amsterdam has built a strong reputation as a place for entrepreneurs through combined efforts in diligent urban management, promoting knowledge flow among a growing and dynamic urban community, leadership of key individuals and the support of specific marketing programs, such as lamsterdam. They have followed the Creative Class playbook, promoting technology, talent and tolerance, resulting in many positive effects. As described in Chapter Three, Amsterdam thrives at producing SMEs but until recently, only a few IDEs have achieved and sustained high growth. One explicitly place-based approach to demonstrate how companies achieve high growth in Amsterdam is to reverse engineer “roadmaps” for its high growth companies, showing where they originally located and where they have relocated overtime, with detailed explanations (based on company interviews) of how milestone decisions were made and what advantages were gained from staying in Amsterdam. This can serve to complement work on cluster analysis and district characteristics already undertaken by the DRO. An excellent candidate would be Guerilla Games, which started in one canal house, then
relocated to another canal house, and then most recently moved to a custom-renovated space in the building called The Bank – all within the canal ring.

Road mapping can achieve a number of objectives: it can reveal more explicitly how Amsterdam’s age-diverse building stock functions to provide a high degree of choice for companies as they grow. It can show that Amsterdam does not just function as a “nursery city” for startups (Duranton and Puga, 2001), but that its quality of place also offers key advantages to maturing companies. It can draw out distinct examples where companies have leveraged their location to forge relationships and access to knowledge, including to access capital. It can tie the narrative of Dutch entrepreneurship and innovation to specific places. It can show Dutch design expertise in adaptively use historic buildings in a way that is respectful of character defining features while introducing new, performance-enhancing ones. It can explain the city as a “high performance workplace” that functions because of the high quality of life it offers. It can generate important real estate data. It can provide real world examples where STEM and Humanities-based knowledge interact. This is particularly important in the context of national educational objectives to encourage study in STEM fields, but it can also be a strategy for attracting talent-hungry companies to Amsterdam. Finally, one of the most urgent things roadmapping can do is explore entrepreneurship in Amsterdam as an inclusive opportunity, made more robust by the participation of a wide variety of individuals. Structural limitations encountered can then be concertedly addressed. Achieving this will also provide an important model for other European cities.

Boston/Cambridge: age-diverse environments as a key for broadening the reach of innovation

One of the most important finings of this research is how inextricably linked entrepreneurial performance is with the overall performance of a city. Live-work proximity, walkability and transit choice, being able to “renew” in urban parks and waterfronts, and other conditions all contribute significantly to entrepreneurial performance. One of the most important things that Boston/Cambridge can do to encourage entrepreneurship and innovation is continue to invest in maintaining its urban infrastructure and the quality of the public realm. Further, fundamental conditions, such as the affordability of housing and quality of public education are critical for keeping entrepreneurs “in the ecosystem” for the long term. Thinking from the perspective of the entrepreneur, this research emphasizes the importance of choosing places that contribute to performance on a daily basis and investing in places that will not merely attract talent, but sustain them. As persistently productive and
dynamic places, this is something for which age-diverse districts seem to have an embedded intelligence.

More broadly speaking, showcasing the value of age-diverse environments to entrepreneurs and innovators is critical for advancing dialogue about quality of place in Boston/Cambridge and shaping future urban development. Findings suggest the need to think about density in relationship to quality, rather than to assume higher density always result in better outcomes. It places new emphasis on understanding existing density gradients in Boston/Cambridge and the collective value they generate. While entrepreneurial activity is extremely developed in some areas of Boston/Cambridge, it has not yet reached some districts that possess ideal building stock and other favorable conditions. Targeting these can be a way to embraces diversity, extend the reach of innovation, and contribute to resiliency.

The findings from this research also hold implications for the region. The Commonwealth of Massachusetts’s Gateway Cities initiative and recent scholarly work (Haynes, 2013) have laid the groundwork for new ways to think about the revitalization potential of many of the commonwealth’s once thriving industrial cities and to think about the cities themselves as a network of connected communities. Some of these gateway cities possess high quality age-diverse building stock valued at a far lower price point than Boston/Cambridge. Adapting buildings in these districts to accommodate startups, coworking models, and accelerator programs, and coordinating programs to build relationships among entrepreneurial ecosystems can specifically serve to connect knowledgeable individuals in legacy industries, emerging talent and potential investors, producing a collective win for these cities, for Boston/Cambridge, and for the region.

**Taking the long view of historic maritime cities**

*In the knowledge economy we will measure places, both buildings and cities, by the amount of knowledge that is accumulated and quantity of ideas that are generated within their fabric (Duffy, 2008, 59).*

Quality of place is but one important factor to entrepreneurial performance and the development of entrepreneurial ecosystems, but it is one that warrants much more investigation. Cities that have persisted for long period of time already function as repositories of knowledge and have already proven
themselves to be frameworks for creative thinking and settings for knowledge sharing. New digital tools offer new ways to utilize and expand upon this collected knowledge. Now more than ever, there is an urgency to draw deeply from these wells to reach a new level of understanding of the complexity of local places, global society and an increasingly connected world.
Appendix 01: 11x17 Maps
VENICE
ENTREPRENEURS/FIRMS INTERVIEWED:
1. Studio Camuffo
2. I Tre Mercanti
3. DNA Italia (Mestre)
4. Bressanello Art Studio
5. Forma Urbis
6. Relations
7. Ski Stradivarius (2 locations)
8. Yellow Chip Srl (H-Farm)
9. Xyee (H-Farm)
10. Marco Bonaldo (Home office)
11. Ennova Research (VEGA)
12. Teleart (VEGA)
13. Venice Commerce Srl
14. Mara Guigilemi
15. FM Games Studio
16. A4 Smart s.r.l. Innovativa

Location
Denotes a relocation or new affiliation during period of research

Denotes site discussed in Chapter Four
Appendix 02: Entrepreneur-Location Typologies

8.1 A Proposed Set of Entrepreneur-Location Relationship Typologies

Several variations of location preference trends appear to be emerging, based upon not only the type of work (as interpreted by industry code) but also the size of firms, age of firms, and the age/life stage of the individual entrepreneurs interviewed, all of which impact location choice and how firms rely upon the built environment. In an effort to increase the metaphorical value of thinking of entrepreneurial communities\(^\text{113}\) as “ecosystems,” I have identified six typologies of the entrepreneur-location, or firm-location relationship. The purpose of this is to have a comparative structure by which the characteristics and needs of individual entrepreneurs or firms under analysis can be compared in more detail. One benefit to identifying a typological system is that it encourages further empirical analysis of the attributes that distinguish individual types. It is important to develop such a typological approach in order to elaborate upon the much explored “elephants-gazelles-mice” construct (Birch, 1991) and the more recently developed IDE and SME constructs (Aulet and Murray, 2013), as neither are inherently related to qualities of the built environment, but could be. I should add that I have taken some creative license, as this construct assumes that one type can actually transform into another (for instance, a coral fish turning into a shark). While this is not the case in the real world, shape shifting is very much a part of development within entrepreneurial ecosystems.

This typology strategy focuses on the relationship of entrepreneurs to their environment, as well as to others in the ecosystem. As it is developed (in future research), it will further understanding of the relationship between coworking locations (and services) on location selection and firm counts by district. These typologies function as components of the larger knowledge ecosystem. I drawing literally upon the metaphor of an oceanic ecosystem, assigning a descriptor to each typology, each of which is described in detail below (see fig. 65). Following these individual descriptions, I make some additional points regarding the relationship between and among the typological constructs.

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\(^{113}\) In regard to the difference between describing the emergent entrepreneurial activity in these environments as an entrepreneurial community versus the sometimes more abstract concept of “entrepreneurial ecosystem” -- so long as relationship to place, as well as agency are considered, the difference in terminology does not seem to matter though different groups might be more inclined to prefer one term over the other.
Type 1: Remora

For truly mobile workers, the entire city is their workplace, but they can often be found attached to highly biophilic interior environments, offering free power sources and free wifi, where they pay no rent (see fig. 66). Thus, they are categorized as *suckerfish* (*remora*), which have a symbiotic relationship with a host species. These are the workers who camp out at the Starbucks flagship location in Amsterdam, Two for Joy Coffee or the state-of-the-art Amsterdam Public Library. Although they pay no rent, they do buy expensive coffee and seem to be willing to pay more in housing costs to be proximate to these locations. They may even have an office, but choose not to work there or to do a certain amount of work from what can be understood as particular types of highly accessible “third place” (Oldenburg, 1999). Often, these are found in age diverse districts. While conducting field research, I was working from Two for Joy Coffee in Amsterdam one day, and I watched and listened as an English-speaking art director conducted an interview with a potential employee, checked her email, met with colleagues, and then held a conference call via Skype, all while her dachshund sat at her feet. This may not be the most efficient way to work -- there is no guarantee of a table, there is nowhere to store your stuff and little control over ambient noise except via the use of headphones. At least some of the time, or for certain tasks, these are viewed as tolerable trade offs. These work locations are not likely to show up in firm data, though they are indirectly discernable in establishment data. These entrepreneurs are also important because they activate public places, making them even more social (see fig. 67). The also
serve as direct evidence of a city's entrepreneurial community, not all of whom areas visible as these individuals.

Figure 67. Two "third spaces" in Amsterdam often frequented by “remora” type entrepreneurs: The Coffee Company and the Starbucks on Rembrantplein. Photos by Author.

Such locations can also be described as “eavesdropping stations,” which necessitates that there is actually something – some conversation – to overhear. In Cambridge, Tatte and Voltage are prime examples; in Boston, The Thinking Cup (locations in Back Bay and at Boston Common) as well as Barrington Coffee (in the Boston Innovation District) fit this category, as do almost all locations of Flour Café/Bakery. These are places where tacit knowledge is actively shared. The first description I heard of Bolt Accelerator in Boston was while waiting for a coffee order at Voltage. The use of cafes/bar as locations of production adds to the heterogeneity of activity taking place; the social impacts of which might be both positive and negative. In Venice, however, some locations might resists this, in part because table service is a way to earn a per person service change. There are plenty of cafes, however, that would probably welcome having more, and a greater diversity of, clientele (at least in the off season).
Such locations are becoming increasingly sophisticated and readily acknowledging the value of such workers; this now extends beyond cafes. In Amsterdam, Hay, a Danish furniture store opened its first shop in Amsterdam and has co-located with de Koffie Salon, a reputable Amsterdam coffee purveyor (see fig 68). ING bank has also opened cafes within some of their banks, while their U.S. affiliate, Capital One Bank has developed multiple co-located sites with Pete’s Coffee, including two in Boston.

**Type 2: Hermit Crabs**

Firms that can be described as *hermit crabs* rely on small, formerly discarded shells of buildings or undervalued portions of buildings. They take advantage of light industrial buildings, storage spaces and simple storefronts. These are the firms willing to fill the nooks and crannies of centrally located real estate that may be substandard in some way (such as a basement level location) while offering other advantages, conveniences and qualities when observed at the building and district scale (see fig. 69 and 70). While firms might make improvements to these spaces, they usually retain a raw character; retaining evidence of past building uses. When hermit crabs outgrow their current space, they often relocate to a larger space within the same general district. Hermit crabs are usually SMEs. Under the
right conditions, some appear to have the potential to be transformed into IDES, while others will be content to achieve slow and steady growth.

Figure 69. "Hermit crab" example: Forma Urbis, Venice. The top left image shows the unassuming entrance to their office, a former storage space in an alley-like street off a main thoroughfare. The firm has since relocated, and is subletting space from an architecture firm (owned by a family member) in a nearby neighborhood.

Figure 70. "Hermit Crab" example: E-builders in Amsterdam, a web design company. Photos by author.
The next three typologies reflect the emergence of new real estate service models for coworking spaces. Coworking service providers, including multi-market companies such as WeWork and the Hub, as well as an increasing number of locally based providers, that are often highly entrepreneurial, innovative and tech-savvy in their own right, are critical actors in this context. As described in Chapter Six, the benefits of coworking and co-location include higher quality space (and shared resources) on more flexible terms, a social, synergistic environment. This shared-resource model bears some similarity to new models of car sharing and bike sharing.

Figure 71. Coral Fish example at the Hub, Amsterdam. Photos by author.

Type 3: Coral Fish

The third group of firms can be described as coral fish drawn to an artificial coral reef. This metaphor is based upon the practice of sinking decommissioned ships to encourage the growth of new coral reefs (for diving sites, etc.). Firms recognized as coral fish are attracted to such sites and take advantage of a programmatic amenity not previously available within their environment. In the case of Amsterdam, largely as a result of the broedplaatsen initiative, a number of large, centrally located, historic buildings (often early 20\textsuperscript{th} century office buildings) have been minimally adapted (via the addition of transparent partitions, high speed internet capacity and a beer brewer in the basement) to attract and
accommodate entrepreneurs, sometimes intentionally within one industry and sometimes intentionally heterogeneous (see fig. 71). These buildings may be conceived as accelerators or simply as coworking spaces. Many sites operate under a dual model, with some space leased on a membership, as well as fixed space leased to entrepreneurs; sometimes tenants may be allowed to share or sublet their space. Both strategies usually allow for short-term commitments (often month to month), with some discounting based upon upfront payment for longer occupancy. The architecture of these buildings usually offers notable street presence, sound structure and some shared amenities (such as a roof deck or event room). The entrepreneurs seeking these spaces are often looking to be a part of a startup community; in some cases (such as CIC in Cambridge and Rokin 75 in Amsterdam) venture capital firms operate, support or reside within these locations. Further, many entrepreneurs (as well as pre-existing firms) now choosing such locations offers services explicitly for entrepreneurs; sometimes this has happened organically (some entrepreneurs reported bartering or exchanges services with others) but in mature locations (such as CIC in Cambridge) it appears that some service providers (such as law firms and others in an advisory capacity) see an inherent opportunity in these types of communities. While this may impact the dynamic among tenants (some intent until “selling” to others), it also puts a number of potentially required services in close proximity, either making the process of hiring for these quite efficient and at the least, informally conveying (educating) that such services might be required. Like remora in café settings, schools of coral fish also create a collective social attraction – attracting other entrepreneurs as well as other important actors in entrepreneurial ecosystems.

Figure 72. Rokin 75 in Amsterdam: a coworking space that works well for Coral Fish and Sharks. Photos by author.
Type 4: Sharks

*Sharks* are aggressive startup firms for which task-oriented workspace (but not appearance) is paramount. They epitomize the innovation-drive enterprise (IDE) concept. These are often exit plan-oriented firms; environments they choose are meant to be temporary because these firms see themselves as constantly in motion. They may inhabit the same space as *coral fish*, or other locations available for short-term lease (see fig. 75). *Sharks* value the qualities of their district environments, especially as these districts provide the common meeting places where industry knowledge is shared and professional relationships, including access to venture capital, poachable talent and a high rate of knowledge flow (“food”), are forged. Sharks may relocate to gain perceived benefit of proximity to capital (VCs) or entrepreneurial “knowledge,” for instance applying to an accelerator program out of state. One example of this is Local Data, a firm started by MIT Alum Alicia Rouault, which relocated from Cambridge to join an accelerator program in San Francisco, a decision based partially on perceived access to capital (Rouault, 2013) or even out of their home country, such as some entrepreneurs in Venice has done recently.\(^\text{114}\) Sharks are faster moving than other types; they may disappear from their initially chosen ecosystem rather quickly if they do not perceive the right conditions.

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\(^{114}\) January 13, 2015 La Nuova, profiles two Venetian firms (based at VEGA) that were accepted to participate in an accelerator program in Chile. Even when intending to be temporary, the risk of relocation is that a firm will thrive in its new environment and not return to its old one.
Type 5: Sea Turtles

Sea Turtles are long-living entrepreneurs that have matured into established companies, some of which require locations in multiple cities. They are slower moving compared to Sharks. Sea turtles are sometimes found intermixed in locations that support coral fish and sharks, although they explicitly possess strong preferences for high quality (high design) interior environments in iconic buildings at notable street addresses. They often come onto the scene after a location has been established as notable (and they often prove lucrative clients to coworking service providers). The model that makes this typology possible is based upon a real estate development and management strategy that provides a mix of high quality on-demand task-oriented workplaces and the services to support them (see fig. 73). Workspace service providers such as Regus have long served this market, but now many more locally-based service providers are also emerging and these often offer a unique identity, or at least one that takes sense of place and local culture more into account.

Sea Turtles include established, global companies that desire to have an outposts in multiple cities without having to do the legwork of finding the space or committing to a long-term lease, but that are willing to pay high quality turnkey services. Google choosing Spaces on the Herengracht for a second location in Amsterdam, or Constant Contact (based in Waltham) renting space at Workbar in Cambridge so that they have a meeting location in town is another example. They also include contingent workers who chooses these high quality environments as a permanent home, even as he/she changes companies or consulting jobs; another would include firms for which prestige factor is particularly valued, such as public relations firms.

Type 6: Whales

Whales are large, successful firms (or organizations), which choose to occupy an entire architecturally notable building (or a large portion of it) at a prestige address\textsuperscript{115} (see fig. 74). Locations include major sites within Amsterdam’s Canal Ring, Venice’s Grand Canal, Kendall Square/East Cambridge and Boston’s Waterfront/Financial District. Often firms, or the real estate development team with whom they closely work, preserve or restore key architectural features while adapting interior configuration to support high programmatic flexibility and/or task-based workspaces. This results in an architectural program that is often far less hierarchical than the original programmatic use of these buildings. From the 1940s

\textsuperscript{115} Headquarters of some established non-governmental organizations also seem to act in this way. Amnesty International in Amsterdam is one example.
to the 1990s, companies that became “whales” might have migrated to the suburban ring, but since then, they often desire to stay in the city. Why? It may still reflect the strong preference for live-work proximity based on both the location of residence of the CEO as well as consideration of talent desiring to live more centrally. But there are likely other conditions at play.

This type of adaptive use affirms the firm’s rise to prominence and their contribution to the urban narrative. Examples in Amsterdam include Guerilla Games, Booking.com and Tommy Hilfiger, and in the non-profit sector, Amnesty International. When demand for space exceeds their current space, *Whales* often choose to acquire additional buildings (satellite locations) in close proximity to the flagship building rather than to relocate. One explanation for this may be the fact that the location of any physical production of such firms is often spatially remote from the outset; another is the increasing degree to which what is being produced is intangible – either in the form of services, or as virtual products increasingly delivered via virtual marketplaces. Even under such conditions, the choice to remain in the historic urban center appears deliberate and based on such environments being a better location for knowledge production. The cultural institutions taking occupancy in Venice’s landmark buildings and Benetton’s purchase of the Fondaco dei Tedeschi (mostly recently the headquarters for the Italian Post Office) on the Grand Canal, adjacent to the Rialto Bridge, can be considered emblematic of whale behavior.
Figure 74. The headquarters of Booking.com and Guerrilla Games in Amsterdam, both examples of the Whale typology. Interior photos top and middle right, courtesy of the Kroonenberg Groep. Other photos by author.
The building to which Guerrilla Games moved when it outgrew its former canal ring location is an 1970s addition internally connected to an adjacent 1926 iconic bank building on the north of this site; these were redeveloped together as part of “The Bank” project by the Amsterdam based Kroonenberg Groep. The interior architecture of Guerilla Games has been explicitly designed for its large and diverse production team. A (snow-covered) military jeep and boat, seen in the picture at right, extend the Guerilla theme out into the public realm. The re-occupancy of the building mirrors many aspects of the original occupancy in the 1920s, when the iconic complex was built to evoke a specific identity for its occupants. It is just such buildings that whales often inhabit and make their own.

8.2 Observations about Relationships Between and Among Typologies

It is possible to observe clear symbiotic relationships between certain typologies, and possibly, among all typologies. For instance, Remoras (particularly the freelance worker element of this typology) move not only between locations, but also between projects and companies. As such they contribute greatly to the recombinant quality of the innovation ecosystem. They are a natural complement to both the Whale and the Shark typologies. Within the numerous coworking sites found in Amsterdam, it is often possible to observe a range of typologies; it may in fact hold true that diversity (both in typology as well as within industry focus) may in fact be one indicator of robustness. Firms vary in their degree of vulnerability to location displacement. Firms (including sole proprietors/freelancers) that can be described as Remora are knowingly vulnerable and prepared to move, but they easily latch on to other sites, whereas Whales, and to some degree, Sea turtles, have secured their positions by demonstrating willingness to pay for critical resources. The perceived and likely very real advantage of many coworking sites – the option to rent month to month – appears to be most attractive to three of the six identified typologies – Coral Fish, Turtles and Sharks. As such, it is the firms that fit these typologies that are most vulnerable in a “hot” real estate development cycle, with the paradox being that a key driver of development interest – emergent innovative firms – that may find themselves soon priced out of the market. This seems to be a risk or condition firms are willing to deal with; the risk-reward is worth it and this willing mobility of firms can also be good for urban redevelopment; such firms function as “activators” in the early stages of urban regeneration. It seems even plausible to coordinate redevelopment of multiple sites in sequence, with planned, relocation options offered from one site to another to participating tenants.
Relative programmatic diversity is an important differentiator among these typologies and the building, district, and city scales are all implicated. Remora seem to be malleable, with limited spatial needs, though they show themselves to prefer what are classically defined as “third places,” as mentioned above. The work places created by hermit crabs are often very programmatically limited, but flexible and/or multi-use. They rarely include formal reception spaces and may include only nominal support functions (such as a coffee bar). Hermit crabs, too, rely greatly on “third places” of the city – though more so for moments of respite or deliberate knowledge exchange, i.e. fortifying the “weak” but important ties within their social networks (Granovetter, 1973). Firms found in coworking sites, including Coral Fish, Sea Turtles and Sharks typologies, are often attracted to such sites due in part to the spectrum of task-oriented workspaces (and support services) they offer. These communal assets are a key driver of knowledge sharing and collaboration that takes places within such locations, but importantly, many coworking sites tend to be highly permeable. As such, they may be particularly effective in promoting knowledge transfer within and outside their walls, notably, a condition Saxenian noted as distinguishing the competitive advantage of firms in Silicon Valley from their Boston/Route 128 counterparts (Saxenian, 1994). The transparent, permeable “storefront” quality of some architecture, especially when located in walkable environments, is an extremely valuable asset for coworking. Not choosing it or not providing it represents a missed opportunity.

Finally, Whales tend to develop as the most internally programmatically complex sites, providing a range of amenities (task oriented work spaces, catered and self-catered kitchens, gyms, theaters, gardens, and massage rooms, to name a few examples) that bear some resemblances to closed campus models of headquarters found in suburban settings. Such investments are intended to attract and retain workers, and importantly, to enhance the productivity of workers – both in individual and group work. In offering such sophisticated internal programming, they set the stage for very different relationships between their workers and activities taking place at the district level. Even in an urban setting, Whales risk creating a situation where they are proximate to knowledge flows but not directly involved in them. The creation of such silos – or calcification – can be avoided by planning events and programs to intentionally penetrate boundaries, that is, to get people outside and engaged in what is happening in the world around them. Whales need urban environments in a different way than other typologies; they need them to keep learning and to remain innovative – not only to fend off isolation (which can lead to over work of employees) but also to continue to appeal to a broad range of high skilled talent. There may be particular advantages to companies, such as gaming, that rely on a rather diverse talent
pool. With the increasing use of more flexible scheduling practices (including select days to work from home or off site), retaining an urban location in an age diverse district can turn out to be especially convenient for workers who live in the suburbs (offering, for instance, the chance to walk to the dentist or meet a friend from another company for lunch). Strategies such as flexible scheduling can also be used to shrink the total square footage required by a company, bringing down the cost of building occupancy on a per person basis.
Appendix 03: Research Methodology

9.1 Methods Utilized
This research takes a mixed methods approach, combining case study analysis with quantitative analysis of firm distribution in relationship to specific qualities of the built environment, together with findings from semi-structured interviews and site visits. The pros of such an approach are the rich dimensionality it affords. The cons include the challenge of managing a large amount of data.

9.2 Case Study Approach
My interest in this research began while observing entrepreneurs in Venice in the mid-1990s; I investigated a number of firms (some of which are included here) for a paper on the emerging knowledge economy in Venice (2010).

After reviewing a number of potential maritime cities to consider in comparison to what is taking place in Venice, I selected Amsterdam and Boston/Cambridge as my two additional case studies. Boston/Cambridge was selected not only based upon convenience, but also and more specifically as a result of experience gained from living and researching in this environment. I have observed key similarities and differences with conditions in Venice, making me eager to undertake formal analysis.

Time and cost constraints for undertaking fieldwork influenced the selection of a third and final city to consider in comparative analysis. I decided to limit potential cases to North America and Western Europe, to cities where I could rely primarily upon my current language proficiencies, and to cities with enough similar characteristics to Venice and Boston that some form of “matched pair analysis” would be possible, in addition to comparison across all three cities. This led me to select Amsterdam, as opposed to Copenhagen, Hamburg, London or Edinburgh/Leith.

9.3 Firm Data and Mapping
Source data for Boston/Cambridge Firms
For data about firms, I utilized Reference USA, one of the dataset services to which MIT subscribes. An important point regarding subscription datasets is that these are most often based upon data that is
required by law to be self-reported to business registries. As such, the integrity of the data varies. Reference USA independently verifies some of this data, but the majority is unverified – only aggregated and formatted to fit Reference USA's database structure. The querying capabilities offered for the total aggregated dataset (all firms in the United States\textsuperscript{116}) are quite flexible, but there is a major research limitation for which a workaround is required: under the terms of MIT's subscription, downloading of query results is limited to 500 results at a time. To access (at one time) the results of any query producing more than 500 results, it is necessary to run the same query repeatedly, download in batches and knit the individual datasets together manually.\textsuperscript{117}

Code Groups

Groups of Industry Codes for Creative Industries and Information and Communication Technology (After Rutten et al, 2011):

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<td><strong>Description (LZ translation with Google Translate)</strong></td>
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<td>91012 Art centers</td>
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\textsuperscript{116} Reference USA (and other subscription datasets) also offer data for firms outside the United States, but these are often more limited in detail and scope than what is available for US firms, so the comparability of data about firms in the US and firms outside the US, based on this data, is limited.

\textsuperscript{117} My assumption is that this limitation is imposed as part of Reference USA's pricing structure. This is a good example of a mismatch between the price of data and the increasing desire, demand and capability to analyze larger datasets. It was also not the only "cost wall" encountered in this research process.
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<tr>
<td>5819 Other publishers (not of software)</td>
</tr>
<tr>
<td>5819 Other publishers (not of software)</td>
</tr>
<tr>
<td>5821 Publishing of computer games</td>
</tr>
<tr>
<td>5821 Publishing of computer games</td>
</tr>
<tr>
<td>5829 Other software publishing</td>
</tr>
<tr>
<td>5829 Other software publishing</td>
</tr>
<tr>
<td>59111 Production of films (no TV movies)</td>
</tr>
<tr>
<td>59112 Production of TV programs</td>
</tr>
<tr>
<td>5912 Facility activities for film and television production</td>
</tr>
<tr>
<td>5913</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>5914</td>
</tr>
<tr>
<td>5920</td>
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</tr>
<tr>
<td>9001</td>
</tr>
<tr>
<td>93211</td>
</tr>
<tr>
<td>93212</td>
</tr>
</tbody>
</table>

20 codes (4 and 6 dig) 12 codes

**Group 3:**

**CREATIVE BUSINESS SERVICE EXTENSION**

<table>
<thead>
<tr>
<th>7021</th>
<th>Public relations agencies</th>
<th>7021</th>
<th>5418</th>
<th>Advertising, Public Relations, and Related Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>7111</td>
<td>Architectural Services</td>
<td>7111</td>
<td>5413</td>
<td>Architectural, Engineering, and Related Services</td>
</tr>
<tr>
<td>7311</td>
<td>Advertising</td>
<td>7311</td>
<td>5418</td>
<td>Advertising, Public Relations, and Related Services</td>
</tr>
<tr>
<td>7312</td>
<td>Trade in advertising space and time</td>
<td>7312</td>
<td>5418</td>
<td>Advertising, Public Relations, and Related Services</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------</td>
<td>------</td>
<td>------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>7410</td>
<td>Industrial design (and formgiving)</td>
<td>7410</td>
<td>5414</td>
<td>Specialized Design Services</td>
</tr>
<tr>
<td>8230</td>
<td>Organizing conferences and (trade)</td>
<td>8230</td>
<td>5619</td>
<td>Other Support Service &lt;omit or not?&gt;</td>
</tr>
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</table>

6 codes (4 dig)

6 codes (4 dig)

**Table 2**  
ICT in the SBI 2008

**Group 4:**  
ICT Services in the SBI 2008  
ICT SERVICES

<table>
<thead>
<tr>
<th>Code</th>
<th>Service Description</th>
<th>Code</th>
<th>Code Description</th>
</tr>
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<tbody>
<tr>
<td>1811</td>
<td>Printing of newspapers</td>
<td>1811</td>
<td>3231</td>
</tr>
<tr>
<td>18121</td>
<td>Printing of books, etc.</td>
<td>1812</td>
<td>3231</td>
</tr>
<tr>
<td>18122</td>
<td>Printing of magazines</td>
<td>1812</td>
<td>3231</td>
</tr>
<tr>
<td>18123</td>
<td>Printing of advertising</td>
<td>1812</td>
<td>3231</td>
</tr>
<tr>
<td>18124</td>
<td>Printing of packaging</td>
<td>1812</td>
<td>3231</td>
</tr>
<tr>
<td>18125</td>
<td>Printing of forms</td>
<td>1812</td>
<td>3231</td>
</tr>
<tr>
<td>18129</td>
<td>Other printers n.e.s. (not elsewhere specified)</td>
<td>1812</td>
<td>3231</td>
</tr>
<tr>
<td>1813</td>
<td>Pre-press and pre-media activities</td>
<td>1813</td>
<td>3231</td>
</tr>
<tr>
<td>1814</td>
<td>Print finishing and other related activities</td>
<td>1814</td>
<td>3231</td>
</tr>
<tr>
<td>1820</td>
<td>Reproduction of recorded media</td>
<td>1820</td>
<td>3346</td>
</tr>
<tr>
<td>6110</td>
<td>Wired communication</td>
<td>6110</td>
<td>5171</td>
</tr>
<tr>
<td>6120</td>
<td>Wireless communication</td>
<td>6120</td>
<td>5151</td>
</tr>
<tr>
<td>6130</td>
<td>Satellite telecommunications</td>
<td>6130</td>
<td>5171</td>
</tr>
<tr>
<td>6190</td>
<td>Other telecommunications</td>
<td>6190</td>
<td>5174</td>
</tr>
</tbody>
</table>

Wired Telecommunications Carriers

Radio and Television Broadcasting

Cable and Other Subscription Programming

Wireless Telecommunications Carriers (except Satellite)

Wired Telecommunications Carriers

Satellite Telecommunications

Satellite Telecommunications
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6190</td>
<td>Other Telecommunications</td>
<td>5179</td>
<td>Other Personal Services</td>
</tr>
<tr>
<td>6190</td>
<td>Other Personal Services</td>
<td>6201</td>
<td>Computer Systems Design and Related Services</td>
</tr>
<tr>
<td>6201</td>
<td>Developing, producing and publishing software</td>
<td>5415</td>
<td>Computer Systems Design and Related Services</td>
</tr>
<tr>
<td>6202</td>
<td>Consulting in the field of information technology</td>
<td>5415</td>
<td>Computer Systems Design and Related Services</td>
</tr>
<tr>
<td>6203</td>
<td>Computer facilities management</td>
<td>5415</td>
<td>Computer Systems Design and Related Services</td>
</tr>
<tr>
<td>6209</td>
<td>Other services associated in the field of information</td>
<td>5415</td>
<td>Computer Systems Design and Related Services</td>
</tr>
<tr>
<td>6311</td>
<td>Data processing, hosting and related activities</td>
<td>5182</td>
<td>Data Processing, Hosting, and Related Services</td>
</tr>
<tr>
<td>6312</td>
<td>Web portals</td>
<td>5191</td>
<td>Other Information Services</td>
</tr>
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</table>

20 codes (4 and 6 dig) 14 codes

**Group 5: ICT Hardware**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2611</td>
<td>Manufacture of electronic components</td>
<td>3344</td>
<td>Semiconductor and Other Electronic Component Manufacturing</td>
</tr>
<tr>
<td>2612</td>
<td>Manufacture of loaded electronic boards</td>
<td>3344</td>
<td>Semiconductor and Other Electronic Component Manufacturing</td>
</tr>
<tr>
<td>2620</td>
<td>Manufacture of computers and peripheral equipment</td>
<td>3341</td>
<td>Computer and Peripheral Equipment Manufacturing</td>
</tr>
<tr>
<td>2630</td>
<td>Manufacture of communication equipment</td>
<td>3342</td>
<td>Communications Equipment Manufacturing</td>
</tr>
<tr>
<td>2640</td>
<td>Manufacture of consumer electronics</td>
<td>3343</td>
<td>Audio and Video Equipment Manufacturing</td>
</tr>
<tr>
<td>2651</td>
<td>Manufacture of measuring, control, navigation and control app</td>
<td>3339</td>
<td>Other Miscellaneous Manufacturing</td>
</tr>
<tr>
<td>2670</td>
<td>Manufacture of optical instruments and equipment</td>
<td>3333</td>
<td>Commercial and Service Industry Machinery Manufacturing</td>
</tr>
<tr>
<td>2680</td>
<td>Production of information carriers</td>
<td>3341</td>
<td>Computer and Peripheral Equipment Manufacturing</td>
</tr>
<tr>
<td>2731</td>
<td>Manufacture of optical fiber cables</td>
<td>3359</td>
<td>Other Electrical Equipment and Component Manufacturing</td>
</tr>
<tr>
<td>2732</td>
<td>Manufacture of other electrical, electronic cables</td>
<td>3312</td>
<td>Steel Product Manufacturing from Purchased Steel</td>
</tr>
</tbody>
</table>

320 of 338
<table>
<thead>
<tr>
<th>NAICS Code</th>
<th>Description</th>
<th>NAICS Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2732</td>
<td>Alumina and Aluminum Production and Processing</td>
<td>3313</td>
<td>Nonferrous Metal (except Aluminum) Production and Processing</td>
</tr>
<tr>
<td>2732</td>
<td></td>
<td>3314</td>
<td>Other Electrical Equipment and Component Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td>Manufacture of other electrical equipment</td>
<td>3322</td>
<td>Cutlery and Handtool Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3333</td>
<td>Commercial and Service Industry Machinery Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3336</td>
<td>Engine, Turbine, and Power Transmission Equipment Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3339</td>
<td>Other General Purpose Machinery Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3342</td>
<td>Communications Equipment Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3351</td>
<td>Electric Lighting Equipment Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3353</td>
<td>Other Electrical Equipment Manufacturing</td>
</tr>
<tr>
<td>2790</td>
<td></td>
<td>3359</td>
<td>Other Miscellaneous Manufacturing</td>
</tr>
<tr>
<td>3313</td>
<td>Repair of electronic and optical equipment</td>
<td>4431</td>
<td>Electronics and Appliance Stores</td>
</tr>
<tr>
<td>3313</td>
<td></td>
<td>8112</td>
<td>Electronic and Precision Equipment Repair and Maintenance</td>
</tr>
<tr>
<td>3313</td>
<td></td>
<td>8113</td>
<td>Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance</td>
</tr>
<tr>
<td>3314</td>
<td>Repair of electrical equipment</td>
<td>3314</td>
<td>Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance</td>
</tr>
<tr>
<td>3323</td>
<td>Installation of electronic and optical equipment</td>
<td>3320</td>
<td>Building Equipment Contractors</td>
</tr>
<tr>
<td>3324</td>
<td>Installation of electrical equipment</td>
<td>3320</td>
<td>Building Equipment Contractors</td>
</tr>
<tr>
<td>7733</td>
<td>Rental and leasing of office equipment and computers</td>
<td>7733</td>
<td>Commercial and Industrial Machinery and Equipment Rental and Leasing</td>
</tr>
<tr>
<td>9511</td>
<td>Repair of computers and peripherals</td>
<td>9511</td>
<td>Electronic and Precision Equipment</td>
</tr>
</tbody>
</table>

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9.4 Data about the Built Environment
GIS data was sourced through the MIT geodata portal, with original data coming from the City of Boston, the City of Cambridge and Mass GIS.

9.5 Semi-structured Interviews and Site Visits
For all three cities, I undertook semi-structured interviews with entrepreneurs and other knowledge holders. While focusing on ICT and Cl firms, particularly those founded from the 2009-2013, I also interviewed representatives of firms that were established earlier, as well as some other entrepreneurs who were collocated with the firms I encountered. I found firms through a process of purposive sampling – sometimes by referral and sometimes making “cold calls” by email with appointment requests.

For Boston/Cambridge, the firm representative selection included identifying a random sample of 30 firms from within the 194 firms identified in the quantitative analysis, with the goal of interviewing at least 10 of these firms, and exploring more explicitly the characteristic of the random sample. The question set for the semi-structured interview is included below the interview lists.

As semi-structured interviews, I did not ask all questions to all entrepreneurs (depending upon relevancy and time availability). I also found that, over time, as findings began to be revealed, some questions became more relevant to the research.

---

9512 Repair of communication (equipment) 9512 Equipment Repair and Maintenance
9112 Electronic and Precision Equipment Repair and Maintenance

<table>
<thead>
<tr>
<th>Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 codes (4 digit)</td>
<td>22 codes</td>
</tr>
<tr>
<td>78 total codes</td>
<td>61 total codes as translated to NAICS</td>
</tr>
</tbody>
</table>

---

118 All thirty firms in the random sample were researched and contacted. Not all were found to be still active; some did not respond. I interviewed the first ten who responded that they were amenable to participating in the research.
Interviews: Firms / Entrepreneurs

1. Franco and Angela Sonzogno, Co-Founders, Ski Stradavarius
2. Emanuele Dal Carlo, Co-Founder, I Tre Mercanti
3. Emanuele Dal Carlo, Founder, DNA Italia (Mestre)
4. Fabio Bressanello, Founder, Bressanello Art Studio
5. Giorgio Camuffo, Founder, Studio Camuffo
6. Annalisa Ballaria, Founder, Relactions
7. Alberto Gallo and Fabio Carrera, Founders, Forma Urbis
8. Paolo Spiga and Andrea Mazzon, Co-Founders, XYZE (H-Farm)
9. Alessandro D’Annibale, Account Executive, Yellow Chip (H-Farm)
10. Raffaele Andreace, President and CEO, Ennova Research (VEGA)
11. Andrea Casadei, Teleart / Best Union, Chief of Operations (VEGA)
12. Marco Bonaldo (Work in Progress / consultant, Milan)
13. Michele Basso, Founder, Venice Commerce Srl
14. Francesco Pedrini, CEO, A4 Smart, s.r.l.s. Innovative
15. Mara Guglielmi, Founder, Mara Guglielmi
16. Francesco Nepite and Marco di Maggi

Interviews / Meetings with other Knowledge Holders

1. Roberto D’Agostino, Arsenale SPA (at time of interview)
2. Margherita Turvani, Professor of Political Economy, IUAV
3. Augusto Cusinato, Professor of Applied Economics, IUAV
4. Paolo Carlucci, Grant Administration Unit (Firms), Venice Chamber of Commerce
5. Walter Belluco, Director, Registry of Firms, Venice Chamber of Commerce
6. Paolo Ravenna, Economic Development and Subsidiary Companies Department, City of Venice
7. Roberta Capuis, Manager of firm incubator program, City of Venice
8. Ottone Grasso, Strategy, Telecom Italia Future Centre
9. Matteo Casini, Professor of History (and resident of Venice), Suffolk University
10. Giovanni Cecconi, Manager, Service Engineering, Consorzio Venezia Nuova
11. Isabela Scaramuzzi, Pierpaolo Favaretto, Giuseppa Di Monte, COSES (Consorzio per la Ricerca e la Formazione)

Coworking / Incubator / Accelerator sites visited

1. Venice District for Innovation – “Venice Cube” Incubator, Ex-Herion (Giudecca)
2. Venice incubator, Ex-Herion, (Giudecca)
3. Telecom Italia Future Center, Venice History City Center (San Marco)
4. Arsenale, Venice Historic Center (Castello)
5. VEGA - Venice Terraferma (Marghera)
6. H-Farm, Quarto d’Altino, Riccardo Donadon and Maurizio Rossi – Co-Founders, H-Farm

Additional Informal Interviews

- Alessandro Tonchia, Founder and CEO, Finantrix
- Michela Scibilia (creator, TapVenice app, author, also: 40perVenezia)
Amsterdam

Interviews: Firms / Entrepreneurs

1. Martijn van Hoek, Co-founders, Smart.pr
2. Wouter Glaser, Founder, Glasnost Communications
3. Doron Nethe, Founder, Peoples Playground
4. Joris Barendregt, Founder, 3D Builders
5. Robert Roosenstein, Producer Media Producer (Advertising)
6. Paul Somers, Firm representative, Spaces
7. Salla Lardot, Firm representative, DEGW (now AECOM)
8. Ef Rodriguez, Founder Ef Rodriguez - Social media strategy (then hired by Weiden Kennedy)
9. Merel LeCogne Kleyn, Founder, De Camer
10. Harm Heurkens, Co-founder, Your World 3D Solutions
11. Herman Holst, CEO, Guerilla Games
12. David Bergmans, Owner, David Bergmans
13. Majel Van der Meulen, Owner, Majel Van der Meulen
14. Heloise Hooton, Manager, Wieden+Kennedy
15. Rozemyn Afman, Owner Rozemyn Afman, Documentary Film Producer
16. James Bryan Graves, CTO, Ideedock,
17. Oscar Kneppers, Founder Rockstart
18. Annemieke Roebeek, Founder Meeting More Minds; also www.refilnow.nl
19. Mike Miello, Founder Webodew, Klunc, Flying Mikes
20. Hedwig Heinsman, Co-founder, DUS Architects

Interviews / Meetings with Other Knowledge Holders:

1. Ger Baron, AIM
2. Zef Hemel, Amsterdam DRO
3. Jos Gadet, Amsterdam DRO
4. Paul Gertman, AEDES Real Estate
5. Deputy Mayor Gerhels, City of Amsterdam
6. Brett Spaan, Waag Society
7. Dan Harple, Venture Capitalist
8. Esther Agricola, Bureau of Monuments and Archaeology

Additional Informal Interviews

- Bottlenose, Volksrant Building, Group meeting as part of MIT Sloan Regional Entrepreneurial Accelerator Lab, US & The Netherlands

Boston/Cambridge

Interviews: Firms / Entrepreneurs

1. Dustin Nolin, Founder, DNA Architecture
2. Brendan Ciecko, Founder, Ten Minute Media | Cuseum
3. Bonnie Burgett, Co-founder, Sourced Capital
4. David Friedman, Founder, Boston Logic
5. Paul English, Co-Founder, Blade
6. Farhan Abassi, Co-Founder (Boston) Coalition | Farhan Abassi
7. Michael Boezi, Founder, Michael Boezi
8. Bob Suh, Co-founder, OnCorps,
9. John Bruce, CEO, Resilient Systems
10. Andrew Yu, Co-founder, Modo Labs
11. Steve Galligan, Founder, Integrated Digital Strategies
12. Lars Albright, Founder, Session M
13. Graham Sibley, Founder, Collabware
14. Stephanie Skinner, Co-founder, Culture the World on Cheese
15. Peyton Marshall, Founder, Leverage Point Innovations
16. Dmitry Skavish, Co-Founder, Animatron
17. Niels Rosenquist, Co-founder, Janys Analytics
18. Sanjay Sarma, Founder, Essess
19. Anonymous, Founder

Interviews / Meetings with Other Knowledge Holders

1. Emily Reichert, Greentown Labs
2. Clint Myers, Hines Real Estate
3. Geoff Mamet, CIC / Hub Impact,
4. Alec Stern, entrepreneur / advisor
5. Lauren Abda, Food Loft

Interview Questions for Firm Representatives

Information to be kept on a separate confidential sheet (if confidentially is required)

Interview # (key): 
Name of Business: 
Address: 
Tel: 
Email: 
Person Interviewed: 
Date: 
To kept confidential?

Questions for Semi-Structured Interview (separate sheet)

Version #1: Firm Owner or Representative.

Note: The following represents a “full” list of data points ideally obtained. Some answers to questions are obtained through preliminary review of firm data; this allows me to use interview time to concentrate on the more open-ended questions while also undertaking some “fact checking” as necessary.

1. Interview # 
2. Year Founded: 
3. Number of Employees (Presently): 
5. Corporation, partnership or sole practitioner?
6. Chamber of Commerce Member?
7. Other Business Memberships?
8. Please describe that your business, including all services that you provide.
9. Please describe the areas of expertise used for this work.
10. In your opinion, does this expertise relate to historic business activity in the city?
11. Why did you decide to locate in this district? (Please describe in detail)
12. What do you perceive to be the biggest challenges to working in this district?
13. Is your business activity related directly, or indirectly to tourism? If so, please describe.
14. Any involved in any activities that relate to the documentation and management of tourism?
15. Are you involved in any activities that related to enhancing the experience of the city?
16. In what ways (if any) is the idea of sustainability important to your business activity?

TECHNOLOGY & WORK PROCESS
1. What role does technology play in the operation and management of your work?
2. What tech tools do you use?
3. How important is wireless internet service?
4. Smart phone?
5. Can you work remotely if you choose (from home for instance?)
6. How often do you do this? (If at all)?
7. How often do you travel out of the city center for work?
8. Is the work you do creative? If so, how? (Describe)
9. Is the work that you do innovative? How so?
10. What role does your environment play in fostering creative and/or innovative thinking?
11. What kind of information do you make use of in your work practice? How is it obtained?
12. What kind of knowledge do you rely upon in your work? How is it obtained or cultivated?

BUSINESS DEVELOPMENT PROGRAMS
1. Have you participated in any business development programs?
2. If so, what which ones? Please describe your participation in each.
3. Did you locate in a targeted redevelopment zone?
4. Were you provided financial incentives?
5. Did you receive any non-financial business development support?
6. What factors were most important in selecting the location for your business?
7. Was this business formed as an offshoot of another company active or other business activity in the city? (If so, please describe)? (Is it a family business?)

CLIENT RELATIONSHIPS
1. What percentage of your clients is in the city center?
2. Veneto Region? (Amsterdam metropolitan area / Massachusetts?)
3. Italy (beyond Veneto) (The Netherlands / New England & The US?)
4. Beyond Italy? (Beyond the US / Beyond the Netherlands?)
5. How often do clients come to your place of work?
6. Are you aware of clients combing work and vacation during their trip? (If they come from outside the city?)

INSTITUTIONAL AND ORGANIZATIONAL RELATIONSHIPS
1. Does your business maintain a relationship with any institution located in this district?
2. If so, describe:
3. Does your business maintain a relationship with any organization located in this district?
4. If so, describe:
5. Did you attend a university in Venice (Amsterdam/Boston)?

NEIGHBORHOOD / LOCATION SPECIFIC QUESTIONS
1. What factors impacted your decision to locate in this general area of this district?
2. How important is it to have close access to the train station (and other mass transit)?
3. Airport?
4. What are the best assets of the general area in which you are located?
5. What are the drawbacks?
6. How important was it to be close other business activity? What types and why?
7. In selecting this location, describe any concerns about the way tourism impacts the ability for you (and others) to travel to and from your office.
8. Was it your objective to be in close proximity to tourism activity or far from it? (or did you have an opinion about this)? Why?
9. How important, if at all, was it to located in an area that is “mixed-use”?

BUILDING SPECIFIC
1. Are you renting or do you own this space?
2. How much space do you have?
3. On what floors are you located?
4. How difficult was it to find a space that you perceived to be affordable for this venture? (1 not-10 very difficult)
5. (Is this the first place the business has been located?)
6. Do you know the age of the building?
7. Do you know how this building was being used prior to this activity?
8. What, if any work have you performed to make this space suitable to your needs?
9. Did this work require a change in zoning (use permit) change?
10. What is the building currently zoned as? (If known)
11. Have you undertaken specific improvements to limit the impact of acqua alta / sea level rise?
12. How many times, if at all, did you experience acqua alta / flooding in 2011 in your work space?
13. What characteristics of this building / space are most important to you and why?

FINANCING / FINANCIAL INFO
1. Have you received financing from a bank? Venture capital?
2. What, approximately, was your 2011 net revenues?

WORK-LIVE RELATIONSHIP
1. Where do you live?
2. How long does it take you to get to work? (How do you arrive?)
3. How important was it for you to live close to where you work? (If at all)

OTHER FACTORS
1. Were there other important factors in deciding to start this business in this district? If so, what were they (and how important)?
2. Where did you work (and in what capacity) prior to this venture?
3. In your opinion, should other things be done to encourage business development in this district?
4. What are your feelings about your decisions to locate here?

5. How confident are you about opportunities for business success in the future (based in this historic district)?

6. Do you wish to share anything else that may be helpful to this research?

7. Is there anyone else that you recommend that I speak with?

9.6 Selection of a discrete choice model

For the development of my model, I drew insight from firm location choice models, many of which focus on location choice at the regional level and residential location choice models, that more regularly take into account amenities (or qualities) associated with individual properties and with neighborhoods. The idea of analyzing discrete location choice owes much to Daniel McFadden’s development of the conditional logit framework. The basic tenants of the model are:

1) The set of alternatives must be exhaustive, meaning that the set includes all possible alternatives. Based on interviews, most entrepreneurs were choosing between Boston and Cambridge (and a few, Somerville). Preliminary data analysis at the MSA level helps confirm this, as did interviews with key knowledge holders, including one affiliated with a Waltham-based company. Therefore the choice set will be limited to Boston and Cambridge, although ideally data for all areas within a particular radius of analysis would be assembled. This would allow the possibility to include, for instance, Brookline, in the choice set. MASS GIS now provides consistently structured parcel data for most cities and towns in the state, but the Boston parcel data is not yet available in this format.

2) The alternatives must be mutually exclusive, meaning that choosing one alternative means not choosing any other. A firm chooses only one district from the set.

3) The choice set must contain a finite number of alternatives (districts).


120 MASSGIS has established a common format for parcel data and it is available for all towns in Massachusetts, except, at the time of this research, for Boston. Since I started working with the Boston parcel data before learning this, I made the choice to focus on editing the Cambridge dataset so that it could be joined with Boston. This meant excluding the possibility to evaluate locations such as Brookline and Somerville in the analysis (even though I knew from regional level reporting that firms were present there). Based on interviews, I felt comfortable with the idea that the model would be based upon the idea that most firms I was analyzing were, at the local level, deciding between locations in Boston and Cambridge.
The underlying premise of discrete choice models

Discrete choice models are derived from Utility Theory, and assume that behavior (choice) is utility maximizing. A firm will choose a district that provides the highest utility. Some factors in the choice are observed (quality of the built environment) while some (such as rent) are not. Utility is therefore decomposed between observed and unobserved factors. Only differences matter, not the absolute levels of utility. (A firm picks the best available option.) “As utility has no units, it is necessary to normalize the scale of utilities (often defined by the variance of the error term). Normalization of the variance affects the interpretation of parameters estimated across diverse datasets.”121

Other conditions to consider

In this case, I am dealing with a large choice set (667 districts) for which I have assembled some information, but minimal information to distinguish between the observed firms. By virtue of filtering by characteristics from a large dataset to produce a selection group, I assume that these firms are similar in nature and would have some of the same location choice objectives. In this case, the utility for each alternative depends upon attributes of the alternative, but without interaction with characteristics of the choosers.

Three models I evaluated

1) Nested Logit (which would capture correlation between alternatives by partitioning the choice set into “nests”
2) C-logit: captures correlations between alternatives using a “commonality factor.”
3) Poisson count estimation model, which has been understood as an alternative “approach” to the conditional logit model, for which it is easier to set up the dataset, an especially important factor when working with a large dataset (not only for convenience but also to limit steps which could introduce possibility for human error)

In a recent paper (2011), Schmidheiny and Brulhart build off earlier work of Guimareaes et. Al. (2003).122 They show how that “with purely location-specific locational determinants, or with determinants that

References

121 Based on McFadden (1972)
are specific to locations and to groups of agents, the conditional logit and Poisson estimators return identical parameter estimates." They conclude that has led a general tendency to interpret that the two models are equivalent, when in fact the identical coefficient estimates resulting from the two estimation strategies have different economic implications. This is in fact quite relevant to this research.

They point out that the conditional logit model implies that the aggregate number of agents (of firms) is fixed and that differences across locations affect only distribution of those agents across those locations. One district’s gain is another district’s loss. ("zero-sum game") In contrast, the Poisson model is structured such that an additional agent (firm) attracted to a location has no impact on the number of agents in the remaining locations, and thus raises the aggregated number of agents. ("positive-sum world") Hence, the Poisson model is a more relevant model when there is evidence that there is a change in supply of new firms, not only as a result of between-district relocation, but also as a result of firms coming from outside the choice set area or new emergence, that is, new firms being founded, as is the known case for this selection group.

This leads Schimdheiny and Brulhart to confirm that the two models, while generating similar results, actually represent "polar cases" and that the elasticities they represent can therefore serve as boundary values in applied research. They also show that it is possible to apply a nested logit model to represent what can be considered an intermediate case between the conditional logit and the Poisson model.

**Bin Creation**

Being able to adjust the sizing or to center the grid onto certain features introduces the possibility for a modifiable areal unit problem (MAUP) in which statistical results are influenced by the way the districts have been created, leading to an introduction of bias. I account for this allowing the mapping software (Qgis) to arbitrarily dictate the starting point of the grid.

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**DATABASES**

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