Building Cities Like Startups:
Innovation Districts, Rent Extraction, and the Remaking of Public Space

by

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Dedication

To Bryan, Benji, and Nena for reminding me that family and laughter are what matter most.

Oliver Frey accepted my application and that it paved the road for me to meet Harvey Molotch, one of my heroes. Through this program I met Joseph Chambers and Christian Eichenmüller, who helped deepen my understanding of Dublin's innovation district. I owe a heartfelt thank you to Christian for his role in my academic and personal development.

A dissertation is more than the solitary and endless hours writing and reading material pertaining to my topic. I am thankful for the many Taubman faculty members who held office hours with me—particularly Ana Paula Pimentel-Walker, Harley Etienne, Lan Deng, and Kim Kinder—to the College for funding my doctoral research, and to the administrative staff for all their hard work behind the scenes. I owe thanks to Ayeza Siddiqi, director of the UM Mentorship program, and to the mentees I had the pleasure to meet through the program. Mentoring bright, curious, and enthusiastic undergraduate students continuously reminded me why I chose to pursue a doctorate degree.

Raising two young children while balancing the demands as a doctoral researcher was never easy. I am indebted to the silent forces that helped see me through this process by providing the financial, moral, and child-rearing support necessary to maintain a growing family: Karen, Barry, John, Katy, Kelly, Michael, Clive, Levi, Michele, Brett, Bri, Jerry, Eric, Alex, Bats, and most of all, my mother, Emma Kayanan. Last but not least, there is the community closest to my heart: that of my dear Bryan and sweet children Benjamin and Natalie. I put you through a lot and you still held me up. Thank you.

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Abstract

Across the globe, economic developers and policymakers are building "innovation districts" –master planned developments with the aim of concentrating the actors, entities, inputs, and physical infrastructure considered essential to process and product innovation. Promoters have repeatedly hailed Barcelona's "22@bcn" (est. 2000) and Boston's "Seaport Innovation District" (est. 2010) for their success in attracting talent, increasing jobs, scaling startups, and transitioning regions into a high-tech economy. Built within the city and the urban-periphery alike, innovation districts point to a new spatial layout for capitalist production.

This dissertation is an in-depth comparative case study of five innovation districts: Boston, Detroit, Park Center (North Carolina), St. Louis, and Dublin (Ireland). I engage a qualitative approach that includes on-site observations and semi-structured interviews with over 100 key supporters of innovation districts–from residents and workers to the university affiliates, developers, incubator owners, venture capitalists, non-profit managers, private executives, elected officials, and consultants driving growth decisions. In developing a more robust definition of innovation districts than the strategy mobilized by growth coalitions, I situate the emergence of innovation districts and their extractive logics along a historic trajectory of capitalist production from manufacturing material goods to new forms of immaterial production. Relying on content analysis of primary documents, maps, legal statues, and architectural renditions, I document how the planning process for each innovation district encloses public space and lived experience within that space, relinquishing it for private profit.

Through detailed case studies I argue that economic developers and policymakers opportunistically used innovation district strategy to trigger real estate development after the 2008/2009 global financial crisis. The allure of the innovation district concept –that of an entrepreneurial haven for science and design breakthroughs and the acceleration of discoveries to the market—succeeded in selling the innovation district strategy for financial, political, and popular backing during a time period of complete construction standstill. However, in places with robust entrepreneurial ecosystems, supporters lost sight of the benefits of the innovation district as a support for startups and entrepreneurs in favor of more established companies seeking proximity to talent. Using census data, I trace the changing demographic makeup of each

innovation district from its date of inception to its current state to demonstrate how innovation district strategy contributes to the splintering of resources. Lastly, I conclude the dissertation with a theoretical discussion gesturing how innovation districts might exacerbate issues of precarity for the entrepreneur who sits at the center of this experimentation and is increasingly interpellated by a state-led ideology that eagerly encourages self-provisioning.

Chapter 1: Introduction

On June 2014, Detroit's Mayor Mike Duggan officially declared and designated the Detroit Innovation District, a 2,750-acre designation for the Downtown, Midtown, and New Center neighborhoods (see figure 1). The event launch, held in TechTown, a business innovation hub located in Midtown Detroit, included prominent community leaders from anchor institutions and supporting foundations in Detroit. Bruce Katz, previous vice president and director of the Metropolitan Policy Program at the Brooking Institution in Washington D.C., was in attendance as an invited speaker. Only three days earlier, Katz, and his colleague Julie Wagner, released their report, "The Rise of Innovation Districts: A New Geography of Innovation in America", a now widely cited policy paper directly influencing innovation district policy. Anticipating success for the Detroit Innovation District, Katz, who featured prominently in the strategic design of Detroit's implementation stated, "What's going to happen is we're going to have a *two-plus-two-equals-five effect*. Collaboration and synergy in this district are going to have unanticipated discoveries for the market" (Broda, 2014, italics mine).

Figure 1: Promotional brochure used for Detroit's Innovation District
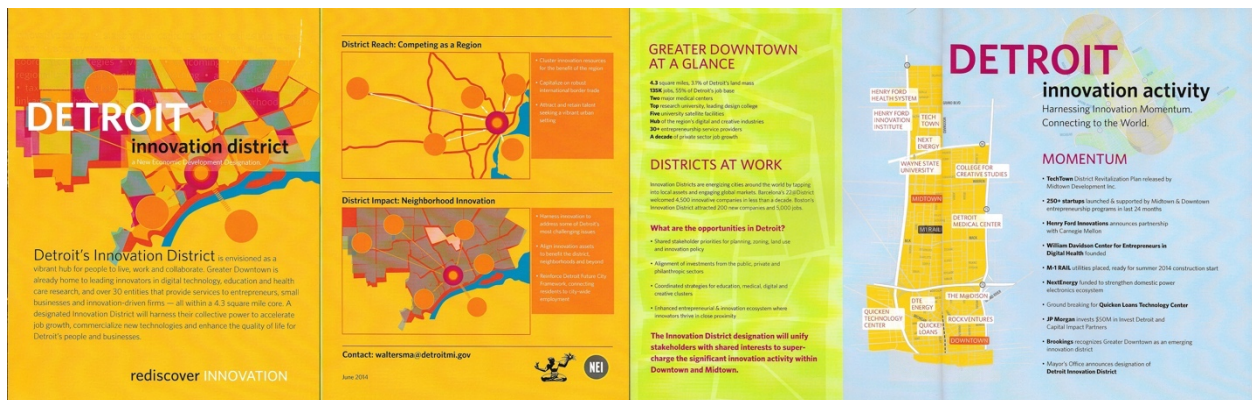
Source: New Economy Initiative ("Detroit Innovation District brochure," 2014)

Amongst economic and urban developers, innovation district strategy has exhibited a type of viral tendency. While the term is slippery and ill-defined, most scholars and policy-makers look upon "innovation districts" as designated sites to cluster the network of people,

institutions, resources, and activities frequently cited as integral to the innovation process (Audretsch, 2003; Feldman, 1994; Malecki, 2010; Shearmur, Carrincazeaux, & Doloreux, 2016). Inspired by seeming successes in Barcelona (est. 2000) and Boston (est. 2010), economic developers and policymakers enthusiastically promote innovation districts as a mechanism for generating entrepreneurship, job growth, and urban redevelopment.

Within the urban sphere, key participants with a stake in innovation are designating sections of the city, typically post-industrial sites, to create these live-work-play laboratories. Similarly, outside of the urban sphere, individuals are revamping suburban office campuses and research and science parks to replicate the density and connectivity of the city. The wide promotion and adoption of this model points to the emergence of a new spatial form. Regardless of location, this new productive utopia invokes the romantic ideal of the city and the entrepreneur as catalytic to the innovation process. Today, in 2018, there are over 90 innovation districts in the United States (Talkington, n.d.).[1] The proliferation of this strategy is evidence that urban and regional actors are investing considerable resources to build innovation districts.

This dissertation interrogates the rhetoric undergirding innovation district strategy to contextualize why innovation districts elicit a feeling of "more than", that is, a two-plus-two-equals-five effect. In other words, what precisely is it about this particular economic development strategy that facilitates its policy mobility (McCann, 2011; Temenos & McCann, 2013; K. Ward, 2017) and leads both its implementors and the public to see it as a panacea for regional wealth and prosperity? In answering this question, I reach three conclusions, which structure of the dissertation. First, though my analysis of innovation districts begins with the definition and strategy formulated by Katz and his colleagues, I am not bound by it. Instead, I develop a more nuanced definition of innovation districts and provide a critical analysis of innovation district strategy that highlights detrimental aspects of this form of development that current policy prescriptions omit. Second, I frame innovation districts along capitalist trajectories in advanced Western economies. By reading their emergence from a perspective on the capitalist production of space (see for example Gottdiener, 1994; Harvey, 2001; Lefebvre, 1992), I point to the ways that innovation districts facilitate the extractive logics of capitalism through land rent and people rent. I demonstrate how innovation district strategies leverage political mechanisms to increase land values for investment capital and how this transformation succeeds in converting public spaces into spaces of production. Lastly, I critique innovation district strategy for

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[1] These figures do not account for various cities around the globe in European, South American, and Asian countries.

opportunistically leveraging entrepreneurial activity to reinvigorate development and point to ways that the strategy manifests in a normative stance on the responsibility of entrepreneurs to foster regional wealth and competitiveness.

Innovation Districts: A Brief Definition

Innovation district strategies are modeled off the successes of Silicon Valley, which represents the prime destination for entrepreneurs in search of venture capital funding and expertise, as well as a tech-culture of embracing failure, willingness to experiment, and focus on accelerating products to the market (Kenney, 2000; O'Mara, 2005; Rao, 2013; Saxenian, 1996). However, to counter the negative externalities of Silicon Valley, that is, the lack of affordable housing, traffic congestion, and the monotony and lack of "authenticity" of a suburban office park (Packer, 2013; Saxenian, 1983; Zukin, 2009), innovation districts strategies leverage the role of design to convert the designated space of the innovation district into an amenity-rich, transit-oriented community attractive to younger, high-skilled workers and the firms that employ them (Clark, Lloyd, Wong, & Jain, 2002; Florida, 2002; Lloyd, 2008). Innovation district designs incorporate a density of entertainment, retail, and housing amenities in close proximity to work, fiber optic cables embedded in the infrastructure to enable continuous public access to wireless connectivity, and the physical structures that support entrepreneurial activity, such as incubators and accelerators, research hospitals and universities, and legal and financial services. In addition to the material elements, innovation district strategies highlight the importance of networking opportunities to encourage spontaneous interactions. As a result, new staff positions have emerged to program space and ensure constant networking and interaction. Collectively, these new fixtures facilitate the around-the-clock work mentality made amenable by sophistications in ICTs and mobile technologies (Davis, 2016; Kalleberg, Reskin, & Hudson, 2000; Mazmanian, Orlikowski, & Yates, 2013) and the belief that today's innovation is best supported by an open and connected environment (Chesbrough, 2003; Chesbrough, Vanhaverbeke, & West, 2006).

Boosters publicly laud innovation districts as a tool to transition post-industrial economies to a knowledge-based economy (Bell, 1973; Machlup, 1973; Porat & Rubin, 1977) supportive of research heavy endeavors often associated with a hospital and/or a university (Audretsch & Feldman, 1996; Feldman, 1984; Feldman & Bercovitz, 2006), creative workers (Florida, 2002; Markusen & Schrock, 2006), service jobs for low-skilled workers (Sassen, 2001).

Spatially, this knowledge-based economy includes infrastructure and amenities that support the demographic preferences of what Florida (2002) termed creative class workers. Increasingly, this class of workers are mobile (Martin-Brelot, Grossetti, Eckert, Gritsai, & Kovács, 2010; Shearmur, 2007).

In addition to creating pathways toward a knowledge economy, the presence of an innovation district serves as a branding mechanism to attract real estate development. Branding serves the purpose of rendering a place 'safe' for investors (Cuthbert, 2006; Klingmann, 2007) and also demonstrates an awareness of know the "right" elements needed to make a city a hot spot (Eisinger, 2000; Hannigan, 1998; Loughran, 2014). This succeeds in directing construction in places where investors and developers might have previously refrained from investing. Even when slated outside of the urban periphery, the declaration of an innovation district serves as an opportunity to approximate the highest and best land use in accordance to market logics (Chappel, Markusen, Schrock, Yamamoto, & Yu, 2004; Mark, Grissom, Liu, & Pearson, 1990).

Raising land values and real estate investment became apparent from how the adoption of the strategy took off after the 2008/2009 recession. Though earlier attempts at innovation-led development existed in cities before the recession, innovation district strategy helped jump start development after construction was halted and large companies paused on their intentions to develop property in the city. Growth coalitions representing public and private interests shifted their attention on entrepreneurs and small startups to generate growth. Focusing on these flexible workers with low real estate demands, both in terms of need for space and in terms of power to request tax subsidies (Clive, Simmons, & Trumble, 2007; V. Gibson, 2003), innovation districts served to generate nominal income for the city and create pockets of activity. As I demonstrate in my cases, in economies with a robust talent pool and entrepreneurial ecosystem (i.e. Dublin and Boston), the strategy worked up until a certain point. As the economy picked back up, the same practitioners who implemented innovation district strategy under the guise of supporting budding entrepreneurs went back to favoring the larger established companies no longer constrained by borrowing term limits.

In practice, different actors adopt the strategy for different purposes. The state of the region in which the innovation district is embedded plays an important factor in the potential outcomes of the innovation district. In some locations, adoption of the policy might displace the very people and inputs that make a place "innovative." However, even this statement necessitates careful consideration as different supporters of innovation districts operate under different

conceptions of the definition of "innovation" and thus implementation strategies compete for different objectives.

Amongst the innovation district decision makers I interviewed there existed a disagreement on the definition of "innovation".[2] Stakeholders harbored conflicting expectations and misperceptions on what the innovation district represents. This discrepancy is evident in a variety of ways, from a definitional understanding of innovation to issues of governance and battles over the boundaries of the district. As a stand-alone concept, innovation refers to the process that leads to a novel outcome, be it a new object or a new way of doing something that did not previously exist (Benoit, 2008). Trying to understand the connection between the city and innovation further complicates the definition of innovation. Within economic development circles, the term innovation can take on a variety of meanings and encompass a broad range of activities (Shearmur, 2012). This is evident in responses from respondents when asked to define innovation and to discuss the purpose of an innovation district. For some respondents, the definition is purposely broad to encompass a novel approach to problems in a wide variety of sectors and/or situations:

> Non-profit executive: "We look at innovation broadly" (personal communication, 2015).

> Foundation head: "Innovation is about the birth of ideas, not limited to tech, [it is about] moving forward powerful ideas" (personal communication, 2015).

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[2] The wide-spread use of the term has prompted rigorous scholarship. Combing through historical archives and texts that date back 2500, as well as cataloguing how often the term innovation appears in academic writing, scholar Benoit Godin (2008) deconstructs the term and concept of innovation. The impetus for the study was to examine the culture force of the term across time and the impact it had on social, political, and economic thought. His is a critical account of the term and a way to understand its normative application. Godin finds that for 2500 years innovation was pejorative and subversive. Individuals who sought to open new potentialities and challenge the status quo through political dispositions were considered innovators. To be called an innovator was an insult deriving from the inability of the individual to conform to cultural and religious mores. The emphasis on detracting from (religion) was acutely prescient during the Reformation where anyone introducing innovations to an established doctrine was considered a heretic. The role of time plays an important element across centuries.

An innovation (as opposed to an innovator) that reformed earlier traditions and ways of life was considered a slow and gradual process; it denoted aspirations to return to earlier and purer orthodoxy. In this configuration, an innovation was not associated as something entirely new. In the 18th century that the term was tied to progress and modernity, thus also efficiency, and by the 20th century, as a result of the industrial revolution and tech innovation, the term is connected to economics. It is during this time period that the concept is instrumentalized as something that needs to be "done" by public policy and government agents. However, as we approach contemporary times, tracing the changing nature of innovation the concept, the term, the innovator versus the innovation, innovation studies, as well as terms connected to it, such as social innovation versus tech innovation, deconstructing the word in its ubiquity becomes challenging. It can be said that today to be an innovator is embraced, whereas historically, as Godin demonstrates, it was a term, or a practice, rejected by the populace.

Private company executive: "The ideal innovator is not restricted by any one definition; innovation cannot be constrained within one demographic" (personal communication, 2015).

For others, it is specifically and purposefully limited:

Tech consultant: "Innovation is the commercialization of a tech economy" (personal communication, 2015).

State-level representative: "It is about entrepreneurs with a global orientation" (personal communication, 2015).

Sometimes, it reflects the aims of the innovation district as a convener of people and ideas:

Economic developer: "Innovation is working together to solve problems to challenges, solve problems in a new and different way, a new way of looking at how to solve a problem" (personal communication, 2015).

University executive: "Innovation is about creativity; it fits with the creative class. It is more interaction, more team sport than solo practice, [it is] collaboration" (personal communication, 2015).

Or, the aim of the innovation district as a way to try out new policies that can later be deployed to spaces outside of the district:

State-level consultant: "It isn't just high tech, but perhaps innovative policies" (personal communication, 2015).

Here we see the definition relating to a new way of solving problems:

Private company executive: "Innovation is the same as idea generation, innovations are the things that change the landscape of a product of a service, the

way you do business, the way you experience things going forward" (personal communication, 2015).

Non-profit executive: "Innovation is different from invention; [it is] making something better and different" (personal communication, 2015).

The various definitions of innovation shape the aims, intentions, and outcomes of innovation district strategy. For each of my case sites, a fixed or agreed upon definition for innovation to direct the implementation of each respective innovation district and the economic development policies never materialized. The ambiguity of the term purposely leaves open space for interpretation. Individual actors can strategically position the definition of innovation and the purpose of the district relative to their own personal interests so to marshal people and resources to achieve particular goals. At the same time, the flexibility in how the term is interpreted and how it is meant to indicate a welcoming of novel ideas or approaches is actually constrained in practice because the lack of agreement keeps the strategy at a standstill.

Theories Introduced

Rather than provide full histories of each of my case sites, I break down the history and the planning process for each innovation district into two thematic chapters. The first theme, *techniques of territory,* details the planning, policy, and legal techniques used by supporters to clear pathways and finance the development of each innovation district. This is the process of extracting land rent. Following the work of scholars such as Elden (2006, 2007), Hannah (2009), Mitchell (2002), and Scott (1999), I discuss the process of securing land as the process of securing "calculable territory" (Hannah, 2009) and sovereignty over the territory (Elden, 2007). This translation facilitates the investment of capital in what was earlier considered uninvestable land allowing the innovation district to become a wayfinding mechanism for a certain demographic, sector, and capitalist logic.

The second theme, *facilitating production,* discusses is the role of the innovation district in concentrating a type of immaterial labor (Lazzarato, 1994). This is the process of extracting people rent. Following the work of the Autonomist Marxists and scholarship on creative workers, I discuss how entrepreneurs and their activities activate space, and through this, trigger additional capital investments. My interest is in creating a link between the scholars writing on

power/knowledge relations – particularly emergent studies at the intersection of territory and subjectivity (Elden, 2006, 2007; Hannah, 2009) to the scholars debating new forms of subjectivity with my added focus on updating the work to the contemporary digital realities (Lazzarato, 1994; Scholz, 2016; Terranova, 2000, 2004). I put these bodies of literature in conversation with each other to derive perspectives on the emergence of innovation districts and their effect on the people working within them.

Research Design

       The factors that marked an innovation district for me and that qualified it for this study were: 1) the use of political boundaries to enact innovation district strategy; 2) efforts by an assemblage of actors –rather than one single entity—to implement an innovation district; 3) the public declaration of master planning an innovation district. I selected cities that purposely adopted the term 'innovation district' to guide their economic development strategy. This decision removed other attempts to accommodate changing forms of production in the city – attempts such as those seen in Austin, Texas, for example, or Denver, Colorado.[3] The reason is to analyze what the term 'innovation' does and to ask three questions: How do urban actors define innovation? What forms of production are included in the term? How does a focus on innovation drive their decisions?

       Through a comparative case study of three primary cases (Detroit, Michigan; Dublin, Ireland; and Park Center, North Carolina) and two supporting cases (St. Louis, Missouri and Boston, Massachusetts), I empirically demonstrate how supporters and developers of innovation districts conceive, build, and fill the innovation district. I ask and answer questions about how specific ideas of innovation are generated in practice, how they are put to use, what effects the produce, and what they end up doing.

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[3] In some instances, these places rebranded their strategy as an innovation district strategy.

Table 1: Innovation District Case Sites

Location	Name	Founding	Acres
Boston, Massachusetts U.S.A.	Boston Innovation District	2010	1,000
Detroit, Michigan, U.S.A.	Detroit Innovation District	2014	2,750
Dublin, Republic of Ireland	Silicon Docks	2012	163
Research Triangle Park, Raleigh-Durham North Carolina U.S.A.	Park Center	2012	100
St. Louis, Missouri U.S.A.	Cortex Innovation Community	2002	240

Figure 2: Scaled comparison of innovation districts
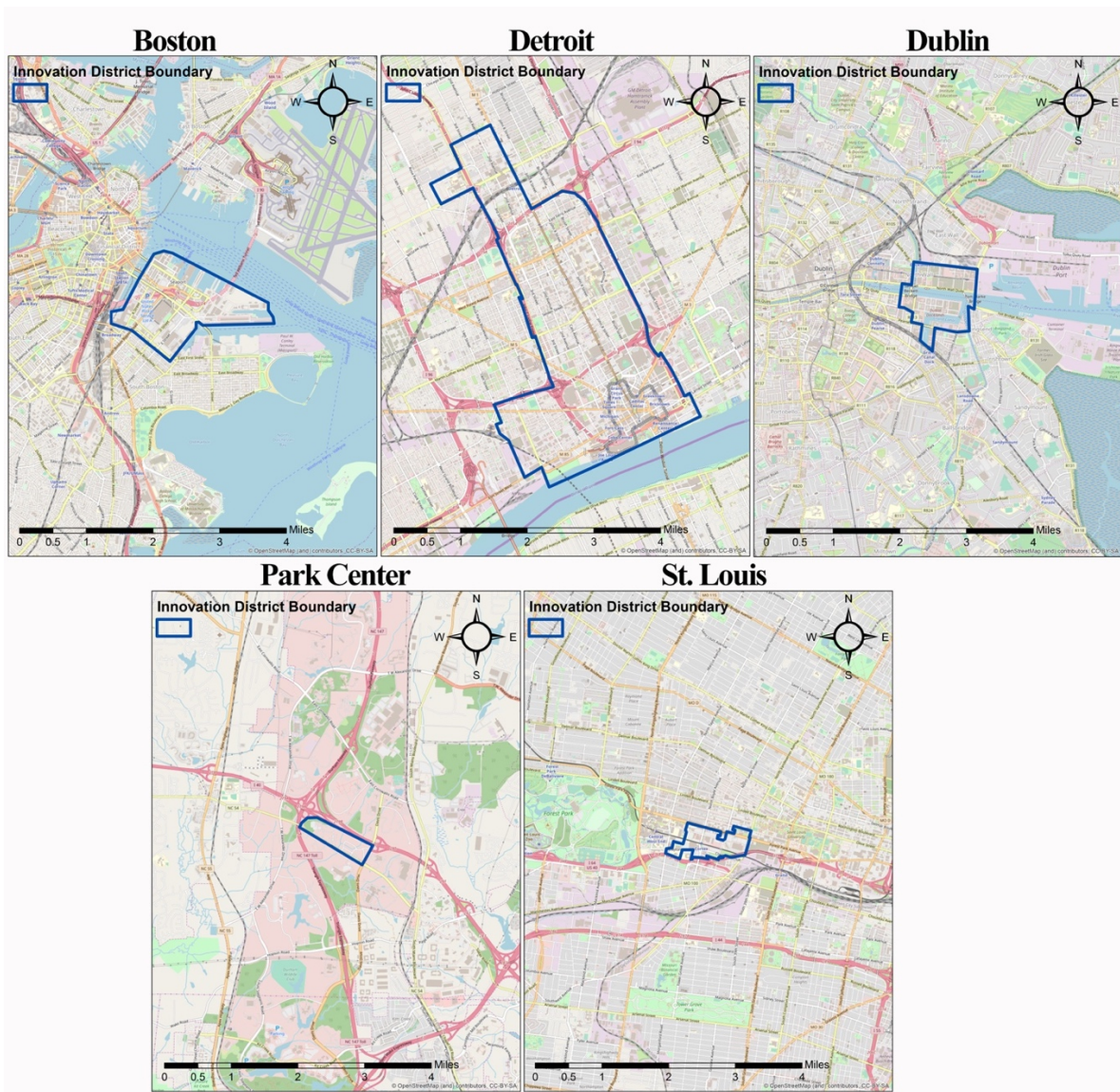
Many innovation districts are in the early stages of their development, if not existing solely as aspirations and imaginaries. Case study qualitative research provides local context where conventional economic evaluation of these spaces cannot. I opted to study them primarily through interviews with stakeholders, residents, and supporters. What did they envision for the innovation district? Who were they targeting? What models were they following? What would the space look like in five years? Ten years? These were the types of questions I asked in my interviews (for my interview guides see Appendix A).

From March 2015 – April 2017 I visited each case site, some twice, and interviewed over 150 individuals (for a list of the positions held by individuals interviewed see Appendix B). I engaged in three levels of interview recruitment and observation. The first level required identifying key players of growth coalitions and city administrators offering incentives for these developments. These people were the 'culturally specialized informants' (Bernard, 2011) intimately familiar with the history and politics of the local setting, also seen as the 'informal gatekeepers' (Seidman, 2012) routinely providing neatly packaged answers to "outsiders" while also protecting insiders from unwanted outside attention. Once I obtained their consent, I was able to access the individuals in the second phase –the less public individuals working inside the major anchor institutions and driving the majority of the decisions shaping innovation district strategies. The third stage of the interview process involved interviewing workers and/or residents of the innovation district.

I recorded and transcribed all interviews, coding and recoding based on emergent themes that helped me derive a pattern recognition (Luker, 2008). I supplemented interviews and triangulated findings with content analysis of architectural renderings, newspaper accounts, Internet media sources, promotional material, webpages promoting the innovation districts, and government documents regulating the planning, financing, and governance mechanism of each innovation district. For the more advanced cases, I was able to find policies supporting their development and marketing material promoting them. For others, I dealt mostly with architectural renderings, site plans, and machetes. This content analysis helped me assess the discourses surrounding innovation district strategies.

My research is grounded (Charmaz, 2006). I started researching innovation districts out of curiosity of how they could succeed. I saw them as exclusionary and could not understand how they would actually help to increase innovation output. My experience in each location, the people I spoke with, the literature I read, and courses I took served to shape background and

disciplinary assumptions and pointed me in various directions. The placemaking, programming, and branding, themes that consistently emerged from interviews (see #3 in the Appendix), led me to draw parallels between innovation district designs and today's big tech companies. From there I started questioning the experience of the individuals working inside these companies and inside the incubators. Interviewing them I grew to learn that there was both an excitement to work in these places, but also negative aspects related to anxiety, stress, isolation, long hours, and the disappointment of not having the necessary venture capital and mentorship supports available in Silicon Valley—the latter sentiment was repeatedly expressed by the Dublin startup community and this is relevant considering the marketing attempts by growth coalitions to brand Dublin as the Silicon Valley of Europe.

I cannot categorize my cases along a continuum of failed innovation district versus successful innovation district. As mentioned above, different actors adopt innovation districts for different reasons. Therefore, measuring outcomes would require a comparison against initially intended goals. To complicate matters, even amongst scholars of innovation, there is no agreed upon decision on what constitutes as innovation nor what are the inputs of innovation (Benoit, 2008; Welz, 2003). As it relates to the innovation district, does innovation mean accelerating a product to the market? Does it mean creating a space to try out innovative policies, such as form-based codes in a city without prior experience using this type of zoning, or smart city applications for city government and private corporations to collect data on the everyday experiences of the people traversing through the space? Does an "innovation district" serve as a code word for the transition into a new kind of economy with a new workforce and firm organization structure scholars are still trying to understand?

Instead of categorizing each case as failed or successful, I use a different categorization: strong market economies (Dublin and Boston), weak market economies (Detroit and St. Louis), and non-city (Park Center). 'Strong market economies' stands for cities with a robust entrepreneurial ecosystem. The cities of Dublin and Boston are replete with universities and have an abundance of talent in the form of skilled tech workers. These cities do not struggle from 'brain drain' from university graduates leaving the city. In addition, though the cities do not compare to the level of venture capital or C-suite experts (i.e., Chief Executive Officer, Chief Financial Officer, Chief Operating Officer, Chief Technology Officer, Chief Innovation Officer[4],

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[4] It has become common for tech companies and startups to develop a Chief Innovation Officer position. Interestingly, government offices are now also creating Chief Innovation Positions. This indicates how expertise from the technology sector is influencing government and governance (Shelton, Zook, & Wiig, 2015).

etc.) available for advice and for fostering networks available in Silicon Valley, funding is available and a long history of firms in the city translates to ease of mentorship from founders and executive managers.

Table 2: Dublin and Boston Startup Cities Global Rankings

| | | | Salary | | | | | | Social Security & Benefits | | | Cost of Living | Quality of Living[5] |
| | | | Project Management | | Tech | | Marketing | | | | | | |
Ranking	City	Startup Ecosystem	Young Professionals (0-3 years experience)	With More Work Experience	Young Professionals (0-3 years experience)	With More Work Experience	Young Professionals (0-3 years experience)	With More Work Experience	Income Tax	Quality of Health System	Holidays	Cost of Living[6]	Equal Rights	Safety
23	Dublin, Ireland	4:41	$31,717	$83,491	$38,004	$66,756	$26,843	$67,600	2:59	4.7	4:05	3:48	4.81	2.94
27	Boston, USA	4.6	$49,430	$110,341	$71,532	$104,937	$47,401	$80,549	3:52	4:34	2:05	2.65	2.88	3.89

Source: (*Start-up Cities Index*, 2017)

The term 'weak market economies' stands for cities with a historically industrial base struggling to transition into a wealth-generating economy (Audirac, 2018; Beauregard, 2013; Mallach, Haase, & Kattori, 2017). To be clear, proponents of Detroit and St. Louis innovation districts worked hard to dispel the notion of the unavailability of venture capital. Whereas Boston and Dublin consistently appear in indexes and scorecards as the best places for entrepreneurs to thrive (see table 2), Detroit and St. Louis rarely make the cut. This does not mean that these supports are devoid in these cities. Detroit Entrepreneurial Study (2017) boasts of 35 venture backed startups representing 25% of the startups in the state, a 50% increase over the last three years in Detroit-based startups, and over $62M in venture capital investments for Detroit startups (*2017 Detroit Entrepreneurial Study*, 2017). Similarly, the St. Louis Regional Chamber's 2017 Investment Capital Report lists $373M in venture capital investments, a 0.55% of the US total shares, ranking in 19th among the US metro areas, with the average deal size of $7M (Smith, 2017). Still, the amount of venture capital, local expertise, and, importantly, talent, is not nearly as attendant as in Dublin or Boston.

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[5] Quality of life incorporates a safety score based on the perception of safety felt by residents and publicly available data on crime rates obtained from police departments. Quality of life also incorporates gender equality calculated using the 2017 Global Gender Gap Report by the World Economic Forum.

[6] Cost of living takes into account local prices of groceries, street food, restaurants, public transport, clothing, and rent for a one bedroom apartment in the city center.

The term 'non-city' is a term I use to categorize efforts of the Research Triangle Foundation (Foundation), the non-profit governance organization of the Research Triangle Park (RTP), to create an innovation district in a rural environment. Like Dublin and Boston, the Raleigh-Durham-Chapel Hill Triangle area is a thriving entrepreneurial ecosystem. There is a great abundance of talent, venture capital, and C-Suite expertise. In 2017, Triangle-based companies raised $408M through 140 deals (*2017 Innovators Report*, 2018). In many respects, the Triangle region suffers from the same negative agglomeration externalities as Dublin and Boston, such as a lack of housing and massive traffic congestion (Rohe, 2012). However, there are three specific reasons why I categorize Park Center as a non-city. First, Park Center sits on land already managed by the Foundation ("Research Triangle Foundation Records, 1955 - 1999," n.d.). This means the Foundation did not have to resort to political mechanisms to acquire public land for development. Second, though the Foundation adopted an existing building when IBM moved their operations from the particular parcel of land on which Park Center is built (Terry, 2014), most of the Park Center is greenfield development. Third, I use the term non-city to point to how a narrative on the contemporary inputs of innovation lead to urban-visions guiding development on pastoral landscapes. This discourse is also evident from efforts to revamp suburban office parks to prevent them from obsolescence (Spivack, 2017).

Importantly, the decision to bring in Dublin as a case is not to create a comparison between national and international cases. Innovation district strategy and economic development policies today are global phenomena that travel across national boundaries (McCann & Ward, 2011; Temenos & McCann, 2013; K. Ward, 2017). This is not to say that I do pay attention to variations in local policies and differences in governance structures, but I do find the comparison between weak market and strong market economies more compelling than national versus international comparisons.

Case Sites Contextualized

To begin, it is helpful to provide a visual description of each case site and to provide a brief history of important events leading up to the declaration of an innovation district. Importantly, it helps to remember that, except for Park Center, the innovation districts in my case sites are all situated over land previously occupied by industry. Innovation districts are bringing forth new post-industrial landscapes and that often translates to two types of urban fabrics:

repurposed industrial infrastructure and new build, which often translates to high-rises with glass facades built out of contemporary material.

<u>Strong Market Economies</u>

Silicon Docks, Dublin, Ireland

Figure 3: Silicon Docks
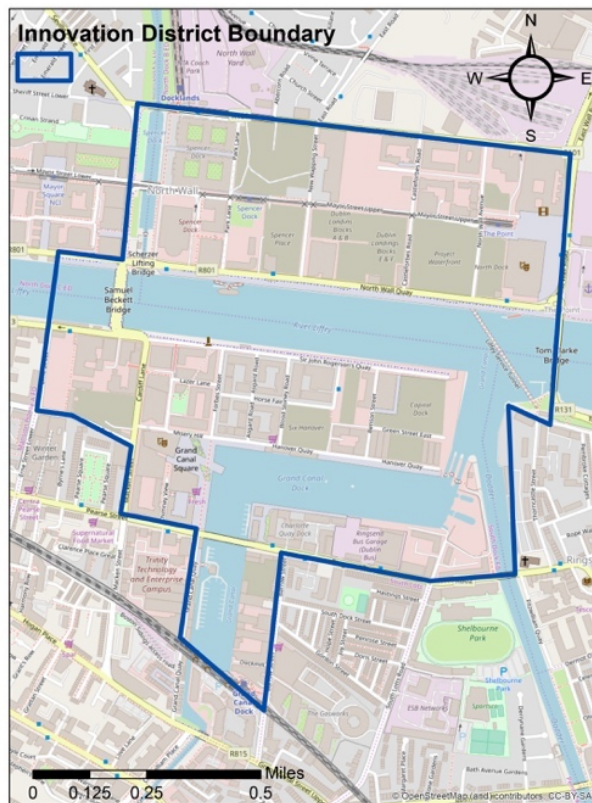
The Dublin Docklands, or 'Silicon Docks', the nickname used by major branding mechanism to promote Dublin as the Silicon Valley of Europe is located to the East of Dublin's city center. Industrial architecture of harbor installations, warehouses and storage depots have given way to material expressions of new economic, social and cultural realities. Class A office buildings with expansive glass walls contorted to exposed steel frames, creatively refurbished luxury offices, and open floor plans ripe with amenities dominate the cityscape. Coffee shops, boutique condominiums, and neon light displays reflecting on the Liffey River illuminate the night sky. The Silicon Docks is home to many notable global technology firms such as Google,

Facebook, Airbnb, and LinkedIn, to name a few, that established their Europe, Middle East, and Africa headquarters in Dublin on account of their business-friendly tax policies.

The progression from de-industrialization, to Celtic Tiger, to recession, and now to a post-crisis hub of the technology sector has been vividly on display in the cycles of development in the Dublin Docklands (Kayanan, Eichenmüller, & Chambers, 2018). For decades, the Docklands were consigned to decline and dereliction. The struggle for investment and the turn to entrepreneurial urban growth led to a dependence on local authorities to oversee development. In Dublin, in the late 1980s, this took the form of the Custom House Docks Development Authority (CHDDA) created to incentivize development on the western most portions of the Docklands (Moore, 2008). The CHDDA succeeded in developing a financial district centered on the International Financial Services Centre (IFSC) but critiques of their myopic focus on commercial and speculative growth negated regenerative development promises of housing and employment opportunities for all (Moore, 2008). Consequently, the Dublin Docklands Development Authority (DDDA) supplanted it in 1997. The DDDA expanded their remit to a 1300-acre development zone. This new border included the IFSC catchment area, in addition to wastelands, brownfields, and old-industrial sites (see figure 4). The DDDA remained lead developers of the new boundary until 2012, when planning powers shifted from An Bord Planeála, the national planning body, to Dublin City Council (DCC). This was coupled with the creation of a 163-acre Strategic Development Zone (SDZ) overlaid on the North Lotts and Grand Canal Dock Planning Scheme (*North Lotts and Grand Canal Dock: Planning Scheme*, 2014) (see figure 5).

Figure 4: Dublin Dockland Development Authority, 1997 boundary
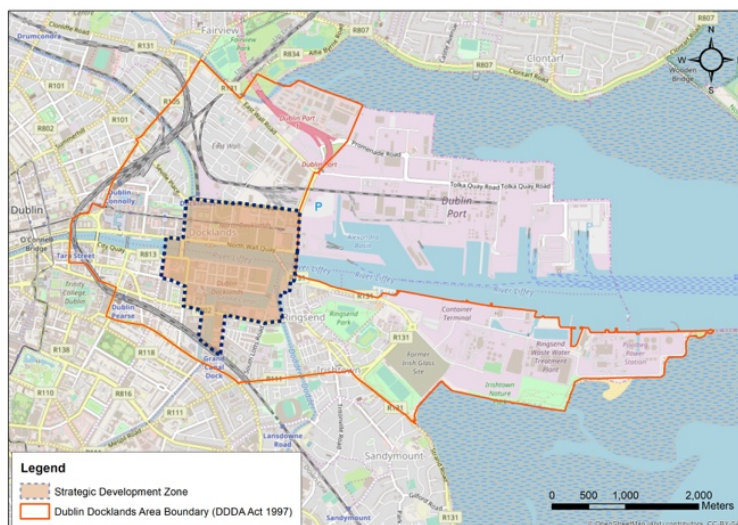
Figure 5: Strategic Development Zone, 2012 boundary
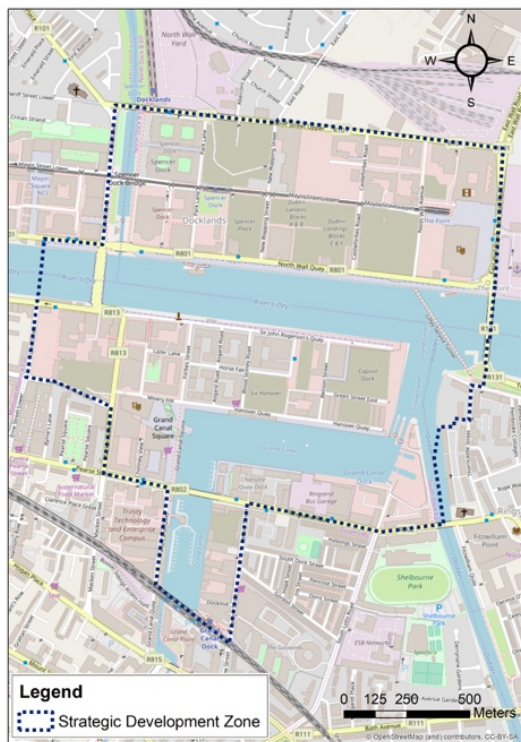
The Silicon Docks concept extends beyond this 163-acre boundary to a larger layer that seeks to envision Dublin as a global tech-hub, but I confine my analysis of the Silicon Docks to the SDZ as a way to discuss how visions of a technologically advanced future influenced planning policies –particularly after the 2008/9 financial crises.

Development authority over the SDZ belongs to Dublin City Council (Lawton, 2017). An Bord Pleanála, the national planning body, transferred the authority with the designation of the SDZ. However, this does not mean that the growth of the area is solely attributed to Dublin City Council. As I demonstrate, two national organizations, the Industrial Development Authority and the National Asset Management Agency are gatekeepers to the SDZ's development (Byrne, 2016b, 2016a).

During on-site visits in 2016 and 2017, the development of Silicon Docks remained work in progress with most of the sites in early phases of construction (i.e., pile driving, cement pouring) (see figure 6). An enforced building height restriction of seven to nine floors visually translates to cranes as the dominant skyscrapers of the space (see figure 7). Though construction

remains on the rise, the idea of Silicon Docks is more established than the reality would suggest, though the aesthetic in place foreshadows what is to come.

Figure 6: Construction of the Silicon Docks south of the Liffey river

Figure 7: Construction of the Silicon Docks south of the Liffey river

The Dublin case demonstrates that, at least in advanced capitalist economies, national boundaries do not limit innovation-led development. A case outside of the United States demonstrates the importance of calculable territory for the seamless flow of global networks (Hannah, 2009). A second reason for including Dublin as a case site is because of their progress in smart city infrastructure and governance. As I argue in the dissertation, calculable territory clears pathways to track all human transactions and interactions within the ordered space.

Boston Innovation District, Boston, Massachusetts

Figure 8: Boston's Innovation District

The Boston Innovation District is located on the South Boston Waterfront, on a peninsula slightly south east of the financial district and the downtown. Over two decades in office, Menino had exhibited the long-standing desire to "leave his fingerprints all over the Seaport" (McMorrow, 2014). Prior to targeted development, marine industrial activity and ground floor

parking were the dominant fabric of the South Boston Waterfront. The completion of the Big Dig and the extension of the Silver Line provided direct and quick access to prime real estate opportunities in the South Boston Waterfront. Located between the downtown and Logan International Airport, the South Boston Waterfront was an obvious place for the city to grow. The city allocated billions of public dollars to open up the peninsula and connect it to the airport prior. This brought forth a few prominent buildings such as the Institute of Contemporary Art, the Boston Convention and Exhibition Center, the US District Court, and the World Trade Center. Growth seemed promising until the recession froze all development. Menino needed a new plan.

On January 4, 2010, kicking off his fifth term with a bold initiative, Boston's Mayor Menino delivered an inaugural address promising to unlock the potential of Boston by converting the South Boston Waterfront into an innovation district ("The Honorable Thomas M. Menino Inaugural Address," 2010: p. 4). "A new approach is called for on the waterfront," he proclaimed, "one that is both more deliberate and more experimental. Together, we should develop these thousand acres into a hub for knowledge workers and creative jobs…Years of *financial* engineering left us with a sub-prime crisis in housing. It's time to get back to "*engineering* engineering" (ibid: p.4-5; emphasis in original).

Menino had approached his staff before announcing his intentions to build an innovation district with the purpose of soliciting 'big ideas' to mark his final term (personal interview, 2016). Andrew Feiberg, then an advisor to the Mayor, now the COO and Co-Founder of a virtual reality application, suggested the idea of an innovation district. Feiberg's exposure with Barcelona's innovation district led him to proclaim that the environment for innovation-led development was ripe in many respects: college graduates who wanted to stay in the Boston area could not find jobs; budding entrepreneurs did not have space to locate their startup; and Venture Café in Cambridge was running weekly events targeting entrepreneurs demonstrating a healthy resurgence of energy. If MIT's experience with Kendall Square and large-scale innovation driven development exceeded expectations and was completely built out, why not direct construction to the blanket of parking lots that covered much of the South Boston Waterfront? (personal interview, 2016).

Feiberg's idea was not a hard sell. Leveraging innovation-led development made sense. The success Route 128, the Boston-Cambridge area has a long history of targeting science and research development (Dorfman, 1983; Saxenia, 1996). More recently, Massachusetts Institute of

Technology's involvement in Kendal Square development around their campus highlighted the strengths of innovation- and transit-oriented-led development (Bertolini, 2000; Miara, 2012). Seeking to replicate the Kendal Square model, in 2010 on the heels of the recession, Boston's late mayor Thomas Menino launched the Boston Innovation District, an initiative to redevelop a 1000-acre swath of land into an urban laboratory of innovation and knowledge production.

Located on the South Boston Waterfront, and encompassing seven subdistricts (see figure 9) the Boston Innovation District is the first official innovation district in the United States.

Figure 9: Subdistricts of the Boston Innovation District
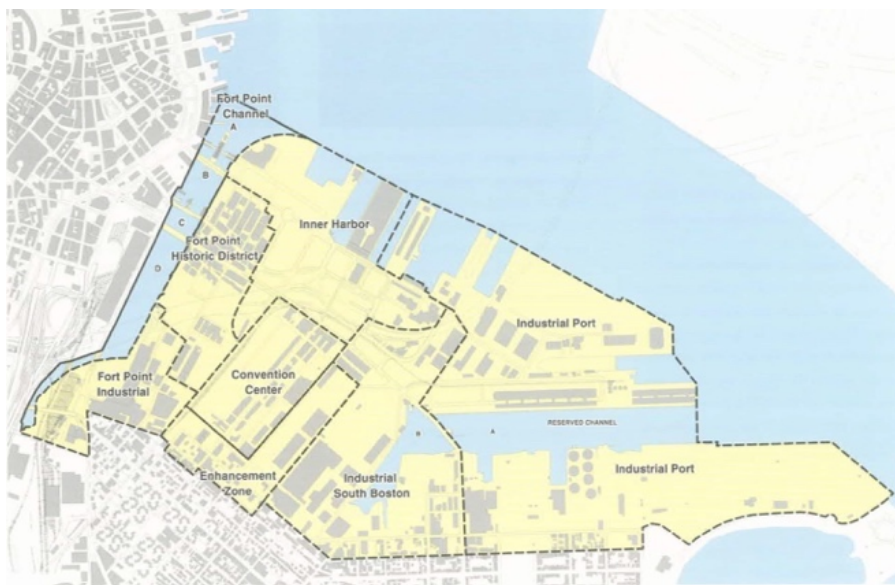
Source: (*The Seaport Public Realm Plan*, 1999; p. 12)

Eight years into its development, the Boston Innovation District today features a fragmented urban fabric. Waterfront development on the north side features manicured lawns, protected walkways along the water, high-end, brightly lit and open Class A office developments, and condominiums with store-front first floors. Open parcels are slated for development and protected with fenced barriers that proudly display architectural renditions of what is to come: glass, and silver steeled high-rises, with luxury accommodations, pools, workout facilities, and boutique ground-floor retail (see figure 10).

Figure 10: Urban fabric of Boston's Innovation District waterfront development

Throughout the day, particularly during the weekend evenings, luxury cars are seen driving around the Boston Innovation District or parked on premise. On the east end of the peninsula, the urban fabric represents low-rise warehouses, administrative offices, and vessels that make up marine industrial activity. New forms of industry and changing cultural preferences are slowly displacing this sector and creating a new morphology, as evident from the arrival of high-end eateries, food stalls, bike lanes, and open entertainment venues. The southwest side of the innovation district is where the former industrial Fort Point neighborhood is located. The urban fabric of this neighborhood features older mid-rise, red-brick structures, and growing cultural amenities such as the Children's Museum. On account of General Electric's arrival, I expect this neighborhood will experience a drastic change to its landscape and urban fabric. Connecting these three main sites, the waterfront, the Marine Industrial Park area, and the Fort Point Neighborhood, are wide thoroughfares built to accommodate truck traffic transporting products from the port to the remainder of the region. Commuters have also found these arteries helpful leading to congested streets (and honking traffic) during rush hours (see figures 11 & 12).

Figure 11: Urban fabric of the Marine Industrial Park

Figure 12: Expansive parking lots in the Boston Innovation District

Mayor Menino led initiatives for the Boston Innovation District using his power over the Boston Redevelopment Authority and his favoritism for certain developers (McMorrow, 2014). As I demonstrate, considering its central location, the South Boston Waterfront was always slated for high-end and luxury development, which it prominently features today. A few years after the crash, when development picked up, innovation district efforts for inclusive development and affordable housing were discarded (Logan, 2017b).

As the first publicly declared innovation district in the United States, Boston's Innovation District is a strong case for my study. In addition, unlike the other cases, it is not anchored by a university—though the region is replete with universities and is prominently featured as a region with one of the largest concentration of knowledge workers (Berube & Holmes, 2016). Like Dublin, Boston's initial efforts focused on smaller scale startups but their prime location in the heart of the city and quick real estate development interests shifted the strategy to benefit large established corporations.

Weak Market Economies

Detroit Innovation District, Detroit, Michigan

Figure 13: Detroit Innovation District

From Henry Ford's Detroit, a city bustling with industrial activity and an influx of labor that reached a population peak of 1.85 million in 1953, to its current population, which hovers below 700,000 and more than 40% of the residents living in poverty, the history of Detroit's founding, its rise during industrialization, bankruptcy, and its ultimate "death" is well rehearsed (Bomey, 2017; Galster, 2018; Manning Thomas, 2013; see also special issue Sugrue, 2014; Tabb, 2015). A wide variety of scholars discuss the factors that contributed to this Detroit's decline, some concentrating on larger global forces, others focusing on changes at the local level. Numerous retellings simplify Detroit's growth and its demise to the reliance on a single industry: the automobile. The story is more multifaceted and complex, which makes it challenging to pinpoint the reasons that led to the adoption of an innovation district strategy and shaped its scope.

Like many other cities seeking investment capital and global recognition not as a bankrupt city, over the past several decades, Detroit has embraced a long string of fad-driven economic development strategies. The innovation district is no different. Mayor Mike Duggan publicly declared the Detroit Innovation District in the summer of 2014 (Broda, 2014), but foundational elements of a renewed interest in the city appeared over a decade earlier with the arrival of Compuware World Headquarters in 2003 in the heart of Downtown Detroit, Dan Gilbert's, one of Detroit's largest property owners, decision to relocate Quicken Loans in 2010, and the work of Midtown Inc., formally known as the University Cultural Center Association, to revitalize Midtown.

The presence of university and hospital research centers anchor institutions within the designated location, as well as an established incubator and a college focused on creative studies played a major role in the decision to overlay an innovation district in the downtown core (*The Detroit Innovation District: Recommendations for State Alignment and Investment*, 2013). At 2,750-acres, Detroit Innovation District is largest in the United States encompassing the New Center, Midtown, and Downtown neighborhoods. The borders of the Detroit Innovation District remain in contention, but generally, the Detroit riverfront creates the southern boundary, interstates 75 and 375 form the eastern boundary, and interstate 94 the northern boundary, with an additional northern extension to include the Henry Ford Health System just north of Grand Boulevard. M-10 forms the western border with an extension to include the Corktown neighborhood.

Detroit's domination by the automobile industry and related spin-offs is as relevant today as it was during the height of industrialization, though for different reasons. In the early 1900s, General Motors, Ford, and Chrysler, the 'Big Three' formed Detroit's economic base and had a tremendous effect on the urban landscape (Ryan, 2008). The presence of the oligopolistic giant automakers had a tremendous effect on the urban landscape. At the height of industrialization, the automotive sector dominated the urban landscape with their superblock factories and suburban-type housing for manufacturing labor (B. Ryan, 2012; B. Ryan & Campo, 2013).[7] To alleviate the increased presence of automobiles on the road, street facing store fronts were pushed back to widen streets (Ryan, 2008). What was once a city with smaller parcels of land and concentrated populations, was slowly consumed by the super-block factory footprints, roads, highways, and parking lots that broke up the density and transit-oriented development on which innovation district strategy depends.

The departure of automobile factories and operations from the city center is also an important contribution to the challenges of implementing the Detroit Innovation District. The large abandoned factories certainly affect density, but in addition, the outcome of companies moving their operations away from downtown to the outskirts of the city (Garreau, 1992; McCarthy, 1997), and later to greenfield sites in the suburbs (Hyde, 1982; Neill, 1995), resulted in the decentralization of people and large demographic changes. Edge cities grew to become self-sufficient, with commuters traveling between edge cities, rather than from the edge to the core (McCarthy, 1997). Despite the slight resurgence of the central business district, this is a pattern that persists today with commuters holding 70% of the jobs in Detroit (*Detroit Future City: 2012 Detroit Strategic Framework Plan*, 2013). In addition, two of Michigan's largest research campuses, University of Michigan (Ann Arbor) and Michigan State University (East Lansing) reside outside Detroit, meaning that any spin-offs from these universities are more likely to remain in Ann Arbor or Lansing rather than relocating to Detroit.

Despite the loss of the automotive manufacturing and direct competition with other cities and countries in the vehicle market, the automotive legacy continues with this sector seeking to corner the market in automated vehicle technologies. In addition, the legacy of the automobile industry remains present not only in the amount of blight caused by decentralization, not only in

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[7] Ryan and Campo (2013) argue for the importance of preserving the automobile heritage to ensure the city of Detroit and its inhabitants remain connected to their historic path. In this article, they state that the contemporary landscape is not reflective of its automotive past because many of the automobile factories have been demolished. I differ from this perspective in that I focus on the ways the automobile industry affected the density of the city, the creation of highways and parking lots.

the abandoned factories that take up massive amounts of space, or in their demise that left gaping swaths of derelict land, but also in an innovation district strategy that captivates the imaginaries of the Detroit stakeholders. The respondents I interviewed believe in the capacity to tap into the innovative energy that existed in Henry Ford's Detroit and to compete against other regions on the cutting edge of autonomous vehicle technologies.

Detroit's trajectory cannot be separated from the role of race in its formation and racism in its decline (Benyon & Solomos, 1987; Darden, Hill, Thomas, & Thomas, 1987; Newman & Safransky, 2014; Sugrue, 2014). During the decentralization of Detroit, racist policies preventing African Americans from moving into the burgeoning white suburbs forced segregation and resulted in the concentration of African Americans within the city center faced with employment, housing, and police treatment discriminations (Neill, 1995; Sugrue, 2014; Vose, 1959). The 1967 rebellion, which killed 41 people and destroyed 1,300 buildings, further exacerbated white flight. By the 1990s, 78% of Detroit's population was African American (Neill, 1995). As of the US Census 2010, African Americans make up 83% of Detroit's population. However, in the Greater Downtown, which encompasses the Detroit Innovation District, black residents account for 69% of the population, down 5%, with whites accounting for 22%, up 3% from the 2000 Census (7.2 SQ MI: A Report on Greater Downtown Detroit, 2015). The increased racial diversity of the Greater Downtown is not in itself negative, but it is necessary to question the reasons for the decline in black residents and the connections between innovation district strategies that cater to higher skill sets that black residents may not possess.

The Detroit Innovation District is an important case to draw comparisons between earlier landscapes of productions and the efforts to convert a blighted landscape focused on entertainment-led economic development strategies (i.e., stadiums, casinos, place-making) to serve today's contemporary form of production. That the Detroit Innovation District strategy is no longer a leading economic development effort is not necessarily a negative conclusion of the research. The experiences of the leaders guiding its implementation and the challenges they faced speak to the importance of local context. The excitement for the innovation district strategy held particular sway in Detroit as Katz and Wagner publicly featured the city's innovative potential in their national report, in addition to personally consulting Michigan and Detroit leaders on the implementation of the Detroit Innovation District strategy. From the onset this mounted the pressure to implement a successful strategy. At the same time, among locals there

existed a concerned undercurrent of an exclusionary strategy focused on a growing central business district surrounded by severely declining neighborhoods.

Cortex Innovation Community, St. Louis, Missouri

Figure 14: Cortex Innovation Community
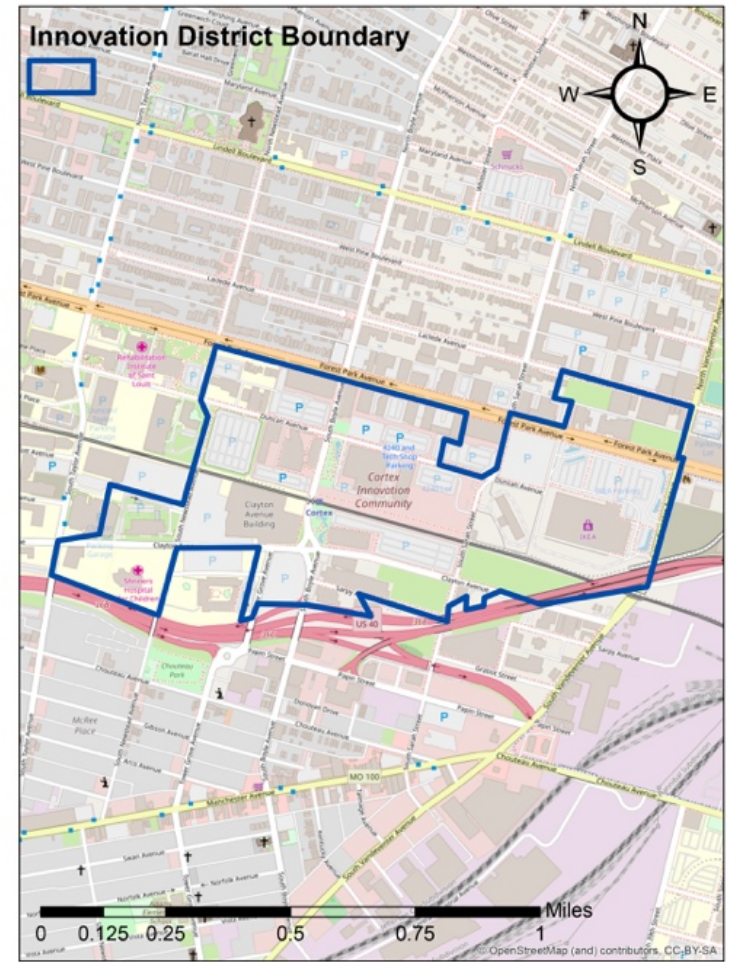
The St. Louis Cortex Innovation Community is a 240-acre development owned by Cortex, a legal 501c3 ("Cortex Innovation Community," n.d.). The Cortex Innovation Community, located in Midtown, is made up of eight staff members and 18 board members representing public and private institutions invested in the district. The board members represent members from area universities, the Botanical Gardens, the Mayor's office, and private businesses. Cortex holds the designation Master Developer for the Cortex District through the establishment of a tax increment finance boundary (*St. Louis Innovation District Tax Increment Financing (TIF) Redevelopment Plan*, 2012).

For two decades, Missouri growth coalitions worked together to grow Missouri's reputation as a hub for plant and bio-sciences. In 2002, in the city of St. Louis, this took shape in the form of real estate development efforts to remove the blighted spaces in the stretch of land between St. Louis University and Washington University. Today, this industry is slowly developing the region as a hub for plant and bio science. As the urban node within this network, the Cortex Innovation Community has seen considerable growth. On account of demand, the Cortex Foundation is continuously updating their master plan to expand beyond its boundaries (Feldt, 2018). Plant- and bio-sciences are no longer Cortex's only focus. Following the 2008 recession, the Cortex Foundation expanded its remit to focus on smaller startup enterprises and these too have flourished within the boundary of the innovation district. However, they only represent a small percent of exits in the startup community with plant- and bio-sciences dominating venture capital funding (A. G. Smith, 2017).

Cortex Innovation Community is my second case located in a weak-market economy. Like Detroit, St. Louis is faced with a declining population, diminishing resources, large tracks of blighted land, and a heavy racial divide (Gordon, 2009; Hollander, Pallagst, Schwarz, & Popper, 2009). The urban fabric of the Cortex Innovation Community and its surroundings is visual evidence of this divide. Much of Cortex Innovation Community is concentrated along two buildings, called Cortex I and Cortex II in planning documents. These buildings house the administrative offices of the Cortex Foundation, small offices for startups and a more established businesses, university incubator space, and the Cambridge Innovation Center, an incubator based out of Cambridge, Massachusetts. Surrounding each building are large, overfilled, parking lots. In many respects, with its low-rise development, Cortex Innovation Community resembles an office park built in the city (see figure 15). This perception is buttressed by the presence of an IKEA on the east side of the Cortex Innovation Community (see figure 16), though remnants of an industrial past are also evident due to the presence of a grain elevator on site (see figure 17), and a few remaining structures that served a community faced with declining working-class opportunities such as a Goodwill retail store and outlet, the Salvation Army, Planned Parenthood, and Legal Services of Eastern Missouri, an organization dedicated to providing legal services to low-income communities.

Figure 15: Parking lots in the Cortex Innovation Community

Figure 16: View of IKEA from within the building overlooking expansive parking lots

Figure 17: Grain elevator in the Cortex Innovation Community

The Cortex Innovation Community case study provides a strong opportunity to analyze longer attempts by growth coalitions to establish a space for knowledge production within the urban sphere. This longer period affords the ability to document the various technical means used by stakeholders for ownership over a territory. It also offers a comparison between a focused strategy on a predetermined sector (i.e., plant and bio-sciences in St. Louis) versus opting to refrain from determining the target sector (i.e., Boston).

The origin story, as told by the founders, as well as the current leadership of the Cortex Innovation Community, prominently centers the development as mission driven (*Smart People. Cool Places. The Story of Cortex*, 2017). It is not uncommon to read in media accounts or hear from respondents in interviews that William Danforth, founder of the Cortex Innovation Community, and John Dubinsky, president and first CEO of the Cortex Innovation Community, are altruist visionaries primarily concerned about the welfare of St. Louis' residents. One interview respondent gloriously attributed the work of these leaders as 'god's work' (Cortex Innovation Community executive, personal interview, 2016). Undergirding the desperation for such charitable work are divinations such as a comment from Robert Calcaterra, president and CEO of Nidus Center for Scientific Enterprise in St. Louis County, commenting on the growing plant and life science sector in St. Louis: "In the next century, the advances in the life sciences

area are going to be the most dramatic things to occur worldwide. There's a very dramatic impact if you can feed people who are starving" (Goodman, 1999).

Since its inception, the Cortex Innovation Community has created jobs. However, the question of who stands to benefit from the changes to the built environment development that generates these jobs is important. The case of the Cortex Innovation Community demonstrates what the powerful rhetoric of mission driven work combined with the imagery of a progressive scientific future can do: it can completely transform a landscape for a particular demographic.

<u>Non-city</u>

Park Center, Research Triangle Park, North Carolina

Figure 18: Park Center
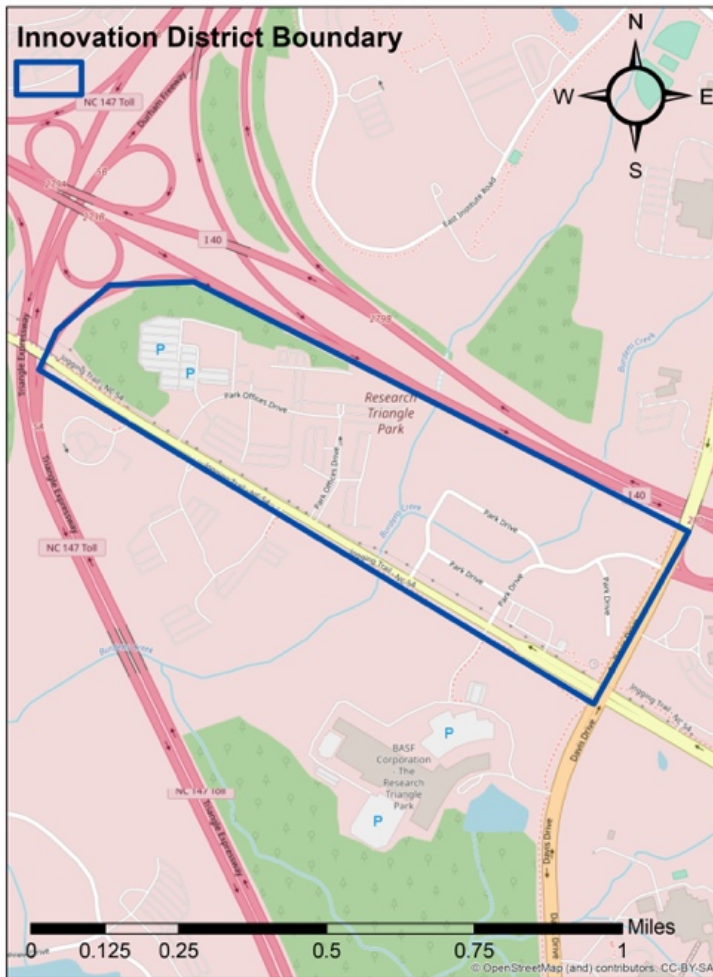
In early 2014, the Research Triangle Park Foundation, the non-profit charged with managing North Carolina's Research Triangle Park's (RTP) strategy, acquired 100 acres of land along the I-40 for $17 million and designated the space as Park Center. The goal of Park Center is to accommodate 100,000 new jobs, build in $2 billion worth of residential and retail amenities, and construct a rail path connecting Park Center to Raleigh, Durham, and Chapel Hill, the three surrounding cities that make up Research Triangle Park (Kroll, 2014; Ohnesorge, 2014). The site plan features an array of amenities to create the appearance of city life. These include street-level retail and entertainment, designated open recreation spaces, and housing in walkable proximity to work all within a pedestrian and bicycle friendly environment. Creating a density of people within their physical environment is the primary focus.

Within the 100-acres, the Foundation intends to locate firms representing science and technology, sectors that have always been associated with RTP, as well as firms representing the arts and humanities. According to their website, "Creating a place where collaboration can occur between industry and academia, nonprofits and corporate titans, entrepreneurs and government is our goal. We want to create spaces for people to gather, meet, hang out and be inspired." (http://www.rtp.org/about-us/park-center/).

This comment contrasts with the initial ideology behind the development of RTP, which is well detailed in many scholarly accounts (for a few examples, see O'Mara, 2005; Rohe, 2012; Saxenia, 1996). In the late 1950s, RTP was conceived as a 7,000 acres science and research campus overlaid on the seven counties that make up the Raleigh-Cary and Durham-Chapel Hill metropolitan statistical areas in North Carolina (see figure 19).

Figure 19: Map of counties of the Research Triangle Park
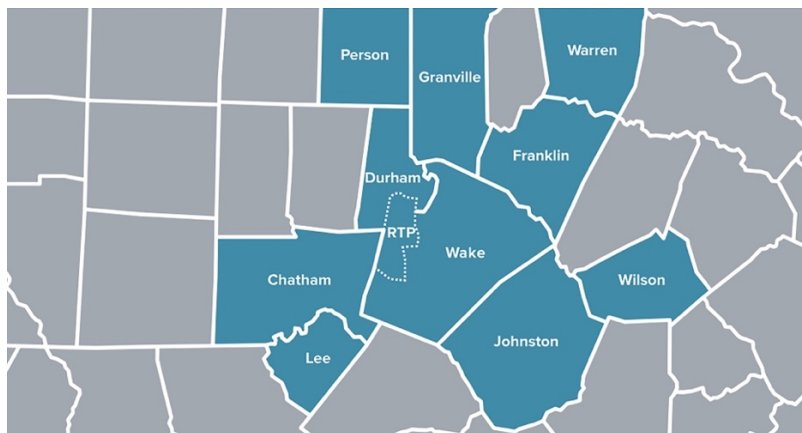
Source: Research Triangle Region ("Counties," 2018)

The layout and space between the various firms was purposely expansive in order to prevent employees from competing firms from fraternizing with each other. In addition to providing ample space for firms to develop their own campuses within RTP, zoning provision established an eight-acre minimum lot size, building set-backs of at least 150 feet from the road, and set-backs at least 100 feet from the side and back property lines (Rohe, 2012). The efforts of the RTP Foundation are focused on changing the silo-like attitude of the science and research park, the idea on which the RTP was originally designed, to a newly collaborative ideal that includes targeted amenities to attract and retain entrepreneurs and young professionals ("Park Center: This is not your grandfather's RTP," 2015).

The imagery of the future Park Center certainly features compact development, consumption-led entertainment, and vibrancy in the urban design connecting buildings and structures. In reality, because of its early stages, at the moment, Park Center exists as a single building known as the Frontier. Essentially, the Frontier is a concept built into the basement of an abandoned IBM building. It is open to the community, wired with high-speed connectivity, and offers opportunity to rent space for those that want to establish a permanent residence for their startup business. Though the inside of the Frontier is colorful and inviting (see figures 20 & 21), the outside of the building does not indicate the activity occurring inside (see figures 22 & 23). The surrounding fabric of the Frontier building resembles the older vision for Research Triangle Park: manicured lawns, boxed, low-rise office buildings, and parking lots.

Figure 20: Lobby of the Frontier

Figure 21: Open workspace in the Frontier

Figure 22: Outside view of the Frontier

Figure 23: Main entrance of the Frontier

Park Center provides an opportunity to compare logics between urban and non-urban redevelopment. What this brings to fore is the underlying operating perspective on the needs of 21st century industry at the cusp of automation and the growth of high-tech entrepreneurship. However, the challenges posed by the urban sphere do not directly translate to the 7,000 acres of land operated by a single 501c3 as a type of home owner's association. Park Center is an important case for a variety of reasons. Principally, it is interesting because of its historic precedent and conscientious planning efforts by university, industry, and government relations to embrace a new spatial logic for innovation capture. In addition, it is important because it is the only case outside of the urban sphere and, as such, there are overlapping districts that make up the 100-acre site. In many respects, the attempt to create a brand new concentrated urban-like development where the arts and culture industries can intersect with science and research, a place

where residential, retail, and occupation are closely connected via public transportation mirrors the rhetoric on agglomeration benefits of the city. Yet, Park Center is not an urban environment in the traditional sense and, in fact, the innovation district strategy seeks to create an urban environment with the balance of a pastoral environment to appease long-standing and in-coming companies that still find that the spacious environment meets their needs and provides them with space to grow (personal interview, 2015).

Unfortunately, during the on-site visits to Park Center and by the time of this writing, the development of Park Center was still in early phases. For this case, I rely on interviews with the Foundation members and neighboring supporters of the innovation district. However, beyond the Frontier, an old IBM building converted into smaller offices and a ground floor open workspace (Terry, 2014), there is little to observe in this case site. For this reason, much of my analysis of Park Center is based on architectural renderings and images that portray the ambitions for a future Park Center.

Conclusion

The changing landscape of the innovation district presents an ideal object of analysis to assess the role the technology and economic development policy nexus play in reconceptualizing relationships between urban form, technological innovation, and our daily social life. Anna Klingman (2007) writes, architecture is not about where we work and live, but where we imagine ourselves to be. If this is indeed the case, speaking with the individuals who are driving the development of the innovation district and assessing the discourse around hopes and objectives for the innovation district provides rich insight into the societal aspirations of contemporary growth machines.

While the object of analysis is the innovation district, the changes I observe are not solely confined to the space of the innovation district. There is a long history of enclosing public land for private profit. With the shifting demographics in the urban core of a young, professional, educated, and technologically-skilled individual and the ensuing development to accommodate their work and living cultural preferences, the reality of growing private citadels becomes starker. In the final chapter I document the changing demographics and the rise in real estate prices within the spaces of all five innovation districts. As these urban laboratories concentrate populations of constantly productive entrepreneurs and a wealthier residential class, difference and diversity are slowly displaced. This is problematic for the prospect of innovation from the

perspective of the scholars who argue that innovation requires input from a wide variety of sources and encounters with different forms of being (Benoit, 2008; Shearmur, 2012; Welz, 2003). But it is also problematic when the ordering of space is considered from the perspective of Foucauldian biopolitics. Following this line of inquiry, I argue in the closing chapter that the emergence of innovation districts points to a shifting of risk on to the entrepreneur. The thesis of the entrepreneurial turn in relation to the built environment is present in Harvey's (1989a) work, particularly his highly cited piece, "From managerialism to entrepreneurialism: The transformation in urban governance in late capitalism." What innovation district strategy demonstrates is an overreliance on the entrepreneur to accrue regional benefits. This is a continuation of Harvey's entrepreneurial turn from the state, to an assemblage of actors, to the precarious entrepreneur. It is the entrepreneurs who are bearing the burden of an ideology on the importance of innovation for regional wealth and the role of the entrepreneur as the catalytic actor that stems from a group of individuals representing the state, the public, and the private sector. [8]

In all five cases, after the global financial crisis of 2008, entrepreneurs became the central focus of innovation district strategies. When large development corporations halted construction and firms froze moving considerations, mobile entrepreneurs and their minimal real estate requirements proved to be the best candidates to generate some form of economic activity. Much like the artists that started the first wave of development in documented studies of gentrification

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[8] The use of the term "precarity" elicits a longer literature on informal workers in the developing countries, care workers—primarily women, working-class women, and migrant workers for whom work has always been precarious (Kern, 2013; McDowell, 2009; McDowell, Batnitzky, & Dyer, 2009). My use of the term "precarity" is in reference to the middle-class workers of the tech economy, many of whom string along a series of tasks to make a living. In addition, scholars studying creative labor draw the connection between the rise of policy prescriptions that centered the creative worker as part of a state-led agenda to dismantle labor disputes and prevent the formation of unions (Gill & Pratt, 2008; McRobbie, 2002; Neilson & Rossiter, 2008).

This scholarship is useful for my research in that it pinpoints and explains the role of culture as the raw material for contemporary production (Lloyd, 2002). However, research on innovation districts differs from this literature in that elements of affect and care work are not central to innovation district strategy. In using the term precarity I am signaling the precarious aspect of non-steady work. Within the past decade, the term precarity has been increasingly adopted in an attempt to explain effects of contemporary capitalism. However, it is important to stress that, as Rossiter and Neilsen (2008) argue, precarity has always been a component of the capitalist project. Within the ideology and the rhetoric that stems from it, it is important to disentangle fact from myth. In 1995, Zukin argued that the flexible workers in the cultural industries without a clear upward trajectory engaged this form of labor because "real identity comes from activity outside of the job" (13) Here, Zukin was referring to the willingness of individuals to take on these types of positions as it afforded them the opportunity to participate in the culture of the space, a line of argument closely associated with Florida's (2002) economic development prescriptions.

In my reading of the literature, the rise of policies that center the tech-worker are no so much a different strand of study as they are a continuation of this earlier literature on precarity. Ultimately, the transition from affect labor, to creative labor, to tech labor all point to what Lorey (2015) discusses as a governing logic of insecurity. The state, removed as a provider of welfare and support, in addition to the firm that can rely on contract labor instead of paying benefits to permanent employees, benefit from the individualized workforce less dependent on the state (McRobbie, 2016).

(see for example Lloyd's (2010) work on the Wicker Park neighborhood of Chicago), this time around it was the tech entrepreneurs who moved into the warehouses converted into incubators and maker-spaces in Boston, Dublin, and Detroit. In St. Louis and Park Center, where the innovation district strategy is primarily dominated by a governing 501c3 foundation, it was a post-recession decision to switch the strategy from targeting large companies to concentrating on smaller firms. The decision to focus on entrepreneurs and their startup companies translated to active marketing strategies, which I document.

Innovation district strategy served to generate development activity when the economy was at a standstill. Supporting my argument on entrepreneurs bearing the burden of risk, as the market began to turn and banks started lending out money for development, the focus on supporting entrepreneurs shifted to accommodate market logics and the desires of larger firms to develop over the parcels of land used by entrepreneurs. In both Boston and Dublin, my strong market economies, entrepreneurs can no longer afford to live in the innovation district. In Boston, much of the startup activity is relocating to the abandoned buildings that the legal and financial firms are leaving behind as they move their offices to the high-end Seaport Innovation District, though branding efforts to call it an innovation district have ended (Martin, 2016; McMorrow, 2012). In Dublin, the new space for startup activity is in Dublin 8, on the west side of town. In addition, the Startup Commissioner position, a position created by Dublin City Council in 2014 to create networking and support opportunities for entrepreneurs, was eliminated in 2017 (Kennedy, 2018). Detroit, St. Louis, and Park Center continue to focus on entrepreneurial activity within the space of the innovation district, but, except for Park Center, these are weak market economies that continue to struggle with attracting investment capital. As for Park Center, because it remains in young stages of development, there remains plenty of space to grow and, thus there is no need at the moment to exclude entrepreneurs from their strategy.

Chapter 2: Landscapes of Production

The perpetual quest for process and product innovation is inexorably linked with distinct spatial landscapes. My particular fascination with innovation districts is to interrogate underlying economic structures in the production of their particular physical form. A landscape survey does not reveal actual levels of activity, only the social aspirations we ascribed to them. Yet, landscapes do represent the institutionalized production of certain kinds of ideas that consequently affect structural change. This is true of today's innovation district as well as earlier landscapes of production.

It is not possible to fully understand contemporary attempts to create spaces for innovation capture without first deconstructing the two most prominent landscapes of production that came before: concentrated industrial districts and the decentralized research and corporate campuses. This trajectory is based in countries of the advanced capitalist world, namely the United States and Europe. There are of course nuanced variations between the transitions and not all cities in the United States or Europe fall within such a clean typology. However, these two periods of production share enough similar features to develop generalizations to describe their spatial geographies.

My research begins with the industrial districts because the connection between the productivity of this time period and its spatial layout features prominently in contemporary economic development strategy for innovation districts. In other words, research and policy continuously references the positive externalities on innovation as a result of the density, diversity, and concentration of the industrial districts of the late 19th and early 20th century and it is important to disentangle the reasons why.

Industrial Districts

The Industrial Revolution of the late-19th century and early-20th century had a tremendous impact on the exponential growth of cities located along rail- and water-transportation nodes (Hall, 1998). These arteries, which connected nodal cities, transported raw materials and material goods. Cities experienced considerable population growth with the expansion of factories and the demand for cheap unskilled labor. Our collective conscious of

how industrial districts looked ranges from the powerful photography of humans operating heavy machinery (Seixas, 1987) to the haunting images of working class immigrants famously portrayed by Jacob Riis (1890). The cramped living and working conditions of the manufacturing era were products of the massive amount of manual labor required to maintain factory productivity. Housing the influx of immigrants was challenging and in these densely packed industrial cities, labor lived in cramped quarters alongside management and livestock, and people resided in close proximity to work (Engels, 1892; Mumford, 1961).

Industrial capitalism, the main mode of production in western capitalist economies of this time period, was marked by individual craft labor (Marx, 1977). This shift in relationship between an individual and his means of production and the role of technology in achieving additional surplus capital prompted the struggle between the factory worker and the capitalist, the capital-labor relation (ibid). Innovations in technology were both in relation to the machinery used in the factory space, as well as assembly line production and Taylorist principles of scientific management to ensure a productive and compliant workforce (Braverman, 1998; Saval, 2014; Taylor, 1911).

This time period is important in marking an era of scholarship where the city and its inputs are connected to economic growth—beginning with the work of Alfred Marshall (2007 [1890]) on attempts to explain agglomeration economies and urban externalities. Marshall concentrated on the localization of industry from the economy of production as well as from the perspective of the customer. The advantages of proximity, the availability of specialized machinery, the skill and tacit knowledge spillovers, the flow of ideas, the availability of skilled labor, and the growth of subsidiary trades were the factors that contributed to agglomerations. These elements, Marshall theorized, led to industry remaining in one place for a long time (ibid., p 225). Disadvantages, such as a single-industry focus that over-exerts availably labor and can depress a region if raw materials deplete or lack of demand are best countered in places were supplementary industries cluster and there is a presence of diverse industries (ibid., 226). Marshall attributes the localization of skilled artisans to the will of customers willing to travel for expensive and choice objects, as opposed to shops that provide ordinary domestic needs that do not need to congregate in one location (ibid., 227). What Marshall witnessed from his research in Manchester, Leeds, Lyons, London, Paris, Philadelphia was that the clustering of industry, customers, and skilled artisans also meant the growth of government, education, cultural

industries, health services, and the service class (ibid., 230). These concentrations lent a competitive advantage to the cities where they were located.[9]

The Industrial Revolution helped economic developers and policy makers understand the importance of attracting an industrial base to the city for generating wealth. Incentive packages to lure manufacturing firms into respective jurisdictions became an integral part of the bidding process. These "smoke stack chasing" developers focused on firm location decisions, such as access to transportation, site improvements, subsidies for land acquisition and building costs, property tax abatements, regulatory, permit, and environmental rules and regulations, recruitment and attraction of facilities and firms (Porter, 1990).

Science and Research Parks

The rise of suburban corporate estates and science and research parks marks the second era of productive landscapes. As a visual descriptor, this was the era of what Louise Mozingo calls "pastoral capitalism" (2011). Following WWII, cities underwent significant structural changes. The rise of suburbia, the affordability of automobiles, the GI Bill, the Highway Act, as well as urban tensions, racism, and the breaking up of union activity all contributed to urban decentralization. The most distinguishing features of the post-WWII spaces designed for innovation activity were central open manicured space, low-rise buildings, and large spaces for parking (ibid). This holds true for corporate estates and science and research parks.[10]

The corporate campus was modeled after the American university campus (ibid). Central open space surrounded by laboratory buildings and administrative offices built as separate entities connected to research facilities through landscaped pathways. Highways adjacent to these complexes provided not only easy access to employees, but also served to prominently and proudly display the campus. Evidence of industrial infrastructure necessary for efficiency and productivity was strategically kept out of sight of highway view, usually relegated to the back of the buildings, or underground if possible.

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[9] Additional scholars expanded and continue to expand on Marshall's theories. For example, the Italian variant of Marshall's industrial district based on the successful expansion of mature industries in the Emilio-Romagna region (Dawkins, 2003; Markusen, 1996; Piore & Sabel, 1984). The difference between Marshall and the Italian variant is that the Italian version incorporates social networks as necessary factors of any analysis (He & Fallah, 2011). Markusen (1996) sought to address the deficiencies of the Italian model for a U.S. context. The focus of her models was to understand how a dominant state or global corporation anchor institution results in creating "sticky" environments that glue small firms to their locale. Markusen's models work in the context not only of the US, but also in describing the concentration of activity outside of an industrial district.

[10] Though Marshall (2007 [1890]) discussed factories relocating to the outskirts of large towns on account of cheaper land rents, this was a phenomenon more prominent during the period of city decentralization (p. 226).

By the early 1950s, corporate estates built on 200 acres or more were the suburban alternative to urban skyscrapers (ibid). The typical corporate estate featured the same layout as the corporate park but extended over larger swaths of land. These complexes were not as welcoming as their corporate park counterparts. Long winding driveways lined by greenery ended in gated entrances. Landscaping strategically obscured the campuses from the general public but was also used to conceal parking structures necessary to house hundreds of employees.

What distinguished the science and research park from the corporate estate was the presence of more than one corporation and the anchor of a research university (O'Mara, 2005). Roots of the first science and research park are evident prior to WWII, but the first actual science and research campus was the Stanford Industrial Park, built in 1951 in Palo Alto California with Stanford University as its landowner and anchor (O'Mara, 2005; Saxenian, 1996). Almost a decade later, a group of individuals in North Carolina organized themselves as a non-profit and opened up the North Carolina Research Triangle Park to attract research and development (R&D) and boost their southern economy, with the help of area universities.

Pastoral capitalism also describes an important element about the mode of production during this time period. Whereas the manufacturing era was primarily fueled by the production of goods, knowledge production as the dominant economic development paradigm started to be the main focus (Castells, 1992; Krugman, 1991; Piore & Sabel, 1984). Scholars have termed this paradigmatic shift in production by various terms such as cognitive-cultural capitalism (A. J. Scott, 2014), cognitive capitalism (Boutang, 2011), creative economy (Florida, 2002; Markusen & Schrock, 2006), and knowledge economy (Etkowitz & Leydesdorff, 1997). The transition from industrial capitalism to the focus on knowledge production, does not mean that goods are no longer produced, but that it becomes more cost effective to offshore manufacturing processes and to focus on harnessing knowledge production (Moretti, 2013).[11]

Automobiles, airplanes, shipping containers, and the transport lines on which these modes travel expanded the geographic range of industrial activity. Suppliers and other entities are located on the outer periphery and connected to a central "hub" through 'wheel spokes' could exist once the rural frontier was accessible for development (Markusen, 1996). Or, the Satellite

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[11] However, there are growing debates on the decline of material products and increased financial and regulatory tools that succeed in capturing rents despite the production of goods (see for example Birch, 1990, 2017). The rise of platforms also challenges traditional understandings on the production of goods (see for example Boutang, 2011; Langley & Leyshon, 2017), though the machinery used to create platforms are still tangible products.

Platform District model, which is a heterogeneous collection of branch locations with corporate R&D headquarters located in different locations, can exist because of advances in methods of communication where non-proximate headquarters can maintain close communication ties with branch locations (ibid). The distance between headquarters and satellite entities demanded new forms of command and control. The managerial capacities of the firm expanded, teams of salaried employees were tasked with executive decisions, growing the bureaucratic arm of the firm. This period of managerial capitalism prevailed for much of the 20th century (Chandler, 1977, 1984; Mozingo, 2011)

Debates on agglomeration economies within economic geography

Theories of cluster dynamics backed by empirical examples of spatial layouts informed scholarship on the inputs of agglomeration economies (Asheim, Boschma, & Cooke, 2011; Saxenian, 1996). The focus of much of this literature is on determining where, why, and how certain regions witness concentration of economic and activity (Dawkins, 2003). For many decades, economists and geographers dominated the field. Increasingly, other disciplines engaged the discussion resulting in an ever-growing body of work incorporating a wide variety of methodologies to understand the anchoring and concentration of certain activities.

The lack of definitional clarity on what constitutes as innovative complicates a simple taxonomy of which concentrations classify as innovative and which do not. One critical question to ask is what the role of innovation in the production of goods and services versus the production of knowledge (Malecki, 2010). If the definition of innovation is not solely based on product development but also on knowledge production, what types of knowledge processes are considered innovative? The traditional linear view of innovation, (i.e., the transition from basic research, to applied research, to development, to production) implies that tech progresses only in a linear fashion (Godin, 2006; Kline, 1985; Massey, Quintas, & Wield, 1992). Therefore, the final outcome, as measured by patents for example, is the only part of the chain that is valued. This negates other measures of innovation such as tacit knowledge, for example, which is central to innovation learning process (Malecki, 2010). The linear model, a model that centered research and development on the university or laboratory is no longer applicable in an era where research and development take place within dispersed networks. From this emerges the need for new forms of acquiring, transmitting, and transforming knowledge (ibid).

The interjection of the creative industries as part of the innovative sector further complicates the definition. By all means, creative activity can foster higher rates of creativity and innovation (Scott, 2000) but what parts of the creative industry should be considered innovative? One way to answer this question is to consider the various terms used by scholars to describe the current economy and to see what sectors they included in their definition. For example, Florida's (2002) Creative Class index measures the concentration of scientists, engineers, professors, and think thank employees. Scott's (A. J. Scott, 2006; Storper & Scott, 2009) cognitive cultural economy includes high-tech, neo-artisanal manufacturing, business and finance, and cultural-products industries. Moretti's (2013) innovation sector includes clean technology, information technology, software, Internet services, life sciences, new materials such as nanotechnology, digital entertainment, parts of finance and marketing. The increased focus on the creative industries, especially the merge between creative industries and science and technology industries forces a reconsideration of what constitutes an innovative sector.

Deciding which sectors are considered innovative is the first step, the second step is determining how to measure their output. This is a challenging endeavor. Regional science has a long history of tracking the role of science and technology industries because these sectors have a proven record of driving long term growth (Spencer, 2015). Patents, patent citations, and business starts are common indicators measured. Despite the healthy debate that exists on measuring activity in these sectors (see for example Malecki, 2010; O hUallacháin, 2012), methods for measuring science and high-tech activity are somewhat established and standardized. The increased focus on the creative industries, especially the merge between creative industries and science and technology industries poses new challenges. For one, the creative industries rarely rely on patents and patent citations (Lee & Rodríguez-Pose, 2014; Miles & Green, 2008). Secondly, the creative industries rely on different forms of knowledge and transfer knowledge differently than the science and technology sectors (Drake, 2003; Malecki, 2010).

Setting aside the differences between the sectors, innovation is also measured through a region's resiliency, that is, the ability to respond to rapid transitions in technologies, exogenous economic shocks, and market fluctuations (J. Clark, Huang, & Walsh, 2010; Markusen, 1996). Empirical data point to the resiliency advantages of a variety of innovative small firms over large dominant firms. Marshall (1890) correctly identified the presence of small firms as a positive externality for regional competitiveness. The presence of small firms is considered by some an

indicator of innovation because small firms represent the creation of new ideas, developments, and entrepreneurial spin-offs (Jacobs, 1969). However, this does not mean that large firms should not be considered innovative or that the presence of large firms indicates lack of innovative activity in a region. Whereas some argue that large firms squelch diversity, cause repetition, and result in lesser probability of entrepreneurial offspring into similar or non-related sectors (ibid), others see them as advantageous to innovative growth in the service sector (Moretti, 2013).

The above discussion serves to highlight the complication in defining innovation and in measuring its activity. It remains an important area of research because innovation is recognized as fundamental to our economic growth. As innovation demonstrates the tendency to concentrate (i.e., it is not evenly distributed across the landscape) (Malecki, 2010), this has spatial implications. The purpose of creating a taxonomy is to have a tidy framework to assess the economic capacities of each model. However, the complication is that firms within clusters mature (or fail to thrive) and shift from one taxonomy to another. In a study of 15 high-tech real world clusters, He and Fallah (2011) find that clusters rarely feature any single type of typology. One reason is that clusters mature and/or decline over time causing them to shift from one typology category to another. Too, the make-up of local economies plays a larger role than the scale of agglomeration (Lee & Rodríguez-Pose, 2014; Rodríguez-Pose, 1999). Existing or institutionalized webs of social relations and business networks that cross cut at different scales and reach are an important necessary for entrepreneurial activity to occur (Boschma, 2005; Phillips & Wai-chung Yeung, 2003; Saxenian, 1996).

The role of proximity and constant interaction, though important for branding the innovation district, might be less important in relation to innovative output. This line of argument parallels the economic geography literature on the importance of clusters. Cluster thinking's genesis comes from a critical school of urban and regional economic geography, for example, Allen Scott (1988), Susan Christopherson and Michael Storper (1986) (both Scott and Storper cited in Gibson & Brennan-Horley, 2016). These scholars were interested in innovation and cultural/creative industries. They wanted to capture analytic insights of the post-Fordist era of flexible accumulation and the emergence of new spatial configurations of production not in the fading rust belt cities.

Scott recognized that innovation was unstable and unpredictable and continually evolving and that frequent access to a large variety of skills was paramount to and encouraged

agglomeration. Face-to-face interaction and issues of proximity were of critical importance. These factors were discussed early on by Alfred Marshall, but were later studied in greater detail by French economists (Ferru & Rallet, 2016). Highly cited work in this vein is also the work of Venables and Storper (Storper & Venables, 2004). The benefits of clustering vary depending on the types of knowledge producers and recipients. Distance need not only be measured in physical proximity. Two firms in close physical proximity may see diminishing benefits in proximity as they mature or the industry life cycle progresses (Audretsch & Feldman, 1996).

Gibson and Brennan-Horley (2016) argue that the work of the critical scholars was later co-opted in an unintentional way by neoliberal policy in the late 1990s and early 2000s (see Gibson & Klocker, 2004 for a more in-depth critique). Michael Porter and Richard Florida were amongst those that pushed the benefits of clustering and agglomeration and profited from it, and these were shorn of much of their political grounding (Gibson & Brennan-Horley, 2016). The focus was more on market forces and urban construction to generate economic activity.

Furthermore, cluster theory promotes an urban bias. This is a problem of the empirical work that favors research in the city, but it is not the case that clustering does not exist outside of the city. Innovation also occurs in peripheral regions (Shearmur, 2015). Based on work in Darwin, Australia Gibson and Brennan-Horley (2016) empirically demonstrate that activity did not simply cluster in the inner-city and that the suburbs were not merely dormitories for the inner-city workers, but that mobility to the suburbs and beyond is vital to the functioning of the innovation economy. Within the same study, empirical work in El Paso, Texas demonstrates the global value chain of a local boot making industry. Acquisition of leather, marketing online or in-person, expanding new markets all demonstrate an historical embeddedness forged earlier during the mass manufacturing era. This, to them, demonstrates the importance of the imprint of history in shaping a contemporary concentration of firms than the need to locate in close proximity for subcontracting or networking purposes (ibid; pg 251). This resonates with Massey (1995) on the importance of understanding the contemporary dynamics and how they intersect with uneven geographies of growth and decline from earlier eras. The point is not to fully discredit theories of cluster dynamics. Existing empirical work demonstrates that clustering dynamics are at work. However, it is important to broaden the discussion to prevent factors sometimes overlooked in the rush to embrace simplistic urban development policies (Shearmur, 2015).

Economic development policies

In terms of shifting economic development policies, it was not until the 1980s, when the successes of the abovementioned efforts were taking effect, that economic developers recognized the role of science and the importance of universities as anchors (Plosila, 2004). Gradually, economic developers started to include access to talent, higher education, and the building of entrepreneurial cultures into their incentive packages. This was also the time period where the role of the state was significant in bridging science and technology efforts with state economic development. In accordance, states created new agencies to house advisors in science and technology or to institute an advisory board and a state science and engineering foundation.

Even the architecture of the post-WWII laboratory reveals that the suburbanization of science created new ways of conceptualizing knowledge (Rankin, 2010). The role of the scientist transitioned from an individual capable of producing pure knowledge to an individual charged with knowledge production. The spatial layout of the laboratory, one that allowed for autonomy yet always under the auspices of a managing body, was purposely structured to capture profit. At the same time, corporate managers recognized capitalism's dependence on the productive capabilities of the individual. In other words, corporate managers did not want to stamp out individuality and were cognizant of this in their design decision. The architecture of the suburban laboratory and its campus had to create new spatial geographies that were different from the university and different from the factory. The suburban campus demonstrated that traditional planning knowledge had to be discarded to allow new innovative forms of design to emerge.

Whereas the corporate campuses and early science and research parks were spaces designed only for firms and research institutions, residential and commercial amenities (both as stand-alone restaurants and evening retreats and as the access to food and services) were not incorporated. Landscape amenities such as playfields, allotment gardens, parks with pavilions and clubhouses were used to for aesthetic and recreational purposes as well as to attract employees and reduce labor turnover. These were included primarily to quell employee dissatisfaction and keep disputes down to a minimum (Mozingo, 2011; Rankin, 2010). Adopting the narrative that residential, commercial, and entertainment amenities are necessary in order to attract and retain talent, are part of a more recent phenomenon entangled with today's innovation district. In comparison with how design is used in today's landscapes of production, the design of the industrial districts of this era was more a product of the economic activity than of active

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design efforts (Biddulph, 2011; Gospodini, 2002; Knox, 2011). But the outcome for informing design prescriptions is relevant in innovation district strategy.

Global Capitalism

More contemporary scholarship, still within economic geography, but increasingly in the field of sociology and organizational studies, is grappling to understand the new mobile workforce and changes to firm dynamics due to increases in ICTs (Davis, 2016; Mazmanian et al., 2013). The onset of globalization brought about changes occurring at the global level. The mobility of capital elevated the question on the role of place. A key debate on the role of place surged in the 1980s and early 1990s with the introduction of Computer Mediated Networks (Pratt, 2002) and Virtual Communities (Doheny-Farina, 1996; Rheingold, 1993). These new technologies removed the spatial constraints on individuals and networks, meaning that larger swaths of territories were accessible in near, or real-time communications, removing the need for face-to-face meetings. New work arrangements such as 'tele-cottaging' (Toffler, 1984) and virtual organizations (Castells, 1996) were postulated to replace the need for people in the workplace, or even the need for many people together in one place at one time. From the perspective of the firm, Amin and Thrift (2002) argued that cities no longer competed against each other, but that footloose firms competed with each other. This was yet another reason for local competition as place bound to be rendered obsolete.

However, scholars such as Sassen (2001) and Friedman (1986) demonstrated that though ICTs did indeed cause a decentering of the local, certain cities in the global system emerged as control nodes. In these 'global cities,' New York, London, and Tokyo in Sassen's view, are crucial for the production of knowledge. The global city is a strategic site where multiple global, highly specialized information loops intersect and produce a dense, thick, "enabling environment" for the production of higher order information. This leads to a growing demand for professional talent. Because of the diversity of people in the city and concentrated pockets of continuous wealth, global cities have niche markets, which open up opportunities for entrepreneurship. Infrastructurally, cities provide the service inputs required of companies and individuals. These also become increasingly specialized. Cities were also spaces for the influx of both high and low skilled immigrants who provide the necessary labor for economic growth (A. J. Scott, Agnew, Soja, & Storper, 2001). Furthermore, scholars such as Venables and Storper

(2004) quantitatively demonstrated the continued importance of face-to-face communication for building trust, screening people, and rapid communications.

Cultural shifts were also occurring. People disenfranchised with the homogeneity of suburban living and enticed by the lure of the city returned. Of course, many factors influenced and facilitated these decisions. The city's entrepreneurial approach to urban growth opened the door for city actors to embrace place marketing as a way to break away from associations of an industrial past (Eisenschitz, 2010; S. Ward, 1998). Transitioning the primary mode of economic development to the suburbs brought about a set of challenges different from the unsanitary conditions and backbreaking work of industrial districts. The decentralization of cities devastated the fabric of inner cities and destroyed much of the American hinterlands, while accommodating the needs of the Anglo-American bourgeoisie (Fishman, 1987). White-flight, drops in employment figures, shortages of municipal services, were all examples of the overall disinvestment and neglect of the once economically vibrant urban sphere. As local governments looked to create pro-business friendly environments, it became necessary to portray an image of a city as tame, sanitary, and welcoming as opposed to a pro-union, working class, city of grit. The design of the post-industrial city relied increasingly on culture as a driver of economic development to attract tourists and investment capital. The city began to resemble what scholars have tried to capture through terms such as fantasy city (Hannigan, 1998), and city of leisure (Mommaas, 2004), city as entertainment machine (Lloyd & Clark, 2001), or have also tried to illuminate through processes such as the conversion of factory spaces to lofts (Zukin, 1989), waterfront development (Harvey, 1989a; S. Ward, 1998), and "Disneyfication," or themed development (Zukin, 1993).

City leaders strategizing how to attract people back to the cities through branding mechanisms demonstrates a shift from the focus on attracting firms to a focus on attracting people. Though scholars were already discussing the importance of attracting young, skilled, and educated individuals to the city, it was Richard Florida's (2002) work on the creative class that popularized the idea and influenced a myriad of policy prescriptions. Using a wide variety of indexes [such as, explain further], Florida argued that cities exemplifying the three T's (technology, tolerance, and talent) were the most likely to succeed as vortexes for fresh talent. Florida's work triggered the response to a focus on attracting talent rather than attracting firms, increasing the focus on a new way for cities to differentiate themselves. One option was focusing on the creation of spaces of consumption. A second was to focus on spaces of production (Turok,

2009). Latching on to the idea of creating a competitive advantage by creating spaces of production meant focusing on attracting talent. Placed with the emphasis on science and technology policy, cities increasingly adapted government reports and policy statements to reflect strategies incorporating higher levels of innovation, more investment in science and technology, R&D, university connections and student graduates in science, technology, and mathematics, in addition to a flexible business environment (ibid).

Today, the consequences on the sub-national level range from 'austerity urbanism' (Peck, 2012) to an intensification and expansion of inter-urban competitive logics. Spaces of exception –special economic zones, strategic development zones, and incentivized tax structures designed to attract FDI –are manifestations of such competition (Bach, 2011; Easterling, 2014). These zones follow replicable global formulas for policy and infrastructure. "Spatial softwares" of free trade and special economic zones, global technology parks, and other similar campuses of global commerce, are designed as sociotechnical regimes, which prioritize free and unrestricted flow and operation of capital. In line with methodically competitive agendas, these high-tech, capital-intensive, low-tax enclaves are sites of exalted financial and economic activity. Aligned with grandiose architecture, zones are not just collecting stations of global capital and not just areas of good employment prospects, they also represent symbolical spaces where innovation and ideas presumably lay the tracks for future development.

Mobile policies circulate the globe (see for example, McCann, 2011), particularly today in relation to economic and smart cities development (Cook, 2008; Crivello, 2015; K. Ward, 2017; Wiig, 2015). The digital economy is an expansion of the cultural industries, they are part of a process of economic experimentation with extracting value out of knowledge, culture, and affect (Terranova, 2000). The focus on the tech sector emphasizes the work component in the live-work-play configuration securing a continuous cycle of productivity through the creation of seamlessly integrated environments (Stehlin, 2016). The literature on smart cities and urban laboratories demonstrates what Lauermann (2016) discusses in relation to advanced forms of entrepreneurial urbanism through the creation of spaces for experimentation. As digital labor increases and sophistications in information and communication technologies shifts work away from the firm in unbounded capacities, public spaces become sites of immaterial production, the type more closely aligned with Boston's Seaport Innovation District and Toronto's recently announced collaboration with Sidewalk Labs, a sister firm of Google. Latching on to the idea of creating a competitive advantage by creating spaces of production engenders a talent-attraction

focus (Turok, 2009). Florida's (2002) popularized prescriptions for attracting a creative class, through what has largely amounted to a focus on placemaking, are evident in cities across the globe (see for example Van Winden, 2014; Yigitcanlar & Bulu, 2015; Zimmerman, 2008), as are efforts to adapt government reports and policy statements to incorporate higher levels of innovation, more investment in science and technology, R&D, and university connections within a flexible business environment.

A bi-product of the second industrial divide resulted in the move of headquarters away from the city center to urban peripheries. In the wake of this massive shift of people, production, and financial resources were the cities that left behind. The convergence of a few factors brought renewed focus on the city. The first was the many efforts of local leaders seeking strategies to revitalize communities. The second was a similar attitude, but at the state or federal level with policy interventions to attract investment back into the city. The 1950s, for example, saw the creation of place-based financial deregulatory tools for urban revitalization starting with Tax Increment Finance (Briffault, 2014; Dye & Merriman, 2006) and moving on to federal programs such as empowerment zones and enterprise communities (Boyle & Eisinger, 2001; Hall, 1982). These economic development tools were created to bring development to underperforming neighborhoods. Or, at the very least, to signal to the private market that targeted the government supported development in these areas, often through tax and business incentive packages. These policies shaped a neoliberal approach to urban development defined in economic development by private sector growth, low taxes, heavy subsidies, low expenditures (see for example Hackworth, 2007). Within the urban sphere, the rise of economic productivity focused less on the manufacturing industries and more entrepreneurial management (Harvey, 1989a). It is against this backdrop that innovation district strategy emerged.

Chapter 3: Brookings Institution's Innovation District Definition

It is important to recognize that a fixed definition for what an innovation district is does not exist. This is because different cities and regions will have different goals and outcomes. Still, the concept, popularized by Bruce Katz and supporters of the strategy (Katz & Bradley, 2013, Katz & Wagner, 2014, Storring & Walker, 2016), does have some fuzzy contours that can be described.

Research and policy prescriptions on innovation districts, using Barcelona's 22@bcn innovation district and Boston's Seaport Innovation District as a model, began at the Brookings Institution under the direction of Bruce Katz. Katz first mentioned the concept of an innovation district in his book, The Metropolitan Revolution (Katz & Bradley, 2013), though it was his co-written report with Jennifer Wagner, The Rise of Innovation Districts: A New Geography of Innovation (Katz & Wagner, 2014), that catalyzed the spread of the concept. Due to its wide-reaching success, in 2015 the Brookings Institution and the Project for Public Places partnered to create a dedicated research arm for the study of innovation districts: the Anne T. and Robert M. Bass Initiative on Innovation and Placemaking ("Brookings announce the Anne T. and Robert M. Bassa Initiative on Innovation and Placemaking," 2015) In addition, the Bass Initiative is also working closely with the Center for London, the only think tank in London, through the Transatlantic Innovation Districts Partnership. The aim is to spread the concept in London and across Europe ("Innovation Districts Homepage," 2018).

It is helpful to quote at length Brooking's full description of innovation districts and its strategy on their homepage ("Innovation Districts Homepage," 2018):

> As part of the Bass Initiative, Brookings continues its work on innovation districts, dense enclaves that merge the innovation and employment potential of research-oriented anchor institutions, high-growth firms, and tech and creative start-ups in well-designed, amenity-rich residential and commercial environments.
>
> Innovation districts facilitate the creation and commercialization of new ideas and support metropolitan economies by growing jobs in ways that leverage their

distinct economic attributes. These districts build on and revalue the intrinsic qualities of cities: proximity, density, authenticity, and vibrant places. Given the proximity of many districts to low-income neighborhoods and the large number of sub-baccalaureate jobs many provide, their intentional development can be a tool to help connect disadvantaged populations to employment and educational opportunities.

I group the Brookings Institution's definition of innovation districts and the strategy for their development in the following categories:

1. Cultural preferences toward the built and social environment
2. Increased concentration around university and hospital research centers and anchors
3. Collaborative, cross-sector, high-tech, open nature of innovation
4. Economic development strategy focused on startups and entrepreneurship
5. Focus on design and place
6. Focus on growth
7. Existence of disadvantaged populations in the city

This categorization is based on Katz and his colleagues' perspective on emergent trends. In the next chapter, through the use of empirical examples I will discuss elements omitted from Katz's perspective. For now, I will contextualize, and critically comment, on Katz's prescriptions.

1. Cultural preferences toward the built and social environment

Cultural trends altering the location preferences of people and firms play a central role in the emergence of innovation districts (Atkinson & Bridge, 2005; Barber, 2013; Moretti, 2013; Storper, 2013). Cultural trends and demographic shifts, particularly the shrinking household size that Fishman (2000) predicted would revitalize the city, resultant from people delaying marriage and starting a family, families having fewer children, and a rejection of the mundanity and homogeneity of the suburbs in search of more 'authentic' living experiences contributes to the rise of younger, educated, tech-savvy knowledge workers relocating to the city. As part of the 'authentic' urban experience, these individuals are also opting to abandon their reliance on the

automobile and traverse the city using public transportation (The National Academies Press, 2004). Scholars back compact living as a benefit to the environment and thus position the resurgence of the city through developments such as innovation districts as environmentally friendly (Kenworthy, 2006). That cities, or at least particular locations within cities, are growing in popularity among knowledge workers does translate to a focus on promoting the city as the prime location for development. Changing cultural preferences also explain why office parks are now revamping their obsolete models to incorporate urban-like amenities that cater to knowledge workers (Spivack, 2017).

The factors listed above demonstrate choices people make to suite their cultural preferences. They are, to use Tiebout's (1956) phrasing for households making residential choices based on public services, "voting with their feet". However, it is also possible to explain these trends from a less positive perspective, such as the inability to afford a car that would allow one to commute from the suburbs, the lack of investment in regional transit forcing people to locate closer to the jobs moving into the urban sphere, and a recession that might force cash-strapped young families to remain in the city (Atkinson & Bridge, 2005; Peck, 2005). In other words, it may be less that the emergence of innovation district is capturing changes in cultural preferences, and more that individuals are limited in their choices.

2. Increased concentration around university and hospital research centers and anchors

Katz's innovation district strategy builds off of the claim that cities in western capital economies are seeing increased clustering around universities, medical centers, and anchors. The population growth around these anchors correlates with the resurgence of knowledge workers in the city. In other words, increased clustering around sectors might simply be a by-product of increased population in cities.

More importantly, clustering around these anchor institutions is not a new trend. In the 1980s, after recognizing the benefits of clustered geographies such as the Research Triangle Park, Silicon Valley, and Route 128, economic developers adopted strategies promoting clustering around research centers such as universities and hospitals with a research arm as a way for the market to absorb potential market spillovers (Feldman, 1984; Feldman & Bercovitz, 2006; Plosila, 2004). Clustering around universities as a way to absorb spillovers was further incentivized by the passage of the Bayh-Dole Act (Mowery, Nelson, Sampat, & Ziedonis, 2001; Shane, 2004). The Bayh-Dole Act, a US policy initiative with facilitates the transfer of

knowledge from the university to the private sector through patent rights, contributed to the rise of entrepreneurial activity and the emergence of smaller R&D companies. Growth around these areas can be attributed to economic development policies that focused on clustering growth in close proximity to these spaces. What the emergence of innovation district strategy does point to are more elaborate and collaborative forms of engagement and entrepreneurial governance (Harvey, 1989a). Universities, the private sector, the public sector, foundations, and the civic realm are working together to drive the growth direction of the city.

3. Collaborative, cross-sector, high-tech, open nature of innovation

The previous Cold War era that marked the rise of landscape buffers between the science and technology firms contributed to a silo-like mentality. Cultural variations, particularly between Rout 128 and Silicon Valley also demonstrated the relevance in a regional culture shaping business organization (Saxenian, 1996). As the west coast model took over, other locals worked to adopt the Silicon Valley mindset and move away from the strict hierarchical model of the Route 128 or the siloed model of Research Triangle Park.

Sophistications in technology have diminished the need for large building footprints to house oversized computers (Saval, 2014; Stringer & Ostafi, 2013). In addition, the affordability of laptop computers allows a larger contingent of individuals to own the means to access the market and in any location. Innovative firms and talent workers seek to congregate to share ideas and practice "open innovation" (Chesbrough, 2003). Open innovation fosters the ability for companies want to interact with researchers, inventors, entrepreneurs, and other firms to define new products and identify new markets. It also creates opportunities for entrepreneurs benefit from pooled resources.

Despite Chesborough's (2003) insights on the growth open innovation as a contemporary phenomenon, open innovation is not new. Open innovation was practiced even in the secluded science and research parks (Turner, 2006). This history is not as prevalent. More prevalent are the stories of cloistered workers separated from other companies. There is truth to this, for example, in the zoning codes of the RTP, at the same time, we must also question to what extent the zoning codes were used to increase the land mass of the companies in the RTP as a way to attract more workers.

Open must also be deconstructed in terms of intellectual property regulations. How are these changing with these new environments? Are firms also willing to be open with their IP or

is there still a proprietary element that is not discussed in the narrative. Take for example the large tech campuses such as Google and Facebook. Though they champion the concept of open innovation through the removal of cubicles and the flattening of the hierarchical structure, their new campus are heavily protected and surveilled as are their employees (Lange, 2012). Thus, open extends only as far as their campus walls. When supporters of innovation districts talk about 'open' they refrain from interpreting the need for open collaboration by precarious employees who are dependent on a network to string along a series of gigs. Finally, there are the rhetorical elements espoused by growth coalitions to support the development of innovation districts. It behooves individuals to claim that innovation today is cross-sector, high-tech, and collaborative because it provides the rational for compact development. Particularly in the urban-based innovation districts with restricted development boundaries, adopting a strategy that ensures the cramming of people and firms can help increase the rent profit margin. It is also necessary to question how open can be translated to profit making, particularly in relation to smart city infrastructure and the ability to create a repository of all human transactions within the space of the innovation district. What happens to any right for privacy?

While it may be true that companies want to interact with individuals and firms of the knowledge economy to define new products and identify new markets, this does not necessarily hold constant to the other anchors, such as the research hospital or the university. There may be branches within these institutions created purposely to focus on research spillovers, but that does not mean the entire university and hospital faculty and administrators agree with the direction of the entrepreneurial management. Rather, as I discuss later, there is an active state ideology pushing universities and hospitals in this direction.

From the perspective of the benefits derived by the entrepreneurs from the strategy, as these individuals are not centralized and organized under umbrellas that provide skills and training, they must seek these resources elsewhere. This has created an avenue for the growth of accelerators and incubators (see for example Gandini, 2015; Mian, Lamine, & Fayolle, 2016; Pauwels, Clarysse, Wright, & Van Hove, 2016; Phan, Siegel, & Wright, 2005). These places charge entrepreneurs rent for the exchange of a working space and access to their services. Another form of collaborative exchange that explains why innovation is deemed collaborative and cross-sector is explained through the rise of the open source movement, which allowed computer programmers to informally exchange information (DiBona & Ockman, 1999; Levy, 2001).

Leaps in innovation continue to transition the primary mode of production away from a heavy manufacturing economy. Light manufacturing has increased in popularity and there are signs of growing maker movements (Dougherty, 2012; van Holm, 2017). However, the equipment for light industrial remains expensive for individuals to purchase. Places like TechShop, which uses a gym-membership model for access to tech equipment, have grown in popularity. The creation of large spaces housing light manufacturing equipment points to the clustering of an activity and feed into the narrative that innovation is collaborative and cross-sector.

4. Economic development strategy focused on startups and entrepreneurship

The Brookings Institution sees the strategy as an economic benefit based on their claim that young, high-growth firms represent the lion's share of new jobs within cities. This fact needs to be put into a much larger context in order to understand how to problematize it. The organization of the firm is undergoing changes. More work increases outside of firm walls. By 2050, more than 50% of the workforce will be contractual labor (Upwork & Union, 2017). Importantly, too, it is necessary to consider what this fact means. Does each transaction count towards a job? Are the jobs construction workers are taking as they rebuild the new landscape of the city considered in this statistic? What is the time-span of these companies? Are they able to scale and 'graduate' or is it more likely that they fail and take down every newly created job with them? Is this statistic accurate because young high-growth firms are increasingly locating in the urban sphere meaning that the loss of jobs in older firms is on account of those opportunities being pushed out of the urban sphere?

5. Focus on design and place

The definition of innovation districts does not specify the need for an urban environment, only the intrinsic qualities of cities. These are proximity, density, authenticity, and vibrancy and come about through a reliance on a physical realm that strengthens proximity and knowledge spillovers (Katz & Wagner, 2014). These positively spun urban characteristics are said to help the commercialization of ideas and creation and expansion of firms and jobs due to the collaboration that emerges from proximity. This same proximity presents denser residential and employment patterns.

The goal of the innovation district is to create a convergence between the economic, place, and human capital assets within a bounded space. Design is used to encourage face-to-face collaboration and ideation and to attract the firms and talent of the knowledge economy. Density and proximity, as discussed above, are seen as necessary for companies to interact with the new innovation ecosystem. Leadership and 'lighter, cheaper, quicker' programming of space are key elements to drive the success of the innovation district. On the whole, this strategy is seen as a way to support the evolution of the region by fostering job creation, economic opportunities, and revitalizing communities.

The key asset in the economic, place, and human capital equation is 'place.' Economic development strategies previously considered these three assets, although not always in concert with each other. For example, the role of the economic and human capital received attention in the 1950s, beginning with principle models such as Silicon Valley, Route 128, and Research Triangle Park, with the growth of research and development and the importance of university connections, incubators, and entrepreneurial supports. Richard Florida's (2002) prescriptions were hugely influential in the connection between place and human capital. The economic assets, in the case of Florida, were a positive spillover that occurred if the correct amenities were in place to attract the right human capital. The combination of place and the economy were front and center in tourist focused developments, stadium, museum, and convention center development, as well as larger infrastructural projects such as airports, highway projects, and regional transit that eased the flow between major nodes of production. Economic developers focused on place with the hope of elevating the status of a city. Innovation district strategy brings these three assets together and gives them equal emphasis. The debate is not focused on whether the firm bring the people, the people bring the firms, or the place brings the people and firms, but that all three are necessary for a region to thrive.

Innovation district strategy emphasizes the importance of design and positions it as a disruptive aesthetic. Based on this new role of design, the Brookings Institution partnered with the Project for Public Spaces to develop the Anne T. and Robert M. Bass Initiative on Innovation and Placemaking as a collaboration to derive policy prescriptions for city building. Their prescriptions favor open floor plans, greater amenities in the office, multi-use walkable environment, reshaping the relationship between buildings occurring at the district scale, breaking down of traditional boundaries, making process of innovation more porous between

public and private realms through wired public spaces, advanced shared work spaces, private tech tested on public streets (Wagner & Watch, 2017).

Storper and Venables (2004) outlined the various reasons why the ability for face-to-face remains important today. Their points are relevant, yet sophistications in ICTs continue to advance increasingly making this line of argument less tenable. Among respondents, once cited reason for the importance of proximity was proximity to venture capital. A venture capitalist is less likely to commute over longer distances when investment opportunities exist within the locality. Comments such as these were made when comparing one city to another, and not the activity that exists at the metropolitan-scale.

6. Focus on growth

The innovation district is indeed a vehicle for revenue growth, particularly in terms of taxes and consumer spending. The innovation district provides an excellent revenue opportunity for development companies. In many respects, the slating of an innovation district, like economic development zones and tax increment finance districts, demonstrate that the state is willing to provide development incentives in a historically underperforming area. Thus, developers know they will receive favorable subsidies. To develop in an urban innovation district means the land is slated, even if not immediately, for high-end development such as boutique hotels, Class A office suites, and condominiums. These will cater to a wealthier class of individuals. Ultimately, revenue growth happens for the developers and current owners of the buildings within the innovation district.

Revenue growth also happens in terms of taxes. Though, how much the firms end up paying in taxes depends on what deals were cut with the local and state government to relocate to the innovation district. As a destination spot with high-end boutiques, craft breweries, and specialty grocery stores, in terms of consumption, the innovation district is also a site for revenue growth. In terms of prosumption, agreeing that the individuals who live, work, and play in the innovation district contribute to both the consumption and production of the space, then the innovation district also succeeds in revenue growth from the activation of the space by these individuals for branding purposes.

Making efficient use of existing infrastructure varies by case. In some situations, it is possible to reuse warehouse remnants and outer shells of historic buildings. However, in interviews developers expressed that older buildings were not well-equipped for the

infrastructure needs of high-tech (personal interview, 2016). In the case of Detroit, the existing infrastructure served to undergird the need for an innovation district to demolish the buildings with innovation district resources to build from scratch. Still in some other cases, existing infrastructure and existing industries are slowly pushed out, as is the case of the maritime industry in Boston's Seaport Innovation District, and what I expect to be the case for the warehouse spaces in Detroit and Boston. There is one case in Dublin where AirBnB remodeled an old historic building protected by historic preservation restrictions. While I generally applaud these developments, I agree with Balibrea's (2001) point that preserving the token smokestack is political strategy to node to the use of culture as a signpost to attract the individuals seeking a more 'authentic' experience on their terms.

As an economic development strategy, Brookings claims that "innovation districts represent a radical departure from traditional economic development because it isn't just about commercial aspects of development (housing, retail, sports stadiums) but also because they help the city move up the value chain of global competitiveness by growing firms, networks, and traded sectors that drive broad-based prosperity" (Katz & Wagner, 2014). What is also new, Brookings states, is putting in tandem the economic, physical, and networking assets within a supportive and risk-taking culture.

The rise of the innovation district is certainly not a radical departure, but a continuation. Growth coalitions and supporters of innovation districts continue to leverage traditional economic development policies in addition to the production element. Sport stadiums, convention centers, and tourist development, have been developed in various cities under the guise of assisting the competitiveness of cities. If innovation districts focused only on providing the material for the production related aspects of development, they would not succeed. These economic development strategies help to brand a city. The innovation district is one more element. Innovation districts provide an opportunity to attract investment capital to a particular area, rezone and redevelop derelict spaces of the city, and to spike real estate values. Housing is also a major component of the innovation district. The inclusion of housing provides the necessary factor for the innovation district to be considered a live-work-playground. The same applies to retail. More importantly, it is not possible to separate one form of economic development from the other. They concomitantly operate. Success in the commercial aspects of development work to attract the inputs necessary for growing firms, building networks, and usher the intermediaries to trade sectors. In fact, the most that the innovation district can do is

create a receptacle for these interactions to occur and the way to fill the receptacle with the right people and firms is through the provision of the commercial aspects of development. It is true that innovation district strategy engages science and technology policies to encourage the colocation of research anchors with firms and entrepreneurs, but this is not radically new. These economic development policies have existed since the 1980s when the success of Silicon Valley, Research Triangle Park, and Route 128 reached a wider audience (Plosila, 2004).

7. Existence of disadvantaged populations in the city

Innovation district strategy purports to support the evolution of the city by fostering job creation, economic opportunity, and revitalize communities. It might accomplish this. The question, however, is for whom it opens these opportunities. Existing communities are revitalized for young, educated, primarily white, and predominantly male individuals and high-skilled job openings skew to this demographic. For individuals taking lower-income jobs, whether it is the jobs in the service sector or the constant stream of temporary construction contracts, the evolution of the city moves in the direction of becoming uncoupled (Mallach, 2015) so that low-income residents are pushed out of the city and removed from close proximity to their jobs.

From this perspective, two issues arise. The first relates to issues of affordability. Despite innovation district strategy stating the importance of affordable housing, in practice, this condition is not necessarily met. For example, in Boston, developers are able to pay into a fund rather than meet the required 20% affordable housing requirement. The city can then use the money to fund development for affordable housing in any part of the city. In places like Detroit and St. Louis, real estate prices for housing units continue to rise and the service workers who are said to benefit from proximity to service jobs in the innovation district must commute. In many respects, advantaged populations are the populations that are removed in order to make place attractive for capital (Catungal, 2009; Donegan & Lowe, 2008; McCann, 2007).

The second problem relates to the elevated status of service jobs. Service jobs, such as coffee barista, restaurant waiter, and bartenders are often filled by middle-class workers who can eventually spin the skills learned from these jobs into transferable skills for higher-paid jobs (McRobbie, 2016). This poses additional challenge for the lower-skilled workers who would have benefitted from jobs in the service sector. Any additional jobs, janitorial, for example,

might remain open, but the low-skilled worker might still face the obstacle of the first problem, which is proximity and accessibility to the job site.

Other Spaces of Production

Innovation districts, as bounded spaces for scientific breakthroughs, profit, and production are not new. These manufactured places for the frontiers of science have proliferated across time and across the globe in various permutations.

In advanced capitalist nations, particularly in the United States, the company towns that date back to the early 19th century were one type of example. These were large-scale planned industrial spaces were equipped with the amenities necessary to function as complete communities. Some company towns, such as Lynch, Wheelwright, and Coal Run within the Appalachian coal country were built and run to ensure constant profitability. Others, such as Pullman, Illinois (home of Pullman railcars), and Scotia, California (home of Pacific Lumber) had more utopian aspirations, enforcing paternalistic attitudes towards their managers and workers, and provided civic structures, education, housing, and facilities for leisure (Green, 2010; p 5). Arguably, the company town that produced wool in the early 19th century was scientifically advanced. In fact, the engineering and innovation behind Merrimack Companies first water wheel parallels the advanced science that the creators of science parks seek.

Similar contemporary efforts include large tech-corporations, such as Google and Facebook, with their enormous campuses, provision of amenities, and interjection into the practice of urban planning by building housing for employees and influencing transportation infrastructure are today's version of company towns. What differs between this model and the innovation district is ownership. Whereas these tech-companies singularly direct development decisions and house employees in residential units they own, innovation districts are ostensibly guided by a series of individuals representing various sectors (i.e., public, private, university, civic, etc.).

What distinguishes the mills and coal mine company towns from the high-tech fantasy are the policy changes that occurred in the 1980s to support their developments. The origin of the science park, thus, is an outgrowth of the Stanford and Silicon Valley and Boston-Cambridge Route 128 model in which universities and the focus on scientific investigation and industrial innovation played a major role (Massey et al., 1992).

Another earlier type of innovation district is what Massey, Quintas, and Wield (ibid) term 'high-tech fantasies.' The glossy and futuristic aspect of technology has always made constructing these high-tech fantasies alluring. But even Massey, Quintas, and Wield (ibid) in their study of 'high-tech fantasies admit' that any project studying science parks grows exponentially on account of the challenge of defining the science park (ibid., p 1). In their study, they bounded their research to the United Kingdom and the definition produced in 1985 by the UK Science Park Association (ibid., p 13).The UK Science Park Association defines these spaces as property-based with formal links to universities and research institutions, designed to encourage the growth of knowledge-based businesses, and with a management function actively engaged in assisting the organizations on sight with transfers of technology and provision of business skills (ibid., p 14 citing UKSPA, 1985).

The science and research park model has proliferated in the US, in Europe, and in many parts of Asia –particularly east Asia from South Korean, down to Japan, and further down to countries in South East Asia (for an overview, see Komninos, 2011). Furthermore, along a similar vein, contemporary science park economic development policy increasingly merges with the concept of the smart city (Hollands, 2008). The Dublin case points to a few reasons why. For now, the point is to recognize the existence of a wide-variety of science parks. The convergence of these seven elements are what makes the innovation district stand apart from earlier and contemporary attempts to build spaces of production.

Conclusion

Shifts in economic restructuring have implications for the urban fabric. This becomes evident when adopting an historical view of spatial strategies seeking innovative output. Design prescriptions for contemporary urban innovation ecosystems are based on policy recommendations for a thriving innovative ecosystem (see for example Chakrabarti, 2013a; Van Winden, Berg, & Pol, 2007; Wolfe, 2014). The problem with these policy prescriptions is that they are under-theorized: they overly emphasize the aesthetic; overlook the amount of time it takes to foster entrepreneurial ecosystems; and fail to consider potential negative consequences. Reading the emergence of innovation districts along literature on the capitalist production of space, in the next section, my description of innovation district moves beyond the booterish policy recommendation that economic developers, planners, policy makers, politicians, and other

supporters adopt. The purpose is to contextualize why innovation districts are proliferating in this particular time period.

Chapter 4: Comparative Analysis

"It is by investigating the working methods and tools of architects—the lines drawn on plans, master plans, maps and aerial photographs—that the equation setting material organization against the abuse of power begins to unravel" (Weizman & Segal, 2003; p. 24).

In this section I detail the origin stories for the five innovation districts as told by the stakeholders: the real estate developers, university heads, elected officials, representatives from the public and private sectors, board members, and the entrepreneurs or digital workers residing within the boundaries of each respective districts. I use examples from each of my cases to document the various obstacles practitioners face in attempting to steer development in a particular direction. Of importance is that consistently the protagonist in the narratives of the stakeholders is the eager entrepreneur. Development narratives highlight the needs of the entrepreneur and his–the tech-sector remains disproportionately male—high-tech playground. A second note of importance is that it does not require extensive digging to uncover real estate profit motives.

A study on the evolving landscapes of the city reveals how political economies of scale under capitalism are socially produced and transformed. Like the production of space (Gottdiener, 1994; Harvey, 2001; Lefebvre, 1992; Soja, 1980), landscapes are socially constructed, constituted, and scaled in particular ways that reveal power dynamics (Cosgrove, 1998). Examining the tools used shape the landscape and the motivation behind innovation district strategies demonstrates how architecture and urban planning are political practices adhering to dominant forces (Balibrea, 2001; Monclús, 2003; Segal & Weizman, 2003).

The innovation district concept is by no means an innocent emergence. It is a strategic development that enables the new world of work serves the logics of capital. Innovation districts demonstrate how political economies of scale under capitalism are socially produced and transformed (Brenner, Peck, & Theodore, 2010). They demonstrate the ability for capital to be most productive, productive in the building of cityscapes, as well as productive of life through the forming of subjectivities (Foucault, 2004; Lemke, 2001). A reading of innovation districts

from these perspectives suggests two emergent urban development trends: 1) techniques of territory and 2) facilitating production.

Theme I: Techniques of Territory

"You are lost if you forget the fruits of the earth belong to all and that the Earth belongs to no one." -Jean-Jacques Rousseau cited in Elden (2013)

One important contribution of this dissertation is detailing how the land is secured for each case site and highlighting how political mechanisms to target development within a specific area are strategically used to create territory. The use of the term "territory" is strategic. I purposely use the term "territory" because it is the act of converting land into one that is owned and managed by a now sovereign entity that converts land into territory (Elden, 2007, 2013). It is from territory that governance is enacted. As territory, the innovation district is a site of political contestation where sovereign authorities determine its ordering and the activity engaged within its border (Lefebvre, 1992).

Whether or not the promise of the innovation district, a space for birthing inventions that will accrue regional benefits to grow the economy, is a fantasy matters less than the fact that the physical embodiment of the innovation district requires space and developmental control over land. For this reason, innovation district strategy depends on political mechanisms to create a bounded space for development. How the land and rights to development are secured matters.

The development of the innovation district is facilitated through regulatory tools that allow for tax exemptions and tailored land use regulations. Each innovation district uses a defined boundary to enact policy measures, though how the determination of the borders is decided and the enforcement within the boundary varies. In addition, it is important to consider the experts shaping the strategy in each respective location. Carefully considering the actors involved allows us to parse who is crafting the rhetoric and how the rhetoric is strategically mobilized. Though each of my cases demonstrates variance in the political mechanisms used to isolate particular parcels of land for (re)development, one consistency across cases is the role of real estate developers.

All four urban cases demonstrate how public land is converted into privately governed territory, (Christophers, 2018). The conception of an innovation district begins when growth coalitions want to derive more profit from land in accordance to its highest and best use (Finch &

Casavant, 1996; Wolf-Powers, 2005). In the case of the innovation district, the highest and best use is tied to increased rents (N. Smith, 1979). I am using the definition of rent related to increased land values within the space of the innovation district.

Dublin

A decade after the spectacular crash of Ireland's "Celtic Tiger" economy, Dublin's urban governance institutions have successfully facilitated the transformation of an area of formerly derelict warehouses into an innovation district, the so-called "Silicon Docks", by now materially and symbolically a key site for Ireland's post-crisis economic recovery (Kayanan et al., 2018; Newenham, 2015).

The redevelopment of the Docklands following the crash involved bounding off 163-acres of land into a strategic development zone—what I am calling their innovation district—to target development (*North Lotts and Grand Canal Dock: Planning Scheme*, 2014). This strategy was coupled with a marketing campaign that promoted the Silicon Docks and Dublin's efforts in setting the pace for innovation-led development in Europe (Newenham, 2015). Three key institutions figure prominently in this transition: the Industrial Development Authority (IDA), Dublin City Council (DCC), and the National Asset Management Authority (NAMA).

The Industrial Development Authority

One of the most influential institutions in reinventing the image of the city and growing the tech sector in Ireland is the Industrial Development Authority (IDA). Since its establishment as part of the Department of Industry and Commerce in 1949, the IDA's responsibility is to promote efficiency in the economy. While today the organization highlights FDI as its principal remit, historically this was not the case ("IDA Ireland: History," 2018). Through organizational restructuring, including ceding from central government to become an autonomous state-sponsored organization, the IDA developed an exclusive focus on high-quality FDI. This positioned the IDA to take a broad view of industrial activity to incorporate the software and high-tech sectors (Sager, 2011).

Prior to the 2007/8 financial crisis, efforts by the IDA to establish a tech presence in Ireland existed but were geographically dispersed. Google's decision in 2003 to expand their European operations and base the company in the Docklands surprised IDA representatives, who worked hard to sell Google on the idea to settle in Ireland but did not expect the company to select the derelict space of the Grand Canal

Docks (Newenham, 2015; personal interview, 2016). Time and experience working with tech companies finessed the IDA's strategies. As it became evident that technology companies favored downtown proximity and could claim prime real estate in the city, the IDA tailored its messaging to leverage the emergence of the Docklands as an attractive site for potential suitors from the technology sector (Kayanan et al., 2018).

Dublin City Council

Dublin City Council emerged as a critical institution with the dissolution of the DDDA and the approved transfer planning power from An Bord Planeála to Dublin City Council, now established as the Development Authority (*North Lotts and Grand Canal Dock: Planning Scheme*, 2014). This transfer of master planning power was coupled with the designation of the innovation district and fast-track provision. The fast-track provision streamlines development by ensuring a standard all firms must meet and speeds up the process of eradicating blighted structures to make the space desirable for potential new firms. It also strips locals of voicing discontent and appealing a plan beyond the initial two-week opportunity allotted to approve the innovation district designation (Byrne, 2016b; Lawton, 2017).

The SDZ process in Dublin is a strategic deregulatory tool to encourage development in particular parcels of land, which are projected to increase economic activity and generate employment (Fox-Rogers, Murphy, & Grist, 2011; Sager, 2011). In Ireland, such governance techniques are necessary due to local level constraints on authorities, particularly in relation to payment structures that limit their funding sources to commercial rates and construction levies. Unless new techniques are innovated, local authorities are limited in their ability to influence economic policy directions and must instead heed to larger national objectives set by influential institutions (Bontje & Lawton, 2013). However, local authorities can influence planning decisions through zoning and the formulation of development plans (Lawton, Murhpy, & Redmond, 2010). Dublin City Council's mobilization for the SDZ strategy demonstrates the intent for the future development of the Dublin Docklands.

National Asset Management Authority

The National Asset Management Authority's (NAMA) principle remit to clear the massive debt accumulated during the financial crash is well documented (Byrne, 2016b, 2016a; Kitchin, O'Callaghan, Boyle, Gleeson, & Keaveney, 2012; Williams, 2014). Set up in 2009 by the government – with oversight from the Finance Minister – NAMA's primary objective was the stabilization of the banking sector. As an asset management company, NAMA offered the Irish banking sector, rocked by the

financial crisis, an expedient solution to address the crisis at the nexus of finance and real estate. NAMA's strategy included isolating problematic assets and replacing loans of a declining value with government guaranteed securities. It also provided direct liquidity and facilitated the availability of credit. NAMA's attempts to revive the property market necessitated investment, however with Irish developers and financial institutions still overstretched by the crisis, capital could only be attracted from outside Ireland. Consequently, NAMA used its position to effect investment-friendly planning provisions, especially in the Docklands. SDZ provisions broke up the Docklands into 20 development blocks of which NAMA held interest in 15 blocks, representing 75% of developable land area of the innovation district. This positioned NAMA as a key player in the courting of global capital towards the Docklands. Its role as a dominant arbiter in Dublin's urban development might be regarded as an unintended, yet considerable consequence of the crisis (*NAMA annual report and financial statement*, 2017; *NAMA annual report and financial statements*, 2016).

The Silicon Docks

As discussed above, as the vested authority of the strategic development zone, again, what I am calling their innovation district, DCC can implement policies to facilitate and massage development in specific directions (*North Lotts and Grand Canal Dock: Planning Scheme*, 2014; personal interview, 2016). The branding of Silicon Docks and the rapid transfer of land worked in tandem with planning tools and regulatory measures that facilitated the transformation of the space. The fast-track designation, not coincidentally set up in 2012, provided the most noticeable formula for a new place-based development strategy. Prior to the crash, entrepreneurial attempts to redevelop blighted land were evident from the development of the International Financial Services Center (Moore, 2008). However, post-crash, as banks were rescued, and debt was offloaded onto the public in the form of bailout loans and austerity programs, economic aspirations needed to be rephrased and reformulated. The Silicon Docks became this formula, and aspirations could now be 'placed' and put on display for everyone to see. These new regulations allowed DCC to take over the planning apparatus, thereby giving it a more interventionist role and adopting what Lauermann (2016) terms 'municipal statecraft status.'

Writing the urban development policy that supports the construction of a 'tech playground' affords DCC the ability to engage in close collaborations with the private sector, inviting the latter to shape location, construction, and design decisions while spinning these new collaborations as experimental, cooperative, and beneficial to urban residents (Kayanan et al., 2018). DCC also succeeds in intervening on a global level through the branding of Silicon Docks, which first appears as a label in

the master plan following the creation of the innovation district (Delaney, 2014). Signifying the intent to create a competitive environment that resonates on a global scale, these branding techniques facilitate a growth agenda under the guise of bottom-up, all-inclusive experimentation. As one academic explained, the language behind the plan for the Docklands strongly defines the space as innovative:

> If you look at all the economic development plans which designate Dublin as exemplar in terms of how innovation can be used to provide [a] competitive advantage for the city, and if you think that Dublin is a showcase for the country and the Docklands is a showcase for Dublin, then if you put the pieces together, it probably is understood very widely like that. – (university representative, personal interview, 2016)

The special regulations of the innovation district, in tandem with branding efforts, and in addition to the policies that promote local technology-related developments, designate the Silicon Docks as a premium location for global players of the technology sector (Kelly, 2018; Newenham, 2015; Sweeney, 2012). The concentration of these technology companies is encouraged by the DCC through narrowing previous boundaries to a concentrated administrative delineation where tax exemptions and land use regulations can be legally actuated. DCC's adoption of this technology-focused urban redevelopment strategy depoliticizes development through creating a space that is exempt from surrounding forms of governance, potentially including existing formulas of tax, redistribution and resource allocation policies. At the same time, the seductive appeal of an industry often affiliated with revolutionary and disruptive power, protects DCC and respective technology firms from critical scrutiny.

Reviving real estate: NAMA's role in increasing rents

Since Google's arrival in the Docklands the technology sector has steadily increased its footprint in the Docklands. Much less affected by the global financial and economic crisis, the technology sector was uniquely positioned to provide liquidity and contribute to NAMA's efforts against the tandem of asset price collapse and dried-up credit. NAMA consequently set itself the objective of 'facilitating the delivery of Grade A office accommodation in the Dublin Docklands SDZ' (*NAMA annual report and financial statements*, 2016).

Why would it do this? According to the NAMA Annual Report and Financial Statements (ibid.): "Section 10 of the NAMA Act requires NAMA to obtain the best achievable financial return for the State, deal expeditiously with the assets acquired by it and to protect or otherwise enhance the value of those assets. That is the core of NAMA's mandate."

Recognizing the mutually reinforcing cycle of credit and urban real estate, NAMA used its close relationship with the IDA in order to identify suitable properties for FDI (*NAMA annual report and financial statements*, 2016) and played a role in the appeal process of the innovation district in the Dublin Docklands (Byrne, 2016b).

Emphasizing greater flexibility in terms of land use mix in the Docklands, NAMA's subsidiaries have successfully removed planning provisions aiming at reference to a dominance of residential development and a 50:50 residential/commercial mix on the site (Byrne, 2016a). Once passed, planning decisions within the SDZ cannot be contested so as to ensure 'planning certainty' (*North Lotts and Grand Canal Dock: Planning Scheme*, 2014).

Besides building and selling Class A office space, another lucrative business is the construction of student housing (*Dublin Student Housing Report*, 2017; *GSA Annual Review*, 2016). Culturally, student housing with high turnover rates and tech-savvy, well-educated residents, contribute to the Docklands' modern urban imagination. Economically, building requirements for Class A office space and student housing both follow fixed templates. This ensures a quick and painless transaction for developers and international investors tied to global markets and transnational capital flows (real estate developer, person interview, 2016).

The combination of NAMA's attempts to kick-start Dublin's property market and the presence of a technology sector largely undisturbed by the crisis, amplified the transformation of the Docklands into the 'Silicon Docks'(Delaney, 2014; Newenham, 2015). Facebook, Google and other major tech firms have repeatedly expanded their use in office space, delivering necessary liquidity and, in a very literal sense, filling the void left by the crisis in the Dublin Docklands. In 2012, before the SDZ boundary, 12 firms were in the general area, while in 2017, the SDZ features over 69 tech related industries (see figures 24 & 25).

Figure 24: Tech related companies before 2012 SDZ
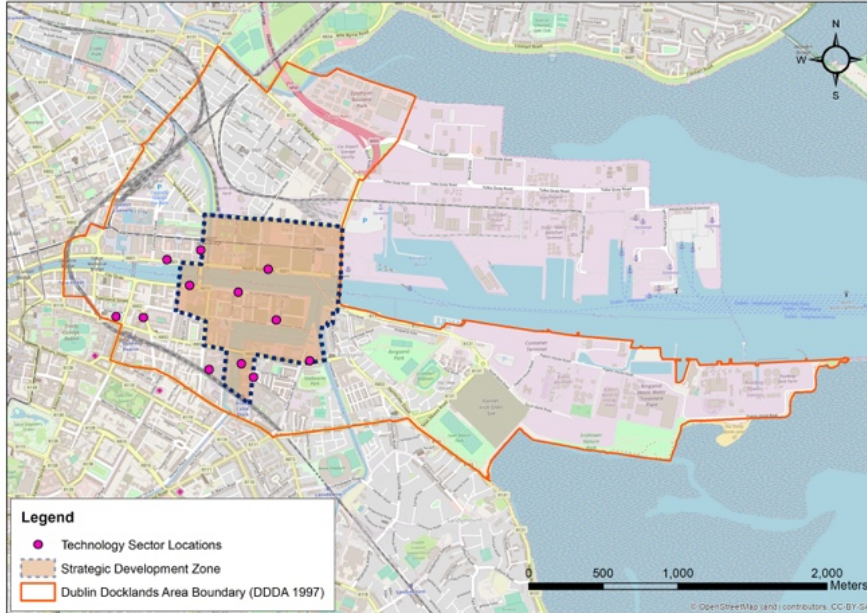
Figure 25: Tech related companies after 2012 SDZ
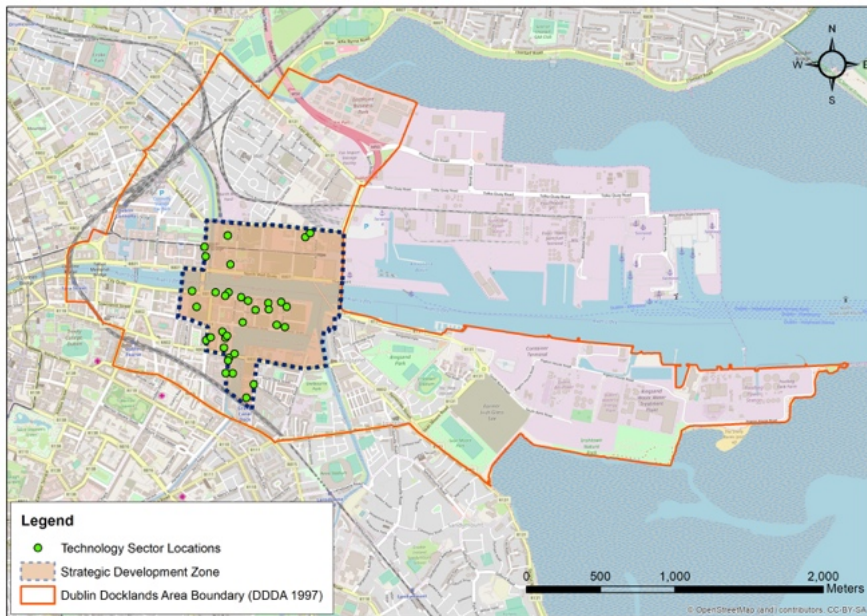
In line with these developments, institutions resources are allocated to attracting outside investors rather than on local populations necessitating attention. In the varied interviews, critical perspectives on technology sector-based growth strategies remained rare and, when present, interviewees uttered critiques mostly in the context of Dublin's housing crisis. Dublin is facing the

largest housing crisis in its history (*Action Plan for Housing and Homelessness*, 2016; MacLaran & Kelly, 2014) yet, connections between a focus on the tech economy and an exacerbating housing crisis are for the most part not automatically recognized.

As the December 2016 occupation of Apollo House (White, 2016), and the judicial standoff in subsequent months (Sheehan, 2017), have shown, NAMA and other public (as well as private) actors cannot shed their responsibility for social, political and economic fragmentations in Dublin. The efforts of protesters to temporarily turn the NAMA-administered office building into accommodations for the homeless, reveals shortcomings at the heart of NAMA's mandate and speaks to the contested nature of urban space more generally.

So long as technology sector-based growth strategies exert a price on local communities through their link with the mutually reinforcing cycle of finance and real estate, the question of class will remain a core struggle between the technology sector and local communities severely impacted by respective urban developments. Funneling local and national resources into the creation of spaces used primarily by a transnational professional class cannot be regarded as an equitable solution to the recent economic crisis. Vague promises of participation and inclusion of local communities will not suffice if that promise is in turn tied up with spending power.

Attracting investments: IDA and the technology sector

With the establishment of the SDZ and a revived real estate market emerging in the Docklands, the IDA was able to tailor its activities to a particular geography. Branding the Silicon Docks as prime destination, the IDA was working in tandem with urban governance institutions trying to turn the crisis into opportunity. As a DCC member stated,

> The whole country was just dying with economic recession, it created a huge
> opportunity effort [for] the IDA to go and sell Ireland as super competitive, great
> access to talent because people are looking for new jobs, and really cheap for
> office, it was, I think one of the most competitive sites for office. Gone from one
> of the most expensive to one of the most competitive in a very short period of
> time. (Dublin City Council, personal interview, 2016).

Consequently, the new concentration of technology firms was hugely important for IDA efforts portraying the Docklands as the 'Silicon Valley of Europe.' The IDA sells Ireland's tech story through a

heavy investment in marketing material. During the height of the recession, the IDA spent €2 million on a campaign to market Ireland as an innovation and technology hub. Two such targeted messages funded by the IDA that ran in a variety of business publications in Europe include: 'Facebook found a space for people who think in a certain way. It's called Ireland.' 'Google searched the planet for the perfect location for their business. They came up with Ireland' (Newenham, 2015).

Figure 26: Industrial Development Authority Facebook marketing campaign billboard

Source: McConnells advertising agency (McConnells, 2009)

Figure 27: Industrial Development Authority Google marketing campaign billboard
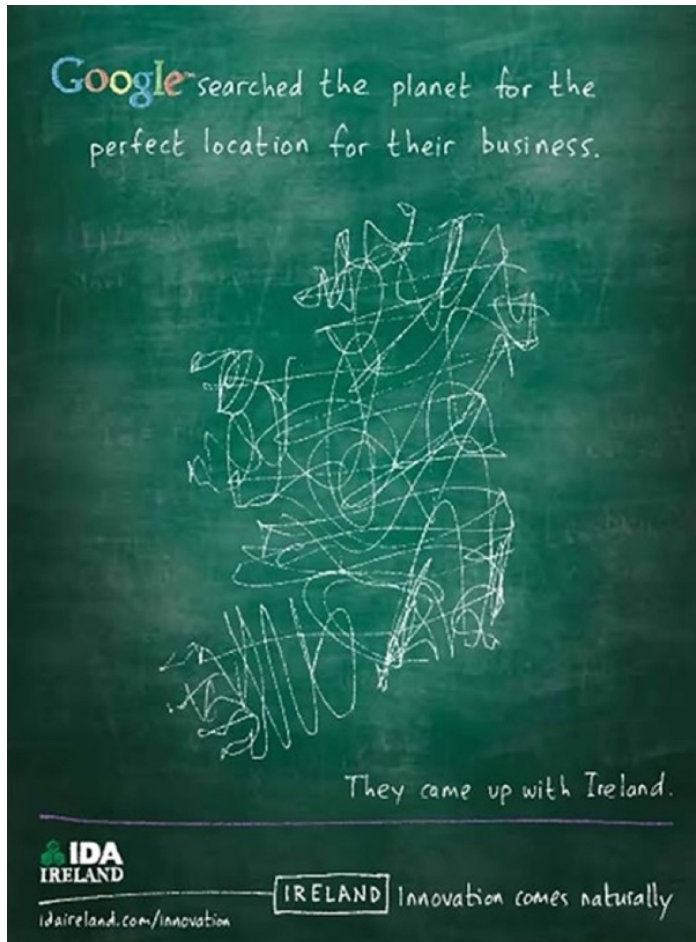
Source: McConnells advertising agency (McConnells, 2009)

The IDA is not the only institution selling this narrative. In 2011, as the country dealt with the aftermath of the recession, Enterprise Ireland, a government agency formed as a split from the IDA in 1994 to focus on indigenous and start-up activity, approved €10 million for an international start-up fund to encourage entrepreneurs to locate in Ireland. Expenses of this kind led one academic to claim,

> They [entrepreneurs] were seen as really important in getting us out of the economic crisis. It was that rhetoric going on that we needed start-up hubs. In a country that had no money, there was a lot of investment in entrepreneurs and start-ups. – (university representative, personal interview, 2016)

The focus on start-ups and entrepreneurs is easier to spin as a bottom-up narrative. The focus on innovation and corresponding emphasis on openness and new forms of participation, lends to technology sector legitimacy (Kayanan et al., 2018)– even while new forms of exclusion, marginalization and economic segregation are manifesting in the city. So far, efforts to attract foreign capital remain unimpeded by these considerations.

The willingness to re-embrace an agenda built on competitiveness and FDI certainly deserves highlighting. Furthermore, there seems to be a complimentary logic between a 'top-down' approach hinging on the belief in trickle-down economics, evidenced by continuous efforts to attract FDI, and the 'bottom-up' allure of technology as a participatory, inclusive, and future-oriented sector. One non-profit director states it this way:

> I don't think there is any backlash in the community if anything we're all anxious for that to grow bigger faster. I don't think there are concerns about money being funneled into it. I think there is awareness in the city being a tech city, there is awareness of the economy being more and more driven by digital enterprise, and I think people, particularly young people, but people in general are excited about that. The more that we can be, you know, on the crest of the wave of new innovation, and new types of jobs and education systems that are more integrated and open, a society that is more diverse and welcoming, we're for all of that. – (non-profit director, personal interview, 2016)

Whether top-down or bottom-up, the events mobilized between the end of the recession and the contemporary have resulted in converting a waterfront location in Dublin into a highly ordered and governed space. The additional layer of smart censors, a topic I cover in the next theme, further contributes to a controlled governance of the territory of the Silicon Docks.

Boston

Like Dublin, Boston's Seaport Innovation District, benefitted from a robust innovation ecosystem that included a large pool of educated workers, a plethora of universities, anchor institutions, venture capitalists, and what the startup industry calls C-Suite executive –corporate executives well versed in the various stages of the firm cycle and management who can provide

mentorship and coaching services. Boston's efforts to create an innovation district in the South Boston Waterfront were quickly circumvented as soon as the real estate market bounced back. Small startups in Boston are now more likely to take over spaces in the buildings in the financial district that the financial and legal companies abandoned in their move to the luxurious South Boston Waterfront (personal interview, 2016).

Today, the space of the Innovation District, more commonly called by other names rather than the moniker used by Menino, is an enclave for the wealthy: "the empty nesters, investors, and people who live there five months of the year" (architect, personal interview, 2016). Unlived in condos that sell for an average of $2,117 per square feet are flipped for at least $500,000 above the original price (T. Logan, 2016a). Affordable housing is non-existent and rents have skyrocketed (McMorrow, 2013). High-end boutiques and destination restaurants line the waterfront and luxury vehicles navigate the streets.

Considering the connectedness of the peninsula and the superior opportunity for real estate developers to command prices for waterfront property, high-end development was always the intended land use purpose. Menino's embrace of the innovation district concept and his ironclad grasp of its branding served as a veil to trigger capital investment in the South Boston Waterfront.

State of the land prior to the innovation district

The first step in uncovering the development outcome of the Boston Innovation District is understanding the land use and planning mechanism that govern development on the South Boston Waterfront. As a coastal city, urban planning in Boston has always been closely intertwined with waterfront regulations. In 1991, the city of Boston developed a Municipal Harbor Plan for the downtown, North End, and Charleston areas of the waterfront and this document formed the basis for the South Boston Waterfront master plan. A second regulation stemming from the Massachusetts Department of Environmental Protection Public Waterfront Act, more commonly referred to as Chapter 91, is a public trust for access state tidelands and waterways (*Environmental Permitting in Massachusetts*, 2003: p. 35-36). Any plans for the South Boston Waterfront must adhere to Chapter 91, in addition to navigating the federally owned land at the Marine Industrial Park, a 190-acre dock previously used as warehouse space for the South Boston Army base. In 1983, the city created the Marine Industrial Park by purchasing the Bronstein Industrial Center, a massive complex to store military supplies, and the

neighboring properties from the U.S. Army and Navy, to create the Marine Industrial Park ("The Innovation and Design Building," 2018).

Menino's proposed Innovation District was a 1,000-acre boundary that included four neighborhoods: Fort Point, Seaport Square, Fan Pier, and Marine Industrial Park. The Innovation District was not the first time these 1,000 acres were cobbled together. In 1999, the Boston Redevelopment Authority (BRA), under Menino's orders and with the assistance of urban design firm Copper, Robertson, the same designers for Australia's Sydney waterfront and Battery Park City in Manhattan, developed the Seaport Public Realm Plan. This was followed a year later by the South Boston Waterfront Municipal Harbor Plan. Both of these documents to guide development and land use on the 1,000 acres of the southern peninsula.

Menino was explicit in his desires for new development to create a vibrancy unlike the after-hours dead zones typical of central business districts.[12] Importantly for him, this would be accomplished through the inclusion of housing. The Seaport Public Realm and the South Boston Waterfront Municipal Harbor Plan outlined the importance of mixed-use construction that fostered a vibrant 24-7 community. The plan outlines guidelines for housing, open space, and height. Housing would be the dominant component comprising 40 percent of development activity and was to be affordable to prevent housing prices from rising in the adjacent neighborhoods. Punctuating this, Thomas O'Brien, director of the BRA, states, "The new housing to be developed must also have a sizable affordable component, and the BRA will not allow only the affluent to have the opportunity to live in this area" (*The Seaport Public Realm Plan*, 1999: p. i).

Following the Seaport Public Realm and the South Boston Waterfront Municipal Harbor Plan, a wide variety of planning documents were generated and approved by the BRA for development of the Seaport, but none encompass the complete 1,000 acres of the Innovation District. Rather, each neighborhood now has its own sub-plan that build on the maiden documents: Fort Point District 100 Acre Master Plan (est. 2006), the Fan Pier Master Plan (est. 2007), the Seaport Square Master Plan (est. 2010), and the Boston Marine Industrial Park, currently under progress.

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[12] In 1999, the term 'innovation' was not the buzzword it is today in 2018 and thus this term does not appear in these master plans in the same way the word and concept of a 24-7 neighborhood overtakes later planning documents. The main emphasis is development targeting residential, commercial office, hotel, retail, and tourist industries.

Open Access: The Big Dig

   The single largest factor influencing development of the South Boston Waterfront was the Central Artery/Tunnel Project, a megaproject referred to as the Big Dig. Listed as the most expensive highway project in the United States, the Big Dig, was an infrastructure project that connected central Boston to the South Boston Waterfront through the construction of two underground tunnels (I-93 and I-90) and the extension of the Silver Line connecting the peninsula to the airport. The Big Dig, which broke ground in 1982 and was completed in 2006, was rife with cost overruns that inflated the project from \$2.6B to \$14.6B, continuously ran behind schedule, and was fraught by the death of an individual due to a ceiling collapse (Flint, 2015).

   A report commissioned by the Massachusetts Transit Authority listed the following benefits for the South Boston Waterfront as a result from the Big Dig: an estimated \$7 billion in private investment, more than 43,000 jobs, 7,700 new housing units, 1,000 affordable housing units, 10 million square feet in office and retail space, 2,600 hotel rooms, \$5-6 million in from construction worker wages spent in state income tax and sales revenue, and between 9-11 percent growth in property tax revenues (Daniel, 2006). Commenting on the report, Richard A. Dimino, the president of the Artery Business Community, a coalition of business individuals developed with the sole purpose of guiding Big Dig development, stated that the efforts of the Big Dig, "demonstrates a wonderful story about how Boston's new central highway system sets the stage for economic growth going into the next millennium" (Daniel, 2006).[13] Of course, this could only happen "as long as development continues" (ibid). As a financial boondoggle, it was imperative that the city and the state recoup investments from the project and the South Boston Waterfront presented that opportunity.

Menino and the BRA

   A second critical factor that influenced the development of the South Boston Waterfront was Menino's relationship to the BRA. When Mayor Marty Walsh took over as the Mayor of

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[13] The Artery Business Community, now known as A Better City (ABC), is a nonprofit with a governing board of business and institutional leaders. Recognizing the benefits that would result from the new connection, ABC banded together to represent the interests of the business community and to involve themselves as key intermediary between project officials and the City of Boston, convening meetings on everything from construction mitigation to the number of highway ramps that would serve the downtown ("Our Origins: The Artery Business Committee," n.d.). To date, ABC continues to work with the Massachusetts Department of Transportation and the City of Boston and is in the process of working on a proposal for a long-term transportation plan that will alleviate some of the congestion issues already evident in the commute in and out of the South Boston Waterfront (Powers, 2013).

Boston, one of his first initiatives was to "clean out" the BRA and reconfigure the organization under a new title, the Boston Planning and Development Agency. "Let's face it. 'Authority' is so authoritarian," said Brian Golden, director of the Boston Planning and Development Agency (cited in Clauss, 2016). And under Menino's leadership, it certainly was.

Created in 1957, the BRA controlled all economic development planning and real estate permitting in Boston. A board of five appointed by the Mayor run the organization, giving the Mayor full reign over its powers. Past Mayors opportunistically used the BRA's power of eminent domain to raze neighborhoods and build signature sky-scrapers (McMorrow, 2014). The BRA owns its own land, collects its own revenues, and manages its own budget (ibid). Importantly, Menino used his power over the BRA to syphon development in the South Boston Waterfront. Any new development in Boston requires approval by the organization. For the Innovation District, development required a final sign-off by the Mayor himself. Furthermore, Menino played favorites. He facilitated development in the Seaport for his friends while rejecting applications from those not in his favor (Diesenhouse, 2015; McMorrow, 2014).

Existing Developments: The Cyber District and other failed attempts to attract tech

In 2010, when Menino declared the Innovation District, the peninsula was not completely barren. Commonwealth Pier, a working port built at the start of the 1900s underwent renovations in the 1980s and 1990s converting the port into the World Trade Center and the neighboring Seaport Hotel.

Located farther east on the peninsula was the maritime activity of the Marine Industrial Park. While much of the South Boston Waterfront was projected for luxury development, the Marine Industrial Park was to be protected for marine activity. In the early 2000, development favored the maritime industry with thirteen seafood processors, and marine industrial terminals, dry docks, and warehouses located on-site. The Big Dig transformed the 35-60-minute commute into a 10-minute commute for transporting seafood. The maritime industry looked forward to freight rail service that would connect to the Marine Terminal. This was a center for skilled blue-collar jobs and new innovations related to marine activity were occurring at the time. Commenting on their spectacular fortune, fish purveyor Roger Berkowitz said, "We'll be able to do things that we can't do at our other locations, like make chowder stock from fresh fish bones" (Diesenhouse, 2003).

For a while in the mid-2000s Menino considered selling off the Marine Industrial Park citing that there was not enough marine related activity to occupy the space. Under contention was the Bronstein Industrial Center, a 1.4 million square foot horizontal building spanning multiple blocks. Menino flipped back and forth on the appropriate use of this building. Initially, when he wanted to sell off the massive parcel, he stated that the Bronstein building on site was not suitable for industrial uses. The industrial sector wanted ground floor access, he opined, and not a building with multiple floors. Yet later, when an opportunity arose for Cargo Ventures to convert the building into office spaces, Menino rejected the proposal fearing that it would trigger office development across the South Boston Waterfront and stating that the proposal suggested using the building in a way that would not support industrial and blue-collar jobs (Palmer, 2008). Perhaps, undergirding the uncertainty was the push-back Menino received from South Boston politicians for not protecting blue-collar jobs. Regardless, as market forces take over the peninsula it becomes evident that the South Boston politicians' concerns are discounted.

Except for the uncertainty of the Marine Industrial Park, there was no reason to negate that eventually high-end development would overtake the South Boston Waterfront. Speculations on the benefits of the Big Dig had spurred development activity from private interests and from Menino. Menino was concerned that private interests were dictating the growth direction proposing high-rises and sport stadium developments. Considering that federal, state, and local government coffers funded $20B to prime the peninsula (i.e., cleaning of the Boston Harbor and construction of the Central Artery, the Silver Line Transitway, the Third Harbor Tunnel, and the Boston Convention and Exhibition Center), Menino felt it imperative that a doctrine protecting the public use of space and dictating private development was in order (*The Seaport Public Realm Plan*, 1999: p. i). This order also functioned as a way for Menino to ensure he had the final say on unfolding development.

In 1997 Menino began promoting the idea of creating a Cyber District in the South Boston Waterfront. The Fort Point neighborhood, home to one of the largest arts communities in Boston featuring an older brick urban fabric and warehouses that were turned into galleries in the 1970s, was starting to demonstrate the formation of a technology cluster. Dot-coms, new media, technology companies, web design shops, and internet consultancies were moving in. Even a Computer Museum was operating in the space. There was reason for Menino to be hopeful. Development in Boston was flourishing. The office vacancy rate was 1.3 percent. Buildings in the South Boston Waterfront were leasing for $42 – 47 a square foot in the area while in the

financial district they were around $65 a square foot and the city (Krasner, 2001). The eventual completion of the Big Dig could only accelerate the development of the South Boston Waterfront. It seemed an opportune time to push development in the South Boston Waterfront until the tech bubble burst (Real estate consultant, personal interview, 2016). This was a definite set-back for Menino's vision.

The Institution of Contemporary Art (ICA) was also located on the peninsula. In 1999, the Pritzker family of Chicago, who owned 21-acres of the South Boston Waterfront intended for a $1B hotel, condominium, and office complex in Fan Pier, put out a bid for a cultural component of their development on a donated .75-acre parcel of land. Of the three proposals formally unveiled, Menino selected the ICA (Flint & Abraham, 1999). The ICA signed a 99-year lease for $1-per year and worked out a massive fundraising campaign for construction (Leblanc, 2003). The 62,000-square-foot building designed by architects Diller Scofidio + Renfro opened in 2004. The building, which features a large public patio with contemporary bleacher-like seating prominently facing the water, is one of the few low-rise buildings on the site. Today it is towered by glass high-rises.

In 2005, Fallon, president of Fallon Company, purchased the 21-acres of land from the Pritzker family of Chicago for $115 M for a $3B for a mixed-use development of office buildings, five-star hotels, luxury condominiums, and high-end retail. In 2006, John Hynes, a Boston millionaire, purchased 23-acres of to develop luxury, shops, condominiums, mixed-use development, and retail.

In 2008, the recession hits and City Hall halts all construction and marketing on the South Boston Waterfront, once again challenging Menino's visions of prosperity for the peninsula (state representative, personal interview, 2016). Yet, Menino was persistent. In 2009 he founded and chaired an organization called Boston World Partnership. The aim of the organization, run by Brian McLaughlin, the former marketing director of the BRA, was to promote Boston's competitive advantage by connecting companies to an extensive network of "Connectors" invested in retaining growth-minded businesses in Boston. Boston World Partners was initially funded by $1M from the BRA and $400,000 in seed funding from Procter & Gamble (Psaty, 2010). Later, Boston World Partnerships received an additional $170,000 from a foundation run by State Street Corporation and Fidelity Investments (Kirsner, 2010).

In 2009, Boston World Partnerships claimed responsibility in generating a lead between the City and Retail Convergence, an e-commerce company, to convince the company to relocate

from Downtown Crossing to the Seaport ("Mayor Menino Welcomes 600 New Employees to Fort Point Channel," 2009). Boston World Partnerships calculated that their connection translated to $14M in immediate salaries for the 100 new employees the company hired (Psaty, 2010). When these connections were brokered, Fidelity was active in the Seaport and Procter & Gambel's Gillette factory sat right on the edges of what was to become the innovation district boundary. State Street Corporation, though not located in the Seaport at the time, moved there soon after the announcement of the innovation district. These organizations had a vested interest in the ongoing development of the South Boston Waterfront as, at this point, they were still surrounded by parking lots and limited amenities.

Menino's Innovation District: Setting the Plan in Motion

Whereas previous development was fragmented and saw a series of fits and starts, the innovation district was Menino's opportunity to build a neighborhood wholesale. Menino achieved this concretely focusing on a handful of innovation related elements and then allowing the market to take over.

After Menino publicly declared Boston's Innovation District he insisted that the BRA and all efforts moving forward brand the neighborhood with the new name (developer, personal interview, 2016). The rebranding of the South Boston Waterfront is starkly evident in the marketing materials that followed his announcement.

The initial master plan for the Seaport Square neighborhood was developed in 2008 by the New York based firm Kohn Pedersen Fox Associates (KPF) with Hacin + Associates acting as the local urban design consultant. Not once in the 1354 paged version of the 2008 master plan available on the Boston Planning & Development Agency website does the word innovation appear. However, in 2010, following on the heels of Menino's public declaration of the innovation district, Hacing + Associates in collaboration with the real estate agency, Boston Global Investors, a new executive summary of the master plan is released. This document is rife with innovation district rhetoric.

Adding to the momentum, Menino assigned his staff to continuously deliver presentations on his Innovation District. These documents, too, are filled with the promise of how space can fuel innovation (Hammar, 2010; consultant, personal interview, 2016).

Providing a base for MassChallenge, an incubator that began in 2009 and now has offices across the globe, helped sell the brand of the South Boston Waterfront as a 1,000-acre cubicle for

innovation. When the recession hit, John Fallon could not advance on his $3B destination neighborhood vision. When Menino received the tip that MassChallenge was looking for new space, Menino negotiated with Fallon for free rent in the 14th floor of Fallon's building on One Marina Park Drive in Fan Pier (state representative, personal interview, 2016). Venture capital firm, Spencer Trask & Co, and MassChallenge launched the start-up competition promising to award $25,000 for a business willing to locate in the Seaport Innovation District. This activity signaled that the new part of the city was going to be focused on innovation. It also signaled flexibility in the space and growth in creating a cluster.

In an effort to include civic space to anchor the district, Menino commissioned the development of District Hall. District Hall, a $7 million, 12,000-square-foot, free-standing public innovation center, was built "to foster collaboration among the young businesses and entrepreneurs" providing a "place or them to gather, innovate, and create jobs"(Farrell, 2013) Unlike other innovation spaces in the district that are not easily accessible and guarded by private security, one of the benefits of District Hall is that it is open to the public and contains conference space, labs, and classrooms for budding entrepreneurs. The building was built by Boston Global Investors a part of its 23-acre development and is leased to the city for $1 a year for five years. After five years, the city could renew their lease (ibid.).

Three years into its development, Menino recognized the need to meet the demands for affordable housing. To meet Menino's vision for a 24-7 neighborhood inclusive of artists, Menino created new zoning ordinances approved for the development of houses called InnoHousing—much smaller in size than the average apartment and include shared kitchen and communal living spaces. Menino approved a $150M housing development with micro-units, as low as 300 sq ft dormitories with shared living spaces and elements for communal lifestyles (Casey, 2010). West Coast development firm Gerding Edlen Cos, agreed to build these micro-units stating of the neighborhood that the area is "a unique place where art, creativity, and innovation all collide" (Kelly Saito, president of Gerding Edlen, cited in Casey, 2011). The first units were designated for the Fort Point Channel neighborhood. They cost $150M to build and they replaced a 5-story warehouse. Of the 200 units to be built, 19 were to be rented below market rates. "They were designed for a startup crowd but are actually targeting a richer demographic, perhaps one that lives in the suburbs but may want a place to stay overnight now and again" (non-profit executive, personal interview, 2016).

Larger space needs for larger companies

The innovation brand was a way to get momentum going. However, the reality of the location and the amount of open and available land for development meant that the Seaport required larger, more established legal and financial firms, such as those anchoring the district today, to bankroll the development.

Large corporations wanted to be part of the energy and tap into innovation potential. Many of these companies have internal entrepreneur programs with successful products sold through their sales channels. They might not be innovative companies themselves, but they outsource innovation. Autodesk and GE are examples of large corporations that want access to what is happening in the marketplace in order to be more competitive and to retain their employees. Some of them build entire floors for companies not in their competitive space (state representative, personal interview, 2016).

In 2011, Vertex's move to the South Boston Waterfront served as a signal that Menino's vision was coming to fruition. Vertex had recently received FDA approval for a new drug, which shifted their status from a funky creative R&D lab in Kendall Square to a major pharmaceutical company (Real estate consultant, personal interview, 2016). When Vertex had the opportunity to build, they could not find enough space in Kendall Square. They wanted to demonstrate to the world that they had a business model that could scale up. People taking off from Logan Airport could see a shiny building with the Vertex logo (Real estate consultant, personal interview, 2016). Vertex received tax breaks for moving to the Seaport. Thus, when Menino declared the innovation district there was not much money in city coffers for additional development (non-profit executive, personal interview, 2016).

Moving to the innovation district served as a way for a company to rebrand their image. In 2016, GE was looking for a flagship location that aligned with their Internet of Things direction. However, moving to the South Boston Waterfront also made sense because there were still large open parcels for an established company to build. GE could now reside within the boundaries of a city as opposed to their prior suburban Connecticut location, breach a connection to P&G, while also gaining direct access to talent. The deal was sweetened by $150M in state and local incentives for its promise to bring 800 jobs (T. Logan, 2018).

Procter & Gamble, the parent company of Gillette, agreed to sell GE 2.5 acres of the 44-acre Gillette campus for GE's move to the Seaport. The company will rehab two empty brick warehouses that used to house the New England Confectionary Company, and also construct a

new building. Since privately owned real estate does not qualify for state incentives, to secure these benefits for GE, the BRA agreed to own the buildings and lease them out to GE. GE could then occupy the buildings rent free for up to 20 years (T. Logan, 2016b).

When Jeff Immelt, the CEO of the GE, was asked why he decided to relocate the company from the suburbs of Connecticut to the Seaport, he replied, "I want [employees] to walk out of our office every day and be terrified. I want to be in the sea of ideas so paranoia reigns supreme. To look out the window and see deer running across? I don't care about [that]" (cited in T. Logan, 2016b). This comment demonstrates a shift from the ideal of a pastoral and secluded environment to an open network.

Amazon also moved offices to the South Boston Waterfront. In May of 2018, Governor Baker of Massachusetts said it would spend $20M to bring Amazon to the Seaport along with tax breaks of up to $5M from the city of Boston. In exchange, Amazon agreed to create 2,900 full-time corporate office jobs (T. Logan, 2018).

The market change led to a different type of development than what was initially projected. Parcels in the Seaport are already claimed and built to the maximum amount. Now the people scouting the place represent well established companies looking for new construction and floor plans that are big and well laid out and conducive to new construction, rather than trying to occupy smaller, multiple floor spaces (non-profit executive, personal interview, 2016).

By square footage the significant majority of the office, residential, and hotel are not innovation economy. They are traditional business tenants, high-end condos, and high-end retail (Real estate consultant, personal interview, 2016).

Today, it is almost impossible to find large parcels of land available. Whether that means the larger companies will buy out a series of smaller companies to expand their operations remains to be seen. Either way, companies needing larger footprints need to seek space elsewhere. This also applies to the larger manufacturing companies that resided in the peninsula before market forces took over but can no longer afford to renew their leases.

Detroit

The origins of the Detroit Innovation District strategy began at the state level. According to individuals driving the development of the Detroit Innovation District, Bruce Katz played a role in highlighting existing assets and resources that could be leveraged to create an innovation district in 2008, years before the 2014 official announcement (personal interviews, 2015-2016).

In December of 2013, the Brookings Institution, in tandem with Business Leaders for Michigan, a non-profit consulting and research arm of the state of Michigan; The Reinvestment Fund, a community development institution with offices in Philadelphia and Baltimore; Public Sector Consultants, a research and program management firm; and the Michigan Municipal League, a non-profit business management consultant organization, collaborated to develop firm aims and objectives for the district (*Detroit Innovation District: Physical Place Working Group*, 2014).

The committee agreed that Governor Snyder would formally declare the district, determine a team to deploy the idea, and then officials in Lansing would step back to allow local Detroit leaders to implement the district. The committee selected Detroit as the location for the first innovation district because they feared that a faltering Detroit would negatively impact the remainder of the state. As one individual on the advisory committee expressed, "Detroit has to do well, or the rest of the state will not do well when it comes to international commerce" (real estate company representative, personal interview, 2015).

The move of the innovation district strategy from the state level to the city level implicated local Detroit foundations. Foundations in Detroit already had a rich history of funding revitalization efforts in Downtown and Midtown. The New Economy Initiative (NEI), the strategic grant-making branch of the Hudson-Webber Foundation, has been instrumental in this respect investing over $50 million in the area since 2010 (*Detroit Innovation District a New Economic Development Designation*, 2014; foundation head, personal interview, 2015). Under the executive leadership of the mayor and with input from the NEI and Mass Economics, the organization hired by the NEI to consult on the development of the Detroit Innovation District, an advisory committee of 18 individuals was created as the public face and steward of the Detroit Innovation District. This star-studded cast represents home grown entrepreneurial initiatives and leaders of all the major public institutions and private corporations within the Detroit Innovation District boundary. Three working groups sit below this advisory committee, each focused on a specific area of development: 1) Physical Place, 2) Innovation and Commercialization, 3) Building Detroit's Knowledge Economy. These groups, made up of ten to twelve people, are tasked with presenting concrete plans for their respective areas to the advisory committee.

By May 2014, the local Detroit committee had revised the state-level draft to adapt it to local context. The overarching vision in this document is that the innovation district would raise the status of Detroit to "be a globally recognized center of ideation, commercialization, and talent that powers economic opportunity for the residents of the city and repositions Detroit's

role in the national and global economies" (Lewis, Lynch, & Vey, 2014: p 8). This local draft aims to provide a firm governance structure and leadership platform to target reform within the district and calls for a Detroit Innovation District manager to oversee development in the district and to formalize economic, physical, and networking asset development while having a direct line to the Mayor, as the city is the lead actor in the Detroit Innovation District effort.

Highlighting how revamping buildings is based on tech imperatives, in February 2015 the space commission presented to the Advisory Committee with the number one recommendation to focus on updating the building infrastructure. The recommendation was based off of a study that revealed only 4% of the buildings in the district were built after 1980 and the remainder are not conducive to current technology needs. This statistic signaled the need to reinvest in the infrastructure of the central business district. In addition, part of the work that emerged from these early meetings was deriving an asset inventory for Detroit. The assets highlighted as part of the Detroit Innovation District include (see figure 28).

Figure 28: Detroit Innovation District asset inventory
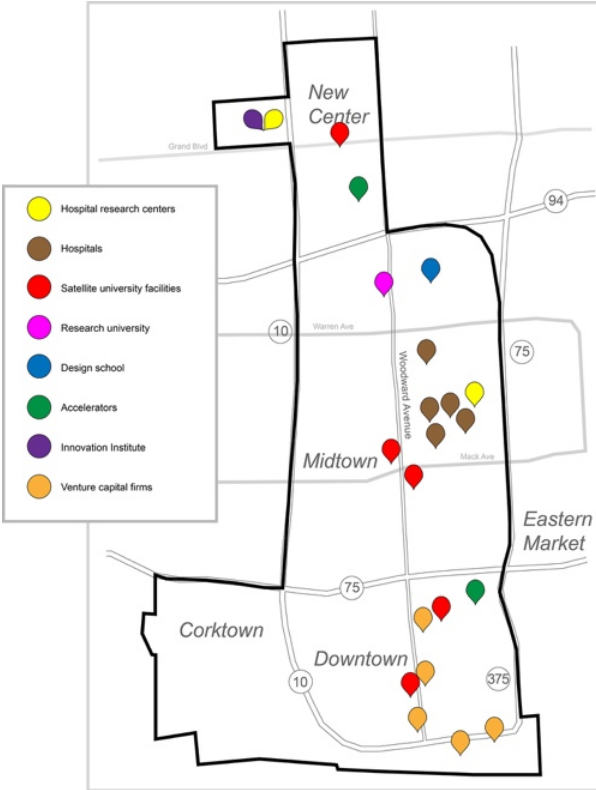
The concentration of these institutions in the downtown core and the inadequacy of the "right" infrastructure to support a knowledge-based economy played a major role in the decision

to overlay an innovation district in the downtown neighborhoods (*The Detroit Innovation District: Recommendations for State Alignment and Investment*, 2013). According to drafts for the innovation district, the decision to focus on the New Center, Midtown, and Downtown neighborhoods was also a result of the demographics. While most of Detroit was losing its population, in the May 2014 draft outlining the innovation district strategy, the targeted area comprised 3.1 percent of the city's land area, a little over 3 percent of the city's population (22,018), 52 percent of the city's employment base, and 9 percent of its business establishments (4,700) (Lewis et al., 2014). Despite employment decline in the city, the Central Business District demonstrates growth. Investments were also concentrating in that area with over $880 million invested in the Central Business District, Lafayette Park, and Rivertown areas between 2010 and 2012 (*7.2 SQ MI Report: A Report on Greater Downtown Detroit*, 2013).

Considering the upward trends in growth and investments already occurring in the downtown, accelerating revitalization became the central justification in labeling the space an innovation district. As one respondent at the state level stated when asked the purpose for an innovation district in Detroit:

> "[T]his should be something where we are unabashed and unafraid to say, we're gonna double down in this area because it is important, because we cannot fail. And so, it doesn't mean we're screwing over the rest of the state, it doesn't mean we are not going to invest anywhere else, but we are absolutely going to prioritize some commitments here" (consultant, personal interview, 2015).

Though the innovation district declaration ignited excitement for a future Detroit, definitional issues of innovation quickly materialized in relation to what space the border would encompass: Does Corktown, the neighborhood with a high concentration of makerspaces, qualify as producing innovative activity? Is it contradictory to include Easternmarket, the public food market that provides fresh produce to the city, as part of the innovation district? On one hand, the crowds it generates displays the urban vibrancy innovation district strategy seeks to foster, on the other hand, it is zoned for slaughtering animals, not necessarily an innovative activity. Also, what is the relationship and responsibility of the innovation district, which encapsulates Downtown and Midtown Detroit, to the remainder of the declining city?

Stakeholders harbor conflicting expectations and misperceptions on what the innovation district represents. This discrepancy is evident in a variety of ways, from a definitional

understanding of innovation to issues of governance and battles over the boundaries of the district.

Figure 29: Detroit Innovation District border disputes
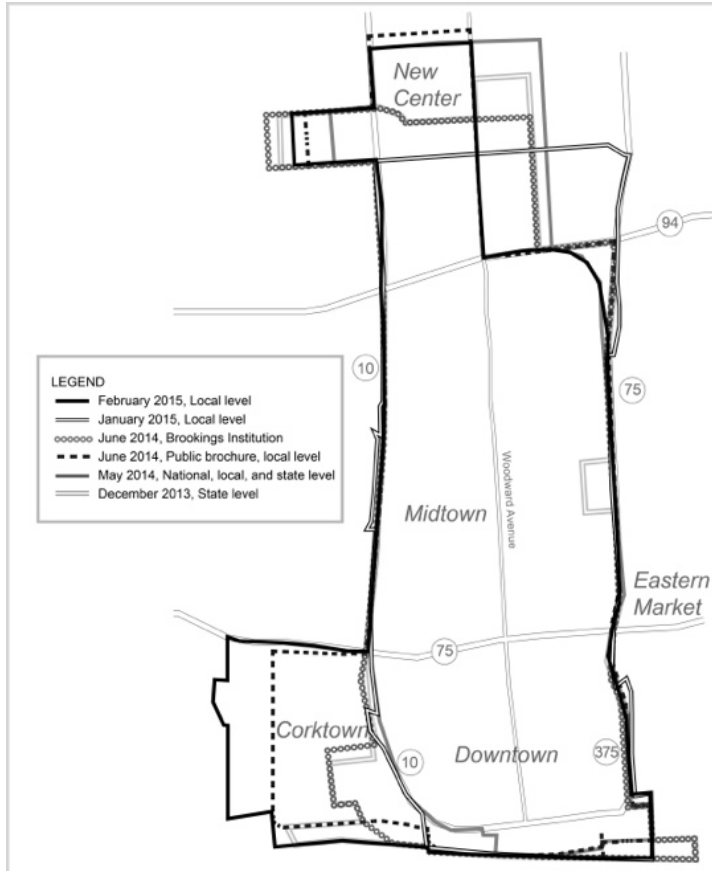
In the 2014 public declaration of the Detroit Innovation District officials did not specify the exact geographic boundaries of the district, preferring instead to name general areas it would encompass. The Woodward Avenue corridor is highlighted as a focal point in all maps of the innovation district. The main differences between the various iterations are the fluctuations with the Corktown neighborhood line on the western border and the New Center neighborhood on the northern border. In all maps, Eastern Market remains outside of the district (see figure 29).

Unlike the formerly bustling urban agriculture markets in Chicago and New York with warehouse structures now converted into trendy lofts or office spaces, Detroit's Eastern Market maintains its economic vitality as an operating market in the heart of the city. Depending on whom you ask, Eastern Market sits either on the periphery or within the boundaries of Detroit's

Innovation District. This is an important distinction. Proponents for its inclusion argue that urban agriculture is a growing sector with opportunities to demonstrate innovation through leadership and new conceptions of agricultural production. In addition, as a popular destination for a diverse array of people, Eastern Market epitomizes the type of spontaneous interaction innovation district boosters proclaim as necessary for innovation. In fact, in 2013, MIT recognized Eastern Market as a prime example of urban place-making (Silberberg, Lorah, Disbrow, & Muessig, 2013). However, opponents' concerns center on the health and sanitation issues posed by an industry that slaughters animals on site. This raises questions about the imaginary of innovation and if agriculture and livestock too closely connote an antiquated model of production not suitable for the tech economy.[14]

The concept of an urban laboratory–what an innovation district seeks to become, mobilizes an aspirational imaginary of what form the district should assume and what activities it should house (Karvonen & Van Heur, 2014). Spatially, a tension exists in determining the hard lines between where the innovation district begins and where it ends. But this same tension is evident in terms of the types of knowledge that can exist within the space. Here is where individual sociotechnical imaginaries come into play. Whereby one individual adamantly believes that it is incorrect to target specific sectors because it will limit the possibility for new innovative and emergent sectors, another feels strongly that "[MSU's] music school, isn't necessarily helping in the innovation space" (Foundation head, personal interview, 2015). When asked what elements do not belong within the space, one respondent's answer included the jail residing in the Downtown[15], heavy manufacturing, and a single-family house on 50 acres enclosed by a white picket fence specifying:

> "So I think that there are a number of different things and not all of them
> negative, they just don't belong in the area, if you define it as a dense, vital,
> connected environment, just intuitively as you go through the list, you say, 'ok,

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[14] Within the smart cities literature there is a strand focused on deconstructing future-oriented imaginaries. See for example Rabari & Storper (2015) and Shelton et al., (2015). For an excellent spatial discussion on ascribing problematic values to a space as a type of government rationality, see Huxley (2006).

[15] On April 2016 Dan Gilbert unveiled a plan to build a soccer stadium at the 15-acre jail site in Downtown Detroit. This is not a formal plan since Wayne County still owns the site and expects to proceed with development of the jail. However, Gilbert's influence in Detroit is significant. MLS Commissioner Dan Garber was present at the announcement, which was held at Rossetti Associates Inc.'s Detroit headquarters as they are the architectural firm behind the 500,000-square-foot soccer stadium and 500,000 squared-feet surrounding area design (Shea & Pinho, 2016).

this makes sense and this doesn't" (private company executive, personal interview, 2015).

Another respondent said, "I think that there are innovative things that are going on in the craftsman side as well that probably don't fit most people's definitions, but they do from an asset building perspective for us" (venture capitalist, personal interview, 2015).

Fundamentally, the disagreement is based on disagreements at the leadership level on the role of the innovation district, as well as what constitutes as innovation. It is difficult, if not impossible, to pin down innovation to any one location. A few elements remained consistent regarding the understanding of what an innovation district would mean for Detroit. The first is that the district would function as a special zone for funding priorities at the state, as well as justification for federal asks for additional financial support in that concentrated area. It is also an area where the Mayor would support and advance changes in zoning regulations. These priorities highlight the preference for securing territory.

St. Louis

Detroit and St. Louis both share the complexities and challenges of shrinking populations, struggling economies, and a diminishing resource base (Beauregard, 2013; Hollander et al., 2009). In addition, both cities have a legacy of racial conflict and securing housing for black populations (Farley, 2005; Sugrue, 2014). One major difference between the Detroit Innovation District and St. Louis' Cortex Innovation Community is the concentrated two-decade long effort by the St. Louis growth machine to develop a regional strength in bioscience. On account of this, the Cortex Innovation Community has undergone many iterations. Still, mechanisms to secure territory were evident in the mid- to late-1990s and continue to the present day with Cortex's latest phase, what they are calling Cortex 3.0.

The origins of Cortex are fragmented with respondents pinpointing different start dates. One reason for this is that the assembly of parcels and buildings that now form the Cortex Innovation Community were added through a piecemeal process. Another major reason is due to the way Cortex is conceived. Leadership views Cortex as an "idea, and organization, and a place" (*An ord. approving the development plan for Cortex West Redevelopment*, 2006: p. 6). For some, Cortex began when the idea of building a science park was conceived. For others, it is when a group of leaders incorporated as Cortex. Still for others, it is when the purchase of a

building marked a physical location where Cortex could exist. Despite variations, the shared commonality across origin stories is a culture of service, marked by powerful leadership, and financial contributions.

The legally recognized beginning of Cortex is in 2002 when founding members from the area institutions and civic realm incorporated as a tax-exempt 501(c)3 under the name the Center of Research, Technology, and Entrepreneurial eXpertise, known as Cortex for its acronym.[16] However, to begin in 2002 is to gloss over earlier efforts by the St. Louis growth coalitions to develop a science-centric rhetoric that assisted in the clearing out of the large swath of land on which Cortex both exists and owns.

Cortex stakeholders influential in its inception refer to four catalytic reports that cleared the path for economic development policies focused on growing the plant and science sectors. The first study was commissioned in the 1980s by the Science and Technology Committee of the St. Louis Regional Chamber and Growth Association (RCGA). This report identified the land between Washington University's and Saint Louis University's campuses as the ideal location for the development of Technopolis, a high-service corridor to connect the campuses (Winter, 2006), but with the added emphasis on technology.[17] The second report, a weeklong series of articles published in the St. Louis Post-Dispatch in March of 1997 collectively called the Peirce Report, elaborated on the idea of Technopolis envisioning it as a 1,000-acre urban research park connecting the two campuses (ibid.). The Battelle Memorial Institute, an applied science and technology development company based out of Ohio with an office in St. Louis, commissioned the third and fourth reports. Both Battelle reports highlight St. Louis' regional potential for national recognition as a business hub for the plant and life sciences, designated by the name BioBelt (*Life Sciences & Missouri's Economic Future: An Opportunity to Build "One Missouri,"* 2003).

The four reports influenced growth coalitions to target development in the land between the WashU and SLU campuses and to focus on the plant and life science sector. However, considering funding sources, some question the legitimacy of the reports wondering whether "the reports are valid or simply a case of a hired consultant telling biotech boosters what they want to

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[16] The X in Cortex was later changed to 'Exchange' to give it its present name: Center for Research, Technology, and Entrepreneurial Exchange. At a later point, CORTEX changed its logo from the all-caps CORTEX to Cortex. For consistency, I use the contemporary spelling 'Cortex'.

[17] The concept of "technopolis", high-technology based economic development, began in the 1960s and 1970s as a regional development strategy that aligned with the growth of suburban office and research parks. The strategy appeared around the globe in places such as Japan, Southern California. For a good review see Preer (1992).

hear" (Melcer, 2005). Bolstering this sentiment is the long-term management (1994 – 2011) of the RGCA by Richard Fleming. Prior to his arrival in St. Louis, Fleming was involved in Denver's downtown revitalization. Fleming forced conversations on the economic development of the region (Winter, 2006), first through the Peirce Report, and later by commissioning a trip for Cortex leadership to visit the Massachusetts Institute of Technology (MIT), a university with an established reputation for actively investing billions of dollars executing the reimagination of its bordering neighborhood Kendall Square.

The concept of building a Technopolis in St. Louis caught on. The University of Missouri-St. Louis was the first to attempt executing the Technopolis vision through an incubator called the Center for Emerging Technologies (CET). A joint endeavor between the University of Missouri-St. Louis and the Missouri Department of Economic Development founded the CET in 1996 as a 501(c)3 with representatives from the major institutions, government, and the private sector. In 1998, spurred by the Technopolis concept and the growing interest in downtown development (Winter, 2006), the leaders of the CET decide to relocate the incubator in the space the RGCA reports pinpointed for Technopolis. Thus, the city of St. Louis, using the CET as the legal entity, purchased an abandoned warehouse on Forest Park Avenue for $500,000. Using $1.5M in tax increment financing, Paric Corporation gutted and remodeled the abandoned warehouse (Kurtovic, 2013). In June of 1998, CET opened its doors for the first time at 4041 Forest Park Avenue. In multiple media reports celebrating the opening of the CET, Marcia Mellitz, president of the CET, hails the foundational importance of CET as the first step in achieving the Technopolis vision: "We haven't begun to tap the potential that is here," she said. "It is well beyond a couple of buildings" (Goodman, 1999). The arrival of CET is the first indication of escalating land prices in the section of land between the Washington University and Saint Luis University campuses, an important fact that is later glossed over in a 2008 Missouri Supreme Court decision to approve Cortex under Chapter 353 status, which bestows them with the power of blight removal and eminent domain (Walter, 2008).

Financial Backing

Washington University was also heavily invested in the success of CET and the idea of Technopolis. The CET board was comprised of representatives from Washington University. Their interest was in the proximity of CET to their campus and the potential for their alumni to use the CET as an incubator. Prior to the legal 2002 Cortex designation, William Danforth, then

Chancellor Emeritus of Washington University but still heavily invested in the university's success, asked John Dubinsky to oversee the development of Technopolis. Having held notable executive positions as Chairman of the board of Barnes Jewish HealthCare, President and chief executive of Westmoreland Associates LLC, presided over Mark Twain Bancshares and Mercantile Bank, president emeritus of Firstar, in 2001Dubinsky agrees to Danforth's request (Tucci, 2002). By 2002, five are institutions (Washington University, the University of Missouri-St. Louis, Sant Louis University, Barnes Jewish HealthCare, and the Missouri Botanical Gardens) formed the anchor of Cortex, in addition to civic partners RCGA, Civic Progress, and the City set up Cortex as an entity to develop a biotech corridor in midtown St. Louis. In May of that same year, the Cortex backers publicly listed include: Harvey Harris, John Dubinsky, Lewis Levey, William Danforth; Danforth Foundation, McDonnell family foundations, and Monsanto Fund (Bolhafner, 2004).

By this point, Cortex comprised a group of individuals interested in growing the plant and life science sectors but did not yet exist as a developer nor as a place. Shortly after incorporating, Richard Fleming, of the RCGA, the same man who orchestrated funding the Peirce Reports, bankrolled a trip for the Cortex leaders to visit Kendall Square in Cambridge, Massachusetts (elected official, personal interview, June 17, 2016). It is at this meeting, which is held at MIT, where Cortex leaders learned about the $600M contributed from MIT endowment money to revitalize the area surrounding the MIT campus. In addition, they also learned about the importance of university anchors and their role in funding innovation. This trip proved catalytic in provoking the replication of the model in St. Louis (incubator executive, personal interview, 2016; *Smart People. Cool Places. The Story of Cortex*, 2017).

For some, this trip, and the events that followed it, form the true beginning of Cortex. The popular story is that upon returning from Massachusetts, Bill Danforth, convenes an impromptu breakfast, held at the executive conference room of Barnes Jewish HealthCare, with a handful of the most influential leaders in St. Louis. Danforth commanded a lot of respect in the community. Of Danford's leadership, one responded stated, "Bill is the kind of person you just don't say 'no' to" (real estate developer, personal interview, 2016). As some insiders tell it, the night before the breakfast, an unnamed source tipped off Danforth that a private developer wanted to acquire a large track of derelict land on the Central West End (ibid.). Recognizing the importance of that parcel of land, at 10 pm that same night, Danforth started a series of phone calls to invite key

individuals to an emergency breakfast. This was a breakfast purposely designed to raise enough funds to purchase Cortex's first official building.

Prominent individuals from the business community were present: the Mayor, university and hospital executives, the heads of the Missouri Botanical Gardens and Civic Progress. At the meeting, Danforth stressed the need to raise money to acquire the property. The trip participants discussed findings from their trip to MIT and proposed the idea of assembling land to create a district. Coming into the meeting, Danforth hoped to raise enough for the estimated assessed land value of $60M. By the end of the breakfast meeting, Danford had raise $175,000 toward the purchase of land (*Smart People. Cool Places. The Story of Cortex*, 2017).

Collecting $175,000 was only the beginning of how much money Cortex leadership would secure for their vision, though now singularly called Cortex rather than Technopolis. Following the catalytic breakfast, Cortex leaders held private individual meetings with leaders from the five area institutions to procure funding with the agreement that after twenty years the investment would be returned with interest. The first person they approached was Mark Wrighton, Chancellor of Washington University. Wrighton, who was previously professor and Provost at MIT, committed $15M to support the Cortex initiative. Once Washington University demonstrated willingness to back the development, the other institutions agreed to follow suit. Barnes Jewish HealthCare contributed $5M, Saint Louis University $5M, and the University of Missouri-St. Louis contributed $4M. The Missouri Botanical Garden enthusiastically supported the initiative but could not help in financing it.

Adding to the venture, in October 2003, the Missouri Finance Board voted to provide $12M in tax credits over five years to buy land for Cortex, plus the Danforth Foundation, one McDonnell family foundation, and Monsanto Fund pledge $2.5M.[18] The $12M funding package represented the first time the state of Missouri used public money to fund a project that extended beyond a single building to creating a "long-term, revolving fund supporting a general *idea* in a geographic zone" (Melcer, 2003; italics mine). As discussed in the next chapter, this is the power of selling an idea, of selling something that moves beyond the tangibility of a material entity and it succeeded in soliciting funds. It also releases any protection or potential public good over the increased value of an area, which, prior to Cortex ownership, was public land. Slowly, over the course of almost two decades, Cortex would take over the rights for eminent domain in 2006,

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[18] This was initially meant to fund BioGenerator's proof-of-concept fund, but since Cortex decided to fund BioGenerator's efforts, the $2.5M were instead used to acquire land through the use of tax credits

and then again in 2012 through a TIF designation giving them full control the area within the legally approved Cortex boundary.

Securing Chapter 353 and its implications

Around 2003, media reporting on Cortex picks up. Whereas before, Cortex worked behind the scenes as a group of individuals interested in the growth of St. Louis, 2003 marks the period where the entity secures funding from federal, state, and local government coffers and begins land acquisitions.

Having secured a sizeable sum of money and support from the City of St. Louis and anchor institutions, Cortex was prepared to acquire land and develop it. To do so, Cortex decided to seek Chapter 353 R.S.Mo 2000 status. The Urban Redevelopment Corporations Act, commonly called Chapter 353, is a Missouri statute established in 1945. This statute allows private developers to acquire and redevelop blighted land and authorizes the entity eminent domain (Mo.Rev.Stat §§ 353.010-353.180 (1986 & Supp. 1988). On July 2, 2004, Cortex incorporates under the legal title CORTEX West Redevelopment Corporation with Chapter 353 status ("Ordinance #66985," 2006).[19] On July 22, one year after becoming a legal redevelopment corporation, the Board of Aldermen approves the ordinance finding and declares the parcel Cortex is interested in developing as blighted as defined in Chapter 353 ("Ordinance #66847," 2005). Soon after in September of 2005, CORTEX West Redevelopment Corporation submitted their detailed development plan ("Ordinance #66985," 2006). On January 4 of 2006, the Planning Commission submitted a recommendation for approval of the plan based on findings from an independent study and investigation that the area is indeed blighted and that the redevelopment plan is both in the public interest and serving a public purpose. On February 16, 2006, the redevelopment plan is approved and Cortex, vested with full development authority, is allowed to execute their plan.

Through its use of maps, geographical layout, and parcel inventory, the Cortex development plan is certainly the type of plan an urban planner would comprehend. The Cortex development plan outlines two redevelopment areas: CORTEX West and CORTEX East. The CORTEX West 353 Redevelopment Area comprises of 180 acres between the Washington University medical Center with Barnes Jewish Healthcare headquarters and flagship facilities and the Frost Campus of Saint Louis University. The designated area extends from Newstead

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[19] Here I use the all caps CORTEX to match the legal documents submitted to the State of Missouri.

and Taylor Avenues on the west to Vandeventer Avenue on the East and from Forest Park Ave
and Laclede Avenue on the North to US 40/ I 64 on the south. The CORTEX East 353
Redevelopment Area comprises of 73 acres located immediately north of the Saint Louis
University Health Sciences Center and focused on the intersection of Chouteau Avenue and
Grand Avenue.

Figure 30: Cortex planned development area
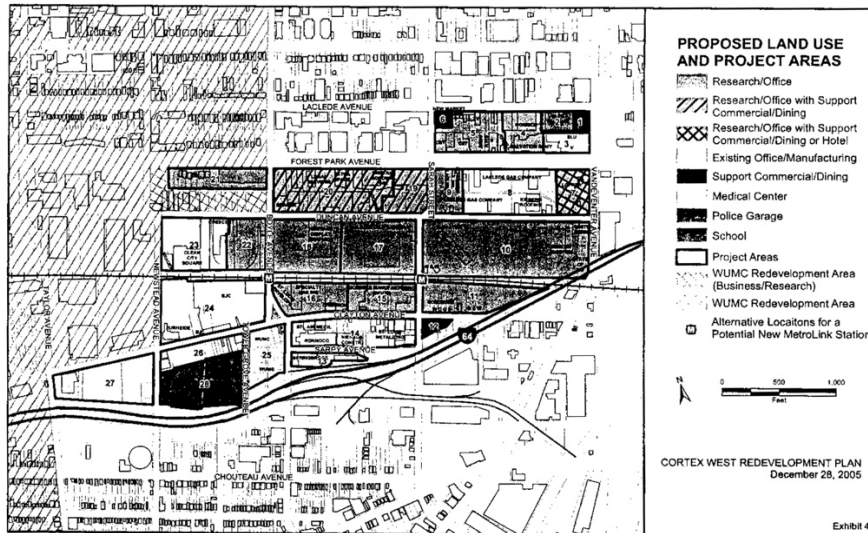
Source: ("Ordinance #66985," 2006)

Each development is formalized under two wholly-owned private, limited dividend
redevelopment corporations, CORTEX West Redevelopment Corporation and CORTEX East
Redevelopment Corporation. To complicate matters, the Cortex leaders created an affiliated for-
profit entity called the St. Louis Land Company, LLC, to conduct land transactions. In addition,
each building that Cortex develops directly becomes a single-asset LLC. For example, Cortex's
first building, Cortex I, is legally CORTEX West Development I, LLC ("Ordinance #66847,"
2005).

At many points throughout the document, the Cortex redevelopment plan invokes the
normative sentiment that the Cortex vision is the shared responsibility of all:

"Successful area redevelopment will require that the residents of the city and the
broader business community share the vision and that a wide array of financial,

corporate, and public resources be committed to a process of redevelopment designed to make sites available for new life sciences-related businesses and institutions" ("Ordinance #66985," 2006: p. 4).

The document claims that many of the existing parcels:

"[A]re in conflict with and stand in the way of efforts to take advantage of the opportunity to capitalize on this key area adjacent to the Washington University Medical Center and St. Louis University by attracting new jobs and employers that will raise the city's economic fortunes and generate revenues necessary to provide the public services and facilities so desperately needed by its citizens" ("Ordinance #66985," 2006: p.8).

Justifying the need for eminent domain and the need to control development in the area, Dubinsky argues it is best for Cortex to lay the first marks:

"CORTEX is viewed as a 20- to 25-year project…We hope to foster millions of square feet of biotech space. We decided we were better off developing the first building ourselves to set a quality standard and a tone for the entire development" (Jackson, 2004).

Cortex does indeed set the tone. In terms of land use, the document states that the current use of the land is for industrial, warehouse, and distribution uses, uses that do not align with the new Cortex vision. The businesses that current use the land in this way, the document states, "can prosper again if relocated to other areas of the city or region that can better accommodate their operations" ("Ordinance #66985," 2006: p.8). Accordingly, the redevelopment plan proposes demolishing 52 structures. This includes the 43 dwelling units on site, 38 of which are occupied. Of the 43 dwelling units, only five are deemed in poor exterior condition. The remainder are either in fair condition (7) or good condition (31). Yet, the recommended action for all 43 units is demolition ("Ordinance #66985," 2006: p.16 & p.30).

Joe Stickler, president of St. Louis Metallizing Co, facing the ordinance that would force his relocation, summarized the development as such, "The message is that they don't want me to

be here because I don't fit their bio, life-sciences criteria… What this is doing is grabbing land from me so that somebody else can profit" (cited in Heisler, 2005). Bob Brauer, a business owner of a heating and cooling equipment company whose business fells within the Cortex boundary and was targeted for condemnation, expressed the following sentiment in a 2006 article documenting Cortex securing Chapter 353 status, "I think all of us agree that bringing in new jobs is a good thing for the city…We just don't think we should be the ones to pay for it," he said. "Why should I, as a good corporate citizen, be subject to peril just because they want my place?" (Heisler, 2006). Finally, another active building purchased by Cortex housed Employment Connection, a non-profit organization that connects ex-offenders to employment opportunities and provides services (Desloge, 2004). The tone set by Cortex on the type of activity that will exist within the borders is clear.

In the 1990s, criticism of the lax blight requirements was prevalent with media reporting on the displacement of residents and unjustified claims on the status of the buildings under question. Chapter 353 was criticized for three main reasons. The first related to the administration of the program and the inability for the government to ensure developer compliance with redevelopment plans. The second was the failure to protect the residents and the neighbors of the redevelopment area. The third was the questionable blight determination and the use of Chapter 353 in areas that do not demonstrate blight (Shultz & Sapp, 1990).

In 2007, the Supreme Court of Missouri ruled over a case between Station Investments #10 Redevelopment Corporation and CORTEX West Redevelopment Corporation. Station Investments argued that the Cortex redevelopment plan was fatally deficient and that the findings of blight were not supported by substantial evidence. In the Development Strategies, Inc. study, a study conducted by a private company hired by Cortex to assess the land, the study concluded that the total taxable assessed value of the area declined nearly ten percent in constant dollars and that the assessed value of the area increased only seventeen percent. The 17% was compared to 34% increase for similar properties. The plaintiff argued that the 34% increase was derived from commercial properties in the city. If the comparison would have been against other industrial uses, then the 17% increase is substantial for the area. Barry Hogue, an expert hired to review the blight study prepared by Development Strategies, Inc., stated that "if the area's assessed values were compared with other industrial areas; it was outperforming the industrial properties within the city as a whole" (Ahrens, 2008).

That this point was dismissed by the court demonstrates the power of the technological vision in quieting dissent. What began as Technopolis and is now being fulfilled by Cortex. First of all, CET's arrival in 1998 had already begun to 'prime the pump' (Droog Jones & Beggs, 2005). Additionally, by 2003, residential rates in the city and inner suburbs were already on the rise. The St. Louis Association of Realtors were reporting home sale prices up 35% since 2000 ("City to the Core," 2003). Plus, in June of 2004 Cortex purchased sites at Markwort and Laclede at rates at a slight premium to the market for $25 and $29 per sq ft. signifying their recognition willingness to wager on the increased land value (Desloge, 2004). A report by the Gundaker Commercial Group speculated that rentable space would be comparable to specialty-use buildings in suburban markets (ibid.).

As it relates to the court case, Pacific Legal Foundation, the Show-Me-Institute, and the Missouri Ombudsman submitted an amicus brief in support of the plaintiff. Their brief argues that the site analysis compiled by the CORTEX West Redevelopment Corporation to give them Chapter 353 status and the right to eminent domain was of a "Drive-By Blight" nature. They contended that the Missouri Supreme Court should reject 'windshield surveys,' where a consultant is hired to assess the state of blight from the comfort of their car (Sandefur, 2008):

> "Given the fact that Missouri courts have refused for so long to enforce the 'public use' requirement in the state Constitution, the only hope Missouri home and business owners have is that courts will at least require government to meet high standards when the determination of 'blight' is concerned. If they do not, and local bureaucrats can not only take property whenever it's 'blighted' but also determine without judicial oversight what property counts as blighted, then those officials will have limitless power to redistribute property at will" (ibid.).

Ultimately, the case was disposed. The leaders guiding development decisions during this time frame reiterated the benefit of Chapter 353. One real estate developer stating that Cortex was respectful to the Alderman's concerns about displacing individuals but that in many ways they have more power than him (real estate developer, personal interview, June 14, 2016): "They [Cortex] haven't had to use eminent domain but the threat of it is powerful. They [Cortex] did flash the threat of it, though they [Cortex] never actually used it" (ibid). Though Cortex did not

forcibly remove individuals, the redevelopment did displace the individuals residing in the 38 occupied units and businesses that did not meet the imagined definition of a tech utopia.

In terms of job growth, the redevelopment plan states that the first positions created will be in construction. However, these jobs were never intended to be permanent. The aim of the redevelopment is to create higher quality jobs and tax rates. "By an expanding and sustainable base of high-quality permanent jobs. Likewise, a substantial new private investment in offices and research and development facilities will increase the taxable wealth of the community"("Ordinance #66985," 2006: p.9). Comments such as these demonstrate the targeted demographic for the area and the tight control Cortex necessitates on the development process to secure its vision. Of priming the pump Dubinsky said, "It's a free-market approach…We're trying to prime the pump. We're not trying to control it" (cited in Melcer, 2004). Yet, this stands diametrically opposed to actions taken to secure eminent domain and gain TIF status, as well as entrenched connections with the private and public sector and funders with the 'deep pockets' Dubinsky credits (Kurtovic, 2013).

New Leadership, New Visions

"What drives Cortex is real estate development. The people who represented the institutions on the board were the real estate people from the universities. The Chair of the board was a real estate banker his entire career. The focus was always on the development of the built environment" (CET executive, personal interview, 2016).[20]

From 2002 - 2010, Cortex was operating without a staff. Essentially, Cortex was a bioresearch park with five founding partners and two buildings. With the recession halting development, it became clear that the strategy for attracting large firms to build within the Cortex boundary was no longer an effective or even viable solution (Cortex staff, personal interview, 2016). In 2010, Cortex engaged a national search to hire a CEO to manage operations. After interviewing a sizeable population, Dennis Lower was hired. "Dennis was brought on to configure a live-work-play environment as a way to attract more companies rather than just provide buildings" (CET executive, personal interview, 2016). Lower brought with him the

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[20] Between 2010 and 2014 five employees were hired. The fifth employee, Phyllis Ellison hired in 2014, was the first person without a real estate background.

experience of having previously built two other research communities and he contributed his background in assembling property, putting together deals, and bringing in partnerships.

To combat the halt in development on account of the recession, when Lower arrived he shifted Cortex's strategy to focus on the live-work-play model. Cortex was initially focused on the suburban real estate model and looking only at bioscience. Lower suggested diversifying the portfolio so to appeal to all technologies. In order to attract startup companies, he recognized the importance of mixed-use development to create a seamless flow between existing incubators and anchor institutions

To fund this idea, Lower applied for $158M in TIF funding over 25 years to fund $2.2B in development under the creation of a new legal entity: Cortex Innovation District (*St. Louis Innovation District Tax Increment Financing (TIF) Redevelopment Plan*, 2012).[21] The TIF plan, like the 2006 Cortex West Redevelopment Plan, was a long and detailed document submitted to and approved by the City of St. Louis. The aim of the plan was to overlay most of the Chapter 353 boundary with a TIF in order to access funds for blight removal and redevelopment. The plan list 17 objectives: concrete plans such as establishing new metro stop, creating new jobs, building greenways and bicycle paths, to more ambiguous objectives such as removing blight to enhance "public health, safety, welfare, or morals" of the area. Ultimately, the underlying purpose of the 17 objectives is to "enhance the tax bases and the resulting tax revenues for the City and all other taxing districts that extend into the Redevelopment Area" (*St. Louis Innovation District Tax Increment Financing (TIF) Redevelopment Plan*, 2012: p.13-14).

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[21] This was the first mention of Cortex as an innovation district, though later Lower would replace the word 'district' with 'community', the name used today.

Figure 31: Cortex Tax Increment Finance Plan
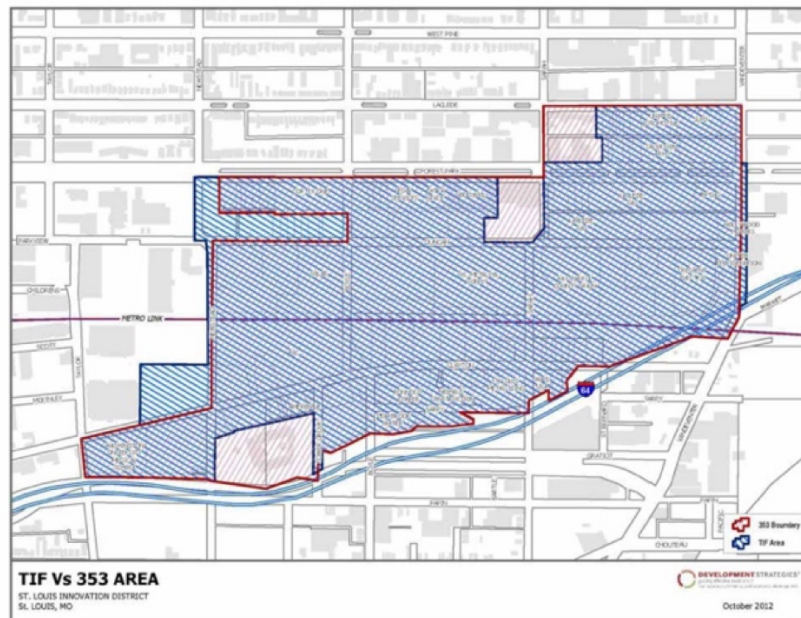
Source: (*St. Louis Innovation District Tax Increment Financing (TIF) Redevelopment Plan*, 2012)

The plan hit a major obstacle when minority leaders criticized Cortex for not meeting minority participation goals. When asked how many of the newly created jobs employed women and minorities, Lower answered, "We do not collect this data, as these are private employers who routinely do not report their workforce numbers" (cited in Rivas, 2012). When asked about minority inclusion policies, Lower responded, "Each company makes their own decisions about diversity inclusion. We have no say in these matters because they are private employers" (ibid).

Advocates for increased minority and women presence in construction jobs cited a bill passed in 2009 requiring public works projects in St. Louis that cost more than $1M to hire a workforce of "25% minorities, 5% women, 20% residents, and 15% apprentices" (Kurtovic, 2012). However, invoking their private developer categorization, Cortex argued that the law did not apply to them. Dubinsky diplomatically ensured that Cortex would abide by the regulation, but also said this: "Everybody wants to make sure that they get their fair share of the jobs, and we'll work with them to make sure that happens…But if anybody wants to say that they're against creating new jobs and more tax revenue for the city, I guess I would like them to tell us why that is in the public interest"(Kurtovic, 2012).

What I want to highlight here is the opportunistic way the "public' is invoked. When Cortex wants contributions from the city or the state government, be it in the form of TIF funds,

abatements, approving Chapter 353 status, etc., they mobilize a mission driven discourse. When they are under fire for not complying with regulations that benefit the community, they ridicule the public for not treating them as a private entity.

Questions concerning the mission of the anchor institutions in relation to commercialization is necessary considering the investments they put into Cortex's development. The ability for Cortex leadership to pay back the initial investment made by the area anchor institutions is dependent on Cortex's financial success, which is based on increased capital investments and the rise of real estate values. University faculty are not in complete agreement about the role their institutions play in funding Cortex or similar spin-off ventures believing it can tarnish pure research and education, but they might concede in part because "commercialization is increasingly encouraged by the federal agencies that provide more than $400 million a year for its scientific research"(Melcer, 2006). Additionally, being off campus, even if in a nonprofit academic lab, means that intellectual property rights operate differently.

University leaders are pressured to play an active role in the economic development of a region. This might happen through the strategic hiring of leaders who can direct resources in particular ways. At various points during my time interviewing Cortex stakeholders, I sensed a dissatisfaction with Saint Louis University's approach to research. In late September of 2017, Saint Louis University hired a Ken Olliff as a new vice president for research to double their research budget to over $100M (Barker, 2017). Olliff was invited to sit on the Cortex board and has created a "Research Innovation Group," located in the Cortex district, to enhance research commercialization. Commenting on Saint Louis University's new direction, Lower says: "I'm thrilled that SLU is really doubling down to position itself as a stronger national and international institution. I think it elevates St. Louis" (ibid.). Once again, favoring Cortex's mission of boosting the life sciences is couched under the larger importance of elevating St. Louis, which can then translate to increasing capital investments in the region.

Park Center

In 2012, the Research Triangle Foundation (Foundation) purchased 100-acres of land. The stated purpose for the land acquisition was to develop Park Center, a new space replete with facilities that reflected the evolving and diverse requirements of the contemporary workplace and that would allow them to better compete on a global and national scale (*The Research Triangle Park: Master Plan*, 2011). Executives of the Foundation promptly followed the land acquisition

with a series of meetings and consultations with developers, designers, and architects. From these meetings a renewed imaginary landscape emerged, one that would exemplify a vibrant ecosystem and project the antiquated RTP brand into the 21st century.

Figure 32: Park Center envisioned by the RTP Foundation

Source: (*Park Center, Research Triangle Park*, 2015)

In the 1950s RTP was designed to span 7,000 acres in order to prevent employees from competing firms from fraternizing with each other. In addition to providing ample space for firms to develop their own campuses within RTP, zoning provision established an eight-acre minimum lot size, building set-backs of at least 150 feet from the road, and set-backs at least 100 feet from the side and back property lines (Rohe, 2012) (see figure 35).

Figure 33: Aerial view of Research Triangle Park

Source: RTI International ("Aerial view of the Research Triangle Park campus," 2009)

Today, the ambitions of the RTP Foundation focus on using design to distance themselves from the silo-like attitude of the science and research park to a newly collaborative phase that includes targeted amenities to attract and retain entrepreneurs and young professionals ("Park Center: This is not your grandfather's RTP," 2015; RTP Foundation executive, personal interview, 2016). To meet the conception of innovation's inputs as collaborative, cross-sector, and high-tech, the design aim of the innovation district is one that prioritizes an open and convergent environment where face-to-face interaction is encouraged as a way to foster the ideation and commercialization of ideas and products (Chesbrough, 2003; Storper & Venables, 2004).

The challenge for the Research Triangle Foundation in conceiving a new plan is ensuring retention of existing tenants. The established corporations that populated the park 60 years ago when it first opened were initially drawn to the Park because of the ability to purchase multi-acre plots to build independent campuses and expand when necessary. Today, the Foundation wants to attract tenants it never attracted before—smaller entrepreneurial firms and startups.[22] The increased spinoff potential from nearby universities creates a viable revenue stream for the Foundation. By creating the right environment -the right stage set- the Foundation can divert the burgeoning startups from locating in nearby Durham and Raleigh. In the past several years close to 400 companies have started in Durham. The American Underground, a private 'campus community' in downtown Durham that caters to entrepreneurs, startups, innovators, and investors, has invested almost $1.5 billion in successful exits (Malizia, 2017).

Conclusion

In all five cases, innovation district stakeholders juxtaposed the inefficiency of the land prior to its development with the envisioned potential for an innovation district. Various tools were used to create a parcel of land for development. The Boston Innovation District, positioned in close proximity to Boston's financial district and across the bay from Logan International airport, was prime real estate for the expansion of the city. The purpose of the Big Dig was to connect the peninsula and open up space for boutique development. The recession seriously halted construction. It was then that the Mayor pushed forward the idea of an innovation district.

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[22] Whereas Silicon Valley and Boston's Route 128 succeed at attracting entrepreneurial ventures, Research Triangle Park never did. Only well established companies could afford to purchase and develop land in Research Triangle Park. Entrepreneurial ventures not only did not have the zoning for smaller lots that could accommodate them or short-term leases. The zoning requirements for Research Triangle Park specified that development was only allowed on 15% of the site (Malizia, 2017).

Cortex shares a similar story. At the heart of St. Louis there were 200 acres of blighted land between Washington University's campus and St. Louis University campus. City leaders first pursued a Chapter 353 blight status on the targeted land for redevelopment and later a tax increment finance district to gain development governance and secure public financial backing to develop the land. The central business district of Detroit, hindered by countless blighted structures, provoked stakeholders to continuously expand the border of the Detroit Innovation District as a way to increase the area of land on which to project a new imaginary, and thus, trigger development. Local Dublin growth coalitions, wanting to capitalize on the momentum of the tech companies moving into the city, developed a strategic development zone to fast-track development and turnover abandoned structures from the building boom into a thriving innovation district. Finally, the Research Triangle Foundation, fearful of a max exodus of firms moving to nearby cities, recognized the need to replicate the 'feel' of the city and its inputs in order to cater to entrepreneurs in need of smaller real estate footprints –an effort they see as a double benefit as it will help them derive more profit from their land. These are examples of political mechanisms to derive territory.

The space of the innovation district functions as a fresh start (Bach, 2011). It moves beyond the derelict structures of the past to present a city very much rooted in the present and future seeking. In my case studies, growth coalitions describe the land slated for development as wasted space that is not meeting its highest and best use. These 'dead zones' (Doron, 2008) are "used and conjured by the hegemony for political, social, and economic ends" (ibid; 204). Growth coalitions juxtaposition the imaginary of decay with a futuristic layer to elicit excitement for development.[23]

In all four urban cases, the innovation district was slated on what was earlier industrial land. But that does not mean that the space was inactive or dead, only that growth coalitions did not feel the land was generating enough rents. Barcelona's 22@bcn innovation district, the model on which the innovation district is based, was also slated for the Poble Nou industrial neighborhood. Scholars and activists documented the various artists factories and lofts located within the space and their slow demise as the innovation district was built out. The same applies to the maritime activity in the Silicon Docks and the Boston Innovation District, and the light-manufacturing and low-income public service administration buildings in the Cortex Innovation

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[23] Various scholars have documented the mobilization of such imaginaries to funnel development. See for example Smith (1996) on development of Lower East Manhattan and Fainstein (2001) on the development of New York and London.

Community. The Detroit Innovation District, encompassing the entire Downtown, Midtown, and New Center, was the only place in the city demonstrating growth. Yet, the presence of the many blighted structures made the adoption of the narrative of dead space possible. As for Research Triangle Park with its designer manicured landscapes, though terms such as 'dead space' do not appear in public accounts or personal interviews, the space is construed as not meeting its potential. More, in other words, can be extracted from the space.

At the local level, the innovation district is a bounded space visible in policy documents through its boundary and legible to pedestrians through its architecture and design. As a 'spatial capital accumulation machine' (Bach, 2011; pg 100), it has a designated physical area and within this space it has special rules to govern the corporations that exist there, and by extension, the workers that live there. However, the innovation district extends beyond the boundary –though not necessarily to surrounding neighborhoods—as a space of flows, a permanently networked society is shaped around a logic of flows, such as resources, information, technology, and images (Castells, 1992).[24] The space of flows is seen as a signature organization of power and efficiency under capitalism that compresses time and place (Harvey, 1989b, 1999). The innovation district elevates the geographically bound district and its concentration of firms and talent of a knowledge economy, into a node in a global network. As a contemporary zone, a zone that moves beyond the historic iteration of a zone, which was a space of exception that could attract and shape investment (i.e., a colonial free port), to a contemporary space that can attract and shape fantasies and aspirations of modernity, the zone becomes what Bach (2011) terms the 'Ex-City'. These spaces use the logic of exception to create the legal and political environment necessary to their survival that "allows for the re-territorialization of capital in a manner consonant with both the needs of nomadic capital and state development" (ibid: pg. 104). The Ex-City is a space not wholly separate from the city, such as an offshore banking center, but instead focuses on high-skilled workers to create direct linkages from the bounded space, to the host city, state, and region.

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[24] As I demonstrate in the concluding chapter, what does extend beyond the border are the heightened real estate prices and lack of affordable housing.

Theme II: Facilitating Production

Innovation district strategy places great emphasis on the role of urban design to create the right environment attractive to knowledge workers while also supporting of the demands of high-tech infrastructure. But the organization of work is undergoing structural changes. Many of the changes are a direct result of sophistications in information and communication technologies (ICT). Since the end of World War II, the boundary of the firm has become increasingly permeable with the global scale of production and the extent of global supply chains (Davis, Ross, Whitman, & Zald, 2006). The difference between then and now is that today the greatest job growth is in jobs that move work beyond the walls of the firm (Kalleberg et al., 2000). The rise of ICTs has enabled contracting out tasks to employees linked across countries and time zones, resulting in firms hiring fewer people for full-time positions, while also challenging the conception that work is performed on a fixed schedule in a fixed location (Davis, 2016). Work is increasingly organized outside of employer-employee systems, beyond the traditional nine-five workday, and occurs in new spaces such as home offices, coworking spaces, warehouses, and public innovation centers (Garrett, Spreitzer, & Bacevice, n.d.). These rapid changes in the organization and experience of work challenge preconceived conceptions of the "office." As such, designing for knowledge workers at the scale of a district requires sensitivity to new forms of work.

Considering today's growing mobile workforce (Martin-Brelot et al., 2010; Shearmur, 2007), the changing dynamics of the firm (Davis, 2016), and the shift in production toward immaterial goods (Castells, 1996; Hardt & Negri, 2001), local actors are challenged in their ability to claim ownership and rents over production. The innovation district mitigates this challenge through two forms of extraction. The first is by increasing the value of the land. As the land increases in value, rents proportionally increase. The designation of an innovation district serves as a marker of incoming development paving the way for the future investment of property. This follows the classic theory of land use and rent theorized by Ricardo and Marx (Haila, 1990; Marx, 1992, 1993) and the role of prestige in the location of development in relation to rent (Harvey, 2009).

More interesting, however, and what marks the difference between the innovation district and earlier spatial iterations for innovation capture, is understanding how the innovation district also serves as an extraction of rent in the form a new type of production, what Autonomous Marxists Maurizio Lazarato (1994) defines as immaterial labor. Lazzarato introduced the concept

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of immaterial labor as the labor that produces the informational and cultural content of the commodity. An example might help demonstrate the point. Categorizing immaterial labor as a contemporary form of capitalism, Boutang (2011) provides the example of the exchange value a pair of Nike shoes can command over and above the expenditure of human labor. What is immaterial is the added value the brand commands.

Using examples from my cases, I aim to extend the concept of the brand for the innovation district by defining two components of the brand: the physical elements and the immaterial elements. The physical elements of the built environment (i.e., the incubators, coffee shops, anchor institutions, etc.) are an essential component of the innovation district. Confirmation of the opening of a respected incubator company, such as the Cambridge Innovation Center opening up in the Cortex Innovation Community, or that that a respected architect is designing a structure in the district, such as Santiago Calatrava's bridge in Dublin, all bring a form of legitimacy that helps boost the physical element brand of the innovation district. The immaterial elements (i.e., the appearance of a networked space buzzing with activity) are an equally important component of innovation district strategy. Mayor Menino's idea of creating a line item in his budget to fund an innovation district manager in charge of enlivening the space of the innovation district and ensuring constant connectivity is one example of efforts to program the space of the innovation to create a type of "buzz" and increase the value of the innovation district.[25]

Following Lazzarato and other Autonomist Marxists such as Terranova (2000) and Mario Tronti, and Antonio Negri (Gill & Pratt, 2008), I conceive of the individual interactions to create buzz as a form of labor. The term buzz here implies the type of vibrancy that exists in a space as conceived by economic geographers as far back as Marshall (1890) in discussing the atmosphere of the industrial districts. The form of labor I am discussing differs from feminist scholars who argue that traditional conceptions of labor do not account for care work and affect (see for example, Boserup, Tan, & Toulmin, 2013; Frederici, 2012; Reid, 1934). I am discussing a form of labor that is facilitated in the built environment, in public space, through ICTs and mobile technologies.

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[25] The idea of 'buzz' is ambiguous, yet it continuously appears in the literature on innovation ecosystems and cluster dynamics. Often there are variations in how the idea is expressed. Bell-Masterson and Stangler (2015) use the term 'vibrancy'. Storper and Venables (2004) and Bathelt, Malmberg, and Maskell (2004) discuss it in relation to face-to-face contact and the knowledge exchange created from this activity. Even as far back as Alfred Marshall (1890) the concept of buzz is discussed as the 'secret' of industrial activity (cited in Storper & Venables, 2004:353). The growing recognition of its importance among practitioners and designers translates to policy prescriptions that attempt to build buzz into space.

To reiterate, there are two elements that facilitate the extraction of labor. The first is ICTs and mobile technologies. These sophistications play an important role in allowing activity to move beyond firm walls. The second is on the role of architectural and urban design. The activity of the firm permeates the space outside of the firm as work moves beyond firm walls.

One need only look at the architectural renderings and master plans for each innovation district to understand the importance of design in attracting investment capital. Design has a long history in economic development of heightening the visibility of a location to attract investment capital through tourist attraction, place marketing, and culture-led economic development (Eisenschitz, 2010; Grodach & Loukaitou-Sideris, 2007; Klingmann, 2007). Well known examples in the fields of architecture, urban planning, and design include the use of museums to elevate the status of a city, such as the classical example of the Guggenheimin Bilbao (Rodriguez, Martinez, & Guenaga, 2001), revitalizing a waterfront, such as the "Rousefication" of Baltimore's Inner Harbor (Levine, 1987), and multiple examples of stadium developments (Chapin, 2004; Robertson, 1995).

Like city-wide economic development strategies, innovation district strategy also incorporates design to boost the image of its location. Stakeholders of innovation districts hire famous architects to create eye-catching buildings and reputable consultants to design masterplans to rival the attempts of other cities with innovation districts. This is evident from the recent announcement to build an overhead gondola connecting Boston's Seaport Innovation District to Boston's financial district (Vaccaro & Logan, 2017), from activating Santiago Calatrava's harp shaped bridge at the heart of Dublin's Silicon Docks as a playable instrument (Lynch, 2014), from the Cortex Innovation District board contracting with the globally recognized firm HOK to design their latest mixed-use expansion, and from Dan Gilbert, founder of Quicken Loans and Rock Ventures in Detroit (Deem, 2018), decorating empty street level storefronts to hide indications of decay (Gannes, 2015).

Efforts to use design to attract a certain demographic, control the space, and project futuristic visions are not isolated to innovation district strategy. Indeed, the City Beautiful movement is an example of scientific progress in urban design and development through its focus on monument, ordered grid, and landscaping (Hall, 1998). The same applies to the heavily landscaped corporate estates of the General Motors, Ford, and Deer companies following WWII (Bethesda, Tumentang, Institutes, & Blvd, 2014). There is an abundant literature on designing for worker productivity at the office/corporation scale. The convergence between factory design

and scientific management were of critical consideration (Braverman, 1998). Similarly, hiring architects and designers to increase worker productivity, satisfaction, and comfort remain as prevalent today as they were in the 1950s with the design of the office cubicle, the transition to open floor plans, coffee-culture aesthetic, retrograde warehouse, and bright colorful designs (Saval, 2014).

Innovation district strategy takes these design practices and scales them to the district level. No longer is it about ensuring worker productivity within the confines of the office but encouraging production spills beyond office walls into the urban realm (Stehlin, 2016). This difference is critical as the productive expectations of the individual are now also managed by the various stakeholders building innovation districts.

Contemporary tech giants such as Facebook and Google, like the powerful company towns before them, moved beyond the internal design of their company operations to include housing, transportation infrastructure, and recreation amenities (Streitfield, 2018). A few company towns also incorporated civic amenities (Green, 2010). These examples demonstrate how individual corporations used design to boost productivity and profit. What is different about innovation districts is that similar design endeavors are used, but now the governance of the innovation district occurs through an amalgamation of public, private, non-profit, and educational institutions. This has implications for the public spaces engulfed within the border of the innovation district and the people who inhabit them. Using my cases, I demonstrate the role design plays in ensuring the space of the innovation district is continuously humming with activity.

Boston: District Hall

Billing itself as a first public-private partnership focused on creating a civic space targeting innovation, District Hall in Boston's Seaport Innovation District is a dedicated civic space where the innovation community can gather and exchange ideas, its homepage proudly haling it as "a new home for innovation in Boston" ("District Hall Webpage," 2018) (see figure 36).

Figure 34: Boston's District Hall white board greeting, orienting, and directing people

Supporters of Boston's Innovation District hail District Hall as widely successful. As the first public innovation center in the United States, it put Boston on the map and today serves as a model for the development of public innovation centers. It is an established template where gig workers can constantly connect to the platform, where entrepreneurs can connect with other startups for resources, and where the general public can continuously access Wi-Fi connectivity (see figures 36 - 37).

Figure 35: Front of District Hall

Figure 36: Height of District Hall in comparison to its surroundings

District Hall, its name a prominent representation of civic centrality, serves as a branding mechanism to heighten the reputation of the Boston Innovation District. In addition to its monumentality, District Hall is a good example of the centrality of innovation in society, as well as what design reveals about the new world of work. The trajectory, thus far, of District Hall, also demonstrates the strength of the market in determining highest and best use land values.

The benefits provided by District Hall include social connectivity, blazing fast WiFi and Internet access, and easy access to transportation (government official, personal interview, 2016). District Hall both serves as a space to congregates a nexus of activity in cheap space while also marketing and framing the vision for the Boston Innovation District.

According to Hacin + Associates, the architect firm behind District Hall, the design of District Hall seeks to convey the feeling of a "public library meeting a community center" (designer, personal interview, 2016). Shaped by conversations with Kahn Pederson Fox, the lead designers behind the Seaport Innovation District's master plan, the design of District Hall required flexibility to accommodate a number of possible eventualities. The aim was for the architecture to provide a 'hack aspect' feeling, come across as an enclosed outdoor space, capture people's imagination in ways other spaces around town had not done, and had to be correctly calibrated to the millennials.

Classrooms and assembly spaces line the front structure of the building leaving the back structure available to accommodate an open floor plan co-working space. Clusters of two-person or four-person tables, couches with low lying coffee tables, and a long rectangular table to

accommodate eight people is positioned in the center of the room. Additional workspaces line windows that look out into the backyard. All the furniture is moveable and the plethora of floor or wall electrical outlets ensure batteries are constantly charged. The walls are lined with writeable material and the free Wi-Fi password (Innovation!) are there for convenience. Two retail establishments located in the building serve to keep the space open for 16 hours per day: Brew, a coffee shop that opens its business at 8 am and Gather, a full-service restaurant and bar that closes its doors at 2 am.

District Hall's BRA agreement states that the purpose of a public innovation center is to make the city more competitive in attracting emerging innovations, businesses, and jobs to Boston, retaining starts and innovations, and promoting innovation in existing Boston-based businesses (*District Hall 121B Agreement*, 2013). Within the agreement, activities that qualify as innovation related and are accepted on premise include:

- Storytelling, idea generation, research, design, product development/improvement, demonstration, entrepreneurship, new business formation, access to business and market opportunities;
- Create opportunities for conversation, mutual learning, interdisciplinary collaboration, open-ended exploration, problem-solving, and networking;
- Improve access to and development of talent and access to capital;
- Create or improve opportunities for collaboration within or across the education, business, government, and civil society sectors;
- Seek to improve the cultural, urban, physical, institutional, and policy environment for innovation.

To date, District Hall has hosted events such as Rock Band competitions, parties on the street, weddings and receptions, and galas ("District Hall Webpage," 2018). That these events meet the specifications for the use of space either points to the complication of pinning down the inputs of innovation or it represents how public space is adapted to market demand.

Detroit

"Place-making is critical to create the culture and reviving the density for the people doing the innovating. The innovating itself comes from the creativity of the individual

doing the work. But without the place-making they don't want to be in that space to do the work. So that is why you're seeing growth in the region happen in areas that have superior place-making" Foundation Head, personal interview, Detroit, 2015

"[T]he most important thing is not so much the development of the individual patent or issue, but can the culture of the district be one where it is walkable, bikeable, and hyper caffeinated? Cause that is where creativity happens."
University Executive, personal interview, Detroit, 2015.

Many efforts to reverse decline in Detroit focus on remaking the built environment though placemaking, many of which targeted the revitalization of the greater downtown. Adopted tactics, such as waterfront redevelopment, casino construction, and sport-led regeneration, are congruent with urban revitalization efforts to harness a tourist economy (Eisenschitz, 2010; Grodach & Loukaitou-Sideris, 2007; Klingmann, 2007). In the 1970s, beginning with the five-term tenure of Mayor Coleman Young and continued throughout Mayor Dennis Archer's two terms in office, revitalization was always closely tied with the physical environment. When Young entered office in 1974, Detroit-based corporations were in the process of building coalitions to address causes ailing the city. Two influential organizations included the New Detroit Committee of 1967 and the Detroit Renaissance Inc., of 1973 (Benyon & Solomos, 1987). Mayor Young leveraged support of the business community through these coalitions, particularly under his initiative, Moving Detroit Forward: A Plan for Urban Economic Revitalization (Manning Thomas, 1990). This bold initiative sought to finance $3 billion worth of improvements through federal and state funds allocated over a five-year period (Neill, 1995). From this fund, Detroit's riverfront slowly developed through flagship projects such as the Renaissance Center, a collection of towers for office, hotel, and retail use, funded through private-public partnership with the Detroit Renaissance Inc.; the Joe Luis (Hockey) Arena; the extension to Cobo Hall, Detroit's convention center; and other smaller projects such as the Max Fisher Riverfront Apartments and Hart Plaza. To connect the major riverfront establishments to the entertainment neighborhood known as Greektown, Young secured funding for the Detroit People Mover, a two-mile ring light railway (Eisinger, 2000).

During Mayor Young's tenure, the Michigan legislature developed state-based intervention approaches focused on targeting delineated boundaries. A series of public acts were enacted to create boundaries with jurisdictional authorities (DiGaetano & Klemanski, 1999). PA

198 enacted the Plant Rehabilitation and Industrial Development District. PA 575 enacted
Downtown Development Districts, Development Authorities, and Tax Increment Finance
Districts (Bieri & Kayanan, 2014). Three additional legislative acts created the Economic
Development Corporation, the Downtown Development Corporation, and the Detroit Economic
Growth Corporation (DEGC). The establishment of the DEGC ushered in an era of project-led
approach to development with tax breaks and incentive packages (McCarthy, 2002). In 1994,
President Bill Clinton implemented empowerment zone policies specifically to address issues
that produce economic, environmental, and social improvements. That same year, under the
Dennis Archer Mayoral Administration, Detroit secured $100 million in federal funding over ten
years dedicated to increase economic development within a geographic span of 18 square miles,
an overlay that includes the property of the Big Three automakers, financial institutions, and an
additional 80 programs scattered across the space (Boyle & Eisinger, 2001).

These efforts contributed to the beautification of the downtown core, but they could not
stop population decline. Facing increased levels of poverty within the central city, higher taxes
were imposed to compensate for the eroding tax base. These were not sufficient to compensate
for the loss of population and income and resulted in a decline in services. This cycle of
disinvestment and Detroit's ongoing borrowing practices to pay off debts reached its climax in
2013, the year Detroit filed for bankruptcy, the largest filing in US history. One direct connection
between bankruptcy and the strategic aims of the Detroit Innovation District was the focus
generated on blight removal. The final Plan of Adjustment prepared by Emergency Manager
Kevin Orr secured $1.4 billion for public services and blight removal (Bomey, Helms, &
Guillen, 2014). This reinvestment of unsecured debt funded Detroit's Blight Removal Task
Force Plan, a multilevel strategy to address and/or demolish the 84,641 blighted structures and
vacant lots (*Blight Removal Task Force Plan*, 2014).

The re-envisioning and remapping of Detroit through the Blight Removal Task Force
Plan, as well as other extremely detailed documents, such as the Detroit Future City Strategic
Framework Plan (*Detroit Future City: 2012 Detroit Strategic Framework Plan*, 2013), build on
the momentum of collaboration and influenced the siting for the innovation district in a pre-
imagined boundary already targeting growth strategies and increased land values. The Detroit
Future City Strategic Framework influenced concentrating on the neighborhoods which were
ultimately included within the border of the Detroit Innovation District. Detroit Future City, an
extensive report that served for many years as a strategic framework for the city, divides the city

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into five planning elements: economic growth, land use, city systems, neighborhoods, land and building assets. The report does not remove the focus on manufacturing, but it does suggest diversifying the economic base to include food processing sector, medical technology, education and digital/creative industries, while emphasizing the need for targeted education and training programs. Within the plan is a specific focus on increasing the value of land and investments in the city in places with the highest potential of jobs. This undergirds reasoning to focus on the central business district for the Detroit Innovation District but also leads to critiques that economic development efforts target the downtown while the remainder of the city continues to shrink (Moskowitz, 2015).

Stakeholders for Detroit's Innovation District face the uphill battle of converting a declining city into a thriving innovation district. Encompassing all the central business district plus two residing neighborhoods, the 2,750-acre landscape of the innovation district features large gaps between developments, derelict infrastructure, expansive parking lots, and wide thoroughfares built to accommodate the heavy flow of daily suburban commuters. Not only must stakeholders build the right infrastructure into the innovation district, they must also demonstrate that the district is humming with activity. Only in this way, will the concept succeed in rebranding Detroit as an attractive place to do business.

Guidelines for the Detroit Innovation District demonstrate recognition of steps to convert a historically post-industrial economy into a tech-economy. Skills training, investment in research and development, fostering university tech-transfers, and strengthening emerging clusters are featured prominently in drafts circulated by the advisory committee and working groups. However, the lack of density in the district overshadows these aims. Detroit's lack of basic infrastructure is a considerable obstacle for building a tech economy. Questioning the feasibility of the successful implementation, one tech consultant expressed, "[I]t is possible to discuss tech transfer failures from Wayne State University, but it is also necessary to discuss basic city issues, safety issues, and car vehicle insurance issues" (2015, personal communication). To date, Detroit Innovation District stakeholders do not distinguish between investing in the tech economy versus investing in place. Instead, stakeholders latch on to this economic development strategy to fund blight removal and rebrand Detroit.

Amongst stakeholders, there is an acute awareness of the passing of time and Detroit's inability to compete against other cities for global city status. The pressure to compete with other cities is readily acknowledged in comments such as, "this is a war for talent" (economic

developer, 2015, personal interview) and, "they [city officials] need to be running but are actually moving at a very slow pace" (venture capitalist, 2015, personal communication). The result of this concern manifests into a focus on efforts that yield immediate results: namely, placemaking. Highlighting the importance of placemaking, one executive for a private tech company stated, "place-making should lead it [the innovation district strategy] because you can do what they call 'lighter, quicker, cheaper[26].' You can do things very quickly to change the perception about Detroit, what is going in Detroit" (personal communication, 2015).

This sentiment on the importance of place-making and design is a reoccurring theme amongst stakeholders and it translates to a problem of visibility and funding. If the Detroit Innovation District Advisory Group and the sub-working groups cannot demonstrate they are succeeding in implementing the strategy, then they can no longer secure funding. But, providing evidence of innovation is tricky. Frequently, respondents describe implementing the innovation layer as "squishy," meaning not concrete enough to develop tangible measures. As expressed by an executive of a foundation heavily involved in the implementation of the Detroit Innovation District, "among government officials the strategy became about activating blighted areas and less about the innovation piece for the city" (2015, personal communication). This switch is justified by the fervent belief and blind faith in place-making as the primary tool to attract and retain talent. In the eyes of the stakeholders, creating a welcoming, safe, but also "cool" place is the first step in attracting talent and firms of the tech economy. As one respondent vehemently argued:

> "[P]eople aren't going to decide to live here because it is an innovation district. I mean, they are going to decide to live here cause it's like a cool, classic, mixed-use district. They want the bars and restaurants, they're not moving here because there is some worker space on the corner" (Planning and development nonprofit executive, personal interview, 2015).

Based on the contemporary rhetoric on the inputs for innovation and based on current forms of capitalist extraction, the Detroit Innovation District stakeholders are not misguided in their assessments and in their faith of place-making impacts. If innovation requires an open, networked, and activated environment, then design is one tool to achieve this. Local government,

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[26] The Project for Public Spaces adopted and popularized this phrase, which was originally coined by Eric Reynolds of the Urban Space Management firm. The phrase symbolizes an inexpensive and immediate solution to make public spaces more dynamic for everyday use.

private, university, and nonprofit leaders champion the opportunity to invest in a wide-range of efforts within their jurisdictions that may result in a heightened marketability of place. The booster promotion of innovation district strategy empowers local leaders faced with growing austerity.

St. Louis: Thursday night's Venture Café

St. Louis entrepreneurs are well aware that the Cambridge Innovation Center located in the Cortex Innovation Community is the place to be on a Thursday evening. Every Thursday, the Venture Café Foundation, a non-profit organization, holds programs and lecture series targeted at entrepreneurs (see figure 39). Bringing over 500 people together on any given Thursday, St. Louis' Venture Café in St. Louis brands itself as the 'Largest weekly event for innovators in the world' ("St. Louis Venture Cafe Homepage," n.d.). The mere size of the event means that the space within Cambridge Innovation Center bustles with activity.

Figure 37: Typical Program for Thursday's Venture Café

The Lineup:

4:30 to 5:00 – Maximizing your Venture Cafe Experience | VenCaf Volunteers
Details

5:00 to 6:00 – Innovation and Investment in Agriculture | Monsanto Growth Ventures
Details

5:00 to 6:00 – Lean Coffee | Monsanto Women in IT
Details | RSVP

5:00 to 6:00 – Office hours with Michael Lamb | Opt It – Michael C Lamb
Details | Book a Slot

5:00 to 6:00 -- Why earning 6% can be better than 7% | Money With Impact
Details

6:00 to 7:00 – Changing St. Louis Commuting Behavior | RideFinders
Details

6:00 to 7:00 – Closing the Education Opportunity Gap | ExpandED Learning Collaborative
Details

6:00 to 7:00 – Office Hours with The BALSA Foundation | The BALSA Foundation
Details | RSVP

6:00 to 7:00 – SQ1 Fall Bootcamp | Center for Emerging Technologies
Details

Check out the full calendar for more info.

Venture Café is managed by Cambridge Innovation Center, a co-working and incubator space headquartered in Cambridge, Massachusetts with additional locations in Boston, Miami, Philadelphia, and Rotterdam.[27] One executive for CIC discussed the role of Venture Café and District Hall as providing the "glue." The glue is an unmeasurable connection between humans that is abetted by the surrounding physical infrastructure. Glue is functioning when a person can show up, meet others, and get connected into the network of support. The rise in ubiquitous technology and the reduced size of computers contributes to the ability to concentrate a large amount of people within a closely confined space. This speaks generally to the overarching aim of the innovation district, but it also applies to the incubators and accelerators that host entrepreneurs in their buildings and provide them with administrative support.

The weekly Venture Cafés are entirely voluntary. At the same time, registration is required to receive a free drink ticket and a name tag. Every week Venture Café staff send reminders to people in the database to remind them of upcoming events. In addition, attendees accrue points for each visit. This number is displayed prominently on a name badge and becomes a point of conversation. The number also serves as a signal. If someone does not have a number because it is their first time attending the event or if they have a low number this indicates others to approach them to guide newbies through the networking process. Those that accumulated a larger number are considered more experienced and are tapped by Venture Café staff (or social contract) to mentor new attendees.

Figure 38: Inside the CIC during the Thursday Venture Café nights

Sources: St. Louis Venture Café website ("St. Louis Venture Cafe Homepage," n.d.) and Crain's (Elder, 2016)

That the Thursday night Venture Café event draws such large numbers of people is telling of the support structures entrepreneurs need to grow their business, and conversely then,

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[27] One executive from the CIC in Cambridge refuses to call the institution an incubator as "incubators are for babies" (personal interview, 2016). Despite this, the CIC operates in the exact manner as other incubators in its class.

the amount of risk they take on as individuals. Not only are entrepreneurs reliant on the 'product,' but they also need the tacit knowledge transmitted through connections and networks and the support services incubators and accelerators provide.[28] This demonstrates the amount of risk individuals take on and is also indicative of the social pressure placed on individuals to succeed as entrepreneurs.

Park Center, Stage Set

In a presentation on the master plan for Park Center, the Foundation, in conjunction with Gensler (a global architecture, planning, design, and consulting firm), and Hines (a real estate investor), profile the ideal resident of Park Center. Her name is Sarah:

> "Sarah holds a master's degree from Duke, she remained in the Research Triangle Park region for a professional position in life sciences. She lives in a townhouse in Durham, a few miles from her office and prefers to bike to work. *While her current income limits potential spending, her career prospects and earning potential are strong*. She is health conscious, eating organic and exercising—after work yoga classes keep her centered. As a young professional, she is often too busy to prepare food at home and relies on healthy, prepared meals. The competitive cost of living affords her discretionary income to spend on clothes, share after work drinks with colleagues and go out with friends on the weekend" (Park Center, Research Triangle Park, 2015, emphasis mine)

Sarah is a knowledge-worker and her imagined live-work-play lifestyle drives design decisions for Park Center. Tellingly, the master plan for Park Center identifies the following 21st Century space needs to attract and retain knowledge workers:

- Improved Park visibility within the region and clear entryways
- Creation of a vibrant central district
- Active retail focused on food and beverage
- High quality, attractive multifamily housing at key nodes
- More integral and defining university presence

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[28] The greatest difference between an incubator and an accelerator is the amount of time spent within the walls of the structure; an incubator will host startups during gestation periods and for longer periods of time, while an accelerator will host startups at later stages in the scaling cycle.

- Space for business support services

All these are presented in at a walkable scale and include street-level retail and entertainment, designated open recreation spaces, and housing in walkable proximity to work within a pedestrian and bicycle friendly environment. The primary focus is an urban fabric that encourages a density of people within their physical environment. The master plan for Park Center, in addition to two other neighborhoods that will be built after Park Center nods to environmental sustainability by integrating a regional transit framework that includes commuter and light rail transit to discourage an over reliance on vehicular transportation. It also seeks to balance the connection between humans and nature by building in spaces for recreation, and sustainability measures such as wetlands, carefully considered landscapes, and natural systems (*The Research Triangle Park: Master Plan*, 2011).

Figure 39: Park Center master plan

Source: Park Center site plan (Surface, 2018)

Figure 40: Park Center machete

The Anne T and Robert M. Bass Initiative on Innovation and Placemaking, and organization that has partnered with the Brookings Institution and the Project for Public Spaces to derive a design companion for their innovation district recommendations, label this aspirational type of environment a 'social test bed' (*Eight Placemaking Principles for Innovation Districts*, 2016).

The concept of the social test bed, an entirely activated environment to foster innovation, closely resembles what Autonomist Marxists call the 'social factory' (Negri, 1989; Terranova, 2000). The social factory shifts the centrality of the industrial factory and the form of production created within the factory beyond the factory walls and into the fabric of our daily lives.

The idea of the social factory as of the all-encompassing space that incentivizes workers to stay and work through play closely parallels the rhetoric undergirded in innovation district strategy. The design for Park Center ensures seamless movement between work and play for an affluent professional class through the inclusion of a horseshoes field, yoga garden, tai chi lawn, outdoor alternative work charging stations, artisanal garden, and bbq pits. Example eating

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options include an artisan creamery, gourmet grocery, a juice express, taqueria/Mexican, and retro homestyle restaurants" (*Park Center, Research Triangle Park*, 2015:55) (see figure 28).

Figure 41: Park Center marketplace amenities
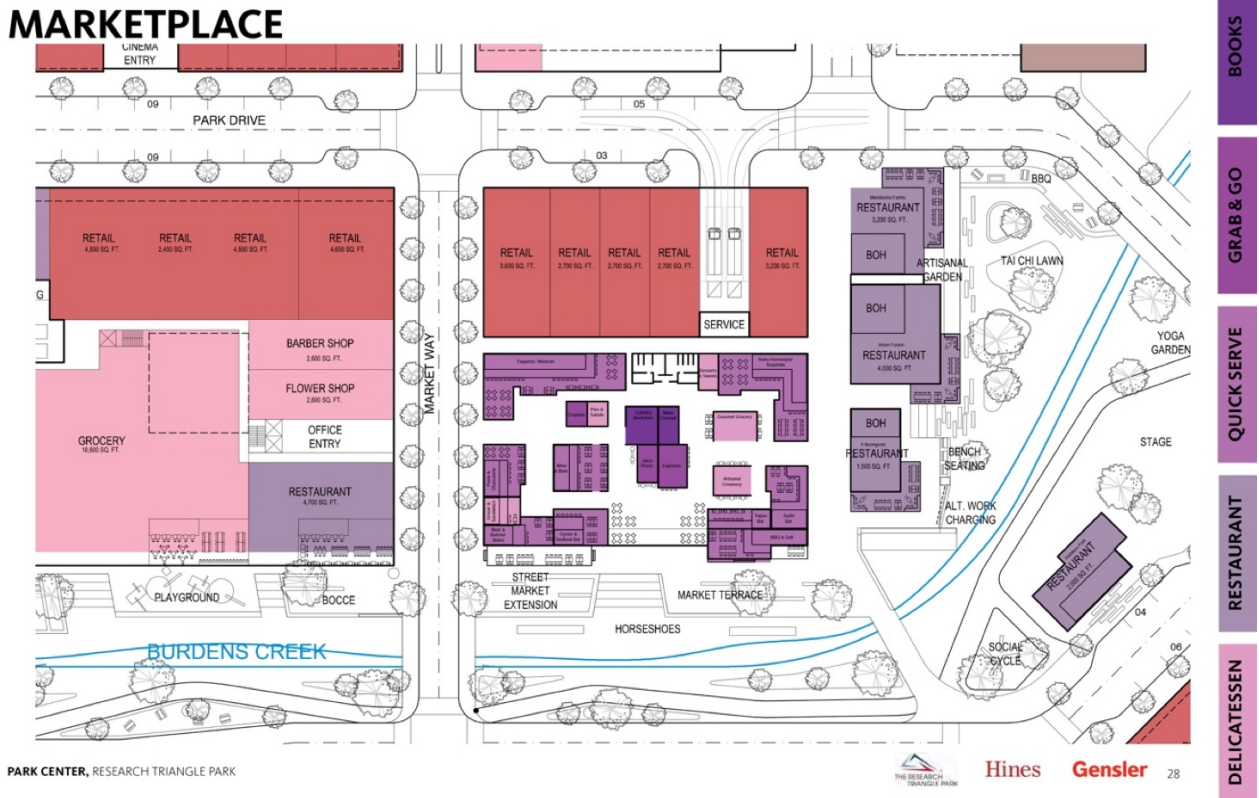
Source: Park Center Masterplan (*Park Center, Research Triangle Park*, 2015)

In addition to ensuring the right diversity of product is in place, land use changes will also support linkages with local universities and international research centers and provide commercialization support. Place is implicated in all these transactions. The master plan aims to "Provide a distinctive, vibrant, mixed-use nexus for research in one or more areas of the park to foster innovation, promote social interaction, and create signature destinations for the RTP" (*The Research Triangle Park: Master Plan*, 2011:20). Theorizing the role of the brand, Klingman (2007) states that the brand is not about perfecting the object, but of transforming the subject. This transformation of the subject is of critical importance because it is a larger reason for the existence of the innovation district. It is this transformation that the executive from the

Foundation emphasizes when discussing the importance of providing the right product to create the stage:

> "[W]hen we developed Park Center, we were looking at the structures for innovation. But I think about the structures for these kinds of experiences as being like the structure you create in the theater. It is a stage set. You want to make sure that all the pieces of the stage set are there so that the actors can go out on to the stage and make it a great experience. And if they own that experience then you are going to hear about it" (foundation head, personal interview, 2016).

The stage set for Sarah, and similar Park Center employees, residents, and visitors, must include the necessary elements to attract them and provide them with a unique experience. The perpetuation of construing individuals and their simple interactions or being in space as opportunistic catalysts for innovation and profit speaks to scholarship on the economization of humans and the reduction of people to the financial (Brown, 2015; Murphy, 2017).

Dublin

> *"The success of Smart Dublin will depend on your input"* ("Smart Docklands
> Homepage," 2018)

Embedded on the homepage of Smart Docklands is a 3:12 minute video magnificently featuring the Silicon Docks. An inspirational instrumental score plays in the background throughout the entirety of the clip while on the foreground a montage of colorful images with captions that boast of the presence of global tech companies such as Google, Accenture, Yahoo, Facebook, to name only a few; the co-location of workers, businesses, and residents; a vibrant startup scene; multiple wireless connections to include Dark Fiber, Wi-Fi, 4G, Lora, NB-IoT, SG, and Sigfox; a smart integrated transportation system; the concentration of people in the square; and even a wake boarder doing a back roll off a ramp on the Liffey river. All this activity, the video boasts, within the 1.25 mile sq walkable—or jogging, the video includes between parentheses to appeal to the health-conscious city dweller—density of the Docklands. A series of phrases appear on the screen throughout the video branding the Silicon Docks as "The most connected district in the world," connecting the world's "most advanced city port" to the home of "world leading tech companies" making it a testbed for "world leading connectivity" ("Smart Docklands Homepage: The world's most connected business and living district," n.d.).

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These superlatives are not exclusive to Dubliners. On February of 2018, Harvard's Technology and Entrepreneurship Center the Docklands convened the TECH Smart Cities Innovation Accelerator, a three-day learning event. The event was held at the Silicon Docks, selected as an exemplar model for innovation. This application-only 'immersion accelerator' brought together 23 Chief Technology Officers from across the globe. Together with Harvard leadership, they derived the 'Dublin Principles,' an agreed upon definition of what a 'Smart District' in a city should be and one that emphasizes the success of Smart Dublin efforts (*2018 TECH Smart Cities Innovation Accelerator*, 2018; Kelly, 2018; SmartCitiesWorld, 2018).

Urban governance institutions in Dublin have endorsed efforts to turn Dublin into a so-called 'Smart City'. The pilot, called Smart Arena, was a project led by Dublin City Council in collaboration with representatives of area universities and tech companies such as Google, IBM, and Cisco. Smart Arena is based on the premise that arenas are a microcosm of urban life. During an event, the layout and management of an arena must facilitate ease of mobility amongst large crowds, ensure safety and security of the customers, accommodate customer consumption and waste disposal needs, and provide seamless, high-speed Wi-Fi access to all mobile carrying individuals, while also serving as the source of entertainment. The arena environment was envisioned as a 'work bench,' an optimal space to experiment with new technologies and data tracking devices, which can later scale to the remainder of the city.

In 2018, Smart Arena strategy transferred over to the Silicon Docks ("Smart Docklands webpage: Ecosystem," 2018). Dublin City Council selected Silicon Docks in part because it houses the largest concentration of tech companies and their employees in Dublin. More importantly, Dublin City Council and corporate collaborators, operate on the collective understanding that the culture of the people residing in the Docklands is such that they would tolerate the nuisance of designing a space with urban interventions for cutting edge outcomes. The overarching assumption is that the technologically literate demographic of the Silicon Docks can withstand change and disruption. As an international trade consultant in Dublin put it:

> "We'll get them [infrastructure developments] sorted out on the small space where
> there is a tech population and a community that would recognize a) the value of it
> and b) probably tolerate any disruption to pavement being dug up to put a new cable
> or whatever." – (personal interview, September 7, 2016)

The demographics of Silicon Docks contribute to a collective understanding that the innovation district stands as a separate entity from Dublin City. The potential for new development to be met with critique and resistance is a hidden benefit of designated an exclusive space for the people and the firms of the innovation sector. In fact, partners in the Smart Docklands endeavor are primarily private companies heavily invested in prosumption activities. Private partners include Accenture, Connect, Enable, Google, Huawai, Vodafone, Microsoft, Deloitte, IBM, intel, AT&T, 3, Ericsson, Dell, and Cisco. All these companies stand to benefit from data collected from users in space, in addition to using the Docklands as a test bed for their innovations.

Dublin's Smart City strategy resembles what Kitchin and Dodge (2011) have termed code/space, that is: configurations in which software and the spatiality of everyday life become mutually constituted. For example, in a recent event, Dublin City Council partnered up with analytics company, ThinkSmarter, to embed a perimeter of the Docklands hosting Oktoberfest with monitors to track the movement of over 66,000 visitors. As declared on the Smart Docklands website, one benefit of this pilot project was the ability to "monitor dwell time" and tackle "anti-social behavior" ("Smart Docklands webpage: Oktoberfest WiFi Analytics," 2018). The small concentrated space of the Silicon Docks, the branding mechanisms that promote the district as a space of the future, and the constructed subjectivity of people's responsibility in participating in the project of future making all contribute in legitimizing smart city efforts. At all points in the day, subjects are expected to conform to socially accepted behavior. Thus, not only does policing (of the self and of the surveillance system) occur, but these companies can also monitor consumer behavior and exploit that for profit. The concentration of space assists in deriving data for analytics. That over 40,000 people work in the Silicon Docks and 26,000 individuals reside there is not lost on the tech companies involved in Smart Docklands leadership.

The Smart Docklands initiatives do not conceal attempts to globally scale innovations derived from their Silicon Docks real-life testbed. They position these potentialities as improving the lives of those who live and work in the Docklands. A recent report by Mirvac, an Australian property owner and manager, in partnership with WORKTECH Academy, a global knowledge online network based out of the United Kingdom, highlights the rise of a new subjectivity in this way, "[A]n alternative perspective is emerging which positions the users of the innovation precinct as 'creative citizens', not just passive consumers of smart services…it must depend on

having active participants, not compliant observers" (pg 12). This sentiment mirrors the quote at the start of this Dublin section, that is, that the success of the Smart Dublin initiative depends on on the activity of individuals. Whether or not this activity is passive or active matters less than having presence in place.

Discussion

Designing an innovation district, a space to house today's tech workforce, requires two layers: the material and the immaterial. What I label as material are the physical and tangible infrastructural elements discussed by stakeholders as necessary for innovation. In interviews, the following items were listed as the material elements of the innovation district.

Figure 42: Material elements of the innovation district

3-4-star hotel	formal and informal space	places that foster support
3rd spaces	gathering spaces	printing services
amphitheater	graduate students	quirky buildings
arts festivals	green space	R&D facilities
bars	grocery store	residential blocks
bench areas	high-efficiency homes	restaurants
big office towers	high-based space	retail
(500-100 people)	historical buildings	running trails
bike lanes	transformed into cool	shared services
bike share	high-tech spaces	single-family homes
boutique hotel	hospitality	small-batch manufacturing
co-working spaces	hot-desk arrangements	small tech start-up space
coffee shops	hotel	small warehouses
commercial spaces	housing	small workspaces
commuter rail	IoT ready	smaller office space above
condos	lab space	residential
convention center	landscaping	space for serendipitous
outdoor space	lawyers	interactions
courtyards	light-industrial activity	sustainable coffee
craft brewers	low-tech makerspaces	tax accountants
craft cocktails	makerspaces	tech support services
destination retail	microbreweries	tech transfer facilities
dining	neighborhood retail	technically advanced homes
early stage innovation	nice boroughs	transit oriented development
educational institutions	nice places to eat	transit nodes
entertainment	office space	tremendous focus on safety
event space	office tower	walkable
fabrication space	open air market	Wi-Fi connectivity
fiber-optic infrastructure	parks	workforce housing
food trucks	PhD Students	

However, these material artifacts alone will not active the space. Activation depends on interaction between the material infrastructure and the flow of activity. This additional layer is the immaterial. Whereas earlier economic development efforts (i.e., Olympic bids, stadium construction, convention centers, etc.) succeeded simply by providing the right product to secure consumption from users, the innovation district depends on creating an activated environment to foment the right experience.

Considerations of the innovation district must incorporate the amenities considered essential for a supportive innovation ecosystem (i.e., incubators, residential amenities, boutique hotels, and craft breweries) *in addition to demonstrating the presence of buzz.* Designing for buzz is what distinguishes the way design is implicated to activate the environment to derive profit from place and from the individuals within that space. In order for the design of the innovation district to promote an experience, space must be activated in a particular manner. Considering that the rhetoric for innovation today emphasizes the importance of collaboration, openness, and interaction, then the existence of people in place is of critical importance. Below are terms interviewees used to describe the immaterial layer of the innovation district:

Figure 43: Immaterial inputs for the innovation district

access	expensive	protected
activated	experience	proximity
affordability	experiment	quick results
architecturally interesting	flexibility	quirky
art related programs	fun	R&D
attractive	futuristic	range of small ideas
authentic	high-quality	receptive
bike-able	hip	relaxed
buzz	hyper-caffeinated	security
collaborative	inspiring	sense of place
commercialization	interactive	serendipitous
community	knowledge intensive	smart
competitive	legible	social consumption
concentrated	lighthearted	spillover
connected	like-minded	spontaneous interaction
consumers	linear	stage-set
contextual	live-work-play	storytelling
convergence	marketable	strategic
cool	millennials	structure
coordinated	mixed-use	talent
creative	monitor	technology
critical mass	multi-tenant	transparent
culture	multifaceted	trendy
density	networking	up and coming
different	open	urban
distinction	open to the public	urbanity
diversity	organic	walkable
dynamic	people-centric	welcoming
engaging	pop up	youth
	programming	

Importantly, this layer \ approaches the individuals' needs and cognitive capital differently from earlier productive landscapes. The landscape of the innovation district points to the construction of the individual as a producer/consumer –what Toffler (1984) originally termed a 'prosumer.'[29] For Toffler, the diffusion and access to technology shifted the power of the production process into the hands of ordinary people.[30] Optimistically, Toffler believed that the prosumer would be the outcome and agent of a new civilization, what he termed the Third Wave. Whereas the Second Wave, tied to the factory and the nation state, was characterized by standardization, specialization, synchronization, concentration, maximization, and centralization, Toffler conceive of the Third Wave as a disintegration of this through flexible work arrangements, the ability to command where and work will take place through contractual work with companies.[31] These are the new work arrangements that innovation district strategy attempts to accommodate so to further extract value from space and prosumers.[32]

Stakeholders building innovation districts base their decisions on the idea that innovation requires a dynamic physical realm that encourages proximity and knowledge spillovers. It follows that the innovation district must display this. If in the eyes of an entrepreneur the innovation district does not provide the right product to scale a business or the right brand as a networked and activated environment, then the innovation district will not sell.

The design of the innovation district demonstrates that tech culture is permeating the urban realm through reconstructed landscapes that purposely employ design to create a seamless flow of production and make the urban fabric of space a generator of innovation (Stehlin, 2016). As discussed, work today occurs outside of the office more so than inside firm walls. The innovation district aims to concentrate these flexible workers within the actual offices and firms,

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[29] The capitalist economy has always been dominated by prosumption (Ritzer & Jurgenson, 2010). Indeed, for Marx the Industrial Revolution's pre-eminent economy was focused on production, though Marx did not negate that production involved consumption. The differences in contemporary capitalism are threefold. The first is that the rise of internet and Web 2.0 has increased the number of prosumers so that today there are more prosumers than consumers and producers; the second is that the consumer is now more conscious and consensual in their participation (Comor, 2011); and the third is that under 'prosumer capitalism' control and exploitation take on a different character and there is a trend toward unpaid labor (Ritzer & Jurgenson, 2010).

[30] Though Toffler coined the term 'prosumer,' Marshall McLuhan and Barrington Nevitt's *Take Today* (1972) was perhaps the first to connect the idea that consumers are becoming producers because of electric technologies.

[31] Countless scholars have also documented this economic shift. For a select few see Scott (2008), Piore and Sable (1984), and Bell (1973).

[32] Here, the work of digital scholars on prosumption is important. Digital scholars adapt the concept of the consumer, making its definition and application more robust by applying the term to Web 2.0 and the role of individual labor in platforms such as Facebook, Twitter, and YouTube (Fuchs, 2014; Scholz, 2016; Terranova, 2000). Through activity on platforms, the individual both produces the content for the platforms while also consuming the advertisements tailored to that individual based on their activity. In this way, the user is at once the producer and the consumer. Consumer scholars also leverage this concept, critiquing Toffler for neglecting to notice that the prosumer still acts within the confines of the market system and through the exchange of commodities, thus negating Toffler's hope for change (Comor, 2011).

in addition to residential spaces, places of entertainment, and the public space of the plazas, the streets, and the sidewalks. In this sense, the space of the innovation district is a social factory (Gill & Pratt, 2008).

The role of technology in the growth of complex, networked, global supply chain capitalism has resulted in the monitoring of workers and machines and in ensuring optimized performance and production (Kanngieser, 2013). As a type of social factory, it is not illogical to extend the management techniques outside of firm walls to ensure optimized performance and production of the people in all domains of the innovation district. Further exacerbating this constant production of work, advanced information communication technologies are implemented for rapid and continuous information exchanges, amenities and housing opportunities in proximity to work enforce the live-work-play mentality; place-making principles are applied to manage (and blur) the public/private realm creating spaces where people can comfortably extend networks and generate new insights outside of the office; and the rise of smart city applications serve to track everyday people in public space.

Chapter 5: What is at Stake?

"It becomes crucial to know what is being built in the city and how the newly built spaces are endowed with hegemonic meaning, in order to understand how individuals and collectives are ideologically interpellated as citizens" (Balibrea, 2001; pg 188).

Innovation districts contribute to the splintering of the city. This is evident primarily from the changing demographics in the space of the innovation district. Following the work of Foucauldian scholars such as Murphy (2017), Lindtner (2017), McRobbie (2016), and Brown (2015), I demonstrate how an assemblage of actors, from the state level to local growth coalitions, eagerly encourage 'entrepreneurial living' (Lindtner, 2017), a practice of self-provisioning that shifts risk from the state to the individual and exacerbates issues of precarity for the entrepreneur sitting squarely within the concentrated space of the live-work-laboratory.

Innovation Districts as Citadels

Innovation districts, particularly Park Center, are in early stages of implementation. It is not possible to draw firm conclusions on their outcomes, not that measuring outcomes against stated aims was ever the intention of my research. Despite this, it is possible to point to certain trends that demonstrate a shift in demographics and a rise of land value and occupancy rents within the space of the innovation district. Collectively, these data points support the claim I make that the space of the innovation district is a citadel for a young, childless, educated, professional, likely-white individual. Coupled with data on rising real estate prices in the area, it becomes evident that the gap will widen between the individuals living and working in the space of the innovation district and those who do not have the skills to work or finances to afford living there.

The changing demographics within the space of the innovation district are consistent in all four urban cases. Park Center remains in too early stages to track shifts in demographics (see tables 5 - 8).

Table 3: Demographics of Silicon Docks compared to Dublin City

Dublin	Silicon Docks	Dublin City
Age 65+	3%	13%
Age 20-44	75%	42%
Childless Households	85%	64%
Non-Irish Residents	47%	20%
<15mins to work	25%	19%
Occupy Professional Jobs	53%	36%
3rd level (from bach onwards)	63%	35%

Table 4: Demographics of Boston Innovation District compared to Boston City

Boston	Boston Innovation District	Boston City
Race		
White alone	88%	53%
Black or AA alone	2%	26%
American Indian and Alaska Native Alone	0%	0%
Asian Alone	8%	9%
Native Hawaiian and Other Pacific Islander Alone	0%	0%
Some other Race Alone	0%%	7%
Two or more races	2%	5%
Age		
18-44	67%	52%
65+	6%	11%
Education		
Bach or more	79%	46%
Occupation		
Male	68%	45%
Female	72%	50%
Households with no people under 18	94%	77%
Family	27%	25%
Nonfamily	68%	52%
Travel Time to Work for Workers 16 Years and Over		
Less than 10 min	12%	7%
Worked at home	4%	3%
Car, Truck, or Van	45%	45%
Public transportation	26%	34%
Motorcycle	1%	0%
Bicycle	1%	2%
Walked	23%	15%

Table 5: Demographics of Detroit Innovation District compared to Detroit City

Detroit	Detroit Innovation District	Detroit City
Race		
White alone	32%	13%
Black or AA alone	56%	81%
American Indian and Alaska Native Alone	0%	0%
Asian Alone	8%	1%
Some other Race Alone	1%	3%
Two or more races	3%	2%
Age		
18-44	56%	36%
65+	11%	13%
Education		
Bach or more	37%	13%
Occupation		
Male	50%	17%
Female	50%	25%
Households with no people under 18	90%	68%

Family	12%	26%
Nonfamily	78%	42%
Travel Time to Work for Workers 16 Years and Over		
Less than 10 minutes	24%	6%
Worked at home	4%	4%
Car, Truck, or Van	59%	83%
Public transportation	8%	9%
Motorcycle	0%	0%
Bicycle	3%	1%
Walked	25%	3%

Table 6: Demographics of Cortex Innovation Community compared to St. Louis City

St. Louis	Cortex Innovation Community	St. Louis City
Race		
White alone	68%	45%
Black or AA alone	18%	48%
American Indian and Alaska Native Alone	0%	0%
Asian Alone	9%	3%
Native Hawaiian and Other Pacific Islander Alone	0%	0%
Some other Race Alone	2%	1%
Two or more races	3%	2%
Age		
18-44	82%	83%
65+	3%	11%
Education		
Bach or more	60%	33%
Occupation		
Male	54%	36%
Female	57%	43%
Households with no people under 18	96%	77%
Family	28%	23%
Nonfamily	68%	54%
Travel Time to Work for Workers 16 Years and Over		
Less than 10 minutes	27%	9%
Worked at home	7%	4%
Car, Truck, or Van	65%	80%
Public transportation	2%	10%
Motorcycle	0%	0%
Bicycle	1%	1%
Walked	25%	4%

Most significant for both Detroit and St. Louis is the increase of white people and drop in black people within the space of the innovation district. For Detroit, between the 2000 and 2016, the white population within the space of the innovation district jumped from 19% to 32%, whereas the black population dropped from 72% to 56%. In comparison to the remainder of the city, in 2016 the white population of the innovation district comprised 32% versus 13% for the remainder of the city. For the same year, the black population in the space of the innovation district was 56% versus 81% for the remainder of the city. Both innovation districts have seen increases in their Asian populations since 2000 and sharp increases in the space of the innovation districts in relation to the remainder of the city, a demographic trend that is reflected in raising rates of Asian populations in Silicon Valley startups (Saxenian, 2002).

The changing demographics in the Detroit Innovation District in relation to the rest of the city shifted in expected ways. There are now more young, childless, educated, professionals in the Detroit Innovation District. Of the people 16 years and over who work in the Detroit Innovation District, there is an increase in proximity to work with more people commuting less than ten minutes to reach their site of employment, a drop in commuting time with an car, truck, or van, and an increase in bicyclists and walkers. Increasingly, more people are working from home.

St. Louis is similar to Detroit in regard to an increase of younger people living in the Cortex Innovation Community from 2000-2016, but the percentage of young people in the Cortex Innovation Community is less than the total for the city of St. Louis. This is explained by the availability of housing in the surrounding neighborhoods and the limited housing availability within the Cortex Innovation Community—an issue the Cortex Foundation is seeking to address. Still, of those living within the Cortex Innovation Community, more households are childless (96%) than the rest of the city (77%), more educated (60%) than the rest of the city (33%), and with people holding more professional jobs (54% male and 57% female) than the rest of the city (36% male and 43% female). Both of these categories have seen an upward trend for the Cortex Innovation Community since 2000. As it relates to commuting times, more people commute less than 10 minutes to work, there is an increase in people working from home, and an increase in bicyclers and walkers. Commuters using public transportation, cars, trucks, or vans has dropped both over time and in relation to the remainder of the city.

Boston and Dublin's innovation district demonstrate consistency in the growth of a young, childless, educated, professional demographic living in close proximity to work. The challenge with these two strong market economies is comparing racial demographics. Boston's Seaport Innovation District, like Detroit and St. Louis, represents a whiter, Asian, and less black population than the remainder of the city. This last point raised harsh critique by Spotlight, the Boston Globe's investigative team, in a study on the absence of black people in the history of the Seaport Innovation District—from development decisions, to leadership, to residential accommodations (A. Ryan, 2017). Dublin's most similar comparison is in relation to the increase of non-Irish residents within the space of their innovation district. This reflects the presence of an international professional class (Sassen, 2001) locating in Dublin to work in the multinational corporations, many of which are concentrated in the Silicon Docks. For the tech-workers in Dublin who can afford to live in the new condominiums, this concentration of expensive housing

and their places of employment contributes to an increase in the percentage of people who live in close proximity to work.

In Boston's Seaport Innovation District, modes of travel and commuting times have fluctuated. Whereas since 2000, more people are commuting less than 10 minutes to work, more people are walking, and more people are working from home, there have been less people using public transportation and biking over time and in relation to the remainder of the city. Changes in car, truck, or van use to arrive at work over time and in relation to the remainder of the city are insignificant, though this is the predominant mode of transportation for almost 50% of the individuals in the Seaport Innovation District and the remainder of the city. These commuting trends reflect challenges the Massachusetts Department of Transportation faces in connecting a peninsula with arteries for delivery truck traffic and existing dockland infrastructure, in addition to congested public transportation lines, and main thoroughfares that once used to accommodate the acres of parking lots for car commuters working in the financial district (Ramos, 2017; Vaccaro & Logan, 2017).

The Brookings report on innovation districts discusses the proximity of innovation districts to low-income neighborhoods as a "focus on expanding opportunities to disadvantaged populations" (Katz & Wagner, 2014). Gesturing to side-by-side co-location invokes the image of trickle-down economics, the image that benefits accrued within the bordered space of the innovation district will spill-over to the remaining neighborhoods, already less fortunate for their lack of inclusivity within the boundary. The problem is that real estate prices in close proximity to the innovation district are rising. The low-income neighborhoods purported to house the service labor are slowly becoming unaffordable to that demographic (see Appendix E).

What is evident in all five cases is the way innovation district strategy worked to target development and create jobs for a particular demographic within its boundary. This strategy was employed during a period of construction standstill due to the 2008 global housing crisis. There were earlier attempts of innovation-led development in cities before the recession, but the strategy worked well after the recession as a way to jump start development after construction was halted and large companies paused on their intentions to develop property in the city. To generate some form of growth, urban actors shifted their attention on entrepreneurs and small startups. However, once the economy picked up, these same actors refocus the strategy on attracting larger companies, which slowly start to displace the entrepreneurs who were once the focal point of innovation district strategy.

Entrepreneurial Living and the Withdrawal of the State

In an opening letter in the 2016 report to President Obama from his Council of Advisors on Science and Technology, the council writes:

> Combined, the innovations that are increasingly within reach provide an
> opportunity to revamp how cities operate at all levels and for all stakeholders.
> Transforming cities around the world in this way is already a race—one that the
> United States cannot afford to lose. It is generating demand for new products, new
> companies, and new skilled jobs in the effort to produce the best urban
> environments (v).

Earlier, in a 2013 State of the Union Address, Obama said:

> ''We're Americans. We are inventors. We are builders. We're Thomas Edison
> and we're the Wright Brothers and we are Steven Jobs. That's who we are. That's
> what we do. We invent stuff, we build it" (cited in Lindtner, 2017; "Remarks by
> the President on Manufacturing and the Economy," 2012)

The success stories of innovators are a continuous source of fascination for policymakers and planning practitioners. Silicon Valley's history of growing from an agricultural landscape to the prime global destination for startups permeates as an exemplar beyond the boundaries of the United States. This is physically evident from the various cluster developments across the globe, many named aspirationally, such as Silicon Wadi, in Israel, Silicon Docks in Dublin, Silicon Cape, in South Africa, Silicon Beach, in Melbourne, Silicon Alley in NYC, Silicon Gulf, in the Philippines, and Silicon Fjord, in Norway to name only a select few (Kit, 2012; "List of Technology Centers," n.d.).

The allure of Silicon Valley and the mythical garage tinkerer turned millionaire is so pervasive that it is actually influencing the way we build and govern our cities and citizens. Part of what the allure embodies is a language of incentivizing risk, testing and scaling ideas, and destigmatizing failure. It is also about the romanticized idea of the entrepreneur as renegade savior, disrupting social conventions to break new ground. This 'entrepreneurial turn' is critical to innovation district strategy. It is critical in terms of securing territory, funding, and attracting

bodies into the profession of entrepreneurship. Furthermore, this ideology perceives individuals as market subjects (Murphy, 2017) and causes individuals to see themselves and each of their interactions as market transactions resulting in an overall sense of 'entrepreneurial living' (Lindtner, 2017).

To begin explaining this, it is necessary to step back and discuss my use of the contested term "neoliberalism". Despite the pushback on the use of the term, I find it useful to extend the concept here. Scholarship on neoliberalism is crudely tied to two strands of reasoning. David Harvey (2005), exemplifying the orthodox view of neoliberalism, defined it as an institutional framework characterized by strong private property rights, free markets, and free trade that liberated entrepreneurial freedom. The second is rooted in Foucauldian theory that construes neoliberalism as a governing rationality. The two strands for understanding neoliberalism are not opposing lines of inquiry (for a good distinction between these strands of thought see Brown, 2015). Rather, both strands seek to explain contemporary capitalist processes and to understand how different actors, policies, and institutions interact. Furthermore, in relation to outcomes of neoliberal rationality, both formulations focus on growth, expansion of the market, and a diminishing welfare state.

Whereas for some scholars a direct genealogy can be traced to either a Marxist or Foucauldian understanding of neoliberalism, many scholars mobilize both. This ad hoc borrowing plays a contributing factor in the critique on the adoption of a neoliberal framework as an overused concept (Boas & Gans-Morse, 2009). At the same time, both frameworks are useful for understanding the various permutations and configurations of neoliberalism as it is a loose and shifting signifier with historical contingencies and spatial variances (Brenner et al., 2010; Peck, 2010).

The type of entrepreneurial urbanism that Harvey (Harvey, 1989a) detailed is deeply situated in the development of the innovation district. That is to say, the role of the growth machine (Logan & Molotch, 2007) remains in place, public private partnerships dominate development (Sagalyn, 2007), tax exemptions and deregulatory mechanisms undergird the financing of these spaces (Weber, 2002). What is categorized as an orthodox classification of neoliberalism is deeply entrenched in the innovation district and this body of literature informs my understanding of the macro level elements at play in innovation district strategy.

At the same time, it is also helpful to adopt the Foucauldian perspective. The Foucauldian perspective of neoliberalism as an order of normative reason that takes shape as a governing

rationality extending a specific formulation of economic values, practices, and metrics to every dimension of human life (see Brown, 2003, 2015). The techniques used in this "art of governing" are implemented in a wide variety of ways with spatially distinct and contextually situated expressions. What scholars building on the work of Foucault share is the inquiry of how government is redesigned and reshaped through a retheorization of thinking through how to act. This conduct of the self forms the basis of Foucauldian biopolitics and is demonstrated in practice from its effect on democracy (Brown, 2015), creating a dialogue around a girl's human capital as a form of birth-control (Murphy, 2017), and issues of bio-life in genetics (Rajan, 2006), to name a few recent studies.[33]

The economization of life means that individuals are seen, and see themselves, as what Foucault termed homo-economicus (Read, 2009). Homo-economicus, an entrepreneur of himself, his/er own capital, his/er own producer, invests time on future returns. The creation of homo-economicus and the management of this human capital is construed in particular ways by local governments (Tadiar, 2013). This is a way for the state ideology to permeate and be enforced at lower scales – to be governed at a distance (Rose, 1999).

The promise of the innovation district, both as a space for the invention of new products and as a source of regional economic growth, is internalized by entrepreneurs. Entrepreneurs are made to interpellate the ideology of entrepreneurship because their efforts contribute to raising the value of the city and the welfare of the city. This is the act of subjectivity. Subjectivity is the process of internalizing certain modes and values, the process of turning the self into a productive individual (Rose, 1999). This is evident in campaigns created by innovation district stakeholders to attract entrepreneurs. Furthermore, the idea of deriving a campaign focused on attracting the entrepreneurs is based on an interpellated ideology that in innovators and entrepreneurs as catalysts for positive change. One respondent in St. Louis explained that entrepreneurs are best known for the ability to think outside the box and are thus post-race, post-class, and post-gender (personal interview, 2016). As an example, the tagline on the homepage of St. Louis' Venture Café exemplifies the glorification of the entrepreneur and innovator: "The future of the world is at stake: You can totally be part of the team that saves society" (St. Louis'

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[33] Harvey (2005) also defines neoliberalism, but he defines it from the perspective of the state. The state, under neoliberalism, liberates entrepreneurial freedom by removing restrictions on the market and increasing private property rights, free markets, free trade. At the other end of the continuum, Foucault's definition of neoliberalism is liberated through the economizing individual. Both strands, however, define relations and reactions in relation to the market.

Venture Café homepage, "A Community of Colliders: Innovators Connecting to Innovators," n.d.).

Figure 44: Image of Venture Café promotional web banner
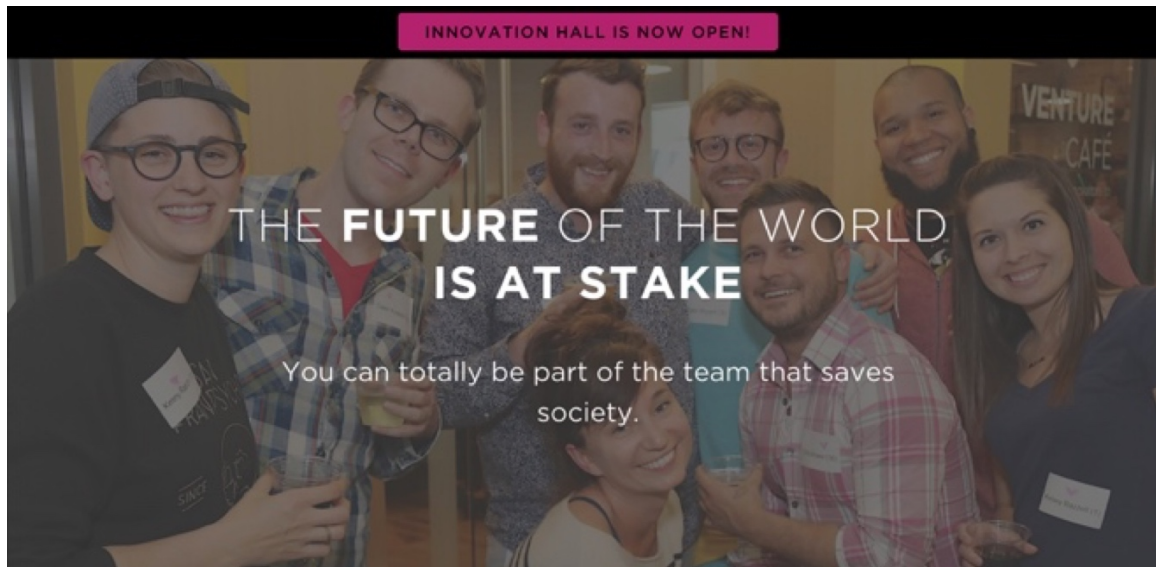
Source: St. Louis Venture Café homepage ("St. Louis Venture Cafe Homepage," n.d.)

This focus on subjectivity suggests we are no longer in a Taylorist form of management where managers controlled all aspects of production and complete control of the employee is no longer the dominant logic in management. Instead, post-Taylorist production represents a type of 'participative management' where workers become active subjects in coordinating different functions of production.[34] This inculcation of individuals in the production process forces individuals to control themselves in new ways so that command "arises from the subject itself" (Lazzarato, 1994). Considering that a growing source of production today is immaterial, the purpose of subjectivity of the individual is to actively produce the cultural content of a commodity. If we extend the concept of the commodity to the innovation district, we see the importance of individuals in the branding of the innovation district. The innovation district serves as a 'basin of immaterial labor' (ibid.) where work permeates the entire space of the innovation district.

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[34] In his Lectures at the College de France Foucault discusses the concept of the panopticon as a direct supervisory technique and this shift of that from total surveillance to subjective forms of surveillance.

Innovation districts represents a new era of economic development –one that moves beyond state-science and technology-based strategies to individual-science and tech-startup based strategies. Though the state is not removed, it is present in ways Block (2008) calls the hidden development state or Mazzucato (2014) calls the entrepreneurial state. Whereas in earlier iterations the state played a visible and prominent role in shaping economic development policies through massive infrastructural development on which the industrial revolution hinged or through a military industrial complex funding science and tech research and warfare, the position of the state in the contemporary era is hidden. Though funding channels demonstrate that the federal government continues to support small business development and research, today's entrepreneurs and tech firms work to distance themselves from a bureaucratic state to maintain the image of efficiency (Mazzucato, 2014). The state takes on the management of human capital to manage and ensure the success of the economy (Brown, 2015; p. 84). This ideology is evident in from the tax exemptions received by firms in the innovation sector, to the marketing materials used to attract innovators to the innovation district, to the growth of entrepreneurship studies in universities, to name only a few examples.

The concept of the innovation district as a bottom-up and seemingly inclusive form of development also coincides with austerity urbanism (Peck, 2012; Tonkiss, 2013). The focus on self-entrepreneurship, particularly following the 2007/8 recession, provides the state temporarily relief from direct provision of welfare. Innovation district strategy as an economic development policy reliant on a 'bootstrap mentality' means that individual take on risk, a risk that was previously mediated through the welfare state but not any longer. With the rise of the various forms of contractual labor and the governance techniques inserted to ensure constant work-readiness (Mitropolous, 2012), the post-Fordist workplace outsources risk to the individual. This risk is taken on not only in the signing of the contract, but also in the time between the signing of the contract when the individual is in a precarious state of employment. Within labor outsourcing, the contracting out of services, and the rise of human capital theory, "workers are constituted as entrepreneurs of their own productive, and indeed reproductive, capacity" (Cooper & Waldby, 2014:15).

Another reason for the increase in this form of governance is due to the reorganization of the firm and the increase in a mobile workforce. In other words, governance of individual subjects increases in difficulty due to the shifting of people and firms. The inability of the national boundary to contain people, that is, the flows that move beyond the nation-state

problematize issues of sovereignty. Creating a bounded territory, where individuals live-work-and play while in the space, serves as a container. And though flows continue, tech workers are often global nomads, governance is facilitated through governable subjects (Lindtner & Avle, 2017). The innovation district facilitates the process as a node within a global network where individuals, determined by their purchasing power—these spaces are expensive—can travel from one space to the next and still have similar experiences.[35]

In summary, the innovation district as a space formed to concentrate entrepreneurs assists in perpetuating self-governance. The success of the strategy depends on the excitement of budding entrepreneurs built on a narrative on the adventure of entrepreneurialism, inherently attached to the image of a free-spirited, unhinged, risk-seeking individual. What is at stake for this individual is the amount of precarity assumed. Neither the corporation nor the state provide a safety net for the entrepreneur or the individuals that comprise the contractual workforce. This is the reality faced at the scale of the individual. At a larger scale, what is at stake with innovation district strategy is the emergence of a wealthy citadel amongst landscapes of disinvestment.

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[35] Foucault's notion of governmentality works best through the production and the control of space (Discipline and Punish, 1977) Foucault used the prison to demonstrate its function in creating a certain type of individual. In the case of the innovation district, the use of design and brand assists in conscripting pre-established norms that are understood and acted upon by the subjects.

Chapter 6: Conclusion

For decades, economic geographers have sought to derive a science on the inputs of innovation and economic developers and policymakers have used some of this literature to inform their strategies. Ultimately, despite attempts on both sides—theory and practice—there is no agreed upon template for how to create a productive and wealth generating economy. Despite this, innovation district strategy proliferates as an economic development tool to generate regional wealth.

Based on a comparison of five innovation districts, in this dissertation I demonstrate that within the rhetoric of the innovation district, that of an alleged openness for talented individuals who will create new apps for the platform economy, entrepreneurs will ideate and scale, and research laboratories will propel a healthier future, a narrowness exists. The compression of time and space (Harvey, 1989b) amongst knowledge workers works best through the creation of a seamless environment so that at all stages of the day individuals are encouraged to work. Social events are programed to ensure continuous interaction with the end goal of spurring innovative ideas. Public space is managed and programmed for additional spontaneous interactions. The design of the innovation district recognizes and builds the amenities to meet the needs of the target audience –the highly educated and skilled workforce—while at the same time, stripping individuals of their freedom by creating an environment that demands constant productivity. This is the logic of the innovation district and its relationship to a constant stream of individuals from whom to derive productivity.

In practice, innovation district strategy in all five case sites suffers from a disagreement on how to define innovation and, therefore, how to operate on a definition that guides the strategy. Is it about accelerating products to the market? Is it about creating a space to try out innovative policies, such as form-based codes, pink zones, and smart city applications? Is an innovation district an attempt for cities to transition into a tech-economy based on a new workforce economists, sociologists, and organizational scholars are trying to comprehend?

The ambiguity of the strategy has problematic outcomes for cities with both declining and growing economies. Cities that have a robust entrepreneurial ecosystem can adapt this strategy to extend their already existing ecosystem. In Dublin and in Boston, the shortage of

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affordable space for entrepreneurs drove the decision to refurbish dilapidated post-industrial infrastructure to accommodate small startups. Many of these small startups benefitted from proximity to an established ecosystem where venture capital and C-suite mentorship was readily available. However, a problem arises when larger companies also want to move into the new innovation district—companies such as General Electric in Boston and Detroit, Facebook in Dublin, an IKEA in St. Louis. These companies demand larger footprints to accommodate their employees. The relocation of a large company to the heart of a city is not necessarily a bad problem for urban actors and residents. The presence of large companies can generate non-quantifiable benefits, such as brand recognition, cache, investment security. These elements create path dependence for other firms and future employees. This was the case in Boston when Vertex Pharmaceuticals, LogMeIn, and ZipCar all moved to the Boston Innovation District (Kirsner, 2014). At the same time, these factors undergird decisions by urban actors and politicians to favor established firms over continued support of smaller ventures.[36] The pressure to ensure the availability of flexible spaces for startups rather than price them out for the location preferences of the larger corporations increases when considering the amount of jobs a larger company may create and taxable income. In principle, larger companies will generate more income for the city. It should be noted, however, that these gains are negated when governments are overly generous with incentive packages and subsidies.[37]

Katz's prescriptions for creating innovation districts refrains from asking and addressing this tipping point. Economic developers and growth machine coalitions willingly embrace innovation district strategy because of the opportunities it presents to transition into a tech economy, create jobs, promote vibrancy, and, through spillovers, generate regional wealth. Whether or not innovation district strategy will meet these objectives remains to be seen. However, as I demonstrate in this dissertation, what is already evident is the role innovation districts are playing in increasing land values that cater to a wealthier demographic and deriving profit from the livelihoods of the people who live within its boundaries. In addition, contextualizing the emergence of innovation districts from a neoliberal perspective, an ideological apparatus stemming from growth coalitions is clear in the development of the tech sector and, by extension, new landscapes of technology. The assemblage of actors that make up

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[36] Parallel arguments on the rent-gap theory and causes of gentrification (N. Smith, 2005, 2008) exist though rather than focusing on the tech sector, they examine creative workers (see for example (G. Evans, 2009; Lloyd, 2008; Zimmerman, 2008).
[37] For an excellent example of how much public governments give in subsidies, see Good Jobs First Subsidy Tracker (*Tracking Subsidies, Promoting Accountability in Economic Development*, 2018).

the growth coalitions for each respective innovation district plays an important role in creating a market driven ideology focused on entrepreneurship. This ideology originates from federal policy championing the role of the entrepreneur and his/her responsibility to society and stems down to local actors. Individuals are made to understand their connection as entrepreneurs and the role they play in actualizing the growth objectives of the innovation district stakeholders. Messaging of this sort operates on the tall tales of garage tinkers turned millionaires who create job opportunities for the region and positively impact the community, the region, and society. This is a message delivered by various actors at various scales, from the human resource and marketing departments of global companies, to federal policy on entrepreneurship, to the motivational speeches for innovators prominent in networking events for entrepreneurs and innovators. What it also does is cause individuals to formulate him/herself as a human capital agent focused on competition. The creation of the precarious market-subject is a governance technique in this new state of insecurity (Lorey, 2015). As an established territory with governance structure focused on entrepreneurship, the space of the innovation district is a great place to practice this entrepreneurial ideology.

Innovation districts built in both the urban and non-urban sphere are changing landscapes. These new landscapes will create challenges for urban residents at the individual scale. The increased work demands due to mobile technologies allow workers to work everywhere and all the time (Mazmanian et al., 2013). Innovation districts, through their connected infrastructure and concentrated design, help accelerate continuous on-demand work. My interest in this scholarship is the acceptance of an all-encompassing nature of labor that extends beyond the 9 – 5 work day. This exemplifies the live-work-play mentality that undergirds innovation district strategy. The benefit of alternative work arrangements provide individuals with a sense of autonomy, but more and more scholars are reporting negative consequences, such as elevated levels of stress and anger from always being 'on,' feelings of loneliness resulting from the loss of a work community, and family conflicts due to blurring boundaries between work and family life (Allen, Golden, & Shockley, 2015; Bloom, Liang, Roberts, & Ying, 2015; Caillier, 2011; Rockman & Pratt, 2015; Schieman & Young, 2010).

My interest in focusing economic development practice on humans translates to seriously interrogating how today's tech-environments are affecting people. As I demonstrate in this dissertation, innovation district strategy affects the way we conceive of the public good. This is problematic when we enclose large tracks of public land to seemingly private ownership and

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capital extraction. The processes of transforming public space into constant sites of production through subversive tactics of command and control demand critical attention.

Sociologist Hans Joas (cited in Welz, 2003) argues that creative innovation happens when established notions of action fail because they encounter resistance thus resulting in the emergence of new forms. By extension then, fabricating spaces devoid of contact between difference cultures (i.e., socio-economic status, mixed use, aging structures), may ultimately deplete the conditions necessary for innovation production. Historic and seminal research on this topic shows that the opposite is more important: creative activity requires physical structures that are aging, mixed use, and can handle instability that is then conducive to change and innovation (Jacobs, 1992; Stevens, 2015).

Such as in the practice of ecological conservation, neighborhoods should put efforts to protect and maintain all typologies including informal economies and small bottom-up ventures as part of an urban ecosystem. The eradication of such occupants to make way for larger institutions and gentrification does not create a complete neighborhood viable for the productive evolution of all economy types.[38]

My concerns with the contemporary focus on building a tech economy are manifold. The first issue is that tech companies are fabled job creators (Davis, 2015). At the startup stage, tech companies consist of a small team of people. If they are deemed high value, a larger company quickly absorbs them (Jacobs, 1969). The second issue that concerns me in building a tech economy is the massive changes to the built environment required to see it through. Policies guiding the development of innovation ecosystems emphasize the importance of a dense, walkable, amenity rich fabric within a tightly integrated contiguous space as the catalyst for spontaneous and synergistic interactions. In and of itself, creating denser, more compact developments might not be a bad form of development.[39] In fact, the physical degradation to the ecosystem as a result of the sprawl that epitomized much of the 1950s and beyond is an argument in favor of urban concentration. However, my research demonstrates that the outcome occurring in cities as a result of these developments is a segregation between the individuals, institutions, and forms of knowledge and expertise that are considered innovative and those that do not fit the definition.

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[38] Even the earliest documenters of new economic structuring foresaw the possibilities of inter and intra region divergence in spaces that seek to boost their economy by targeting knowledge based economies (Castells, 1992; Harvey, 1989a; Scott, 2008).
[39] However, recent studies on density point to problems associated with issues of health (Feintzeig, 2014).

Finally, this dissertation uses innovation districts as a lens to study how advances in technology shape economic development strategies. However, these changes are occurring outside the space of the innovation district. Changes in the role technology plays in reconceptualizing urban governance and the management of human capital bleed beyond the boundary of the innovation district into all spaces of the city. The space of the innovation district serves as a laboratory to experiment with these new forms of governance before extending the policies to the remainder of the region (J. Evans & Karvonen, 2014). The innovation district is one bounded space from which to draw observations on the extractive logics of contemporary capitalism, but any other places to study these same phenomenon exit. In this way, the claims in this dissertation can be made stronger by extending the study into places outside of the innovation district.

There are other directions for research that would strengthen the claims I make in this dissertation that I want to point out. In chapter 5, I gesture to studies on the mobile workforce and growing health issues related to the pressure of non-stop performance and accommodating work around the clock. This research would benefit from an ethnographic study of the lives of the entrepreneurs working within the space of the innovation district or in similar fast-paced and continuous work environments. Though I did hold interviews with some of the entrepreneurs of the innovation district, a study dedicated solely to them and their livelihoods would be informative.

Tracing the citizenship status of the people who live in the innovation district would inform fluctuations in democracy and citizen participation in local politics. This assumption stems from the idea that innovation districts function as a node along a globally interconnected network of firms. As one Facebook employee relayed, Facebook strategically positions offices to "follow the sun" so that at all times of the 24-hour day, at least one office is operating (personal interview, 2017). This is particularly important for the employees who are responsible for ensuring the acceptability of content on their platform. Though many of these employees are rooted in one location, many of the managers do transition from one satellite to the next. In addition, individuals use the satellites in one location as a way to move up the ladder, eventually making it to a Dublin office or a, for a select few, Silicon Valley. The question that arises from this constant stream of relocation is the rootedness of the innovation district. While it is place-bound within a jurisdiction, inhabitants are less likely to be invested in local politics and

happenings. This has implications for any attempts to build communities and the role that local coalitions can have on the welfare of non-transitory residents.

A follow-up study analyzing the performance of innovation districts ten to twenty years from now would be informative. By then, provided the plans move forward as intended, Cortex Innovation District will have completed Phase 3.0 and Park Center would be far beyond laying underground tubes and piping. Likely, Detroit's Innovation District and Boston's Innovation District would be less revealing considering that excitement for the Detroit Innovation District declined before majority of the city knew about it and that the targeted activity for Boston's Innovation District has transitioned to the Financial District. As Dublin's Silicon Docks stands to benefit from the Brexit referendum, should the UK succeed in separating from the European Union, many UK based foreign tech-companies might move their operations to nearby Dublin. For now, these are the three future research engagements that come to mind.

Appendices

Appendix A: Example interview guide

My interview guide is based off of Weiss' (1994; p 49-50) example. He states that four to six areas of an interview guide can be covered adequately in a two-hour interview. My interview guide (below) consists of three sections. I hope to complete my guide in 45 minutes to one-hour interviews.

My plan is to begin each interview by informing the respondent that I researched these developments while at the Brookings Institution and I continue to research them for my dissertation as a doctoral student in urban and regional planning at the University of Michigan.

At the end of the interview I will ask the respondent if he/she would be willing to keep me abreast of any new developments and/or if it would be acceptable for me to sit in on meetings regarding the development of their innovation district. If I am invited to attend, I will participate only as an observer, and not as a collaborator.

I will interview respondents in their offices (or in a nearby coffee shop if they have time and are willing to leave their offices), I will not pay the respondents, and I will request tape-recording the interviews.

Interview Questions
1. History of innovation district
    a. When did R first hear about the innovation district concept?
    b. When did R first hear about the innovation district for their city/location?
    c. When and how did R and R's organization become involved?
    d. Who determined what other organizations would be involved and which ones would not? How was consensus on this issue reached? How did each invited organization respond? How was a point person for each organization selected? Were there any organizations that rejected participation? Where there any organizations that requested participation?
    e. How is the innovation district financed?
2. Definition of innovation district
    a. What was R's initial thought when the leaders proposed an innovation district for their jurisdiction? What type of image developed? Is there a similar development R can point to that may be worth replicating or that at least points in the desired direction?
    b. What are the necessary amenities for the innovation district to succeed?[40]
    c. What does the "ideal" innovation district look like?[41]

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[40] Here I am looking for items such as schools (pre-K – research university-technical university), incubators or accelerators, parks, entertainment amenities, etc.
[41] I am not looking for the outcomes of the innovation district. I am trying to gauge an idea of the aesthetic vision of the innovation district (i.e., ground plan, urban fabric, monuments, parks, wired technology, modern buildings, open public space, etc.)

> d. What are R's hopes for the innovation district?[42]
> e. Does R have experience in other similar development projects?
3. Possible roadblocks to implementation of the innovation district
> a. What is currently happening with the development of the innovation district?
> b. What are the hurdles to implementation?
> c. Have there been any discrepancies in the visions for the innovation district amongst the various stakeholders?

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[42] This question is based on an interest in whether or not the focus is district specific versus city/region specific; the creation of marketable products vs revitalizing the community; respective organization vs innovation district as an entity, etc. I recognize that these are hard binaries and that likely the answers will fall somewhere within the continuum.

Appendix B: Interviews completed

Table 7: Breakdown of interviews based on type of actors

City	Type of actor	Total
Boston	City government representative	5
	Economic developer	0
	Federal government representative	0
	Non-profit representative	3
	Private sector representative	7
	State government representative	3
	Tech entrepreneur	0
Detroit	City government representative	2
	Economic developer	8
	Federal government representative	0
	Non-profit representative	12
	Private sector representative	8
	State government representative	3
	Tech entrepreneur	2
Dublin	City government representative	6
	Economic developer	0
	Federal government representative	2
	Non-profit representative	6
	Private sector representative	11
	State government representative	0
	Tech entrepreneur	0
Park Center	City government representative	0
	Economic developer	1
	Federal government representative	0
	Non-profit representative	7
	Private sector representative	0
	State government representative	0
	Tech entrepreneur	0
St. Louis	City government representative	4
	Economic developer	0
	Federal government representative	0
	Non-profit representative	15
	Private sector representative	12
	State government representative	1

	Tech entrepreneur	6
		124

Table 8: Categorization of actors

Type of actor	Categories	Boston	Detroit	Dublin	Park Center	St. Louis
City government representative	elected officials, appointed public servants, government employees	5	2	6	0	4
Economic developer	public and private interests	0	8	0	1	0
Federal government representative	elected officials, appointed public servants, government employees	0	0	2	0	0
Non-profit representative	Think tanks, universities, hospitals, foundations	3	12	6	7	15
Private sector representative	Company executives & staff, consultants, real estate developers	7	8	11	0	12
State government representative	elected officials, appointed public servants, government employees	3	3	0	0	1
Tech entrepreneur	startup owners	0	2	0	0	0
TOTAL		**18**	**35**	**25**	**8**	**32**

Table 9: List of people interviewed by employer

City	Type of actor	Employer
Boston	City government representative	Boston City
Boston	City government representative	Director of Strategic Partnerships, MassIT
Boston	City government representative	City of Boston
Boston	City government representative	New Urban Mechanics
Boston	City government representative	New Urban Mechanics
Boston	Non-profit representative	The Institute of Contemporary Art/Boston
Boston	Non-profit representative	Artists for Humanity Epicenter
Boston	Non-profit representative	Design Museum Foundation
Boston	Private sector representative	Space with a Soul/ CIC-Boston
Boston	Private sector representative	Hacin + Associates
Boston	Private sector representative	Drydock Center
Boston	Private sector representative	Boston Convention & Exhibition Center
Boston	Private sector representative	CIC
Boston	Private sector representative	Boston Convention & Exhibition Center
Boston	Private sector representative	Former Executive Director of Venture Café at the Cambridge Innovation Center and helped develop and run District Hall in the innovation district.

Boston	State government representative	Redgate
Boston	State government representative	MassChallenge
Boston	State government representative	Transit-Oriented Development Transportation, Americas
Detroit	City government representative	City of Detroit
Detroit	City government representative	City of Detroit
Detroit	Economic developer	Detroit Economic Growth Corporation
Detroit	Economic developer	Detroit Economic Growth Corporation
Detroit	Economic developer	Detroit Economic Growth Corporation
Detroit	Economic developer	Detroit Economic Growth Corporation
Detroit	Economic developer	Downtown Detroit Partnership
Detroit	Economic developer	Detroit Riverfront Conservancy
Detroit	Economic developer	Downtown Detroit Partnership
Detroit	Economic developer	TechTown, WSU
Detroit	Non-profit representative	Hudson Webber Foundation
Detroit	Non-profit representative	Henry Ford Health System
Detroit	Non-profit representative	Allied Media Projects
Detroit	Non-profit representative	University Research Corridor
Detroit	Non-profit representative	New Economy Initiative
Detroit	Non-profit representative	Henry Ford Health System
Detroit	Non-profit representative	Midtown, Inc.
Detroit	Non-profit representative	Hudson Webber Foundation
Detroit	Non-profit representative	Hudson Webber Foundation
Detroit	Non-profit representative	TechTown
Detroit	Non-profit representative	University of Michigan
Detroit	Non-profit representative	University of Michigan
Detroit	Private sector representative	TechTown
Detroit	Private sector representative	Rock Ventures
Detroit	Private sector representative	313 Creative
Detroit	Private sector representative	Mass Economics
Detroit	Private sector representative	Rock Ventures
Detroit	Private sector representative	Invest Detroit
Detroit	Private sector representative	313 Creative
Detroit	Private sector representative	Invest Detroit
Detroit	State government representative	Public Sector Consultants
Detroit	State government representative	Michigan State Housing Development Authority

Detroit	State government representative	Michigan Economic Development Corporation
Detroit	Tech entrepreneur	Utility Boost LLC
Detroit	Tech entrepreneur	Rocket Fiber
Dublin	City government representative	Dublin City Council
Dublin	City government representative	Dublin City Council
Dublin	City government representative	Dublin City Council
Dublin	City government representative	Master planner of Silicon Docks
Dublin	City government representative	Dublin City Council
Dublin	City government representative	Startup Commissioner
Dublin	Federal government representative	Public Affairs, American Chamber of Commerce
Dublin	Federal government representative	US Department of Commerce
Dublin	Non-profit representative	Maynooth University
Dublin	Non-profit representative	Maynooth University
Dublin	Non-profit representative	University College Dublin
Dublin	Non-profit representative	Maynooth University
Dublin	Non-profit representative	Maynooth University
Dublin	Non-profit representative	Trinity College
Dublin	Private sector representative	Ryan Academy
Dublin	Private sector representative	Liffey Trust
Dublin	Private sector representative	Guinness Enterprise Center
Dublin	Private sector representative	Inward Investment Consultant, Connect Ireland
Dublin	Private sector representative	Bennett Property Ltd
Dublin	Private sector representative	Facebook
Dublin	Private sector representative	Accenture
Dublin	Private sector representative	Salesforce
Dublin	Private sector representative	Facebook
Dublin	Private sector representative	Oracle
Dublin	Private sector representative	Facebook
General	Non-profit representative	Brookings Institution
Park Center	Economic developer	Durham Chamber of Commerce
Park Center	Non-profit representative	NC Justice Center
Park Center	Non-profit representative	Research Triangle Park Foundation
Park Center	Non-profit representative	Research Triangle Park Foundation
Park Center	Non-profit representative	Research Triangle Park Foundation
Park Center	Non-profit representative	Triangle J Council of Governments
Park Center	Non-profit representative	Research Triangle Park Foundation

St. Louis	Non-profit representative	Cortex
Park Center	Non-profit representative	University of North Carolina Chapel Hill
St. Louis	City government representative	Arch Grants
St. Louis	City government representative	St. Louis Development Corporation, St. Louis Economic Development Partnership
St. Louis	City government representative	St. Louis Development Corporation, St. Louis Economic Development Partnership
St. Louis	City government representative	St. Louis Alderman
St. Louis	Non-profit representative	Park Central Development
St. Louis	Non-profit representative	BJC Healthcare
St. Louis	Non-profit representative	Missouri Botanical Garden
St. Louis	Non-profit representative	Washington University
St. Louis	Non-profit representative	St. Louis University
St. Louis	Non-profit representative	St. Louis University
St. Louis	Non-profit representative	University of Missouri St. Louis
St. Louis	Non-profit representative	University of Missouri St. Louis
St. Louis	Non-profit representative	Washington University
St. Louis	Non-profit representative	Center for Emerging Technologies
St. Louis	Non-profit representative	Washington University, Center for Emerging Technologies
St. Louis	Non-profit representative	Washington University
St. Louis	Non-profit representative	St. Louis Community College
St. Louis	Non-profit representative	Washington University
St. Louis	Private sector representative	Enhanced Value Strategies
St. Louis	Private sector representative	BioSTL
St. Louis	Private sector representative	BioGenerator
St. Louis	Private sector representative	Cambridge Innovation Center (CIC)
St. Louis	Private sector representative	Capital Innovators
St. Louis	Private sector representative	TechShop
St. Louis	Private sector representative	Venture Café
St. Louis	Private sector representative	Venture Café
St. Louis	Private sector representative	Bayberry Group Inc.
St. Louis	Private sector representative	Express Scripts
St. Louis	Private sector representative	Lawrence Group

St. Louis	Private sector representative	Maritz
St. Louis	State government representative	Regional Chamber
St. Louis	Tech entrepreneur	Gateway VMS
St. Louis	Tech entrepreneur	Gateway VMS
St. Louis	Tech entrepreneur	IDEA Labs
St. Louis	Tech entrepreneur	Kypha
St. Louis	Tech entrepreneur	GlobalHack
St. Louis	Tech entrepreneur	Mission Center L3C

Appendix C: Emergent themes from coding

Table 10: Themes from Detroit interviews

Main theme	Sub-theme
Location specifics	
Brand	
Definition of innovation	Brand
Definition of placemaking	Brand
Exclusions	Border
Goals	Brand
Governance	Border
Infrastructure	Border
	Brand
Obstacles	Border
	Brand
Origin stories	Brand
Imagery	Brand
	Counter imaginary
	Cultural change
	Problem with prior system
Time	
Legacy	Border
	Brand

Table 11: Themes from Dublin interviews

Main theme	Sub-theme
Aesthetics	
Benefits	
Boosterism	
Challenges	
Civic realm	
Cultural character	
Definition of innovation	
Desires	
Economic Development	
Expertise	
Flexibility	
Governance	
History	
Housing	
Imaginary	
International connections	
Location specifics	
Market fundamentalism	
Place-marketing	
Real estate	
Regionalism	
Shared responsibility	
Size	
Speed	
Splintering urbanism	
Technology	
Urban planning versus innovation	
US-centrism	

Table 12: Themes from St. Louis interviews

Main theme	Sub-theme
Anchor	
Benefits	
Boundaries	
Brand	
Challenge	
Contrast	
Definition of innovation	
Economic Development	
Finance	
Goals	
Governance	
History	
Location specifics	
Millennials	
Neighborhood	
Organization	
Placemaking	
Real Estate	
Reason for success	
Region	
Structure	
Technology	

Table 13: Themes from Park Center interviews

Main theme	Sub-theme
Border	
Challenges	Housing
	Real estate
	Regionalism
	Non-city
	Structure
	Technology
	Metrics
	Flexibility
	Competition
Control	Covenants
	Finance
	Governance
	HOA
	Surveillance
Corporate culture	
Definition of innovation	
Design	Accessibility
	Affordability
	Anchors
	Authentic experience
	Challenges
	Civic amenities
	Collaborative
	Connectivity
	Convergence
	Density
	Diversity
	Expenses
	Flexibility
	Housing
	Imaginary
	Inspiring
	Live-work-play
	Knowledge-based economy

	Non-city	
	Organic	
	Brookings	
	Placemaking	
	Programming	
	Technology	
Economic Development	Brookings	
	Network	
	Leadership	
	Live-work-play	
Entrepreneurs		
Finance		
Growth		
Housing		
Imaginary		
Location	Acquisitions	
	Benefits of non-city	
	Border	
	Branding	
	Centrality	
	Diversity of choices	
	Growth of region	
	Real estate	
Location specifics		
New working patterns		
Obstacles	Growth boundaries	
	Space requirements	
	Zoning	
Partnerships		
Planning	Business	
	Civic amenities	
	Economic development	
	Planning	
	Communications	
	Finance	
	Flexibility	
	Governance	
	Housing	
	Timeline	
	Transit	
Real Estate		
Regionalism		
Small industries		
Speed		
Transit		
Technology Skills	Automation	
	Strategy	
	New working patterns	
Travelling mobilities	Katz	
	New working patterns	
Travelling mobilities	Katz	

Appendix D: Demographics in innovation district cases across time

Table 14: Boston Innovation District demographics

Boston Innovation District	**2000**	**2007-2011**	**2012-2016 (ACS)**
Population	1857	3401	5412
Race			
White alone	90%	89%	88%
Black or AA alone	2%	2%	2%
American Indian and Alaska Native Alone	0%	0%	0%
Asian Alone	5%	7%	8%
Native Hawaiian and Other Pacific Islander Alone	0%	0%	0%
Some other Race Alone	1%	0%	0%
Two or more races	2%	2%	2%
Age			
18-44	59%	64%	67%
65+	9%	6%	6%
Education			
Bach or more	39%	80%	79%
Occupation			
Male	49%	70%	68%
Female	43%	71%	72%
Households with no people under 18	87%	93%	94%
Family	20%	20%	27%
Nonfamily	66%	73%	68%
Travel Time to Work for Workers 16 Years and Over			
Less than 10 min	39%	10%	12%
Worked at home	3%	8%	4%
Car, Truck, or Van	46%	42%	45%
Public transportation	31%	26%	26%
Motorcycle	0%	0%	1%
Bicycle	0%	1%	1%
Walked	18%	21%	23%

Table 15: Detroit Innovation District demographics

Detroit Innovation District	**2000**	**2007-2011**	**2012-2016 (ACS)**
Population	27,688	20236	25,586
Race			
White alone	19%	24%	32%
Black or AA alone	72%	65%	56%
American Indian and Alaska Native Alone	0%	0%	0%
Asian Alone	6%	8%	8%
Some other Race Alone	1%	1%	1%
Two or more races	2%	2%	3%
Age			
18-44	51%	50%	56%
65+	11%	11%	11%
Education			
Bach or more	22%	27%	37%
Occupation			
Male	41%	39%	50%
Female	35%	42%	50%
Households with no people under 18	83%	90%	90%
Family	12%	13%	12%

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Nonfamily	71%	77%	78%
Travel Time to Work for Workers 16 Years and Over			
Less than 10 minutes	20%	21%	24%
Worked at home	3%	4%	4%
Car, Truck, or Van	56%	54%	59%
Public transportation	18%	17%	8%
Motorcycle	0%	0%	0%
Bicycle	1%	1%	3%
Walked	22%	23%	25%

Table 16: St. Louis innovation district demographics

St. Louis: Cortex Innovation Community	2000	2007-2011	2012-2016 (ACS)
Population	135	1546	2092
Race			
White alone	76%	63%	68%
Black or AA alone	19%	19%	18%
American Indian and Alaska Native Alone	1%	0%	0%
Asian Alone	3%	14%	9%
Native Hawaiian and Other Pacific Islander Alone	0%	0%	0%
Some other Race Alone	1%	4%	2%
Two or more races	0%	0%	3%
Age			
18-44	44%	80%	82%
65+	5%	3%	3%
Education			
Bach or more	38%	42%	60%
Occupation			
Male	59%	36%	54%
Female	100%	43%	57%
Households with no people under 18	82%	88%	96%
Family	25%	28%	28%
Nonfamily	57%	61%	68%
Travel Time to Work for Workers 16 Years and Over			
Less than 10 minutes	59%	28%	27%
Worked at home	10%	9%	7%
Car, Truck, or Van	80%	48%	65%
Public transportation	0%	9%	2%
Motorcycle	0%	0%	0%
Bicycle	0%	3%	1%
Walked	10%	31%	25%

Appendix E: Real estate price increases in US-based innovation district cases

Boston Innovation District
2010 – 2018
Notes: The industrial category covers transactions in the Bronstein Center. This is a flexible interpretation of industrial use as the space has housed a wide variety of uses over time – from maritime related activities, to wet labs, to furniture maker spaces, to office uses for companies such as Reebok and Adobe.

In 2010 four transactions were made. The sale of one office building at $208/sf, the refinancing of another office building, the sale of an apartment selling at $416,774 per unit, and the refinancing of an industrial building. One for an office building and one for an industrial building.

In 2011,11 transactions occurred. Five industrial sales, one hotel sale, three development site sales, and one development site refinance. One office build sold for $28/sf.

In 2012, 25 transactions occurred. Three industrial sales, five development site sales, two development site refinances, three office refinancings, nine office sales, one office transfer, two retail sales. For the office sales, the highest rate was $318/sf for a building built in 2010 and the lowest reported was $199/sf for a building remodeled in 1989.

In 2013, 22 transactions occurred. Five development site sales, three development sites refinanced, four industrial sales, seven office sales, and three office refinances. For the office sales, the highest rate was $393/sq ft for a building remodeled in 2010 and the lowest reported was $137/sq ft for a building remodeled in 2009.

In 2014, 17 transactions occurred. Five office site sales, three office sites refinanced, one industrial sale, one industrial refinance, two development site sales, four development sites refinanced, and one apartment sale. For the office sales, the highest rate was $994/sq ft for a new 2011 building and the lowest was $224/sq ft for a building remodeled in 2010. The apartment units sold at $224,719.

In 2015, 27 transactions occurred. One retail site was sold, twelve office sales, four office builds refinanced, one industrial site refinanced, one hotel sale, one hotel refinance, four development site sales, two apartment sales, and one apartment refinanced. For the office sales, the highest rate was $514/sq ft for a building remodeled in 2010 and the lowest reported was $359/sq ft for a building remodeled in 2007. The apartment units sold for $644,957.

In 2016, 14 transactions occurred. One retail refinanced, one retail sold, two office builds refinanced, six office sales, one industrial sale (the future site of the GE HQ sold for $522/sq ft), one hotel sale, and two development sites sales. For the office sales, the highest rate was

$1029/sq ft for a new 2015 building and the lowest was $479/sq ft for a building remodeled in 2008.

In 2017, there were 18 transactions. A sale by WS Development for the assemblage of the future Boston Seaport sold for $5,601/sq ft. There were also six office sales, three office builds refinanced, two industrial sales, three hotels refinanced, one co-op refinanced (an artist building at 300 Summer Cooperative Corporation), one apartment refinance, and one apartment sale. For the office sales, the highest rate was $1,734/sq ft for a new 2016 building and the lowest was $561/sq ft for a building remodeled in 2012. The apartment units sold for $351,715.

As of mid-July 2018, there were seven transactions. Two office sales, two office refinancings, one industrial refinancing, and one apartment sale. For the office sales, the highest rate (pending) was $1,162/sq ft for a new 2018 building and the lowest $578/sq ft for a building remodeled in 2012. The apartment units sold for $693,175.

Cortex Innovation Community
2006 - 2017[43]
2002 Cortex 501c3 established
2006 Chapter 353 established
2014 TIF established

In 2006, two industrial sale transactions happened, one for $115/sq ft and the other for $33/sq ft.

In 2007, one industrial sale and one office sale occurred. The rate for the office was $256/sq ft for a new building built in 2007 for Solae's headquarters and the rate of the industrial site was $27/sq ft.

In 2008, only one sale on for a development site occurred.

In 2009 and 2010 no transactions occurred.

In 2011, two office sales occurred. Rates were not reported.

In 2012, two industrial sales occurred. The only reported rate was $171/sq ft thought the prices of the building (Cortex 1) was $26,000,000.00

In 2013, five transactions occurred. Two industrial sales, one office refinancing, and three industrial entity transactions with Wexford Science and Technology selling to BioMed Realty Trust. The industrial sale rate was $33/sq ft.

In 2014, three development site sales occurred, all for the building of the future IKEA. All three sales totaled $15,303,030.00.

In 2015, one industrial sale and one office sale occurred. The office rate was $346/sq ft for a building built in 1978. The highest rate for industrial uses was $43/sq ft.

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[43] The data for Real Capital Analytics on the Cortex Innovation Community border only reaches as far back as 2006 and ends in 2017.

In 2016, eight transactions occurred. Four industrial sales, one office refinancing, and three industrial entity transactions from BioMed Realty Trust to BioMed Realty. The highest rate for industrial uses was $246/sq ft.

In 2017, two transactions occurred. One industrial sale and one office sale. Rates were not reported.

Detroit Innovation District
2014 - 2018
In 2014, 24 transactions occurred. Fourteen office sales, four office refinancings, one development site transfer, one development site sale, three apartment refinancings, and one apartment sale. For the office sales, the highest rate was $129/sq ft for a building built in 2003 and the lowest reported was $12/sq ft for a building built in 1917. The highest apartment unit rate was $122,928.

In 2015, 33 transactions occurred. Two retail sales, eighteen office sales, three office build refinancings, one office transfer, one hotel sale, one development site sale, four apartments refinanced, and three apartments sold. For the office sales, the highest rate was $120/sq ft for a building built in 1911 and the lowest reported was $16/sq ft for a building built in 1929 (the Fisher Buliding and Albert Kahn Building). The highest apartment units went for $206,667.

In 2016, 26 transactions occurred. One retail sale, nine office sales, three office builds refinanced, one hotel sale, and three hotels refinanced, one sale of a development site, four apartments refinanced, and three apartments sold. For the office sales, the highest rate was $161/sq ft for a building built in 1989 and the lowest was $12/sq ft for a building built in 1920 (the former Wayne State Criminal Justice Building). The highest apartment units are rated at $332,143.

In 2017, 32 transactions occurred. One retail sale, twelve office sales, five office builds refinanced, two industrial sales, one development site sale, five apartments refinanced, and six apartments sold. For the office sales, the highest rate was $124/sq ft for a building built in 1997 and the lowest reported was $59/sq ft. The highest apartment units (for a refinanced apartment) are rated at $152,756.

As of March of 2018, 23 transactions occurred. Three retail sales, five office sales, five office builds refinanced, one industrial sale, two hotel sales, six apartment builds refinanced, and one apartment sale. For the office sales, the highest rate was $147/sq ft for a building built in 2004 and the lowest report was $29/sq ft for a building built in 1929. The highest apartment units (for a refinanced apartment) are rated at $83,333.

Park Center
Park Center only has a total of three transactions from 2013 – 2018. One office sale (2014), one retail sale (2013), and one hotel sale (2013). All are on existing buildings from the 70s and 80s. The office sold for $6,223,000.00, the retail space for $4,975,000.00, and the hotel for $6,750,000.00. As Park Center remains in a state of imagination, tracking transactions for the next decade will be more revealing.

Appendix F: Use of human subjects in doctoral research

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Health Sciences and Behavioral Sciences Institutional Review Board (IRB-HSBS) • 2800 Plymouth Rd., Building 520, Room 1170, Ann Arbor, MI 48109-2800 • phone (734) 936-0933 • fax (734) 998-9171 • irbhsbs@umich.edu

To: Carla Maria Kayanan

From:
Thad   Polk

Cc:
Scott   Campbell
Carla Maria   Kayanan

Subject: Notice of Exemption for [HUM00110191]

SUBMISSION INFORMATION:
Title: Productive Utopias and the New Business Urbanity: An Exploratory Case Study of Four Innovation Ecosystems
Full Study Title (if applicable):
Study eResearch ID: HUM00110191
Date of this Notification from IRB: 12/17/2015
Date of IRB Exempt Determination: 12/17/2015
UM Federalwide Assurance: FWA00004969 (For the current FWA expiration date, please visit the UM HRPP Webpage)
OHRP IRB Registration Number(s): IRB00000246

IRB EXEMPTION STATUS:
The IRB HSBS has reviewed the study referenced above and determined that, as currently described, it is exempt from ongoing IRB review, per the following federal exemption category:

EXEMPTION #2 of the 45 CFR 46.101.(b):
Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Note that the study is considered exempt as long as any changes to the use of human subjects (including their data) remain within the scope of the exemption category above. Any proposed changes that may exceed the scope of this category, or the approval conditions of any other non-IRB reviewing committees, must be submitted as an amendment through eResearch.

Although an exemption determination eliminates the need for ongoing IRB review and approval, you still have an obligation to understand and abide by generally accepted principles of responsible and ethical conduct of research. Examples of these principles can be found in the Belmont Report as well as in guidance from professional societies and scientific organizations.

SUBMITTING AMENDMENTS VIA eRESEARCH:
You can access the online forms for amendments in the eResearch workspace for this exempt study, referenced above.

ACCESSING EXEMPT STUDIES IN eRESEARCH:
Click the "Exempt and Not Regulated" tab in your eResearch home workspace to access this exempt study.

Thad Polk
Chair, IRB HSBS

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