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INNOVATION DISTRICTS: CONTRIBUTING FACTORS FOR CITIES' PROSPERITY, EQUITY IMPLICATIONS, AND PLANNING POLICY SOLUTIONS IN RESPONSE TO PLACELESSNESS

by

LADAN MOZAFFARIAN

DISSERTATION

Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
in Urban Planning and Public Policy
at The University of Texas at Arlington

August 2023

Arlington, Texas

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DEDICATION

I wholeheartedly dedicate this dissertation to a constellation of remarkable individuals, each of whom has illuminated my path in their own unique way.

To my beloved husband, Massoud, your unwavering encouragement, endless patience, and steadfast belief in me have been my guiding light throughout this endeavor. Your presence has been a source of strength, and your love has been a constant reminder of what is possible.

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This dissertation stands as a tribute to the love, wisdom, and unwavering support that Massoud, Rose, Mom, and Dad have bestowed upon me. May the knowledge within these pages reflect the depth of my gratitude and the extent of my devotion to them.

August 14, 2023

ABSTRACT

INNOVATION DISTRICTS: CONTRIBUTING FACTORS FOR CITIES' PROSPERITY, EQUITY IMPLICATIONS, AND PLANNING POLICY SOLUTIONS IN RESPONSE TO PLACELESSNESS

Ladan Mozaffarian, Ph.D.

The University of Texas at Arlington, 2023

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Innovation is one of the most critical determinants of future success for cities. Urban policymakers and planners have developed a great interest in "innovation districts" as an impactful factor in enhancing cities' economic competitiveness and productivity. This planning policy has become very attractive to urban planners, urban economy specialists, and policymakers to the point that every city in the United States is trying to develop its version of an innovation district. Simultaneously, urban scholars have developed great attention to the most critical factors shaping innovation districts and affecting their prosperity.

The literature identifies factors such as spatial clustering, mixed land use, regional connectivity, and agglomeration as the most evident built environment characteristics to contribute to the concept of innovation districts and their prosperity. However, there is still a need for a conceptual framework based on empirical studies to evaluate and explore the contributing factors to enhance innovation-friendliness in innovation districts and improve their economic roles. In addition, the attractiveness of innovation districts to city officials and policymakers has resulted in rushed decisions in inviting these new developments into the cities. Therefore, more attention must be

paid to the inclusivity and equity issues associated with innovation districts when planned and implemented within urban areas. Furthermore, the concept of innovation districts is relatively new. Therefore, more attention and research should be needed regarding their negative externalities and planning policy solutions to remedy these negative consequences. Therefore, this study's objective is to understand the implications of innovation districts for planning, equity, and economic prosperity through policymaking in the context of the American cities. Accordingly, to bridge the gap in the literature, this study seeks to understand 1) What are the most critical factors shaping innovation districts and affecting their prosperity? 2) How do planning and implementing innovation districts include and engage residents? 3) What are the policy solutions to the negative consequences of developing innovation districts?

This study incorporates mixed methods that combine mostly qualitative and some quantitative research approaches to answer the primary research questions. Therefore, the methodology includes qualitative techniques, such as textual analysis, document retrieval, and empirical studies of cases, as well as quantitative approaches, such as spatial analysis, and socio-demographic analysis to compile data and develop the conceptual framework. The research's purpose is to develop a methodological framework through empirical analysis and qualitative methods to shed light on 1) the ambiguities about the potential and challenges for a prosperous innovation district and the generalizability of the innovation district model, 2) the social externalities associated with the development of innovation districts regarding civic inclusion and equity, and policy solutions to help reduce the negative consequences and 3) the future of innovation districts affected by remote working and placelessness. This study's methodology and findings can help policymakers who aim to foster knowledge-based policies and enhance economic growth by creating an innovation district in their cities. It also emphasizes the significance of social aspects, such as the

impacts of innovation districts on residents, particularly the vulnerable populations (in terms of race, ethnicity, and income), when making decisions to add these new economic developments into urban areas. Therefore, this study's primary contribution is to help planners and policymakers develop more effective policies and initiatives and fulfill the shortcoming or enhance their cities' resources through educated decisions. The results of this study provide important related considerations for urban planning and policymaking in the future concerning innovative urban areas and knowledge-based economic developments.

TABLE OF CONTENTS

ACKNOWLEDGEMENT…… ii
DEDICATION ……... iii
ABSTRACT ……... iv

1. CHAPTER 1- Introduction 1
1.1 Problem Statement 1
1.2 Research Purpose and Research Questions 4
1.3 Research Significance 5
1.4 Research Design 7
2. CHAPTER 2- Literature Review 9
2.1 Definition and History of Innovation Districts 10
2.1.1 Innovation 10
2.1.2 Geography of Innovation 11
2.1.3 Understanding the Concept of Innovation Districts 13
2.1.4 History and Evolution of Innovation Districts 18
2.1.5 Innovation Districts and Similar Planning Concepts 20
2.2 Indicators of Prosperity of Innovation Districts 24
2.2.1. Innovation Districts and their Identified Indicators 24
2.2.2 Contributors of Innovation Districts 27
2.3 Innovation Districts and Their Planning Implications 30
2.3.1 Innovation Districts & Cities' Economic Development 30
2.3.2 Innovation Districts and Their Equity Implications 32
2.3.3. Innovation Districts and Future Planning for Cities 34
2.4 Summary 39
3. CHAPTER 3- Methodology and Analytical Frameworks 41
3.1 Research Method 41
3.2 Research Questions and Analytical Frameworks 43
3.2.1 The main contributing factors to shaping innovation districts: Analytical Framework- RQ1 44
3.2.2 The extent of community engagement and the impacts of innovation districts on civic inclusion and social equity: Analytical Framework- RQ2 49
3.2.3 Future planning for innovation districts amid rising remote working: Analytical Framework- RQ3 55

3.3 Data Sources and Data Collection Procedures 57
3.3.1 Contributing factors to shaping innovation districts: Data Collection Procedure- RQ1 57
3.3.2 Community engagement and civic inclusion in developing innovation districts: Data Collection Procedure- RQ2....60
3.3.3 Future planning for innovation districts amid rising remote working: Data Collection Procedure- RQ3....63
3.4 Methodological Limitation....66
4. CHAPTER 4- Analysis and Findings....68
4.1 Empirical Analysis of Key Contributing Factors Shaping Innovation Districts: Evidence from 14 Case Studies in the United States (RQ1)....68
4.1.1 Buffalo Niagara Medical Campus (BNMC) 69
4.1.2 San Francisco Mission Bay Area 70
4.1.3 Boston Seaport Innovation Districts (BSID)....71
4.1.4 Cortex Innovation Community (CIC)....73
4.1.5 Atlanta Technology Square (Tech Square)....74
4.1.6 San Diego I.D.E.A. 75
4.1.7 Oklahoma City Innovation District 76
4.1.8 Innovate ABQ....78
4.1.9 ASU SkySong Innovation Center....79
4.1.10 Destination Medical Center (DMC) 80
4.1.11 Houston Innovation Corridor (Ion District) 81
4.1.12 Midtown Detroit TechTown District 82
4.1.13 Tech Center at Oyster Point (Tech Center)....84
4.1.14 Richardson Innovation Quarter (Richardson IQ) 85
4.2 Findings for Key Contributing Factors Shaping Innovation Districts: Evidence from 14 Case Studies in the United States 86
4.2.1 Economic Assets....88
4.2.2 Physical Assets 89
4.2.3 Networking Assets....89
4.2.4 Governance Structure Typology....90
4.2.5 Geographic Location Typology....91
4.3 Empirical Analysis of Community Engagement and Civic Inclusion in Developing Innovation Districts: A Case Study of Fort Worth Medical Innovation District in Texas, U.S. (RQ2) 92
4.3.1 City Council Meeting Minutes 96

4.3.2 Major Media Outlets (magazine articles and newsletters) 97
4.3.3 Technical Reports 100
4.4. Findings for Community Engagement and Civic Inclusion in Developing Innovation Districts: A Case Study of Fort Worth Medical Innovation District in Texas 101
4.5 Content Analysis of the Impacts of Placelessness and Remote Working on Future Planning for Innovation Districts (RQ3) 108
4.5.1 General Classifications 109
4.5.2 Classification by Themes and Concepts 112
4.6 Findings for the Impacts of Placelessness and Remote Working on Future Planning for Innovation Districts- A systematic Review of the Literature 119
4.7 Summary 121
5. CHAPTER 5- Conclusions and Policy Implications 123
5.1 Conclusions and Policy Implications: The main contributing factors to shaping innovation districts (RQ1) 123
5.2 Conclusions and Policy Implications: The extent of community engagement and the impacts of innovation districts on civic inclusion and social equity (RQ2) 126
5.3 Conclusions and Policy Implications: Future planning for innovation districts amid rising remote working (RQ3) 129
5.4 Discussion and Summary of Conclusions 132
5.5 Research's Contributions to Planning Theory and Practice, and Policy 135
REFERENCES 139
APPENDIX 157

LIST OF FIGURES

Figure 1-1. Research Design 8
Figure 3-1. The Methodological Approach of the Study 42
Figure 3-2. The three key assets shaping innovation districts 45
Figure 3-3. The analytical framework for RQ#1: Three main categories of innovation districts' assets and their subcategories 46
Figure 3-4. Location of the 14 selected case studies of innovation districts 48
Figure 3-5. The analytical framework for RQ#2: the relationship between different groups of people and an innovation district in terms of Influence in decision-making and impacts 51
Figure 3-6. The boundaries of the proposed medical innovation district - Source: Fort Worth Economic Development Department 54
Figure 3-7. The location and type of the medical facilities in Fort Worth Medical Innovation District 55
Figure 3-8. The analytical framework for RQ#3: Understanding the impacts of BE attributes in the future planning for IDs amid placelessness and remote working via conducting the systematic review of the literature. 57
Figure 3-9. Data Collection Sources and Procedure for Research Question 3 66
Figure 4-1. Geographical location of BNMC in relation to Buffalo CBD 70
Figure 4-2. Geographical location of Mission Bay Area Innovation District in relation to San Francisco CBD 71
Figure 4-3. Geographical location of Boston Seaport Innovation District in relation to Boston CBD 72
Figure 4-4. Geographical location of Cortex Innovation Community in relation to St. Louis CBD 74
Figure 4-5. Geographical location of Atlanta Technology Square in relation to Atlanta CBD 75
Figure 4-6. Geographical location of San Diego I.D.E.A in relation to San Diego CBD 76
Figure 4-7. Geographical location of Oklahoma City Innovation District in relation to Oklahoma City CBD 77
Figure 4-8. Geographical location of Innovate ABQ in relation to Albuquerque CBD 79
Figure 4-9. Geographical location of ASU SkySong Innovation Center in relation to Scottsdale CBD 80
Figure 4-10. Geographical location of Destination Medical Center in relation to Rochester CBD 81
Figure 4-11. Geographical location of Houston Innovation Corridor in relation to Houston CBD 82
Figure 4-12. Geographical location of Detroit Tech Town in relation to Detroit CBD 83
Figure 4-13. Geographical location of Tech Center in relation to Newport News CBD 84
Figure 4-14. Geographical location of Richardson IQ in relation to Dallas CBD 86
Figure 4-15. The Employment Density in Fort Worth and Near Southside (showed in red rectangular) 103
Figure 4-16. The Population Density in Near Southside 104
Figure 4-17. Minority Population and low-income population in Near Southside 104
Figure 4-18. The distribution of different land uses in the Near Southside area 105

Figure 4-19. Publication year of the reviewed literature for the four keywords associated with Placelessness, Remote Working, and Innovation Districts 110
Figure 4-20. Type of the selected publications for the four keywords 112
Figure 4-21. The Built Environment attributes discussed in the reviewed literature. 113

LIST OF TABLES

Table 3-1. Case Studies of Innovation Districts 47
Table 3-2. Characteristics of the 14 selected case studies of innovation districts 48
Table 3-3. Research Question 1: Data Collection Sources.....58
Table 3-4. Research Question 2: Data Collection Sources.....62
Table 4-1. Typology of ID's economic, physical, and networking assets and governance features 86
Table 4-2. List of the identified economic, physical, and networking factor, and the governance structure of the 14 case studies of innovation districts in the U.S. 87
Table 4-3. Summary of the government structure typology for the 14 cases of IDs in the US 90
Table 4-4. Summary of the geographical location typology for the 14 cases of IDs in the US....92
Table 4-5. Data Analysis Procedure (Content analysis and narrative analysis) 93
Table 4-6. Number of reviewed publication based on the study scope/established keywords during 2000-2022 110
Table 4-7. Type of reviewed publication based on the study scope and designated keywords. .111
Table 4-8. Classification of BE attributes of innovation districts within the scholarly publications 113
Table 4-9. Number of the reviewed literature based on major theme/concept- Keyword: Placelessness 115
Table 4-10. Number of the reviewed literature based on major theme/concept- Keyword: Remote Working & Telework 118

CHAPTER 1

1. CHAPTER 1- Introduction

1.1 Problem Statement

Innovation, recognized as the core reason for modern existence (Kylliäinen, 2019), has been critical in various fields, including the economy, political science, social science, and applied science. Innovation happens when ideas, products, services, technologies, or processes are new or improved to provide new market demand or cutting-edge solutions to economic, social, and environmental challenges (Katz & Wagner, 2014a). Cities are not an exception when the matter of innovation comes into discussion. During the past couple of decades, cities and metropolitan areas in the US and worldwide have been trying to become more innovative places to be livelier, attract more investment, increase job opportunities, enhance social equity, and fulfill residents' needs. The shift in the US economy from an industrial type, being more dependent on factories, mass manufacturers, and an intensive labor force, to a knowledge-intensive economy (Drucker, 2002; Mudambi, 2008; Powell & Snellman, 2004) has provided the basics for many changes in urban planning and public policies. The intense dependence of the knowledge economy on entrepreneurs, educational institutions, innovative businesses, and talented human capital (Hamidi & Zandiatashbar, 2019; Morisson, 2020; Powell & Snellman, 2004; Yigitcanlar, 2014) has motivated urban planners and policymakers to assess the urban form's role in shaping and supporting this type of economy.

Therefore, various urban planning and urban design strategies/models have been developed and promoted by urban planning scholars and/or practitioners to enhance cities' capacities as "innovative places" due to the economic, social, and spatial benefits that they offer (Adu-McVie et al., 2021). Creative clustering (Bagwell, 2008), technology zones (Casper, 2007), clusters of

innovation (Engel et al., 2018), and innovation districts (Katz & Wagner, 2014a) are some of these urban models/strategies. In this vein, innovation districts or clusters of innovation are among the most current development concepts discussed by scholars to enhance innovation-friendliness within urban areas and enhance economic growth. Moreover, since innovation clusters are formed as economies of agglomeration, city officials are interested in economic development plans that attract major corporations, particularly those related to technology (Carlino & Kerr, 2014). Innovation districts, by definition, are geographic areas that are physically compact, transit-accessible, and offer mixed land use, where leading-edge anchor institutions are located; they also provide a basis for companies to cluster and connect with start-ups, business incubators and accelerators (Katz & Wagner, 2014a).

Innovation districts are defined and characterized by specific place-based factors and their practicality and/or functionality is tied to their "place-making" attributes. Accordingly, innovation districts are defined as place-based economic development urban models (Zandiatashbar & Kayanan, 2020) and specific geographical areas (Katz & Wagner, 2014a) developed in urban areas aiming to revitalize urban cores and promote the economy of agglomerations (Esmaeilpoorarabi et al., 2020a; Engel et al., 2018; Katz & Wagner, 2014a; Casper, 2007; Read, 2016). Furthermore. innovation districts are places where knowledge workers, technology firms, and ICT employees are clustered to enhance knowledge economy. However, research suggests that among employees from different sectors, knowledge workers and IT/technology employees are increasingly attracted to more recent working modes, such as remote working (or telework) (López-Igual & Rodríguez-Modroño, 2020; Okubo, 2022; Ollo-López et al., 2020; Vilhelmson & Thulin, 2016). Remote working adds to the geographical dispersion of workers and workplaces and increase the opportunities for these groups of employees to be detached from a particular place (as office) and

work from any location with the help of the technological advances (Kniffin et al., 2021; Nikbakhsh, 2022; Sinitsyna et al., 2022). Digital connectivity has enabled a placeless environment for work and social activities, resulting in a growing population of digital nomads who use remote work and personal mobility to avoid the restrictions of fixed places. This has led to a concept known as "placelessness" within the literature (H. Wang, 2020, Montague, 2016), where people and activities are no longer attached to a particular place. This trend has significant implications for urban planning and policy, particularly in the context of innovation districts and other place-based economic development initiatives. Policymakers will need to consider how to respond to these trends in order to ensure that innovation districts remain practical and continue to attract knowledge firms and workers.

According to the literature, the most evident built environment characteristics to contribute to the concept of innovation districts are spatial clustering, walkability, proximity to urban amenities, diversity, regional connectivity, and agglomeration (Hamidi & Zandiatashbar, 2019; Engel et al., 2018; Katz & Wagner, 2014a). However, while the role of the built environment and other environmental factors in promoting innovation within urban areas has been discussed through theoretical studies (Hamidi & Zandiatashbar, 2019; Keeble & Wilkinson, 2017; Katz & Wagner, 2014a; Florida & Boyett, 2014) and empirical studies (Engel et al., 2018; Lee et al., 2014; Casper, 2007; John & Pouder, 2006), the literature lacks a conceptual framework to explore the primary contributing factors in shaping innovation districts and to evaluate the challenges and potentials of developing innovation districts through a comprehensive study of empirical cases.

The literature pays specific attention to the economic benefits of innovation districts, which include an increase in the number of jobs (specifically higher-paying jobs), higher investment absorption (by attracting a talented workforce, start-ups, tech-based corporations, and

headquarters), an increase in property value, an increase in demand for goods and services, and increase in revenue revenue for industries located within these districts (Esmaeilpoorarabi et al., 2020a; Engel et al., 2018; Katz & Wagner, 2014a; Casper, 2007; Read, 2016). However, there is less attention to the social impacts of innovation districts, and there is not enough evidence to show how and to what extent the people residing within the innovation districts have been considered and/or engaged when making decisions about developing innovation districts in an urban area. Besides, it is important to understand the local residents' perception of the innovation district's concept and the changes or impacts it may cause to their residential area.

Fewer studies have considered social-related issues/complications that might be caused by innovation districts, such as displacement, gentrification, exclusion, lower race/ethnicity diversity, and more income gaps between residents (Griffith, 2015; Morisson & Bevilacqua, 2019a; Stehlin, 2016; Zandiatashbar & Kayanan, 2020). Research suggests that these aspects of innovation districts are not fully considered when policymakers and planners are deciding to bring these new developments into the cities. In addition, our knowledge of the policy solutions to remedy the negative impacts of innovation districts is limited. Also, the literature lacks of empirical social impact assessments to understand the implications of innovation districts for cities and communities. Therefore, there exists a gap in the literature regarding how policy could respond to future issues resulting from the development of innovation districts.

1.2 Research Purpose and Research Questions

This research aims to provide a comprehensive discourse of planning and policy implications of innovation districts concerning their place-based characteristics, the social and economic equity associated with them, and their role in planning for future cities. The primary research question is thus "***what are the primary implications of innovation districts for planning, equity, economic***

prosperity, and policymaking?". This principal question will be addressed through the following supporting research question:

I. *What are the main contributing factors to shaping innovation districts? And how does understanding the potentials and challenges for a thriving innovation district help with generalizability of the innovation district model?*
II. *What are the impacts of innovation districts on civic inclusion and social equity? And how and to what extent is the community engaged in different stages, from developing the idea to operating the innovation districts?*
III. *What are the policy solution and recommendations for the future of place-based economic development planning supporting equitable and inclusive innovation districts amid rising placelessness?*

1.3 Research Significance

The literature identifies some built environment determinants or place-based characteristics that impact promoting and enhancing innovation in urban areas. However, the literature does not explicitly address three critical aspects concerning innovation districts and their impacts, including:

- Essential contributing factors shaping innovation districts and affecting their prosperity.
- Community engagement and civic inclusion in planning and implementing innovation districts.
- The role of innovation districts in developing an equitable economic development approach in future planning for cities and urban areas.

This research's purpose is to develop a methodological framework and a comprehensive research methodology to understand innovation districts as an attractive urban model, their negative externalities as an urban economic development, and the policies that could help respond to these potential negative consequences. The findings from this study will uncover how and to what extent built environmental determinants, including density, diversity and mixed-use, transportation

amenities, access to open spaces, and access to other types of amenities such as education centers and recreational facilities, walkability, and bike-ability can capture the knowledge-economy prosperity via promoting innovation production. Also, this study's results will help to understand the social impacts derived from the development of the innovation districts and the way decision-makers and city officials could address them. Furthermore, this study's findings will become useful to policymakers to obtain a better understanding of the tradeoffs between the positive and negative implications of innovation districts, and how to proceed with inciting this new development into their cities. Finally, this study's findings will help to understand how the place-making attributes of innovation districts will be affected by impacts of remote working and placelessness and how planning and policymaking may respond to these impacts.

Although many institutions such as anchor companies, research centers, universities, medical campuses, incubators, accelerators, and economic cultivators, as well as some individuals such as major real estate developers, major landowners, mayors, local government officials, and research campuses' managers, are interested in developing innovative places in urban areas (Katz & Wagner, 2014a), they do not have access to a reliable and comprehensive framework to determine whether the environmental determinants of a specific urban area support the development of an innovative place such as an innovation district or not. This study's results and frameworks will be helpful for any qualitative and quantitative analysis related to economic development, the impacts of innovation districts on quality of life, and the impacts of innovation districts on urban areas. In addition, it can provide a basic guide for planners and policymakers to develop more effective policies and initiatives and to fulfill the shortcoming or enhance their cities' resources through educated decisions.

1.4 Research Design

The research design strategy of this study consists of five phases. First, thorough review of the literature was conducted to understand the theory and definitions related to innovation districts and their contributing factors. Second, the existing literature gaps were identified to establish the research's primary purpose/objective, which led to better defining the research questions. Subsequently, in phase three, a methodological framework was developed to address three primary research questions based on the identified gaps in the literature. In this phase, a research approach was developed for each of the research questions and decided on the data sources and the data collection procedure. A spatial analysis was conducted to identify innovation districts across the nation and their characteristics. Empirical analysis, content analysis, and spatial analysis were relied upon to evaluate the key contributing factors shaping these cases of innovation districts and what will affect their prosperity. Next, approximately 50 documents were examined based on a single case study design strategy to deeply engage and uncover the factors outlined, and a series of socio-spatial analyses was conducted to understand the state of civic inclusion and community engagement when developing innovation districts. A series of content analyses and reviewed of 181 scholarly texts was also conducted to understand how the future of innovation districts will be affected by recent changes in the working modes. Phase four was to present the study's findings in response to the research questions. The discussion over the findings, the conclusions of the study, and the research's contributions to the planning and policy will be making the final phase of the study. Figure 1-1 summarizes the research design strategy of this study.

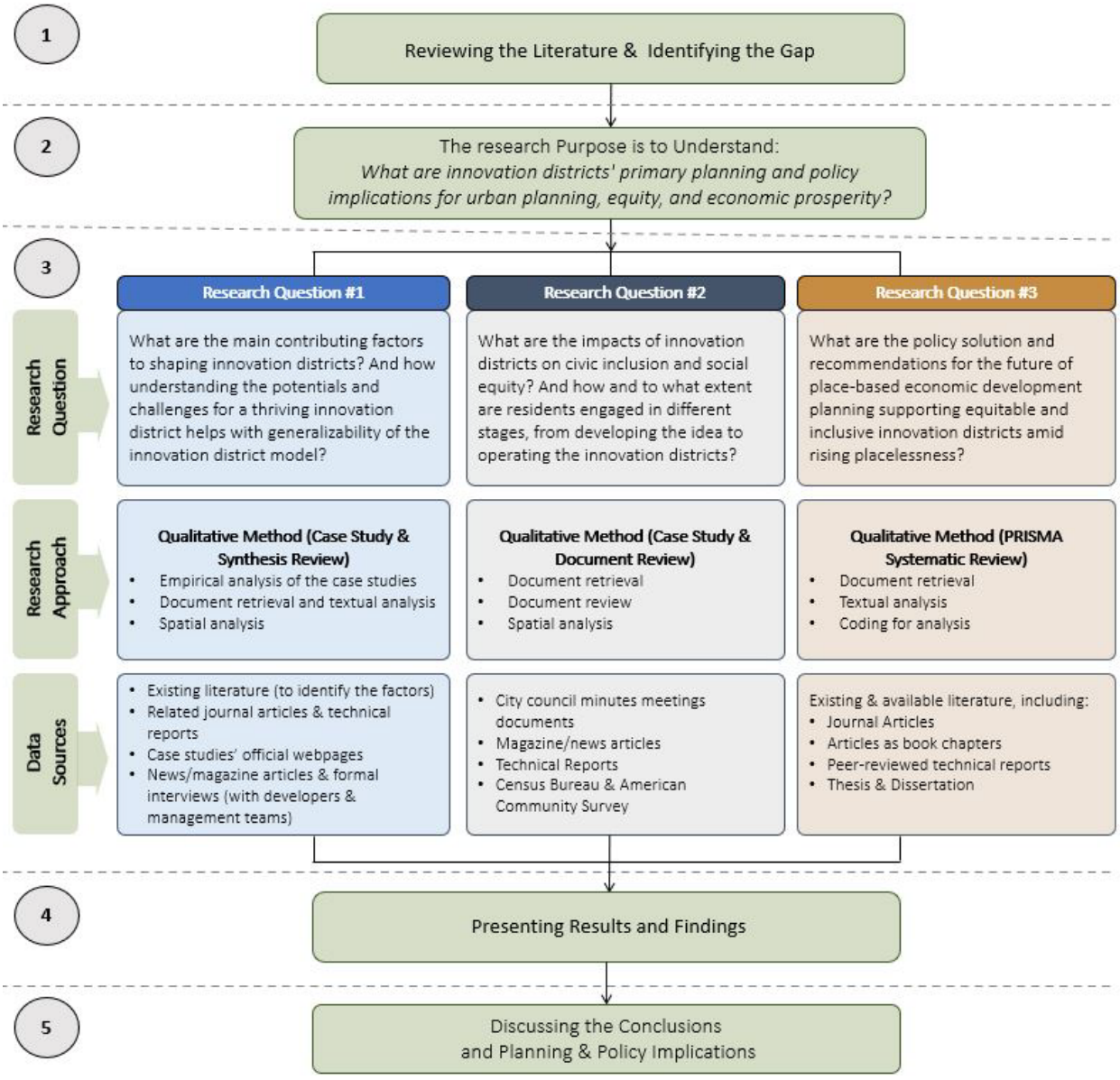


Figure 1-1. Research Design

CHAPTER 2

2. CHAPTER 2- Literature Review

While growth depends on many factors, such as economic, social, educational, and political factors, innovation is known to significantly encourage growth for cities and urban areas, particularly economic growth. Innovation can happen in different fields and via various tools, and it may have multiple types, including technological, non-technological, and organizational innovation, and it will "lead to better productivity performance (Mohnen & Hall, 2013)." Therefore, in general, innovation is highly valued not only by economists but also by urban planners. Hence, urban policymakers worldwide are attracted to policies, initiatives, and urban models that can create more innovative places and enhance innovation in urban areas (Katz & Wagner, 2014a; Kayanan, 2022). Innovation districts are among the most well-known urban model concepts promoted by urban planners and urban scholars to attract different types of innovative ideas, innovative products, and innovative workforces into cities to enhance economic development and prosperity in cities (Yigitcanlar et al., 2020). Urban policymakers have become more interested in designing and implementing innovation districts during the last two decades. It is discussed that almost every city in the US aims to implement and have an innovation district (Morisson, 2020).

The concept of innovation districts was introduced and popularized by Katz and Wagner in 2014 in an article published by Brookings Institute. While urban planners, policymakers, city managers, and developers are very attracted to the concept of innovation districts (Katz & Wagner, 2014a; Kayanan, 2022), urban scholars are trying to understand the most influential factors to impacts the innovation districts prosperity, their economic and planning implications, and their equity and inclusion implications. In this section, I conduct a comprehensive literature review to understand

the concept of innovation, the geography of innovation, innovation districts, and their evolution. In addition, indicators of innovation districts, contributors of innovation districts, and the impacts of innovation districts on urban areas within the literature are discussed in this section. Finally, this section will conclude by discussing the literature reviewed and mentioning what could be considered the gap considering the literature and the study's topic.

2.1 Definition and History of Innovation Districts

2.1.1 Innovation

The definition of innovation is usually accompanied by the word "new." Products are assumed to be innovative if they respond to the "new" market's requirements or if they are a "new" solution for the existing market (Maranville, 1992). It has been stated that in all economic ages, which are defined in four different categories, including the hunter/gatherer, agriculture, the mercantile, and the industrial, there were evident and remarkable signs of innovation. However, the innovation related to information processing and communication will be the form of innovation for the coming economic age (Maranville, 1992). While innovation has mostly been recognized in the presence of new technological, medical, or pharmaceutical products or solutions, it also may happen in other fields, including art, social care services, marketing/business, and management (Frankelius, 2009). On the other hand, innovation is commonly possible through the high-level knowledge acquired at universities. Besides, high-level knowledge could be obtained outside universities, and the interaction between universities and companies is critical to producing a high level of knowledge (Pancholi et al., 2020; Frankelius, 2009). The literature also identifies two different types of knowledge, including "thinking knowledge," known as the idea, and "action knowledge," known as creating the idea, and discusses that that innovation happens when thinking knowledge and

action knowledge are both present, and at the same time, they "gain a foothold in society (Frankelius, 2009)."

Another study identifies two different types of innovation; while the first one is about the new products and services called technological innovations, the second one is innovation related to organizational and marketing changes called non-technological innovations (Mohnen & Hall, 2013). Innovation districts can benefit from both types of innovation. Regarding measuring innovation, the literature indicates that innovation can be measured by its inputs or outputs (Mohnen & Hall, 2013). In terms of inputs, the most critical measure is R&D; however, it is not the only one. The type of equipment and software to produce new products and processes, training-related efforts to introduce new products and methods are also influential. In terms of output, they identify four types of innovation: Product Innovation, Process Innovation, Organizational Innovation, and Marketing Innovation (Mohnen & Hall, 2013). Accordingly, when ideas, products, services, technologies, or processes are new or improved to provide new and unique market demand or cutting-edge solutions to economic, social, and environmental challenges, it can be called innovation (Katz & Wagner, 2014a). Therefore, based on the existing literature, products, services, technologies, or businesses are innovative when they tend to be new and more effective at the same time for people, market, government, or environment.

2.1.2 Geography of Innovation

Geography and place-based interactions play a significant role in shaping industries and locating firms. Innovation has a geographic dimension that directly affects many aspects, including economic growth. Knowledge can be quickly circulated among different economic assets such as firms, corporations, start-ups, and other economic actors when there is physical proximity between these actors, and it happens because the dynamics of innovation can be processed more

conveniently (Feldman & Kogler, 2010). Economic activities have been dependent on factors such as diffusion of innovation and the underlying determinants of it (Ormrod, 1990). While geographers indicated concerns regarding the uneven distribution of economic activities and concentration of industrial activities, this clustering effect resulted in an increasing number of technology-intensive industries focusing on innovation and entrepreneurship (Feldman & Kogler, 2010). Moreover, it has been widely discussed that firms can benefit from the clustering effect, which will add to localized competition among them through "reinforcing supply and demand conditions, industry conditions, and related and supporting industries (Porter, 1990)." Thus, through this lens, one can achieve a more "formalized view of the national innovation systems" that describe and analyze the innovation process and technological changes (Feldman & Kogler, 2010).

Furthermore, innovation has a great tendency for spatial clustering. The history of creative activities shows that these activities usually tend to be gathered and concentrated in specific places. While Florence under the Medici is a more historical example, Silicon Valley could be recognized as a more recent example (Feldman & Kogler, 2010). On the other hand, technological firms and R&D centers are tremendously dependent on innovative ideas and creative concepts to make profits and stay in the market. Therefore, these types of firms are competitive over creative performance and innovation. While the technology firms are usually globally connected, the firms still prefer to cluster in specific locations (Gassler & Nones, 2008). The evidence also shows that typically there is the collection of related firms in specific locations called with different names, and one of them is innovation districts. The literature also mentions three main reasons for this clustering, which are 1) the infrastructure that supports identical/related industries, 2) the

knowledgeable and specialized workforce, and 3) the facilitation of knowledge exchange due to proximity to other related firms (Feldman & Kogler, 2010).

As mentioned earlier, economic growth and economic prosperity could be related and even dependent on innovation, particularly in the long term. However, innovation itself relies on other factors such as capital, skilled workforce, technological advances, and creative collaboration between different actors, either in the private or public sector. Therefore, while "innovation cannot be dictated, it can be cultivated" During the past two decades, there has been a dramatic effort in the U.S. and worldwide to create "innovation clusters" or areas that attract innovative firms and innovative workforce to a specific geographic location. Records show that regional innovation clusters are a critical component of national competitiveness (Sallet et al., 2009). Therefore, the reason that geography matters for innovative activities is that the process of creating and producing new products for the market is dependent on technological and scientific knowledge and action, and this knowledge and action can be better created and processed when geographic clusters of innovative activities (Feldman, 1993). Also, to commercialize ideas and concepts, firms need to have access to complementary knowledge, which will enhance the innovation process and can become possible by clustering and agglomeration of creative, innovative, and technological firms (Feldman, 1993; Feldman & Kogler, 2010; Sallet et al., 2009).

2.1.3 Understanding the Concept of Innovation Districts

Planners and policymakers have developed various urban models that may encourage cities to become more innovative places. Concepts, such as science parks (Koh et al., 2003; Lecluyse et al., 2019), creative clustering (Bagwell, 2008; S. Wood & Dovey, 2015), technology zones/districts (Casper, 2007; Forsyth, 2014; Heilmann et al., 2013; Z. Wang et al., 2022), urban buzz (Arribas-Bel et al., 2016), clusters of innovation (Engel, 2015; Engel et al., 2018; Moreno et al., 2005), and

innovation districts (Clark et al., 2010; Katz & Wagner, 2014a) have been used to designate innovative activity clusters. In this vein, "innovation districts" or "clusters of innovation" are among the most current development concepts developed by planners and policymakers and discussed by scholars to enhance innovation-friendliness, promote knowledge-economy, and create innovative urban spaces. Innovation districts are areas with a cluster of "leading-edge anchor institutions, companies, and firms, connecting with startups, business incubators, and accelerators to attract talented human workforce into the cities (Katz & Wagner, 2014a, p. 1) " Innovation districts are also known as "places where economy shaping, placemaking, and social networks are linked (Katz & Wagner, 2014a)." The concept of Innovation districts was first proposed in a research project done by Leon (2008) for the case of "22@Barcelona," where they introduce it as a new hub to attract knowledge workers and knowledge-intensive economy for Barcelona through its regeneration plan (Xiaohui et al., 2021). In other words, an innovation district is a geographical area that encourages and regulates the ecosystem of innovation and aims to magnetize highly skilled people from different sectors with entrepreneurial ideas and services, as well as business incubators and accelerators, and developers, all helping the city to increase its innovative economic activities and revitalize its urban spaces (Esmaeilpoorarabi et al., 2020a; Hamidi & Zandiatashbar, 2019; Engel et al., 2018). Moreover, the geography of innovation explains that proximity to innovative activities and agglomeration of innovative firms and occupations is significantly influential to create innovative places (Feldman & Kogler, 2010). Accordingly, innovation districts are defined as "clusters of creative industries, life science and applied science within large-scale real estate development projects and they are driven by inter-organization and cross-industry collaboration, open systems for R&D, and workers who have the aptitudes and skills required by the knowledge economy (Katz & Wagner, 2014a, p. 6)."

According to Kevin Lynch, “Districts are the relatively large city areas which the observer can mentally go inside of, and which have some common character. They can be recognized internally, and occasionally can be used as external reference as a person goes by or toward them (Lynch, 1960, p. 66). This means that an innovation district can be described as an urban area that has the ability to inspire, foster, and support innovation, regardless of the size of the space. It's an area within the city that's recognized as being driven by innovation, where various individuals and activities related to innovation converge, or an area that's believed to have tremendous potential for innovation in the near future (Xiaohui et al., 2021).

Moreover, these areas/districts try to provide the necessary basis for communications within the urban environment between the main actors; therefore, the proximity between innovation-driven actors is one significant factor in shaping innovation districts (Engel et al., 2018; Katz & Wagner, 2014a). Accordingly, the physical proximity enhances the social interactions among actors and increases trading the ideas through collaborative workspaces for creating an innovative and inclusive urban model (Engel et al., 2018; Katz & Wagner, 2014a). However, it is not the industry’s concentration to define innovation districts; in fact, it is the concentration of innovation acceleration and innovative activities, firms, and people representing an innovation district (Esmaeilpoorarabi et al., 2020b). Two main groups of factors are discussed to form clusters of innovation in the metropolitan areas: hard factors and soft factors. While universities, government, entrepreneurs, venture capital, mature corporations, research centers, and service providers are among the main hard factors within the clusters of innovation, soft factors are mostly defined as behaviors and structures such as mobility and resources, entrepreneurial process, global strategic perspective, and global connections (Engel et al., 2018).

The primary purpose of developing innovation districts is to spur innovation and creativity, emphasizing business and economic growth. Innovation districts aim to revitalize the urban core to make it more economically efficient and developed with the help of public and private actors working together to absorb investment and attract talents and, more importantly, to retain both (Pancholi et al., 2020; Esmaeilpoorarabi et al., 2020b; Engel et al., 2018). Due to the economic benefits of innovation districts, many cities worldwide started developing these districts by reorganizing the central urban areas to use them as innovation districts, such as the @22 district in Barcelona (Katz & Wagner, 2014a; Battaglia & Tremblay, 2011) as an early case of innovation districts, as well as cases in Berlin, London, Medellin, Montreal, Seoul, Stockholm, Boston, and Toronto (Fernandez & Bentley, 2022; Sharp et al., 2022).

Some scholars have expressed their skepticism about the effectiveness of innovation districts as a non-participative top-down economic development strategy (Morisson & Bevilacqua, 2018). However, other scholars emphasize the critical role of knowledge-based development where public and private actors work together (Esmaeilpoorarabi et al., 2020a). To attract and retain talent and investment and accelerate their socioeconomic performance, (Baily & Montalbano, 2018a) proposes specific place characteristics that innovation districts must possess. Additionally, other scholars highlight the significant impact of innovation districts beyond their boundaries through knowledge spillover in the labor market and the value chain (Lawrence et al., 2019). The definition of innovation districts, therefore, is tied to their placed-based characteristics as they are essentially known to be a “policy and practice concept” and a “place-based urban development strategy” (Sharp et al., 2022) to invite innovative and creative institutes and workers into the central parts of the cities, where people can share their ideas, knowledge, and skills via various forms of proximity (Boschma, 2005). One of the main reasons for this regeneration happening in the cities'

central areas is the "polarization of advanced economic activities in the city's core (Battaglia & Tremblay, 2011)."

Moreover, urban researchers and developers discussed two types of clusters that cities have developed to attract entrepreneurial and innovative activities, including industry-focused clusters and technology-based clusters (John & Pouder, 2006). Of these two types of clusters, technology-based clusters are very similar in definition and concept to innovation districts. Therefore, cities and metropolitan areas are interested in providing regional hot spots and technology clusters to increase jobs, attract new businesses and stimulate innovation within the regions (Casper, 2007; John & Pouder, 2006). Besides, technology clusters as places where high-technology firms agglomerate are significant actors to provide economic growth for a region (Casper, 2007). The literature argues that when there are social ties to link individuals with companies and firms, these technology clusters will become more innovative and, therefore, more successful (Casper, 2007). The identifiable characteristic of regional technology clusters/high-technology clusters is that they include many innovative enterprises, mostly small and new firms that are technology-based manufacturing corporations and provide innovative and creative service activities (Casper, 2007). These clusters are known for delivering new forms of "inter-firm collaboration" and supporting the link between educational centers such as universities and developers, and also for being technology-based developments that connect scientific, technological, and managerial expertise within their region (Pancholi et al., 2020; Keeble & Wilkinson, 2017; Casper, 2007). Thus, technology-based sectors that are speedily entering into technology clusters in the cities are "service industries rather than manufacturing industries; some sectors such as computer software and services are among the most typical sectors in technology clusters (Keeble & Wilkinson, 2017)." The definition and characteristics of technology clusters and innovation districts are very

similar. These two concepts follow the same strategy and pattern to enhance the economic development within the cities.

2.1.4 History and Evolution of Innovation Districts

From the beginning of the 20th century, the concept of providing clusters that are attracting entrepreneurial and innovative activities has become the center of attention, particularly by urban researchers and economic researchers (John & Pouder, 2006). According to the literature, from the 1970s, the concept of innovation emerged into the cities by examples such as Silicon Valley; however, these types of innovative areas were mostly developed in suburbia, and had their isolated campuses and were only accessible by cars (Katz & Wagner, 2014a). While industry and economic growth was greatly emphasized, "quality of life, and integration of work, housing and recreation" had received less attention in these type of innovative areas, until a new urban model for creating innovative areas within the cities was introduced called "innovation district" (Katz & Wagner, 2014a). The concept of innovation districts was the following trend after industrial districts and suburban science parks (Katz & Wagner, 2014a). While industry-focused clusters had been mostly formed in the outer edges of cities, innovation districts started to shape in central cities' cores rather than suburban greenfield sites (Engel et al., 2018; Katz & Wagner, 2014a).

Industrial districts that emerged in the 19th century and early 20th century were mostly concentrating on manufacturing; however, by moving forward through the 20th century, this manufacturing activity changed, and the face of "industrial districts" altered to a new type of districts known as "science parks"(Katz & Wagner, 2014a). Science parks were more concentrated on innovation and invention in science. Following that, the technological advancement happening worldwide and specifically in the U.S. provided conditions for science parks to be introduced as a new concept known as "research parks" (Engel et al., 2018; Katz & Wagner, 2014a). The

collaboration between universities, private and public developers, and technology-driven firms resulted in clusters of corporations and scientific labs trying to attract more entrepreneurial activities and commercializing research ideas (Katz & Wagner, 2014a). This was the model of research parks, which the most well-known of them are Stanford Research Park (the Silicon Valley), and Research Triangle Park in Raleigh Durham. Another significant difference between the early concepts and the concept of innovation districts was that (as mentioned) science parks, and research parks were some isolated suburban type of innovative areas that were only accessible by car, while innovation district was forming mostly in the city cores (Katz & Wagner, 2014a).

The main differences between early concepts and the concept of innovation districts was that first, the new idea was more associated with technology-driven activities, and second, there was a noticeable link between economy-shaping, place-making, and network building, which was missing in the early models (Katz & Wagner, 2014a; P. Wood, 2005). Accordingly, by the emergence of "New Industrial Districts," significant changes started to happen in the contemporary economy and types of economic growth within the cities worldwide. Many researchers and policymakers began a new kind of effort to advance and promote clusters of interdependent activities to repeat the success of exemplary regions such as Silicon Valley in their cities (P. Wood, 2005). Thus, during the first part of the twenty-first century, many cities tried to become innovation engines; it also was a natural reaction to all the technological advances and alternations happening (Engel et al., 2018; P. Wood, 2005). Cities aim to attract talents and retain investment to produce benefits locally and compete globally; that is how they are attracted to the idea of innovation districts (Engel et al., 2018; Katz & Wagner, 2014a; P. Wood, 2005).

Also, another study clarifies in the last decades of the 20th century, it was believed that one of the most effective forms to improve a region's economic growth and to make it more innovative was

developing a cluster of industries and firms outside the metropolitan areas (Engel et al., 2018). At the beginning of the twenty-first century, it became inverted; innovation ecosystems started to be developed in central city areas (Engel et al., 2018). It was a reverse model of what was happening in the second half of the twentieth century as a sprawling suburb was shaping like a ring around the cities which made urban residents, and then urban businesses start residing and shaping in these areas because they were looking for safer and more affordable lifestyles, and probably cheaper and more scalable production for companies (Engel et al., 2018; Katz & Wagner, 2014a). The economic advantages of industrial clustering supported this trend, which flattened the road for economic growth and shaped new industrial complexes outside the city cores (Engel et al., 2018).

Innovative districts/clusters are emerging in many cities and metropolitan areas around the world including many metropolitan areas in the United States. In the U.S., the emergence of innovation districts is mostly happening in downtown and midtown of the cities where there is access to "anchor institutions" (Katz & Wagner, 2014a). In most of these examples underutilized areas and particularly older industrial areas are being reutilized and revitalized as innovation districts, by attracting knowledge-based economy and technology-related firms and employees. Also, there are examples of the transformation of "traditional exurban science parks" (such as Research Triangle Park in Raleigh-Durham) to new type of areas that are more vibrant living-working environments and are more urbanized (Katz & Wagner, 2014a).

2.1.5 Innovation Districts and Similar Planning Concepts

The concept of creating and developing urban models that support innovation and innovative activities has become a critical subject in planning and policymaking during the past decades. Additionally, in the past several decades, the economy has experienced a transition from the industry-led economy to the knowledge-intensive economy (Drucker, 2002; Mudambi, 2008;

Powell & Snellman, 2004). Therefore, many cities attempted to develop and create planning and policy strategies to promote innovative activities, magnetize knowledgeable workforce, and attract investment (Hamidi & Zandiatashbar, 2019; Morisson, 2020; Powell & Snellman, 2004; Yigitcanlar, 2014). These attempts have led to the development of various types of urban models, such as science parks, creative clustering, technology zones, and urban buzz. Despite the differences in main contributors, these urban models share similarities in terms of spatial characteristics and built environment attributes with innovation districts and clusters of innovation.

Science parks: According to Felsenstein's (1994) insights, science parks are typically established with dual objectives. The primary aim is to function as a seedbed and an enclave for technology, nurturing the growth of innovative products and processes by providing incubator support to small, high-tech firms. By facilitating the transfer of university know-how to tenant companies, science parks also encourage the development of faculty-based spinoffs. The second objective is to catalyze regional economic development or revitalization, thereby promoting economic growth (Felsenstein, 1994). Science parks come in various models but generally support the start-up, incubation, and development of knowledge-based, high-growth businesses. They offer business support and technology transfer mechanisms that promote innovation and growth. Additionally, science parks often connect with universities and research organizations to help facilitate collaboration and advancement.(Koh et al., 2003). The United Kingdom Science Park Association (UKSPA) defines them as a “business support and technology transfer initiative that: (1) encourages and supports the start-up and incubation of innovation-led, high growth, knowledge-based businesses; (2) provides an environment where larger and international businesses can develop specific and close interactions with a particular center of knowledge creation for their

mutual benefit; (3) has formal and operational links with centers of knowledge creation such as universities, higher education institutes and research organizations (Lecluyse et al., 2019, p. 560)."

Creative Clustering: Creative clusters, which are networks of interconnected companies and associated institutions operating close, are helpful in identifying groups of companies to target for growth (Bagwell, 2008). Creative firms are viewed as a source of innovation for the knowledge economy and as providing a seemingly endless supply of new ideas for potential products in various industries. These firms are also linked to diversity, which is another driver for innovation, and are considered a significant source of competitiveness for multicultural cities (Bagwell, 2008). "Creative industries do not locate randomly within cities and are sensitive to 'characteristics of place' at the neighborhood scale. (S. Wood & Dovey, 2015, p. 52)." It is widely recognized that the quality of place plays a significant role in creative clustering. Density and network effects are especially crucial in creative industries and knowledge-based economies, as they are central to innovation and the flow of ideas. Therefore, it is essential to prioritize providing an environment and infrastructure that fosters creativity and innovation in these industries.

Technology zones: According to the literature, technology zones are "successful clusters to heightened innovation capacity achieved through the existence of social ties linking individuals across companies (Casper, 2007, p. 438)." Clusters of high-technology firms have been playing a pivotal role in driving economic growth in advanced industrial economies. These clusters have also become a central focus of technology policies aimed at promoting innovation and development. These firms work together to create new products and technologies that can transform entire industries. By fostering these clusters, governments and businesses alike can help to create an environment that encourages innovation and drives economic progress (Z. Wang et al., 2022). The high-tech zone is an area that is driven by innovation and promotes development

through reform. It has become an area with fruitful achievements in high-tech industrialization, concentrated high-tech enterprises, strong atmosphere of innovation and entrepreneurship, and concentrated financial resources (Z. Wang et al., 2022). High-tech industrial development zones are the key levers for governments at all levels to implement the innovation-driven development strategy deployed by the central government. They are also important policy innovations to promote the transformation of scientific and technological innovation achievements into real productivity (Z. Wang et al., 2022). Some other factors discussed in the literature regarding technology zones includes technology spillovers, network relationships, cooperative innovation, and technology trade.

Urban buzz: According to Arribas-Bel et al., (2016), urban buzz is a phenomenon that has received quite an amount of attention in the recent urban literature. Buzz areas—be they cities as a whole or urban districts—are powerhouses of innovation, creativity, and unconventional lifestyles. Urban buzz is based on intensive social interactions in a compact urban space, predominantly through physical face-to-face contacts. This geographically concentrated phenomenon serves to enhance social and economic interaction through communication, message transmissions, information acquisition, social contacts, knowledge and learning mechanisms, creativity exchanges, and so forth. Spatial copresence is an important action-oriented condition for information acquisition and selection in buzz areas. Clearly, an urban buzz district is a combination of buzz producers (e.g., restaurants, theatres, entertainment centers, recreation parks) and buzz consumers (e.g., visitors, residents). “Thus, urban buzz does not refer to people per se but mainly to the positive externalities created by the interface of various actions and behaviors in each urban district resulting from density, proximity and connectivity (Arribas-Bel et al., 2016, p. 190).”

2.2 Indicators of Prosperity of Innovation Districts

2.2.1. Innovation Districts and their Identified Indicators

The studies related to innovation districts provide a wide range of explanations about the key indicators of innovation districts and the main reasons that innovation districts enhance cities' economic growth. The following paragraphs provide evidence from the literature regarding the key indicators of innovation districts.

Innovation districts are physically compact and amenity-rich areas that provide access to transit and offer mixed-use development with walkable and bike-able infrastructure and bike-sharing facilities (Katz & Wagner, 2014a). The critical reason firms and residents are attracted to innovation districts is that there is less need to take long daily commutes when residing and working within innovation districts that are walkable, bike-able, and connected by transit and technology (Katz & Wagner, 2014a). Additionally, innovation districts tend to be places where many innovative solutions towards the economy, environment, and social aspects are gathered (Katz & Wagner, 2014a). Therefore, they include a mixture of entrepreneurs and startups, educational institutions, schools, and innovative medical firms and centers with new medical knowledge and methods (Katz & Wagner, 2014a). Also, innovation districts will "introduce places within the cities that have the characteristics that have been lost during the 20th century, including density, complexity, diversity of people and culture and layering of the old and new (Katz & Wagner, 2014a)."

Another empirical study has also examined three case studies, including San Francisco, Austin, and London, and introduced similar concepts in terms of the most significant innovation districts' indicators. Based on this study, one of the attributes of the "innovation process" is that it happens on the local scale; however, the production of "new knowledge" occurs on a global scale (Engel et

al., 2018). On the other hand, the innovation process had been linked to other concepts such as "proximity, social integration, and economic performance" (Engel et al., 2018). According to these concepts, innovation districts are places with a concentration of resources, including technology, skills, information, and capital, and this concentration is a result of the accumulation of specialization, close (physical) proximity of different firms and expertise, and density of industry (Engel et al., 2018). Currently, the presence of innovation in urban areas is more recognized by focusing on creative hubs and digital districts. Technology is the primary input for the emergence of clusters of innovation in cities; when technology is accompanied and aligned with cultural preferences and lifestyle trends, significant contributions for innovation districts to be shaped are provided (Engel et al., 2018). Moreover, Density in urban areas is considered one of the main aspects of innovation districts, and it is believed that these areas are more productive (Engel et al., 2018).

Also, another study indicates that critical indicators of the place quality of innovation districts are “socio-equipment” and “socio-cultural” aspects existing in the area (Esmaeilpoorarabi et al., 2020a). While socio-equipment factors are place-related and tangible aspects such as physical space and infrastructure that help increase social interactions in an innovation district, socio-cultural aspects are user-related and intangible, and they characterize the diversity, tolerance, and creativity of a place (Esmaeilpoorarabi et al., 2020a). Suppose policymakers want an innovation district to be thriving, there should be an accurate mix of both tangible (place-related) and intangible (people-related) factors in the place making (Esmaeilpoorarabi et al., 2020a). “Hard factors can be intangible —e.g., highly intangible knowledge-based activities that generate economic outcomes in innovation districts. At the same time, soft factors can be tangible —e.g., cafés and restaurants that create a social vibe in innovation districts (Esmaeilpoorarabi et al.,

2020a).” This study indicates that hard and soft, tangible and intangible, and place- and people-related factors should be combined and inter-related to form and achieve the goals of innovation districts, which are attracting talented workforce and retaining them, and enhancing cities’ economic conditions (Esmaeilpoorarabi et al., 2020a).

Besides, “Innovation districts revitalize urban locations physically and socially through: (a) Providing a broad employment and educational opportunities for local communities; (b) Mixed-used redevelopment with diversified functions such as residential, commercial, institutional and recreational; (c) Denser residential and employment patterns; (d) Dynamic ambiance activated by vibrant street life and nightlife; (e) Variety of lifestyles shaped by the diversity of communities and ethnicities besides various café, restaurants, and recreational facilities; (f) Authenticity shaped by different artistic, historical, natural, high-tech, cutting-edge and scientific scenes—unique identity and brand; (g) Integration into the surrounding neighborhood and sharing affordable amenities and facilities with them (Esmaeilpoorarabi et al., 2020b).”

Furthermore, another study explains that there are two significant factors regarding the formation of innovation districts; which the first one is that innovation districts are “spatially integrated” with a high concentration of firms and institutions, and second, innovation districts are “institutionally integrated” with different firms, universities, R&D centers, and other anchor institutions being able to collaborate, partnership, and exchange knowledge (Battaglia & Tremblay, 2011). This study emphasizes that the issue of physical and geographical proximity is a critical factor in shaping innovation districts; however, another type of immediacy, which is called “rational proximity,” is even more important, meaning that the link between firms, institutions, universities and research center is more important than their physical proximity (Battaglia & Tremblay, 2011). This study also argues that “both public and private higher education establishments and

research/scientific establishments" significantly impact creating innovation clusters (Battaglia & Tremblay, 2011). Also, having a background in cultural and creative industries will help cities generate innovation districts in specific areas of the town; thus, advanced knowledge economy sectors are another factor in shaping innovation districts (Battaglia & Tremblay, 2011).

2.2.2 Contributors of Innovation Districts

This part adopts the ideas regarding the main contributors of innovation districts based one theoretical study and one empirical study (Engel et al., 2018; Katz & Wagner, 2014a):

1- The following elements are identified as the key contributors of innovation districts that are intensively linked to city cores and urban area:

- **People**: Job opportunities are more available within the city centers, and thus, young and educated people (between 20-50 years old) are highly attracted to the city core and the type of lifestyle provided by cities. Urban life and amenities such as public transit and entertainment options and city centers' livability and vitality are among the most powerful magnets for young educated people (Engel et al., 2018).
- **Technological advances**: New technology could be introduced and entered into the market through the city core because of more demand in these places and urban firms that leverage markets are frequently aware of new trends and new technologies, even before the need exists (Engel et al., 2018).
- **Capital**: Financial resources are the essential contributors; they empower startups and enable entrepreneurs to begin new businesses, expand new products and ideas, and reinforce current ones. Investors are more interested in spurring development in urban cores, where they believe it is more profitable due to the knowledge-based economy and

industries in existence. Therefore, a significant financial capital movement supports innovation, and innovation strengthens economic growth (Engel et al., 2018).

- **Regional context:** Territory and regional context are among the best-related aspects to economic activities and economic development. Cities have a particular regional context attached to their historical and cultural background (Engel et al., 2018).

2- Moreover, the following factors are introduced as another category for the key contributors of the innovation districts: Innovation districts are composed of three main assets including "economic assets, physical assets, and networking assets". When these three assets are in combination together and supporting each other, they create an "innovation ecosystem." Innovation ecosystem happens when there is a cooperative relationship between employees, firms, and places. This cooperation is the main tool to make new ideas to be generated and commercialization become accelerated (Katz & Wagner, 2014a). Therefore, the main factors that make an innovation district innovative, productive, inclusive, sustainable, and prosperous are categorized in three main groups by Katz and Wagner (2014). Accordingly, these factors are introduced as three groups of assets known as economic assets, physical assets, and networking assets. According to (Katz & Wagner, 2014a):

- **Economic assets** are the firms, institutions and organizations that drive, cultivate or support an innovation-rich environment. They could be subcategorized to 1) innovation drivers, 2) innovation cultivators, and 3) neighborhood building amenities. Innovation drivers are research institutions, medical centers, large corporations and headquarters, SMEs, start-ups, and entrepreneurs. Innovation cultivators are incubators, accelerators, shared working spaces, and local high schools/community colleges advancing specific skill

sets for the innovation-driven economy. And finally, the neighborhood building amenities facilitate and provide services to both residents and workers in the district, which are grocery stores, restaurants, coffee bars, small hotels, and local retail (Katz & Wagner, 2014a).

- **Physical assets** are the public and privately-owned spaces—buildings, open spaces, streets and other infrastructure—designed and organized to stimulate new and higher levels of connectivity, collaboration, and innovation. Based on this definition, physical assets could be divided into three groups including 1) physical assets in the public realm, which are those spaces accessible to the public, such as parks, plazas, and streets, 2) physical assets in the private realm, which are the privately-owned buildings and spaces that encourage innovation and creativity, and 3) physical assets that knit the district together and/or tie it to the broader metro area are specific investments aimed to eliminate barriers that hinder relationship-building and connectivity (Katz & Wagner, 2014a).
- **Networking assets** are the relationships between actors—such as between individuals, firms, and institutions—that have the potential to generate, sharpen, and/or accelerate the advancement of ideas. Thus, this group of assets includes two main subcategories including Networking assets that build strong ties which focus on strengthening relationships within similar fields, and Networking assets that build weak ties, which focus on building new and cross-sector relationships (Katz & Wagner, 2014a).

There are similarities between the main contributors of innovation districts discussed by Katz & Wagner (2014) and Engel et al. (2018). In terms of similarities, what is discussed as “Capital” by Engle et al. (2018) could be the same as what is mentioned as economic assets by Katz & Wanger (2014). Also, while Engel et al. (2018) discuss that the city’s core provides the most acceptable

conditions for clusters of innovation to grow, the physical assets discussed by Katz & Wagner (2014) are among the most apparent built environment characteristics found within the city cores. One of the differences between what is discussed by these two groups of scholars regarding the contributors of innovation districts is the emphasis on technology that is in Engel et al. (2018), which is not explicitly mentioned by Katz & Wagner (2018). Therefore, it can be concluded that these two groups of scholars' opinions regarding innovation district contributors are similar; however, the assets mentioned by Katz & Wagner (2014) have become more popular within the literature related to innovation districts.

2.3 Innovation Districts and Their Planning Implications

2.3.1 Innovation Districts & Cities' Economic Development

Although the concept of innovation districts is recent, it is believed that they have the potential to stimulate productive, inclusive, and sustainable economic development since they provide the basis for commercialization of ideas and help firms and jobs to thrive via proximity and collaboration (Katz & Wagner, 2014a). Some other scholars have confirmed a robust and positive relationship between firm-level innovation and productivity, between innovation and employment, and between R&D and productivity (Mohnen & Hall, 2013). Besides, most policymakers, economists, and geographers believe that the significant factor in helping the economy to thrive is innovation (Mohnen & Hall, 2013; Hall et al., 2011).

One of the benefits of clusters of knowledge-intensive industries and innovation districts is the economic competitiveness benefits for similar industries; while they encourage cities to provide complementary activities within the cluster, they improve the cities' business climate (Benneworth & Hospers, 2007). Cities can increase their competitiveness in the global market by adopting new business strategies and by providing a basis for more firms being connected in the same area with

strong networks and traded sectors that have extensive measures of prosperity through developing innovation districts (Esmaeilpoorarabi et al., 2020b; Katz & Wagner, 2014a). Moreover, information and communication technology (ICT) are one of the significant fields adopted by main cities worldwide to strengthen their economic power and add to their global competitiveness. Another study argues that "Convergence of IT services within urban space that are accessible regardless of time and location will enhance a city's competitiveness and the quality of life of its citizens (Lee et al., 2014)."

Innovation districts as compact and amenity-rich areas provide access to critical facilities such as research labs, universities, and research and development (R&D) centers with people who can share innovative ideas and knowledge (Pancholi et al., 2020; Katz & Wagner, 2014a). On the other hand, entrepreneurs prefer to begin their careers and locate their firms in such "collaborative spaces" because they can benefit from being linked with other entrepreneurs and startups and having access to resources such as lab equipment and knowledge workers (Katz & Wagner, 2014a). Other studies also argue that innovation and modular clusters are crucial actors in an industrial world because they provide a place for knowledge sharing between businesses and industries (Cooke, 2017). Due to the work opportunities and life amenities in these districts, those seeking opportunities often move to the district, bringing their talent and expertise. Consequently, innovators and entrepreneurs can be empowered by working in districts where technologies and capital are gathered (Engel et al., 2018). Therefore, innovation districts in the urban areas help to link firms and provide a basis for people and firms to exchange their knowledge, and increase the productivity of the firms and people by engaging local communities in the creative works (Esmaeilpoorarabi et al., 2020b).

Educated and talented workers, who are known as members of the creative class, knowledge workers, or talented workforce (Katz & Wagner, 2014a; Florida & Boyett, 2014) are more looking for some advantages such as amenities that enhance their Quality of Life (QoL) in the area that they live and they work, and not only financial benefits. Therefore, they look for places that provide them with facilities for "Work + Live + Play (community)" at the same time and the same place (Esmaeilpoorarabi et al., 2020b). "Quality of Life is increasingly relevant to young people similarly to knowledge workers—e.g., proximity to restaurants, retail, cultural and education institutions, and accessibility to vibrant street life, historic sites, and public transit. Innovation districts combine the quality-related aspects such as physical and social attributes, with economic, and technological aspects, in inner-city neighborhoods (Esmaeilpoorarabi et al., 2020b)."

Therefore, innovation districts attract a specific group of people into urban areas that will dramatically impact cities' economic, physical, and social conditions, significantly concerning planners and policymakers. The new talented workforce invited to these urban developments will have needs for housing, transportation, and urban amenities, which directly concern planners and policymakers. However, on the other hand, the need for affordable housing for the younger population (getting into the job market) or people with service-related jobs (lower income) will be an even more significant issue that needs to be addressed by planners and policymakers.

2.3.2 Innovation Districts and Their Equity Implications

While the definition of innovation districts indicates that they are "well-defined geographical areas (Kayanan, 2022)," they can be shaped as districts with legislatively approved boundaries or as cases that have not planned within specific boundaries (Fernandez & Bentley, 2022). In whichever form, innovation districts are mostly shaped within the heart of the cities, usually in urban areas (Sharp et al., 2022), where density, diversity of land-use, walkability, and access to urban

amenities are the most identifiable built environment attributes. The literature broadly discusses the economic benefits of innovation districts and their place-based characteristics; however, there is less known about the equity implication of innovation districts and the potential social challenges that they may cause. Accordingly, some scholars discuss that it is becoming increasingly apparent to governments that economic growth and innovation are not the only things that matter regarding innovation policy. In the past, innovation policy was focused mainly on promoting economic growth, national competitiveness, and job creation. However, a shift towards prioritizing the reduction of inequality, poverty and combating climate change as key challenges and opportunities for innovation policy is happening within planning practice and research. (Hekkert et al., 2020; Mazzucato, 2018; Sharp et al., 2022).

The knowledge economy, which is represented by and dependent on innovation and technology, has transformed the business landscape and the economic development in our cities, and has become a defining feature of a new type of capitalism and urbanization (Esmaeilpoorarabi et al., 2017; Liu et al., 2020; Wu et al., 2021). Some scholars discuss that innovative and creative-based economy has entered the urban development into the third wave of urbanization through alteration of urban spaces and requesting to develop a better urban environment to attract innovative talent and enhance creativity (Scott, 2014; Wu et al., 2021). Innovation districts are discussed to benefit cities by increase in the number of jobs (specifically highly-paying jobs), an increase in investment absorption (by attracting the talented workforce, start-ups, tech-based corporations, and headquarters), an increase in property value, an increase in demand for goods and services, and a rise to revenue (Engel et al., 2018; Katz & Wagner, 2014a; Read, 2016). However, the potential negative externalities of innovation districts, such as social/economic inequities, racial

inequalities, gentrification, displacement, and exclusion (Esmaeilpoorarabi et al., 2020b; Stehlin, 2016) have received less attention in the literature.

The literature discusses that innovation districts magnetize the labor force that have higher income and look for higher quality of life (Agbali et al., 2019) regarding the urban space attributes and urban amenities, which can result in creating and causing a new form of gentrification (Morisson & Bevilacqua, 2019a; Stehlin, 2016). Additionally, scholars discuss that innovation districts, which are mostly developed in the core areas of the cities, act like magnets to attract investment and high-tech firms and this can significantly affect the area in terms of land/property values (Read, 2016). Scholars also indicate that innovative urban areas, such as innovation districts or creative clusters, may result in some specific and critical social issues, such as displacement, gentrification, exclusion, lower race/ethnicity diversity, polarized division of labor, income inequalities, and housing unaffordability (Morisson & Bevilacqua, 2019b; Stehlin, 2016; Zandiatashbar & Kayanan, 2020). For instance, Wu et al., (2021) discuses that "there is still a challenging theoretical and empirical issue to study whether and how innovation and its unbalanced distribution affects the spatial pattern of housing prices (Wu et al., 2021, p. 108)." Furthermore, though existing studies on urban gentrification patterns have highlighted adverse effects of new development on communities in the form of displacement and loss of power, they have yet to consider residents' views on civic inclusivity, social well-being, and equity as well as policymakers' perspectives on these topics.

2.3.3. Innovation Districts and Future Planning for Cities

Innovation districts are described as place-based development strategies that link "economy shaping, placemaking, and social networking (Katz & Wagner, 2014a, p. 1)." Besides, innovation districts are typically located in or near urban centers and are known for their mixed-use, transit-

accessible, dense, walkable, and amenity-rich areas (Engel et al., 2018; Esmaeilpoorarabi et al., 2018, 2020b; Fernandez & Bentley, 2022; Katz & Wagner, 2014a). Additionally, innovation districts often feature spatial clustering, regional connectivity, and firm/organization agglomeration as key place-based characteristics (Feldman & Kogler, 2010; Hamidi & Zandiatashbar, 2019; Katz & Wagner, 2014a; Vaculík et al., 2017). While the contributors and characteristics of innovation districts, such as their spatial characteristics and the built environment attributes are widely discussed in the literature, the role of the built environment characteristics amid the rising placelessness resulted from remote working[1], online education, and gig-economy is understudied in the literature.

"Placelessness" refers to a state where people and activities are not limited to specific locations. Digital connectivity has enabled a placeless environment for work and social activities, resulting in a growing population of digital nomads who use remote work and personal mobility to avoid the restrictions of fixed places (H. Wang, 2020). In 1976, Edward Relph introduced the term 'placelessness,' which he defined in terms of experience and perception. He identified three factors that contribute to a place's identity: its physical setting, activities, and social meaning (Montague, 2016).

According to the literature, “desks in the United States of America (US) are empty an average of 40–50 percent of normal working hours. When employees are not in their office, they are working in conference rooms, in clients’ offices, at coffee shops, at home, in their cars, at airports and just about anywhere there is an Internet connection. They are working in those places at all times of the day – during normal working hours, at nights and on weekends (Lister & Harnish, 2019, p.

[1] The concepts of remote work, remote working, and telework are used interchangeably in this study.

128).” These researchers also discuss that “While many acknowledge there are negative aspects to telework/ telecommuting, in particular the tendency to work longer hours, a large majority of US employees (79–87 percent, depending on the sector) say they would like to work remotely at least some of the time. A number of studies also show that more than a third of them would give up some pay for the opportunity to telework (Lister & Harnish, 2019, p. 128).”

“The first flexible working concept was proposed by Jack Nilles, by defining the term “telecommuting” in the 1970s, when he was working remotely on a complex NASA communication system (Yu et al., 2019, p. 448).” Following that, in the 1990s some scholars evaluated the impact of remote working/telecommunication on travel and emission impacts, residential location, and activity patterns (Yu et al., 2019). Since the year 2000, there has been a rise in the popularity of telecommuting among large companies worldwide. This can be attributed to the widespread use of advanced personal computers and the Internet.

Over the past several decades, the rise of remote work (or telework) has gained more popularity due to ongoing technological advances (Golden, 2009), specifically in knowledge-economy-related jobs and among knowledge workers (Caulfield & Charly, 2022; Hynes, 2014; Ozimek, 2020). Research shows that educated, high ICT-skilled, and younger workers with higher income are more inclined to telework (López-Igual & Rodríguez-Modroño, 2020; Okubo, 2022; Ollo-López et al., 2020; Vilhelmson & Thulin, 2016). “Many businesses, both domestic and international, are familiar with the idea of remote working. It has been defined in various ways by scholars, but generally refers to work being completed in a location other than the employer's workplace. This definition has since expanded to include flexible work arrangements where workers can work remotely from their business location, without personal contact with co-workers, but with the ability to communicate with them using technology (HA, 2021).”

In addition, remote work became a norm for many employees because of the COVID-19 pandemic restrictions and has continued in the post-COVID era. “Some scholars predict a long-run equilibrium in which information workers will work from home approximately 20% of the time (Yang et al., 2022, p. 43).”A recent survey discusses that about 50% of the US workforce currently works remotely at least some days each week (Brynjolfsson et al., 2020; Sako, 2021). Another study indicates that while “only 2.3% of hiring managers had fully remote teams, and only around 13.2% of the represented labor force was working fully remotely, these numbers have changed to 20% and 56-74%, respectively in the post-COVID era (Ozimek, 2020, p. 2).” In addition, another study discusses that 37% of the jobs in the US can be performed entirely remotely, which also pay more than the jobs that cannot be done remotely (Dingel & Neiman, 2020; Okubo, 2022; Yang et al., 2022). Consistently, a policy report published by the Centre for Economic Policy Research (CEPR) in 2020 indicates that “34% of American jobs can plausibly be performed from home, and this will be up to 29% for Argentina, 24% for Italy, 28% for France, 29% for Germany, 25% for Spain, and 31% for Sweden and the UK (Bonnet et al., 2020).”

These changes in work and employment have immediate implications for the economy, planning, and policymaking and may lead to permanent shifts in the urban economy. The top five industries with the highest remote work share are “Educational Services, Professional, Scientific, and Technical Services, Management of Companies and Enterprises, Finance and Insurance, and Information (Dingel & Neiman, 2020, p. 4).” Another study also indicates that a broad category of jobs, “including managers, financial analysts, engineers, computer programmers, and lawyers—were found to be among those whose jobs could be performed in a variety of locations, and basically remotely (Sako, 2021, p. 21).”

In the last two years and specifically due to the Covid-19 Pandemic restrictions, the use of digital platforms and software for operating remotely have been accelerated and employers in the ICT and technology sectors have been encouraged to work remotely (Kniffin et al., 2021; Nikbakhsh, 2022; Sinitsyna et al., 2022). "Many technology companies, such as Twitter, Facebook, Square, Box, Slack and Quora, have taken this shift one step further by announcing longer term and, in some cases permanent, remote work policies that will enable at least some employees to work remotely, even after the pandemic (Yang et al., 2022, p. 43)." Also, the transition to remote work was feasible for office-based jobs, but not for production plants or manufacturing sites (De Vincenzi et al., 2022; Manuti et al., 2020). Therefore, many office-based organization around the world will make the transition to work remote either fully or at least few days per week (De Vincenzi et al., 2022).

The literature, however, discusses that "it is not at all clear what these new arrangements of remote working will mean for cities that have spent the past decade building an 'innovation complex' around physical density, digital technology and real estate development (Zukin, 2021, p. 3)." It is interesting to see how many aspects of the tech industry have adapted to remote work and virtual collaboration. Coworking spaces, hackathons, and mentoring programs are now being held online (Zukin, 2021). However, this shift away from physical locations and established networks could affect cities' economies with receiving less visitors due to remote working (Akan, 2022, p. 3). The relocation of people from city centers to suburbs creates some challenges for planners (Akan, 2022, p. 3), and some scholars discuss that with the benefits of fixed, social, and human capital, cities may maintain their position as hubs of innovation and growth (Zukin, 2021).

2.4 Summary

The global economy has experienced a transformation towards becoming more innovation-oriented, and consequently, innovation and the knowledge-based economy have become two of the most distinguishing features of urbanization, urban planning, and policymaking in the last few decades. According to the literature, the most evident built environment characteristics that contribute to the concept of prosperity of innovation districts are spatial clustering, walkability, proximity to urban amenities, diversity, regional connectivity, and agglomeration (Hamidi & Zandiatashbar, 2019; Engel et al., 2018; Katz & Wagner, 2014a). Within the literature, urban areas or cities are innovation-friendly when they maintain five critical aspects, including 1) acting as customers, which means to be accessible to smaller businesses and providing basics for entrepreneurs, 2) being great hosts, which means to attract talented workforce and corporations, 3) advocating for startups and innovation, 4) acting as connectors and facilitation of the connections between different actors either physically or digitally, 5) having a long-term strategy to both attract and maintain entrepreneurship, talented workers, firms and innovative activities (Gibson et al., 2015; Guerrini, 2015).

The review of the literature shows that there some aspects of innovation districts that are not addressed in the scholarly research projects and practical/technical reports. This study discusses that among these aspects, the major contributing factor in shaping innovation districts, and the potential and challenges in their success, the negative social impacts of innovation districts and community engagement in the development process of innovation districts, and finally, the impacts of remote working and placelessness on developing future innovation districts are among the most significant ones in need of comprehensive research and attention.

The economic development strategic models focused on innovation productivity such as innovation districts are leading the cities' visions across the world while planning practitioners and academics need to learn more from the successful examples. There are varied ambiguous potentials and challenges for a successful innovation district and generalizability of the innovation district model that a review of implemented cases could shed light on.

During the last few decades, cities in the U.S. and worldwide have shown great interest in becoming more innovative to attract investment and fulfill their residents' needs. While innovation districts are known to economically benefit urban areas, the potential negative externalities of innovation districts, such as social/economic inequities, racial inequalities, gentrification, displacement, and exclusion have received less attention within the literature. Therefore, residents' perception of the new development, their awareness of its impacts on their life, and the extent of residents' inclusivity should be comprehensively studied. In addition, it is crucial to understand how policymakers consider and respond to the negative social impacts of innovation districts.

The increase in remote working and the prevalence of technology-related and knowledge-based jobs that can be done remotely will have a significant impact on the meaning of place and place-based attributes of urban areas designated for these types of jobs. The concept of remote working/telework has inspired research in various disciplines such as transportation and urban planning, ethics, law, sociology, and organizational studies. As a result, there is a growing gap in our understanding of the challenges faced by the built environment in innovation districts amid the rise of placelessness caused by remote working, gig economy, and online education.

CHAPTER 3

3. CHAPTER 3- Methodology and Analytical Frameworks

3.1 Research Method

My research approach employs a mixed-method research approach, with a qualitative research approach as its primary method to address the three established research questions concerning the identified gaps in the literature. Additionally, I utilize a series of socio-spatial data analyses to complement my methodology approach. The qualitative approach offers the most appropriate methods to explore and understand human behavior (Vaus, 2002; Fidel, 1993) and is introduced as one of the most acceptable means to conduct social studies. Besides, the exploratory nature of qualitative research method makes it an appropriate method for investigating complex phenomena when very little is known about them (Fidel, 1993). Among the five popular categories of qualitative methods, including ethnography, narrative, phenomenological, grounded theory, and case study (Creswell & Poth, 2017; Sauro, 2015), this study primarily engages the case study method to collect data and conduct the analysis. A case study involves a deep understanding through multiple types of data sources, including interviews, documents, reports, and observations. Case studies can be explanatory, exploratory, or describing an event or a phenomenon (Sauro, 2015).

The qualitative research method for this study will be applied through case study approach for conducting empirical investigations of the selected case studies as well as a comprehensive review and analysis of the related documents. The case study approach follows the principles developed by Robert Yin (2009) in his book titled, “Case study research: Design and methods.” According to Yin (2009), case study research is a “linear, but iterative process,” with six identified steps, including planning, designing, preparing, collecting, analyzing, and sharing (Yin, 2009). While

Yin explains that the case study research usually focuses on "why" and "how" questions, he explains that case study research needs to "have a logical design, pre-described data collection, and pre-determined data analysis method (Aberdeen, 2013, p. 69)." Yin describes four primary case study designs, including 1) holistic[2] single case design, 2) embedded[3] single case design, 3) holistic multiple case design, and 4) embedded multiple case design (Yin, 2009). This study employs the case study design described as number two and four. To collect the required data when conducting case study analysis, Yin (2009) also introduces six specific resources, including documentation, archival records, interviews, direct observation, participant observation, and physical artifacts (Yin, 2009). This research utilizes multiple sources of data and mainly relies on documentations, archival records, and direct observation as its primary data sources. The methodological approach for this study is depicted in Figure 3-1.

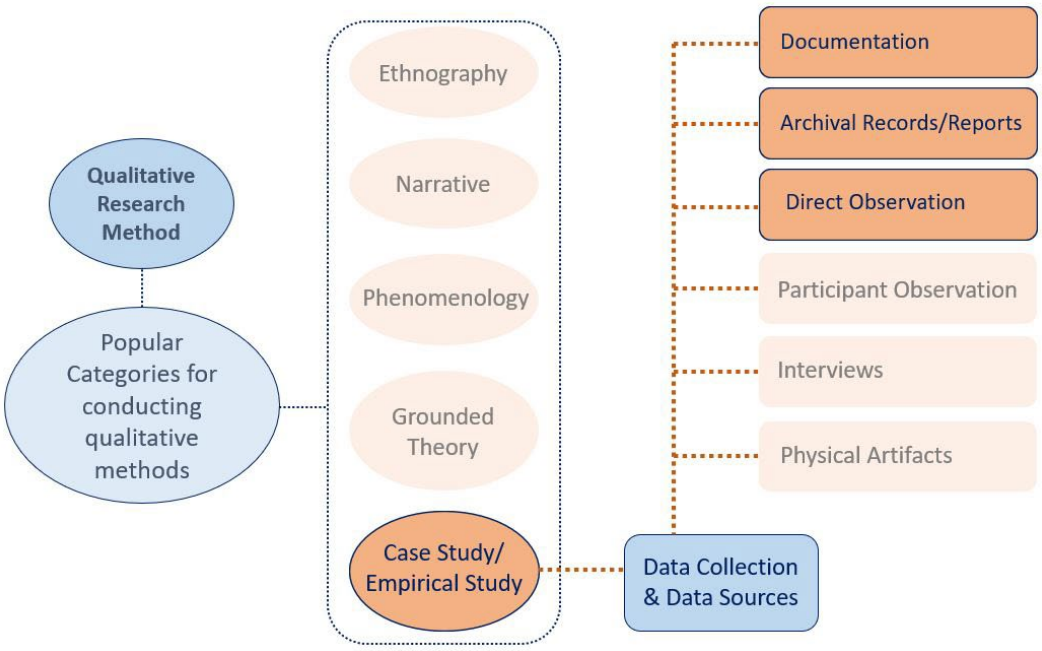


Figure 3-1. The Methodological Approach of the Study

[2] Holistic stands for signal unit of analysis.
[3] Embedded stands for multiple units of analysis.

This research's objective is to understand "***What are innovation districts' primary planning and policy implications for urban planning, equity, and economic prosperity?***" Considering the above-mentioned question as the central research question, the methodological framework of this research will be constructed based on three sub-research questions. The following sections will introduce the three primary research questions, the methodological approach to respond to each research question, and the data collection and data sources associated with each research questions.

3.2 Research Questions and Analytical Frameworks

After conducting a comprehensive review of the literature regarding innovation districts, this research identifies gaps withing the literature concerning three main categories, including the planning and policy implications of innovation districts, the equity implications of innovation districts, and the role of innovation districts in enhancing economic development in future cities. Therefore, this research aims to respond to three supporting research questions:

I. ***RQ1****: What are the main contributing factors to shaping innovation districts? And how does understanding the potentials and challenges for a thriving innovation district help with generalizability of the innovation district model?*
II. ***RQ2****: What are the impacts of innovation districts on civic inclusion and social equity? And how and to what extent is the community engaged in different stages, from developing the idea to operating the innovation districts?*
III. ***RQ3****: What are the policy solutions and recommendations for the future of place-based economic development planning supporting equitable and inclusive innovation districts amid rising placelessness?*

For each of the above-mentioned research questions, I have developed a specific research plan and a methodological framework, which is described in the following sections.

3.2.1 The main contributing factors to shaping innovation districts: Analytical Framework-RQ1

While there is increasing scholarly attention to innovation districts, their contributing factors and their typology, our empirical knowledge of innovation districts that have turned frameworks of contributing factors argued in the literature into real-world cases is rather limited. Further, the ID concept is relatively new since many innovation districts are in the early stages of development.

As outlined above, Katz & Wagner's 2014 paper concludes that innovation districts typically feature three major groups of assets—economic, physical, and networking. The economic assets are a cluster of firms, organizations, and institutions that support innovative activities. When these entities are connected physically through the built environment to facilitate collaboration, that enhances and makes innovative activities more impactful. Finally, these conditions create fertile ground for members of the workforce and entities themselves to create networking assets.

This study adopts the analytical framework established by "Brookings Institution's Metropolitan Policy Program" (Katz & Wagner, 2014b), using a qualitative, case-based approach to identify the categories and types of innovation district economic, physical, and networking assets. Per Brooking's framework, innovation districts are places where an innovation ecosystem features collaborative interaction between economic, physical, and networking assets (Figure 3-2). Individually, each asset is not sufficient; active interaction among them is the basis for encouraging innovative activities and growing innovation districts (Baily & Montalbano, 2018b).

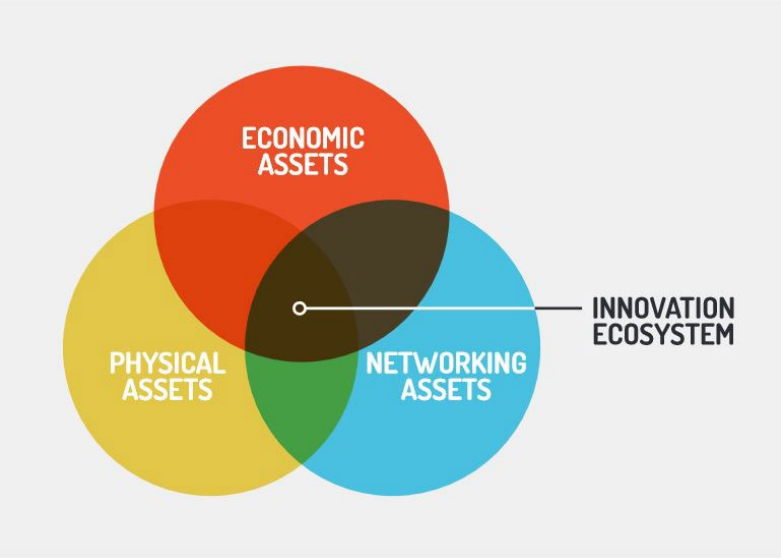


Figure 3-2. The three key assets shaping innovation districts [4]

To explore the factors driving ID formation, this study uses a mixed method of a synthetic review of the literature and empirical analysis of the case studies. First, I review theoretical and empirical studies of innovation districts and populate the analytical framework of economic, physical, and networking assets. In this first step, I introduce categorizations of the three major assets and governance structures for innovation districts (see Figure 3-3).

[4] Source: The Rise of Innovation Districts: A New Geography of Innovation in America (Katz & Wagner, 2014b, p. 3

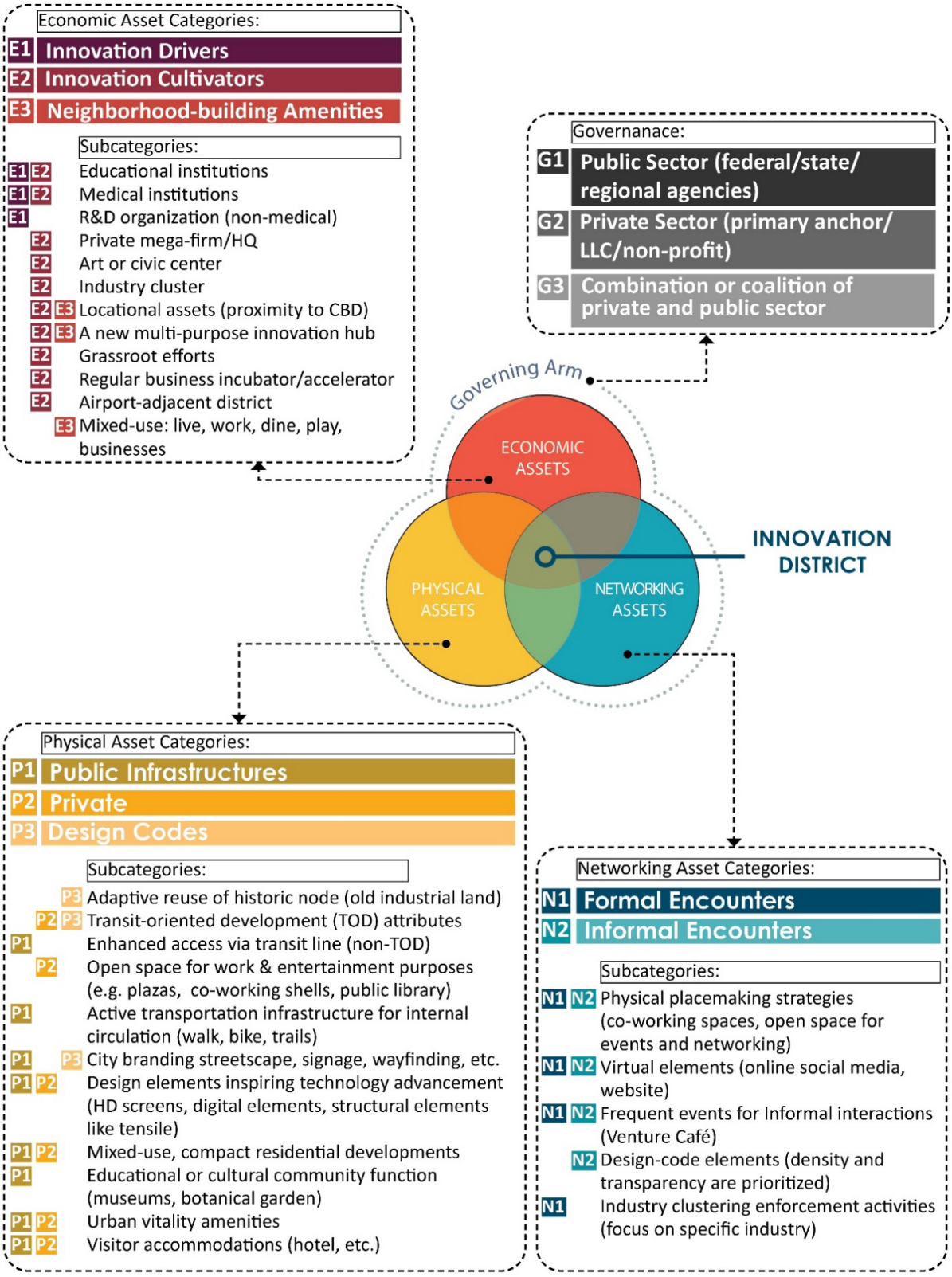


Figure 3-3. The analytical framework for RQ#1: Three main categories of innovation districts' assets and their subcategories

Second, I conduct a series of analyses of fourteen (14) innovation districts in the United States in order to identify the key contributing factors related to my framework and to evaluate their role in each district. Table 3-1 lists the ID's names and city locations of the case studies and Figure 3-4 depicts their spatial distribution in the U.S. The final step in my exploration of the driving factors in innovation district formation is presenting lessons that may be helpful to practitioners and policymakers planning innovation district development in their cities. To select my case studies, I consider a series of criteria. The first criteria to consider was to select case studies of innovation districts that have been established or implemented. Therefore, my selected cases are mostly out of planning phase and have been operating as an innovation district for a number of years ranging from 2000 t0 2019. In addition, I was interested in choosing cases that offer a variety of innovation districts, in terms of their location in the U.S., the size of the innovation district, the age of the innovation district, and the type of the district (regarding their primary anchor institutions). Table 3-2 provides complementary information regarding the variety in the characteristics of the selected cases.

Table 3-1. Case Studies of Innovation Districts

	Innovation District (Case study)	**Location (City, State)**
1	Buffalo Niagara Medical Campus (BNMC)	Buffalo, NY
2	San Francisco Mission Bay Area	San Francisco, CA
3	Boston Innovation District (BSID)	Boston, MA
4	Cortex Innovation Community	Cortex; Saint Louis, MO
5	Atlanta Technology Square	Atlanta, GA
6	San Diego Innovation+Design+Education+Arts (I.D.E.A)	San Diego, CA
7	Oklahoma City Innovation District	Oklahoma City, OK
8	Innovate ABQ	Albuquerque, NM
9	ASU SkySong Innovation Center	Scottsdale, AZ
10	Destination Medical Center (DMC)	Rochester, MN
11	Houston Innovation Corridor (Ion District)	Houston, TX
12	Midtown Detroit TechTown District	Detroit, MI
13	Tech Center at Oyster Point	Newport News, VA
14	Richardson Innovation Quarter (Richardson IQ)	Richardson, TX

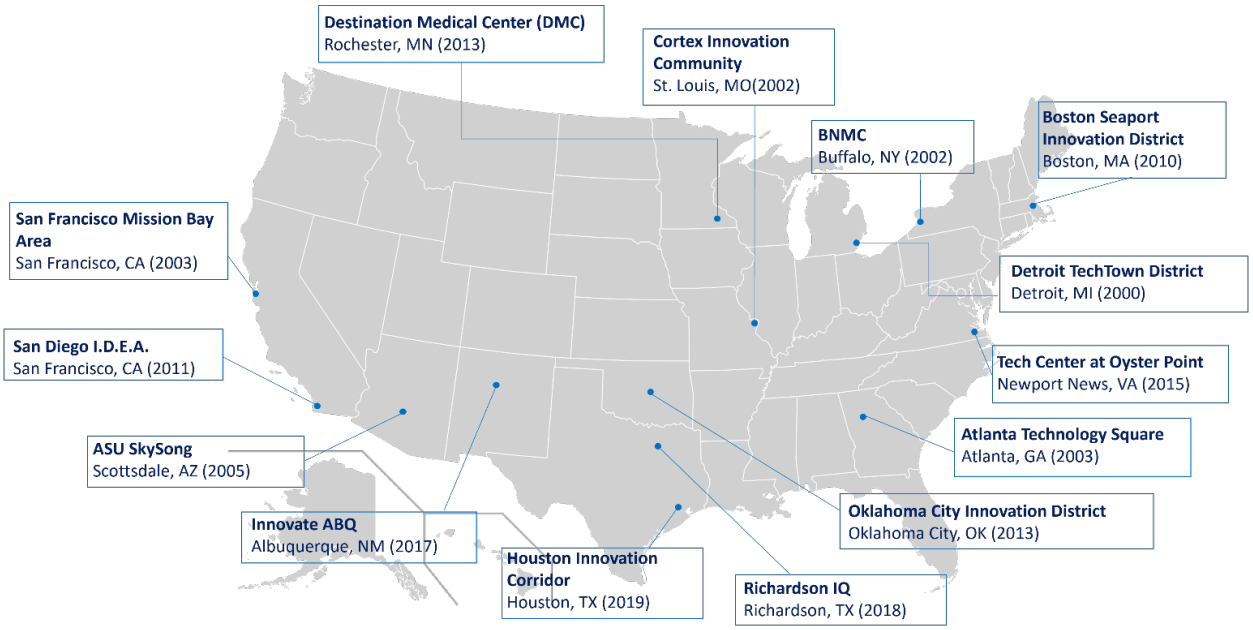


Figure 3-4. Location of the 14 selected case studies of innovation districts

Table 3-2. Characteristics of the 14 selected case studies of innovation districts

Innovation District (Case studies)	Year initiated or established	Land Area	Type	Primary Anchor Institution
Buffalo Niagara Medical Campus (BNMC)	2002	120 acres	Medical	Hospital
San Francisco Mission Bay Area	2003	300 acres	Medical, Biomedical	University & Hospital
Boston Seaport Innovation Districts (BSID)	2010	1,000 acres	Medical, Pharmaceutical	Civic Innovation Hall
Cortex Innovation Community	2002	200 acres	Technology, IT	University & Private Firm
Atlanta Technology Square	2003	30 acres	Technology, IT	University
San Diego Innovation+Design+Education+Arts (I.D.E.A)	2011	94 acres	Art, Design, Energy, ICT	University
Oklahoma City Innovation District	2013	830 acres	Medical, Aerospace, Energy	University & Hospital
Innovate ABQ	2017	7 acres	Technology, IT	University
ASU SkySong Innovation Center	2005	27 acres	Technology, IT	University
Destination Medical Center (DMC)	2013	550 acres	Medical, Biomedical	Hospital
Houston Innovation Corridor (ion)	2019	16 acres	IT, Energy, Healthcare	Urban Node & University
Midtown Detroit TechTown District	2000	2,700 acres	Energy, Healthcare	University & Private Firm
Tech Center at Oyster Point	2015	100 acres	Technology, Aerospace	R&D Center & Private firm
Richardson Innovation Quarter (Richardson IQ)	2018	1,200 acres	Technology, IT	University & Private Firm

3.2.2 The extent of community engagement and the impacts of innovation districts on civic inclusion and social equity: Analytical Framework- RQ2

There is an agreement on the economic benefits of innovation districts (Engel et al., 2018; Katz & Wagner, 2014a; Read, 2016); however, there is little evidence to show that the impacts of innovation districts on local residents and the communities' perception of these impacts are also considered by developers, policymakers, and city officials. Accordingly, there is not enough evidence to show how and to what extent the people residing within the innovation districts have been considered/engaged when making decisions about developing innovation districts in an urban area. Besides, there is little knowledge about the community's perception and their engagement with the innovation district's concept and the changes that it may cause in their residential area. Therefore, in respond to this gap, this section evaluates the local residents' perception of an innovation district being developed in an area, and also by assessing the level of the local residents' engagement while developing the idea of an innovation district to be operated in a specific urban area. For this section of the study, the Medical Innovation District in Fort Worth (FW-MID), TX has been selected as the single case study (Yin, 2009) and have been evaluated in terms of the resident's perception of the FW-MID and the community engagement when making decisions to develop an innovation district in the Near Southside area in Fort Worth, TX.

It is essential to know about the residents' perception of the innovation districts, their role while developing innovation districts, and their opinion about the impacts of innovation districts on their life, since they are the mostly likely impacted when innovation districts are proposed and established in an urban area. When developing an innovation district, different groups of residents and other stakeholders may be affected by the new development that innovation districts bring to

the urban areas. The groups are defined as follows and depicted in Figure 3-5 in terms of their influence the impact of the development on their future:

1. Developers, business owners, and city officials
2. Employees, who work in these districts but not necessarily live in the district.
3. Low-income households who live within the innovation district boundaries

Each group may form a different type of "relationship" with the concept. Besides, each group has a different amount of "influence in decision-making" in shaping and developing this concept, while the impacts of this development on each group of people are not necessarily aligned with the amount of power they possess. As Figure 3-5illustrates each group's power in shaping and developing the innovation districts and the impacts of the innovation district on each group differs.

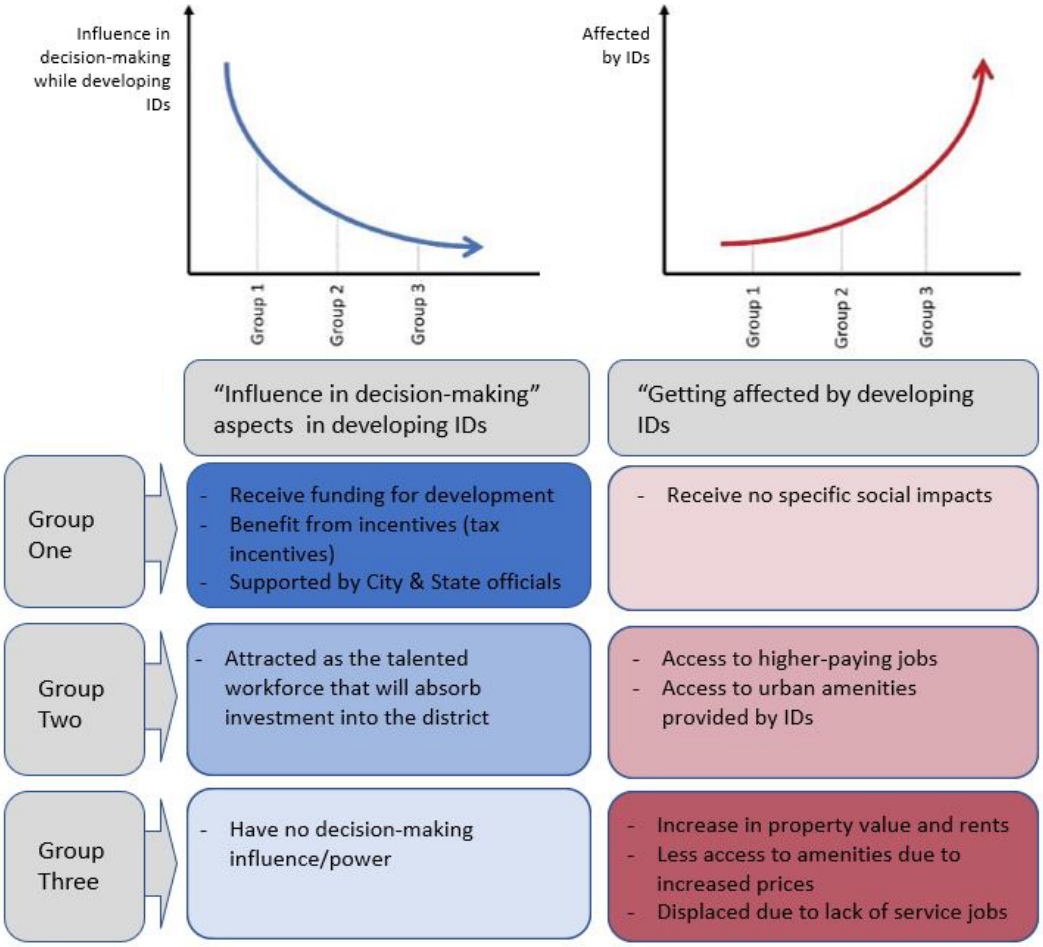


Figure 3-5. The analytical framework for RQ#2: the relationship between different groups of people and an innovation district in terms of Influence in decision-making and impacts

As shown in Figure 3-5, I theorize that while the residents of the innovation districts are the group that may be impacted the most, they have the least amount of influence when making decisions about developing these ideas. The community/local residents, especially low-income households, may be impacted in various ways, from increased property value/rents and fewer job opportunities to displacement, gentrification, and social/ economic inequalities. However, in terms of policies, there are growing attempts towards developing innovation districts. Innovation districts are an attractive urban model for city managers, business owners, and developers since they can absorb investment through locating more/new firms, educational and medical centers, and R&Ds. Thus, cities are usually interested in providing policies, such as tax incentives, funds/grants, and

providing land to develop districts of this type. Therefore, it is crucial to understand how and to what extent is the community engaged in different stages, from developing the idea to operating the innovation districts.

This study uses qualitative research methods and spatial analysis of a specific case study to comprehensively evaluate the local residents' role and engagement level when developing an innovation district within an urban area. The study will evaluate the Fort Worth Medical Innovation District (FW-MID) also known as "iter8: health innovation community" [5], located in the Dallas Fort Worth metropolitan area, which is planned to become one of the most prominent medical innovation districts in the country (Murray, 2019).

Different data collection methods were examined for this study to obtain an extensive understanding of people's roles and their level of engagement when developing a medical innovation district in Fort Worth, TX. Finally, "Document Retrieval/Document Review" was decided as the primary method for data collection. The reason for choosing this method is due to the reliability of the official documents, such as city council meetings and technical reports, when providing information and data regarding the development process and decision-making process in inviting and shaping new developments into the urban areas. Moreover, considering the different data analysis types and in alignment with the method of data collection for this study, "Document Analysis and Narrative Analysis" has been determined as the most appropriate data analysis method. Document analysis is a systematic procedure for reviewing or evaluating documents—either printed or electronic material. Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted to elicit meaning, gain

[5] https://www.nearsouthsidefw.org/projects/iter8-health-innovation-community

understanding, and develop empirical knowledge (Bowen, 2009). Documents that may be used for systematic evaluation as part of a study take various forms, including reports, newsletters, publications, minutes of meetings, and agendas.

The case study for this study is thus the Medical Innovation District in Fort Worth, TX, which is known as FW-MID or Iter8 (Figure 3-6). To evaluate the residents' role and engagement level when developing the FW-MID and to understand residents' perception of the impacts of FW-MID on their life, this study goes through many documents, including the city of Fort Worth council meetings (minutes of meetings and agendas), a group of newsletter and magazine articles, and several technical reports that specifically or generally have considered the FW-MID.

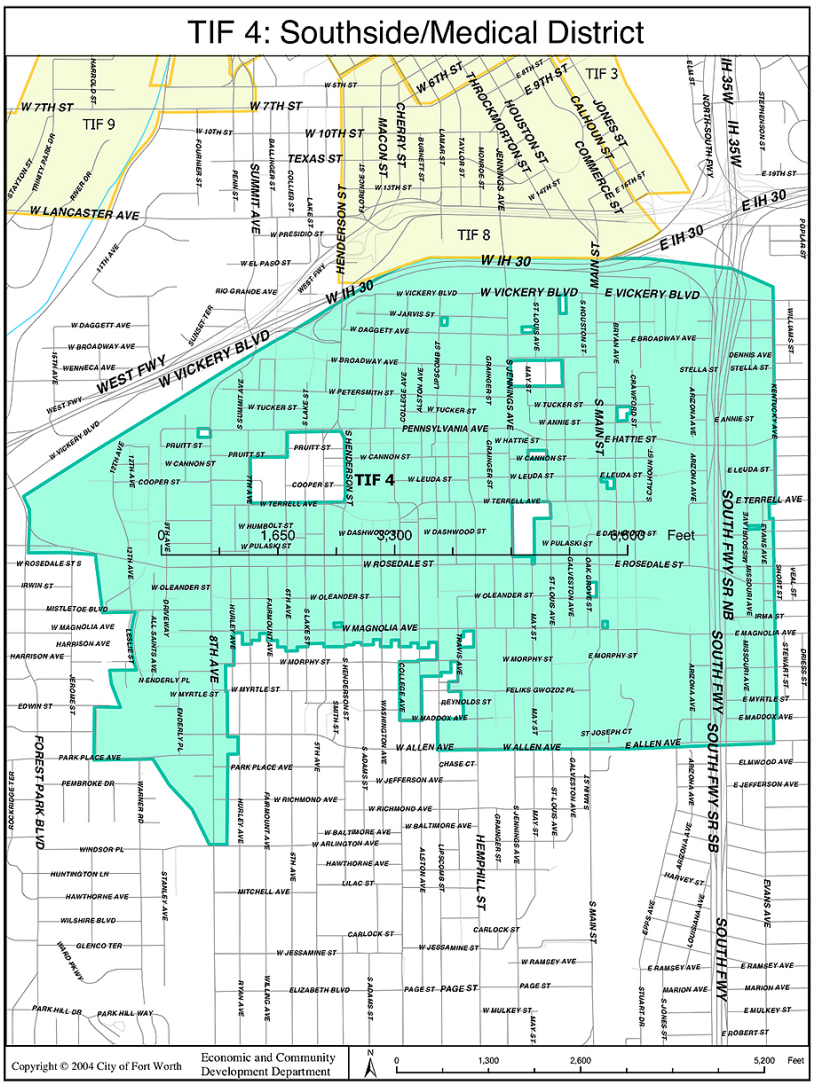


Figure 3-6. The boundaries of the proposed medical innovation district - Source: Fort Worth Economic Development Department

In 2017, the City of Fort Worth unveiled its new strategic plan for economic development efforts, and one of the plan's four primary goals was to establish a Near Southside Medical Innovation District to help attract more business to the area (Murray, 2019; nearsouthsidefw.org, 2020). Near Southside area is home to several important and big medical centers including Cook Children's Healthcare System, Texas Heath Harris Methodist, Baylor Scott & White, and Medical City Fort Worth (Maddox, 2019), and this has been the major reason for developing the concept of the

medical innovation district in this area. Figure 3-7 illustrates the location and type of the medical facilities in the Near Southside area.



Figure 3-7. The location and type of the medical facilities in Fort Worth Medical Innovation District

3.2.3 Future planning for innovation districts amid rising remote working: Analytical Framework- RQ3

While remote working has become more of a norm due to the COVID-19 pandemic, data shows that remote working or teleworking have become increasingly popular in the last two decades due to the technological changes. In 1973, Jack Nilles introduced the idea of remote work with the aid of digital technology. He suggested the term "telecommuting for this type of work. Some researchers discuss that the implementation of remote working in business could be explained from three perspectives: "to respond to urban industrialization, to transform the manner of working under the rise of digitalization, and to provide flexibility to workers (Tanpipat et al., 2021, p. 1)." The improvements in information technology, software and internet have tremendously supported

remote working specifically in the technology-related firms and among knowledge workers. However, the growth of remote working is discussed to be uneven among different sectors, meaning that some sectors, such as manufacturing, transportation, and health industry are being tied to physical location. Remote and home working are becoming more common, and there are some suggestions that this trend will continue. Our current technology has shown that work can be just as effective when done away from a central workplace. Moreover, some workers have found advantages in working away from the office (Dayaram & Burgess, 2021)."

On one hand, innovation districts are introduced as hubs to attract high-tech firms and knowledge workers and as tools to enhance economic development via knowledge-based economy. On the other hand, "innovation districts acknowledge a new, urban geography of innovation, i.e., place-based forms of innovation that occur not within the confines of the big industrial labs of the 1950s or the innovation campuses in suburban areas of the 1980s, but within the heart of cities (Sharp et al., 2022, p. 1)." Therefore, the built environment attributes in developing innovation districts as place-based economic development models in planning for future cities amid rising remote working remains a question.

This section of the study employs qualitative research approach and content analysis as its research method to address the above-mentioned gap. This section of the research conducts a systematic review of the literature based on the protocol developed by the "Preferred Reporting Items for Systematic Meta Analysis (PRISMA)" to understand how the impacts of the built environment attributes (BE) and place-based characteristics of innovation districts will be affected or changed amid placelessness and due to the increase in remote working. Finally, the study will discuss the policy recommendation and implication for the BE attributes of innovation districts affected by

placelessness. Figure 3-8 shows the methodological framework for conducting my systematic review of the literature.

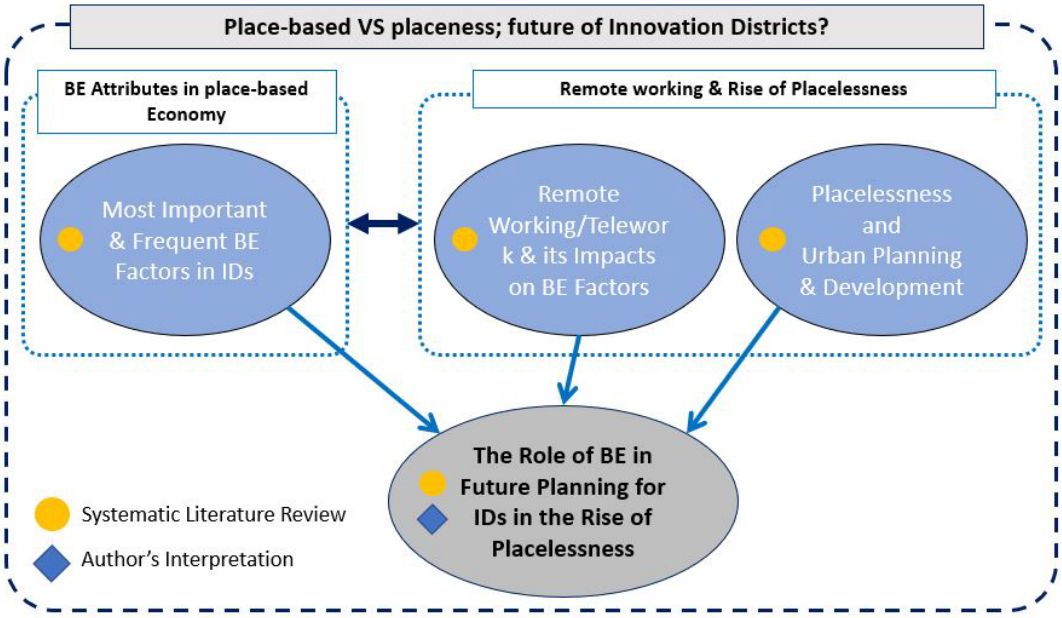


Figure 3-8. The analytical framework for RQ#3: Understanding the impacts of BE attributes in the future planning for IDs amid placelessness and remote working via conducting the systematic review of the literature.

3.3 Data Sources and Data Collection Procedures

This research utilizes multiple sources of data. As explained, the research primarily uses a qualitative research approach with a concentration on case study analysis. Accordingly, the data sources and the data collection procedure for the three primary research questions are described in the following sections.

3.3.1 Contributing factors to shaping innovation districts: Data Collection Procedure- RQ1

To address the first research question, this study employs a qualitative research method and adopts a "multiple case study analysis design" as its research approach. The analyses are based on document retrieval, content analysis, and narrative analysis. The data is collected from reliable sources, including scholarly texts such as peer-reviewed articles and technical reports, major media outlets such as magazine articles and interviews of the innovation districts' directors/managers,

city officials, and other related authorities. Finally, the official websites of the case studies (14 cases of innovation districts in the U.S.) are also used as data sources. The complete list of data sources for the cases of innovation districts is listed in Table 3-3.

Table 3-3. Research Question 1: Data Collection Sources

	Case studies of Innovation Districts	Document Name	Document Type	Data Source
1	Buffalo Niagara Medical Campus (BNMC)	Buffalo Niagara Medical Campus Master Plan Update	Technical Report	https://bnmc.org/wp-content/uploads/2022/01/BNMC-Master-Plan-Update-FINAL_12-3-10.pdf
		BNMC website	Official Website	https://bnmc.org/
2	San Francisco Mission Bay Area	Bay Area's Innovation Waterfronts: Public Space as "Productive" Space	Magazine Article	https://portusonline.org/bay-areas-innovation-waterfronts-public-space-as-productive-space/
		Mission Bay Development Group	Official Website	https://www.mbaydevelopment.com/mission-bay-new
3	Boston Seaport Innovation Districts (BSID)	All Smoke, No Fire? A Critical Evaluation of Innovation Districts	Scholarly Text	https://works.bepress.com/jdrucker/34/
		Seaport Square Innovation District	Official Website	https://www.kpf.com/project/seaport-square
4	Cortex Innovation Community	Cortex Innovation Community	Official Website	https://www.cortexstl.org/about/
		Case Studies in Innovation District Planning and Development	Scholarly Text	https://www.naiop.org/research-and-publications/research-reports/reports/case-studies-in-innovation-district-planning-and-development/
		Negative Consequences of Innovation-Igniting Urban Developments: Empirical Evidence from Three US Cities	Scholarly Text	https://scholarworks.sjsu.edu/urban_plan_pub/35/
		Innovation Districts as A Strategy for	Scholarly Text	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3498319

		Urban Economic Development: A Comparison of Four Cases		
5	Atlanta Technology Square	Case Studies in Innovation District Planning and Development	Scholarly Text	https://www.naiop.org/research-and-publications/research-reports/reports/case-studies-in-innovation-district-planning-and-development/
		Technology Square: Community for Collaboration, Innovation, and Technology Development	Official Website	https://www.gatech.edu/tech-square
6	San Diego I.D.E.A	All Smoke, No Fire? A Critical Evaluation of Innovation Districts	Scholarly Text	https://works.bepress.com/jdrucker/34/
7	Oklahoma City Innovation District	Oklahoma City Innovation District	Official Website	https://okcinnovation.com/
		Positioned for growth: Advancing the Oklahoma City innovation district	Technical Report	https://www.brookings.edu/articles/positioned-for-growth-advancing-the-oklahoma-city-innovation-district/
8	Innovate ABQ	Innovate ABQ Master Plan	Technical Report	https://perkinswill.com/project/university-of-new-mexico-innovate-abq-master-plan/
		Innovate ABQ	Official Website	https://www.innovateabq.com/
9	ASU SkySong Innovation Center	SkySong - The ASU Scottsdale Innovation Center	Official Website	https://skysong.com/
		Case Studies in Innovation District Planning and Development	Scholarly Text	https://www.naiop.org/research-and-publications/research-reports/reports/case-studies-in-innovation-district-planning-and-development/
10	Destination Medical Center (DMC)	DMC Destination Medical Center	Official Website	https://dmc.mn/
11	Houston Innovation Corridor (ion)	ION District	Official Website	https://iondistrict.com/
		Houston Innovation Corridor	Official Website	https://www.houston.org/innovation-corridor
		The Ion	Official Website	https://www.ionhouston.com/

		Rice University-led Ion innovation district breaks ground	Magazine Article	https://www.houstonchronicle.com/business/technology/article/Rice-University-led-Ion-innovation-district-14108575.php
		The trouble with the Midtown "innovation district."	Magazine Article	https://www.houstonchronicle.com/local/gray-matters/article/rice-midtown-innovation-district-displacement-13577627.php
12	Midtown Detroit TechTown District	All Smoke, No Fire? A Critical Evaluation of Innovation Districts	Scholarly Text	https://works.bepress.com/jdrucker/34/
		Detroit launches Innovation District to spur job growth	Magazine Article	https://neweconomyinitiative.org/detroit-launches-innovation-district-to-spur-job-growth/
		Midtown Detroit TechTown District	Technical Report	https://www.sasaki.com/projects/midtown-detroit-techtown-district/
13	Tech Center at Oyster Point	Tech Center- A High Tech Haven	Official Website	https://techcenterva.com/
		Case Studies in Innovation District Planning and Development	Scholarly Text	https://www.naiop.org/research-and-publications/research-reports/reports/case-studies-in-innovation-district-planning-and-development/
14	Richardson Innovation Quarter (Richardson IQ)	Richardson IQ	Official Website	https://richardsoniq.com/
		Collins/Arapaho Transit-Oriented Development and Innovation District	Official Website	https://www.cor.net/departments/development-services/comprehensive-planning/enhancement-redevelopment/collins-arapaho-transit-oriented-development-and-innovation-district

Furthermore, in addition to the above-mentioned data sources and data collection procedure, for this section of the study, data from Google Maps was also used to conduct the spatial analysis for the case studies of innovation districts when it was needed.

3.3.2 Community engagement and civic inclusion in developing innovation districts: Data Collection Procedure- RQ2

To respond to the second research question, this study utilizes document retrieval and document analysis as its primary data collection method. Therefore, as the first source for data collection,

this study looked for city council minutes meetings' documents starting from 2017; however, only documents from August 2019 were available. Despite all attempts to contact city officials and asking for the previous documents via emails, no response was received from the city officials. In total, this study was able to access 41 city council minute meetings dated between August 06, 2019, and December 01, 2020. In addition to the missing document dated before August 2019, eight other city council meeting documents held on 3/17/2020, 3/24/2020, 3/27/2020, 4/21/2020, 5/19/2020, 6/9/2020, 8/31/2020, and 12/1/2020 were missing from the Cit of Fort Worth webpage. All the information and data collected from the 41 city council meetings (available online via the city of FW website) were documented in an excel file for further analysis.

Furthermore, this study refers to other documents to collect reliable and relevant data to understand the local residents' role and engagement level when developing the innovation district's concept. As the second source for data collection, this study reached out to five magazine articles via their websites, including D-Magazine, Dallas Innovates, Fort Worth Business Press, Fort Worth Star-Telegram, and Fort Worth Magazine. The data from this group of documents was collected and archived for further analysis. Finally, following a comprehensive search to retrieve additional documents that could be included as a reliable source to help responds to the second research questions, I was able to broaden the list of the retrieved documents by locating four technical reports related to my research scope and aim. Therefore, four reports (available online) that have been related to the scope of my research were added to my database, including "Innovation Districts, Texas-style," "Future @ Fort Worth," "Dallas- Fort Worth Regional Innovation Study 2018," and "Dallas- Fort Worth Regional Innovation Assessment 2018." Table-3-4 provides a list of the documents which were reviewed/ retrieved as the data sources.

Table 3-4. Research Question 2: Data Collection Sources

Document Type	Document Title	Data Source
City Council Minute Meetings	**41** City Council minute meetings dated between 08/06/2019 and 12/01/2020	City of FW Website: https://fortworthgov.legistar.com/Calendar.aspx
Magazine Articles/newsletter	What is Fort Worth's Medical Innovation District?	D-Magazine website: https://www.dmagazine.com/healthcare-business/2019/05/fort-worths-medical-innovation-district-will-arrive-this-fall/
	Medical Innovation District: Fort Worth Targets Near Southside for New Hub	Dallas Innovates Website: https://dallasinnovates.com/medical-innovation-district-fort-worth-targets-near-southside-for-new-hub/
	Council Report: Medical Innovation District can fuel citywide growth	Fort Worth Business Press Website: https://fortworthbusiness.com/health-care/council-report-medical-innovation-district-can-fuel-citywide-growth/
	More than nightlife: How Near Southside could be DFW's health-care hub	Fort Worth Star-Telegram website: https://www.star-telegram.com/latest-news/article230379739.html
	Shiny New Toy	Fort Worth Magazine Website: https://fwtx.com/news/features/shiny-new-toy/
Reports (available online)	Innovation Districts, Texas-style	Brookings (institute) Website: https://www.brookings.edu/blog/metropolitan-revolution/2016/03/16/innovation-districts-texas-style/
	Future @ Fort Worth: Capacity Analysis, Success Factors, and Growth Vision for the Fort Worth Medical Innovation District (FW-MID)	CTEDD Website: https://ctedd.uta.edu/research-projects/future-fort-worth-capacity-analysis-success-factors-and-growth-vision-for-the-fort-worth-medical-innovation-district-fw-mid/
	Dallas- Fort Worth Regional Innovation Study 2018	Dallas Regional Chamber website: https://www.dallaschamber.org/wp-content/uploads/2019/01/DallasInnovationStudy_2018.pdf
	Dallas- Fort Worth Regional Innovation Assessment 2018	Dallas Regional Chamber website: https://www.dallaschamber.org/wp-content/uploads/2019/01/dallas-assessment_Final_low.pdf

In total, this study has reviewed 50 documents to conduct qualitative research and find the appropriate answers to the research questions. The data was collected from the city of Fort Worth website, the magazines' official websites, and other reliable sources between November to Mid-December 2020. The collected data has been documented in an excel file for further analysis through an appropriate qualitative data analysis method.

3.3.3 Future planning for innovation districts amid rising remote working: Data Collection Procedure- RQ3

To respond to the third research question, this study employs a systematic review of the literature and relies on document analysis as a qualitative research approach. Accordingly, the data collection procedure for this part of the study includes several steps. This study uses several databases to collect data, including Scopus, Web of Science, Science Direct, Wiley Online Library, and Directory of Open Access Journals. The reason for using various sources to collect data was to ensure that all the relevant studies had been included. The data collection process was carried out between February and May 2023. The data collection and analysis in this section of the study and to respond to the third research question include five primary steps.

The first step was to develop a plan to collect the related literature based on research questions and designated keywords and conduct the initial search. This study uses three main groups of keywords to search for the studies in the planning literature, including 1) "Innovation Districts" (if the literature included the concepts and keywords of "clusters of innovation, technology zones/districts, and creative clusters," I also included them in the initial dataset.), 2) "Placelessness," and 3) "Remote Working" and "Telework." Considering that the topic of innovation districts has been most popularized after 2000, my initial search included the literature published between the years 2000-2022. In this step, I looked for the literature that included the abovementioned keywords in their "Title, Abstract, and the list of Keywords." Accordingly, the search in the first step, which is called the initial search in this section, yielded a total of 1,529 items, including 530 items for the keyword of "Innovation Districts" (and related themes), 305

items for the keyword "Placelessness," 513 items for the keyword "Remote Working," and 181 items for the keyword "Telework[6]."

Steps two, three, and four included a series of "inclusion and exclusion criteria" to screen the data collected in step one and evaluate their eligibility to be included in the final dataset. Therefore, I narrowed down the dataset results in step two based on three prominent inclusion and exclusion criteria. I first excluded the literature published in any language other than English. Second, any duplication of the collected literature was excluded from the dataset. Third, I excluded the publications whose titles, topics, and publishers were irrelevant to the study's scope. At the end of step two, the total items included in the research dataset was reported as 657 items, including 264 items for the keyword of "Innovation Districts" (and related themes), 112 items for the keyword "Placelessness," 232 items for the keyword "Remote Working," and 49 items for the keyword "Telework."

The third step of data screening and collection was based on three primary exclusion and inclusion criteria: the document's type, availability, and relevance to the study's scope. Regarding the documents' type, I excluded the literature under the category of books, conference papers, pre-prints/working papers, and book reviews. In addition, not peer-reviewed documents, such as presentations, magazine/news articles, webpages, and webinars, were excluded from the dataset. Therefore, only peer-reviewed journal articles, book chapters, technical reports, and dissertation/thesis were included in the dataset. Next, I removed the documents that were not

[6] "The sudden spread of technology-based working arrangements resulted in a high number of international reports and scientific papers describing employees' working conditions, using several different terms, such as remote working, teleworking, and working from home. Despite the differences among them (for example, remote or teleworking not necessarily imply that the employee is working from home), it is not possible to universally define technology-based work arrangements (De Vincenzi et al., 2022)." Therefore, in this study I will use remote working and teleworking as synonyms.

related to the study's scope and belonged to other disciplines, such as education, business, management, art, architecture, English literature, tourism, psychological & medical studies, and cybersecurity by reading the abstract of the selected document. Finally, if the documents' full text was unavailable online, it was excluded from the dataset. Step three led us to a total of 302 items, including 143 items for the keyword of "Innovation Districts" (and related themes), 57 items for the keyword "Placelessness," 75 items for the keyword "Remote Working," and 27 items for the keyword "Telework."

In step four, and after reviewing the remaining documents' abstract, I investigated the whole manuscript's text if the decision could not be made only based on the abstract. Accordingly, in this step, the primary focus was on the publications that had covered the concepts of "innovation districts" concerning the built environment attributes, "placelessness" regarding future planning and built environment factors, and finally, "remote working and teleworking" and their impacts on planning policymaking with a focus on built environment factors for future planning. After reviewing and screening the remained documents against the research aim, at the end of step four, the finalized dataset consists of a total number of 181 items, including 76 documents for the keyword of "Innovation Districts" (and related themes), 30 items for the keyword "Placelessness," 56 items for the keyword "Remote Working," and 19 items for the keyword "Telework" for further analysis.

Finally, step five was to analyze data and report the results. I conduct the analysis using qualitative techniques by reviewing and re-reading the whole manuscript and using coding and categorizing methods to report the results. Therefore, this study uses a manual content analysis approach to answer the research questions. Figure 3-9 illustrates the specific steps taken in terms of the literature selection procedure and analyses.

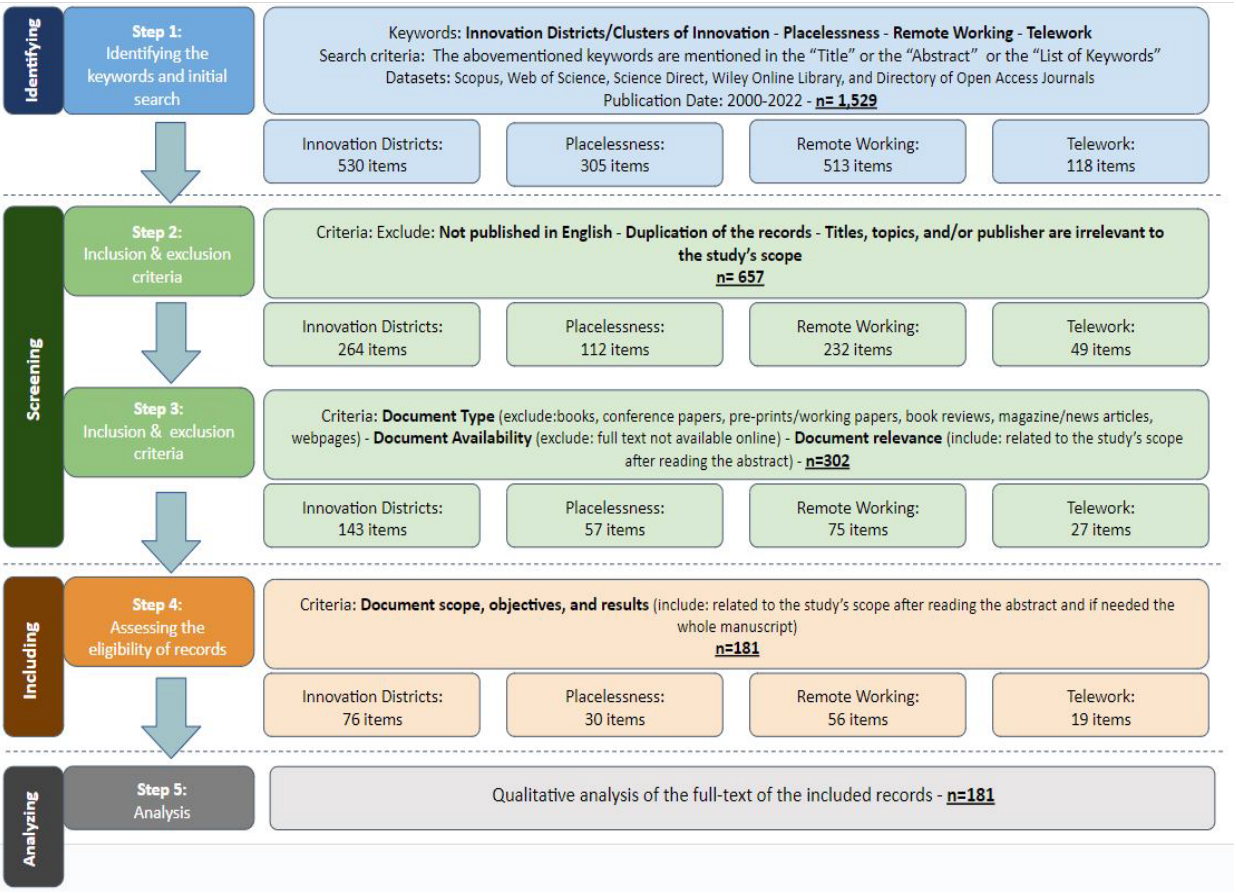


Figure 3-9. Data Collection Sources and Procedure for Research Question 3

3.4 Methodological Limitation

The study ensures the accuracy and dependability of the data sources and acknowledges the importance of honesty and fairness in reporting the results. Additionally, the study recognizes some limitations associated with the research data and the researcher.

This research aims to address the central question of "What are innovation districts' primary planning and policy implications for urban planning, equity, and economic prosperity?" Accordingly, content, empirical, and socio-spatial analyses are defined as the main analytical methods this research utilizes. This study employs the qualitative research method and analysis as its primary methodological approach. Some limitations are associated with qualitative research methods, which must be acknowledged. Since the results from a qualitative research analysis

cannot be verified, it may be difficult to draw conclusions from findings that are not generalizable. The labor-intensive approach required for qualitative research may also limit the ability to conduct research on a large scale. Finally, because it is challenging to investigate causality with qualitative research, one may be unable to determine the cause-and-effect relationships between variables. In addition, this research solely considers some qualitative methods to understand the social equity impacts, such as observation and document analysis. It does not include other types of data collection, such as interviews with city officials and residents or local community surveys. This also can affect the results of the study.

Also, qualitative case study research generalizations are limited to what (Yin, 2009, p. 15) calls "theoretical propositions and not to populations or universes." Therefore, the findings reported in this research do not seek to be construed as a theory that explains beyond the research objective discussed in Chapter One. Finally, when conducting research, it is essential to consider the quality of both primary and secondary data. While primary data may be less prone to bias, researchers should still be aware of their values and biases when reporting findings. On the other hand, secondary data may have been collected for different purposes or contain bias, so it is essential to assess their quality before using them in research.

CHAPTER 4

4. CHAPTER 4- Analysis and Findings

The analysis and results section of this research presents the findings of the study aiming to answer the central research question of "**What are the primary implications of innovation districts for planning, equity, economic prosperity, and policymaking?"** This study focuses on innovation districts and their contributing factors for cities' prosperity, equity implications, and planning policy solutions for the future of place-based urban economic development models. This section provides a detailed analysis of the data collected from reliable sources, such as scholarly texts, major media outlets, and official websites of case studies as well as the socio-spatial and empirical analysis for cases of innovation districts. Accordingly, the following sections will discuss the analysis and findings separately for the three primary research questions. The analysis leads to three different types of findings for each research question that are all helping to address the central question of this research. In the following sections, I present the data sources and then the analyses for each research theme, followed by the findings for each of the three research questions based on the conducted analyses.

4.1 Empirical Analysis of Key Contributing Factors Shaping Innovation Districts: Evidence from 14 Case Studies in the United States (RQ1)

This section presents the analysis to address the research question of "What are the main contributing factors to shaping innovation districts? And how understanding the potentials and challenges for a thriving innovation district helps with generalizability of the innovation district model?" The data were analyzed using qualitative research methods and a multiple case study analysis design and relied on content analysis as its primary analytical method.

In this section, I complete two sets of analysis for each case study. First, I conduct a series of content analysis based on the available sources, including reports, internet media pages, websites, government documents, and promotional documents related to each innovation district. In addition to identifying the economic, physical, and networking assets and their key subcategories for each case study, I provide information regarding the governance structure, the targeted industries, the primary anchor, and the development stage of each case study. The analyses are presented in a narrative format. Second, I conduct a series of spatial analysis to understand the geographical location typology of the selected cases of innovation districts. Finally, I expand my analyses to explore what are the lessons learned (take aways and challenges) through comparative analysis concerning economic, physical, and networking assets as well as the governance structure typology and geographical location typology of the 14 case studies of innovation districts.

4.1.1 Buffalo Niagara Medical Campus (BNMC)

Buffalo Niagara Medical Campus (BNMC) was established in 2002 and targets the medical industry and is introduced as an "epicenter of health, entrepreneurship, and innovation." BNMC creates an urban community that is composed of a medical campus, nationally renowned hospitals, research centers, incubators, and over 200 private sector companies. This innovation district encompasses an area of 120 acres of land, which includes several clinical, research, medical, and office spaces. BNMC is in proximity to Downtown Buffalo, and mixed land use, access to transit, walkability and bike-ability, urban vitality amenities, and adaptive re-use of historical land are some of the placed-based characteristics of BNMC. BNMC provides a wide array of workspace options for collaboration, co-working, office, research labs, and light manufacturing space. In terms of governance structure, "The Buffalo Niagara Medical Campus, Inc.," a non-profit organization formed in 2002, is the governing arm of BNMC. (BNMC Homepage, n.d.; Buffalo

Niagara Medical Campus Master Plan Update, 2010). The spatial analysis regarding the geographical location of the BNMC in relation to the central business district (CBD) or downtown is depicted in Figure 4-1.

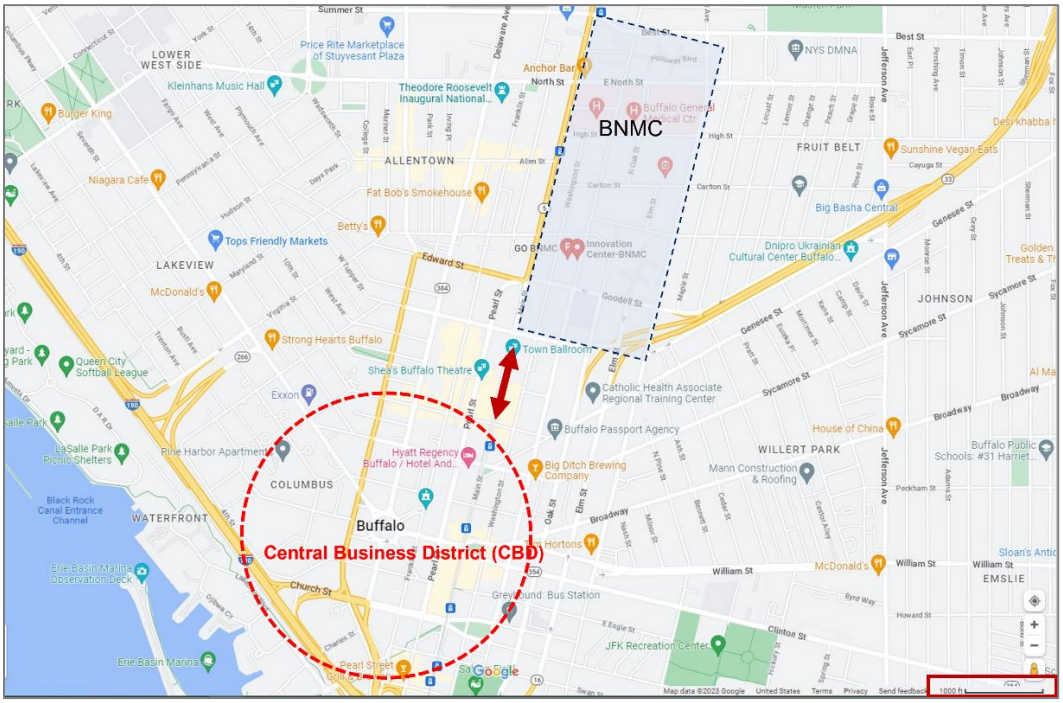


Figure 4-1. Geographical location of BNMC in relation to Buffalo CBD

4.1.2 San Francisco Mission Bay Area

Mission Bay Area in San Francisco is project of transforming an industrial wasteland (a rail yard) into an innovation district with clusters of medical, biomedical, life science, and innovative firms and institutions. The innovation district is planned to revitalize an area of 300 acres into a vibrant, high-density, transit-oriented community (Mission Bay, n.d.). This innovation district, which has become operationalized since 2003, targets medical and biomedical-related industries and its primary anchor is the University of California San Francisco (UCSF) Medical Center. The Mission Bay area features placed-based qualities, such as mixed land us, diversity in amenities, light-rail connectivity, the central park, and the high-rise multi-use office buildings. "The Mission Bay

Conference Center and Bayer U.S. Innovation Center" create space for collaboration and networking among the actors in the district. The development of this innovation district is a public-private partnership between Mission Bay Development Group and the San Francisco Redevelopment Agency (Mission Bay, n.d.); and the UCSF Medical Center, the primary anchor, is the governing arm of the district. The spatial analysis regarding the geographical location of Bay Area Innovation District in relation to the central business district (CBD) or downtown is depicted in Figure 4-2.

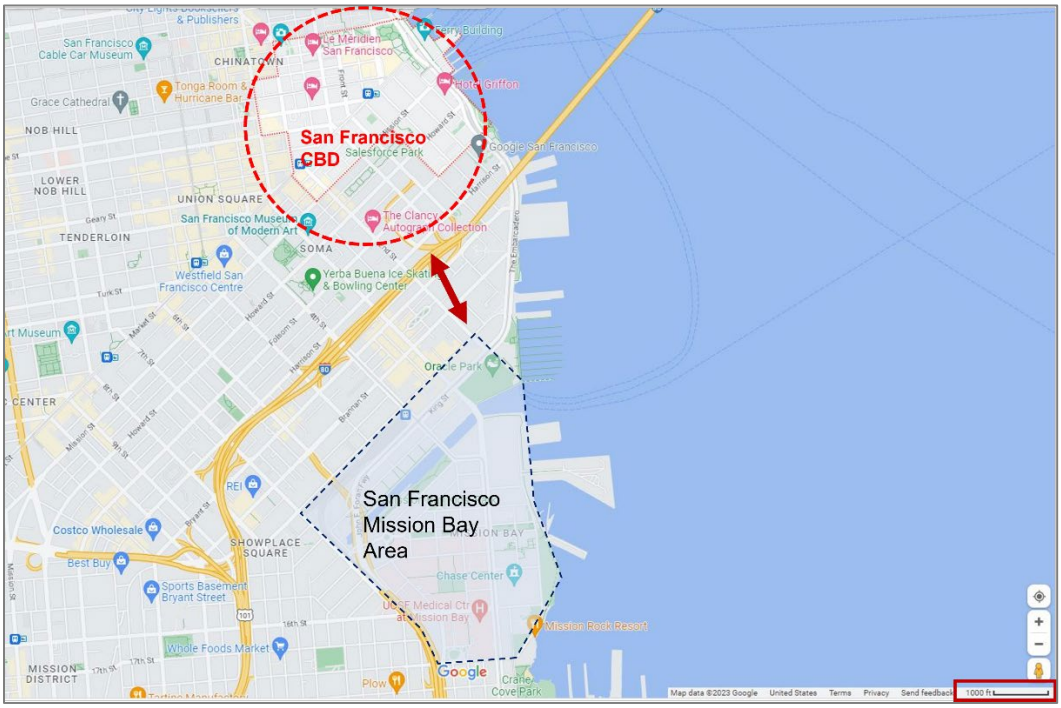


Figure 4-2. Geographical location of Mission Bay Area Innovation District in relation to San Francisco CBD

4.1.3 Boston Seaport Innovation Districts (BSID)

The Boston Seaport Innovation District (BSID) was stablished in 2010 with its primary goal to enhance organic and bottom-up entrepreneurship (Barnett et al., 2014). BSID, located in South Waterfront area in Boston, encompasses an area of approximately 1,000 acres. BSID targets industries in medical science, pharmaceutical, and technology, and have become home to many global headquarters. The primary anchor of this innovation district is a civic innovation center (the

Boston Convention Center). BSID is near Central Business District (CBD) in Boston and provides a diverse range of land-use and amenities. "MassChallenge" and "Boston Convention Center" are among the places that provide opportunities for collaboration and networking for start-ups. As to governance structure, BID is an example of public-private partnership. While the public sector is the City of Boston (the Boston Redevelopment Authority), the primary private sector actor is the "Boston Global Investors," a private real estate and consulting firm. Accordingly, "a large portion of the funding and investment came from the private sector, with the public sector taking the role of public relations and marketing for the innovation district and developing public infrastructure (Barnett et al., 2014)." The spatial analysis regarding the geographical location of Boston Seaport Innovation District in relation to the central business district (CBD) or downtown is depicted in Figure 4-3.

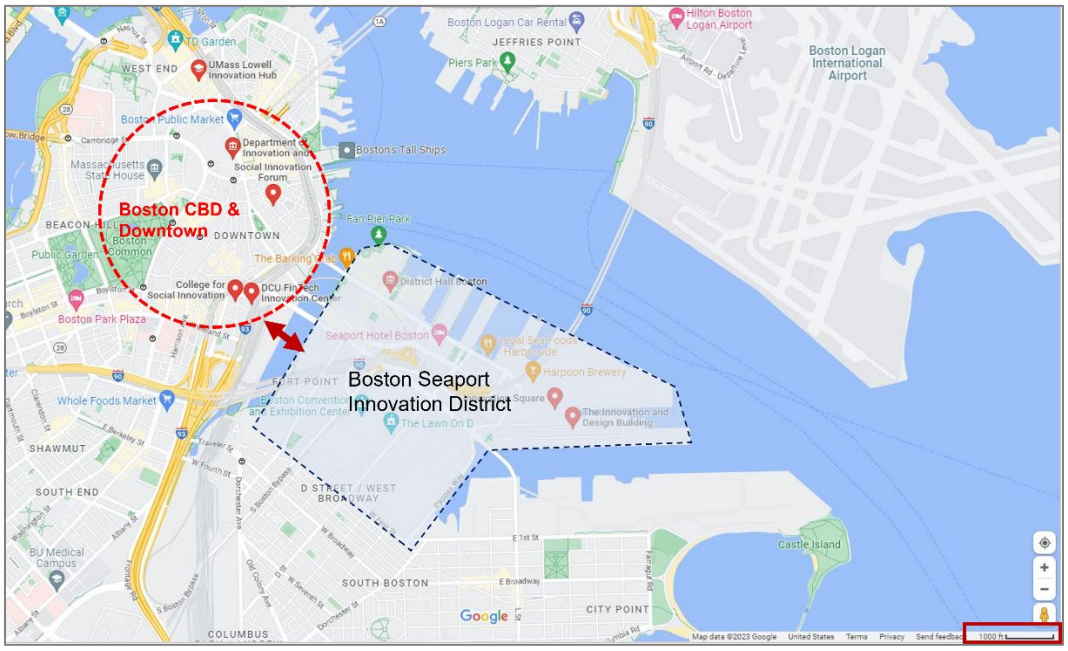


Figure 4-3. Geographical location of Boston Seaport Innovation District in relation to Boston CBD

4.1.4 Cortex Innovation Community (CIC)

Cortex Innovation Community (CIC), located in the St. Louis Midtown area, includes an area of 200 acres of land. The initial attempts were taken in 2002 to create a research corridor between St. Louis University, Washington University, and BJC Healthcare research medical center (J. Drucker et al., 2019; Zandiatashbar & Kayanan, 2020). There has been a collaboration among several entities and organizations, including Washington University in St. Louis, BJC HealthCare, the University of Missouri – St. Louis, Saint Louis University, and the Missouri Botanical Garden in developing the CIC (Cortex Innovation Community, 2023). CIC is an example of transformation of a blighted industrial into a district that promotes entrepreneurial activities focusing on technology, life science, and biotechnology (D. C. Read, 2016). These universities and private firms are the primary anchors of the CIC. Also, CIC features a variety of placed-based factors, including mixed- land use, access to transit, walkability and bike-ability, open spaces, and sport and recreational facilities. In addition, @4240 Building and the Venture Café–St. Louis provide places for collaboration among innovation district actors. The nonprofit Cortex Innovation Community organization is CIC's primary governing arm (Cortex Innovation Community, 2023). The spatial analysis regarding the geographical location of Cortex Innovation Community in relation to the central business district (CBD) or downtown is depicted in Figure 4-4.

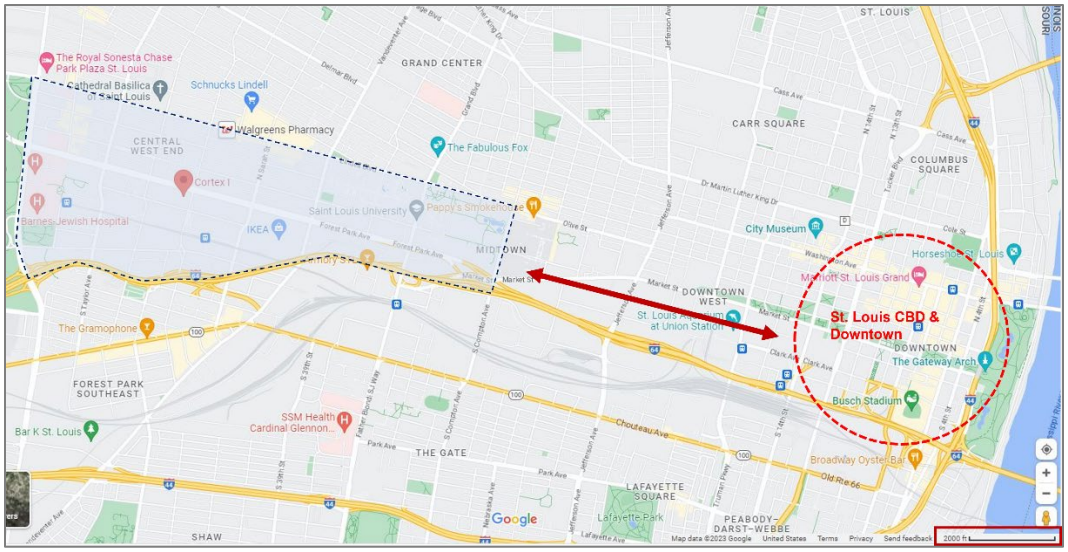


Figure 4-4. Geographical location of Cortex Innovation Community in relation to St. Louis CBD

4.1.5 Atlanta Technology Square (Tech Square)

Atlanta Technology Square (Tech Square) was established in 2003 and is still growing as an innovation district to attract more technology-based firms, entrepreneurial activities, and start-ups. The Tech Square encompasses a land of "more than 1.3 million-square-foot mixed-use development project in Midtown Atlanta (D. C. Read, 2016)." Tech Square is an example of revitalization a vacant surface parking lots into a place for a diverse land-use and technology-related activities. Georgia Tech University (Ga-Tech) is the primary anchor of Tech Square. This innovation district targets industries in "High Tech, Advanced Manufacturing, Financial Technology, Information Security and Machine Learning, Health Care, Neuro-science (Tech Square, n.d.)." Tech Square features the collaborative spaces provided by Georgia Tech, open spaces, walkable & Bike-able lanes, and transit stations. "The Georgia Tech Research Network Operations Center (GT-RNOC)" facilitates collaboration among innovative actors. Georgia Tech is the main governing arm of a structure that encompasses collaboration with the nonprofit Midtown Alliance and the City of Atlanta (Tech Square, n.d.). The spatial analysis regarding the

geographical location of Atlanta Technology Square in relation to the central business district (CBD) or downtown is depicted in Figure 4-5.

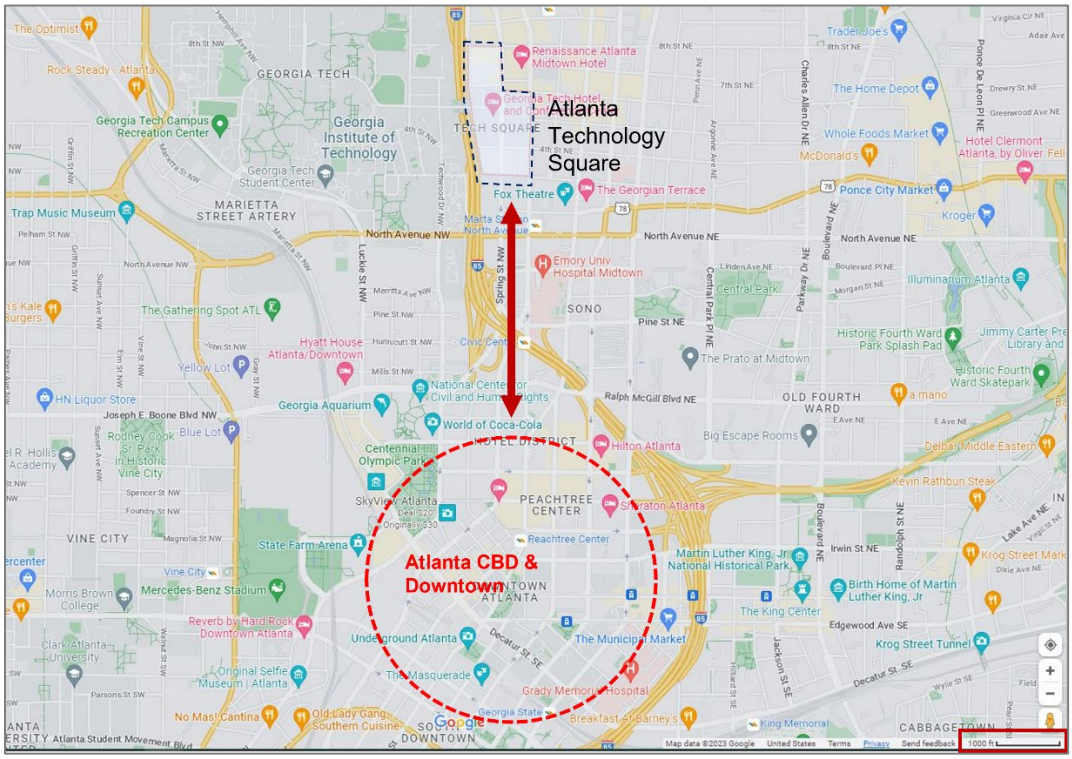


Figure 4-5. Geographical location of Atlanta Technology Square in relation to Atlanta CBD

4.1.6 San Diego I.D.E.A.

The planning for the San Diego I.D.E.A. innovation districts started in 2011 and this district has been under development since then. San Diego I.D.E.A., located in Downtown San Diego' East Village, occupies an area of 94 acres with its primary goal being to create "a mixed-use residential, professional, and retail space to promote the innovation and arts. The I.D.E.A. district plan attempts to enhance the city's reputation as a magnet for art and design talent across the country and internationally (Barnett et al., 2014)." I.D.E.A.'s targeted industries include art & design, information technology (IT), biotech, and energy, and its primary anchor are the education centers and the University of California San Diego (UCSD). In addition, mixed land use, access to transit, density, presence of community spaces, open spaces, and business incubation spaces are among

the placed-based qualities of I.D.E.A. innovation district. I.D.E.A. also benefits from shared working spaces, district-wide Wi-Fi system, and interactive digital media. “The lead partners are private developers including the former chairman of the San Diego Regional Economic Development Council (Barnett et al., 2014).” Accordingly, I.D.E.A is an example of private firm, “I.D.E.A. Partners,” as its governing arm (ideadistrictsd.com). The spatial analysis regarding the geographical location of San Diego I.D.E.A in relation to the central business district (CBD) or downtown is depicted in Figure 4-6.

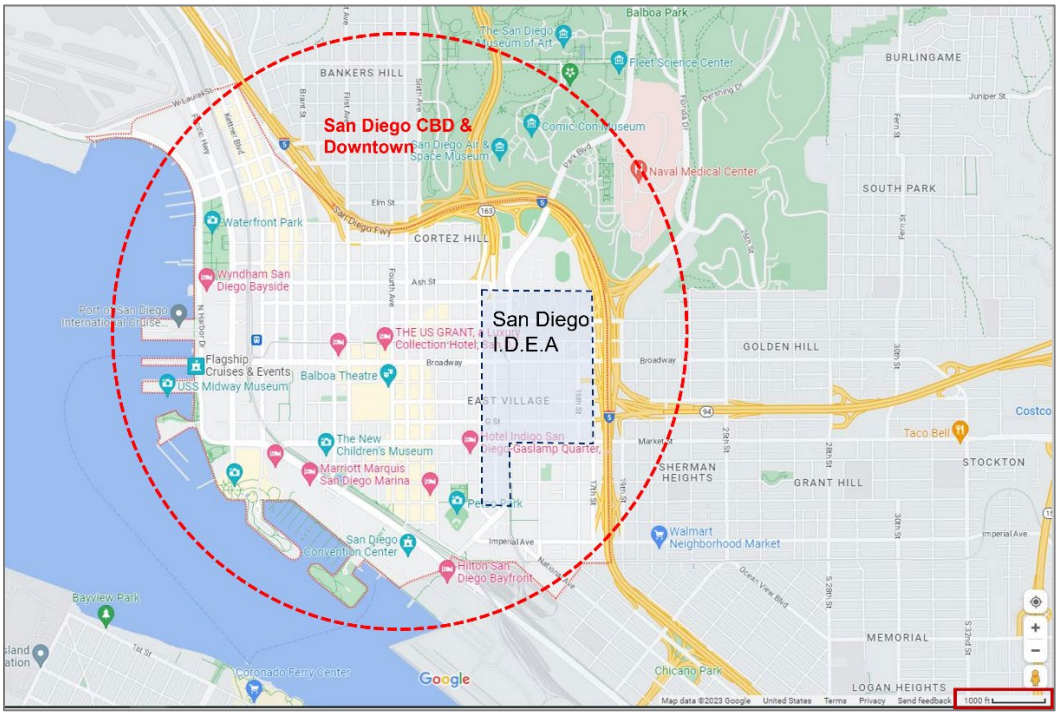


Figure 4-6. Geographical location of San Diego I.D.E.A in relation to San Diego CBD

4.1.7 Oklahoma City Innovation District

The development of the Oklahoma City innovation district (OKCID) was initiated in 2013. OKCID encompasses 1.3 square-miles east of downtown and aims to create “an ecosystem of collaboration, innovation and economic growth located in historic, Northeast Oklahoma City, surrounded by internationally acclaimed organizations spanning Oklahoma’s diverse sectors – healthcare, bioscience, aerospace & unmanned systems, specialized manufacturing, academia,

technology and energy (*Oklahoma City Innovation District*, n.d.).” The OKCID targets industries in healthcare, medical & biomedical, energy, aerospace, and biotech. Its primary anchor is the the University of Oklahoma (UO) College of Medicine Hospital. OKCID provides co-working spaces in the “Automobile Alley” as well as open spaces for collaboration and networking. Oklahoma Health Center Foundation, as part of the primary anchor institution of the district, has been the management arm of the OKCID since 2017. It collaborates with public and private organizations such as Greater Oklahoma City Chamber of Commerce, University of Oklahoma Health Sciences Center, and the Oklahoma City Redevelopment Authority (Oklahoma City Innovation District, n.d.). (*Oklahoma City Innovation District*, n.d.). The spatial analysis regarding the geographical location of Oklahoma City Innovation District in relation to the central business district (CBD) or downtown is depicted in Figure 4-7.

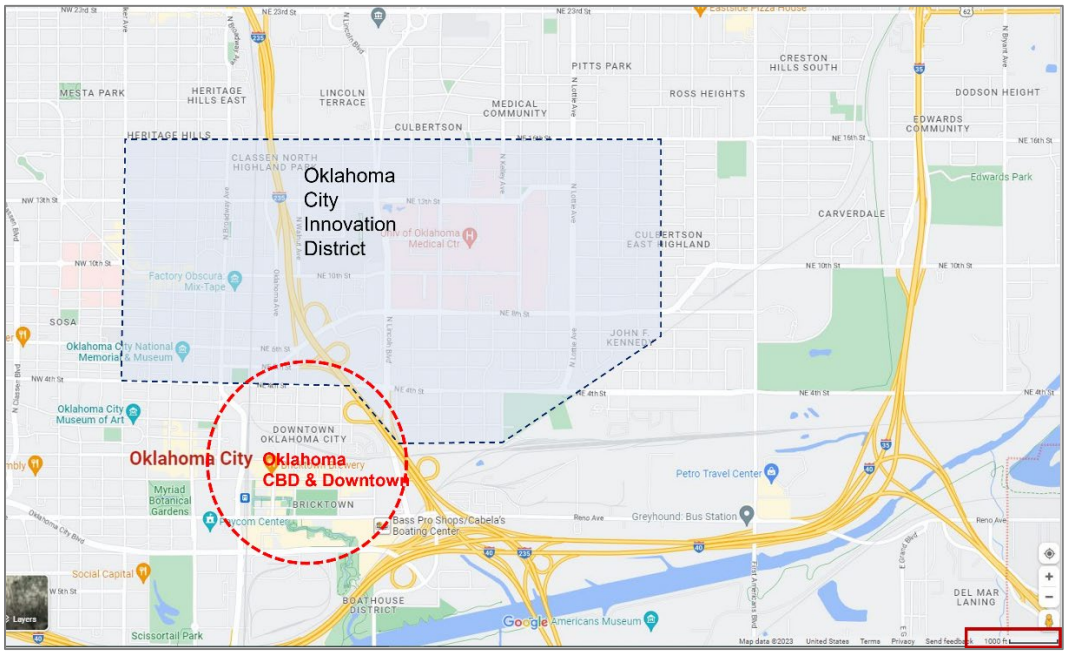


Figure 4-7. Geographical location of Oklahoma City Innovation District in relation to Oklahoma City CBD

4.1.8 Innovate ABQ

Innovate ABQ was established in 2017 in an area of 7 acres in downtown Albuquerque in New Mexico. It aims to enhance economic development and create more job opportunities through attracting innovative and technology-related firms and investors. Innovate ABQ creates a "physically-compact, technically-wired, and walkable space devoted to bringing together initiatives from New Mexico's innovators to foster the creation of long-term, job-creating ventures and increase access to opportunity for the entire community (InnovateABQ, n.d.)." Innovate ABQ connects city of Albuquerque downtown to the University of New Mexico (Perkins + Will, 2015). It targets industries in Medical, human science, and technology. Its primary anchor an urban node (Innovate ABQ Rainforest Building), which provides a networking space for the innovation districts as well (InnovateABQ, n.d.). A public-private partnership between the Innovate ABQ team and the City of Albuquerque develops the district with Innovate ABQ acting as the governing arm (InnovateABQ, n.d.). The spatial analysis regarding the geographical location of Innovate ABQ in relation to the central business district (CBD) or downtown is depicted in Figure 4-8.

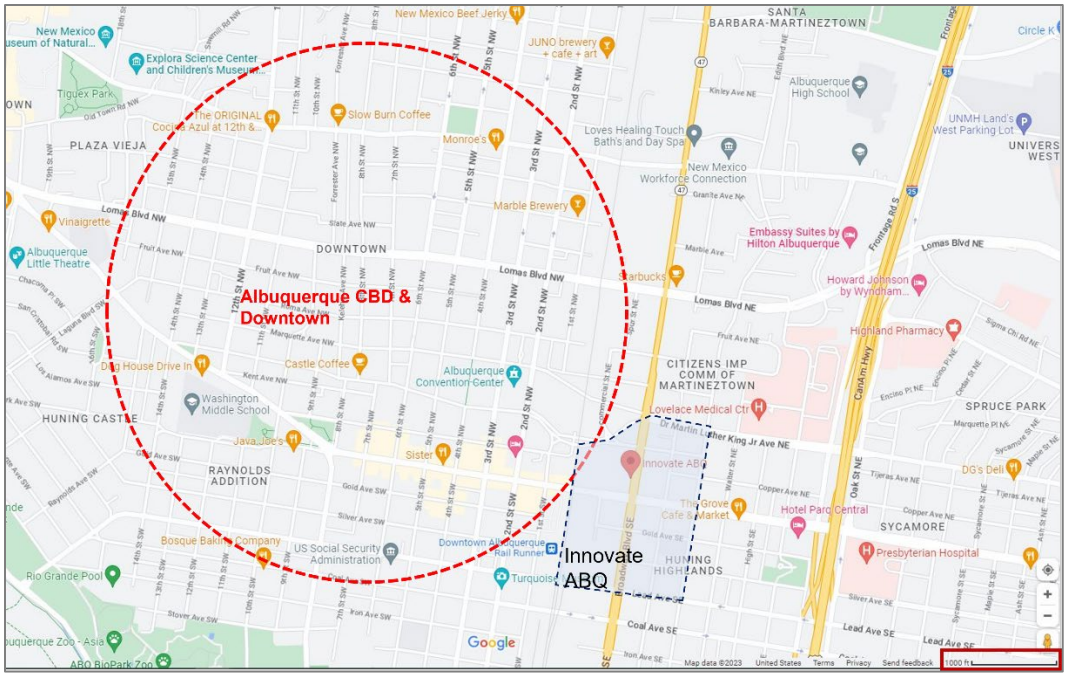


Figure 4-8. Geographical location of Innovate ABQ in relation to Albuquerque CBD

4.1.9 ASU SkySong Innovation Center

The ASU SkySong Innovation Center, known as SkySong, is a home to "Class A commercial office spaces, retails, restaurants, hotel components, and residential apartments. It provides space and amenities for startups and nearly 500 companies and hundreds of new residents (SkySong - The ASU Scottsdale Innovation Center, 2021)." In 2005, "Arizona State University (ASU), the ASU Foundation for a New American University (ASU Foundation) and the city of Scottsdale joined together to redevelop the property in hopes of revitalizing the area through the attraction of rapidly growing technology firms (D. C. Read, 2016)." This district targets industries in technology and aims to create a collaborative place for entrepreneurial activities. The Arizona State University (ASU) along with an urban node are the primary anchor institutions of SkySong The district operates through a partnership between the City of Scottsdale, the nonprofit ASU Foundation, and the private real estate firms Holualoa Companies and Plaza Companies (D. C. Read, 2016; SkySong - The ASU Scottsdale Innovation Center, 2021). The spatial analysis

regarding the geographical location of ASU SkySong Innovation Center in relation to the central business district (CBD) or downtown is depicted in Figure 4-9.

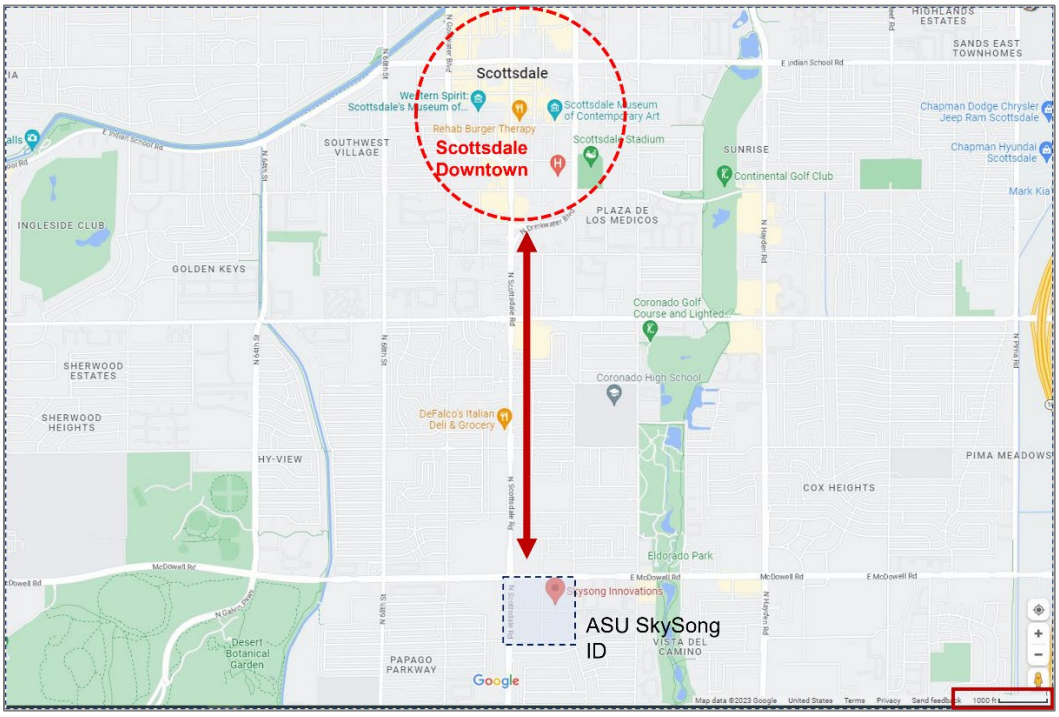


Figure 4-9. Geographical location of ASU SkySong Innovation Center in relation to Scottsdale CBD

4.1.10 Destination Medical Center (DMC)

Destination Medical Center (DMC) was established in 2013 in Rochester, Minnesota. DMC encompasses 550 acres of land to create a global destination for health and wellness through innovative and entrepreneurial activities. This innovation district's targeted industries include health care and business and biomedical research, education, and technological innovation. "Mayo Clinic and the Bio-Business Center" are the primary anchor institutions of DMC (Destination Medical Center, n.d.). DMC is near Downtown Rochester, and includes mixed land use, open spaces, labs, shared workspaces, and urban amenities (e.g., Rochester Art Center). The DMC Corporation (DMCC) and DMC Economic Development Agency (EDA) are the two non-profit organizations that act as the governing arm for the district (Destination Medical Center, n.d.). The

spatial analysis regarding the geographical location of Destination Medical Center in relation to the central business district (CBD) or downtown is depicted in Figure 4-10.

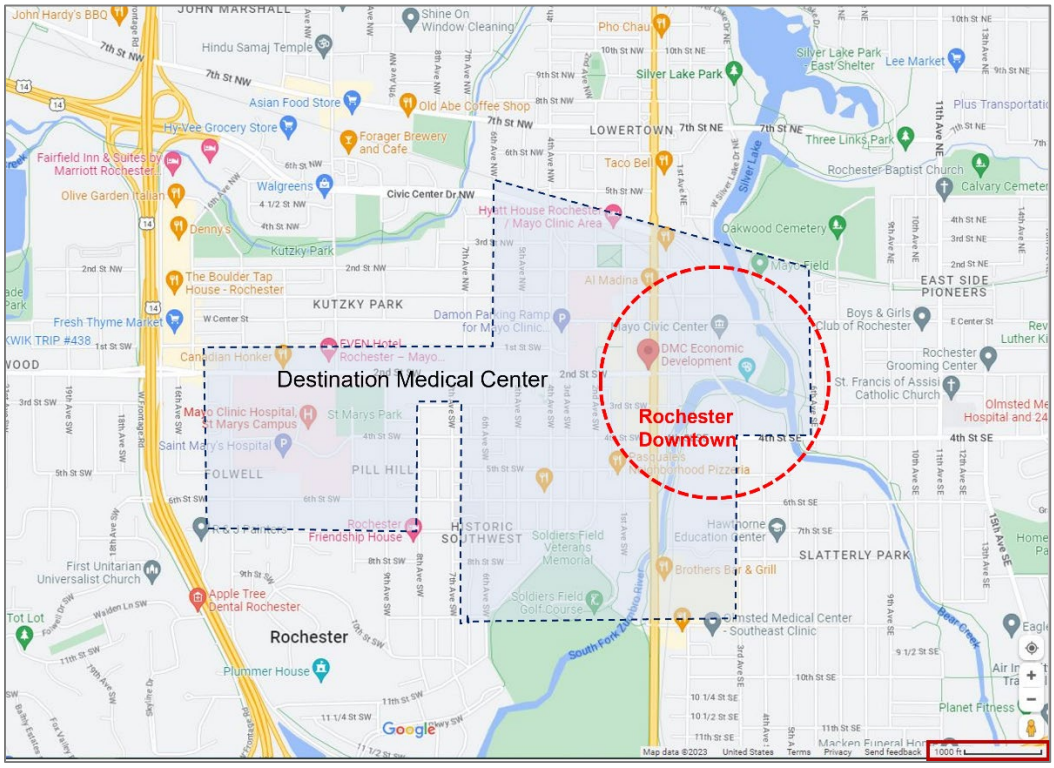


Figure 4-10. Geographical location of Destination Medical Center in relation to Rochester CBD

4.1.11 Houston Innovation Corridor (Ion District)

Houston Innovation Corridor (Known as Ion District) includes 16-acre area in Midtown (Asakura, 2019; Leinfelder & Sarnoff, 2019). The primary anchor for the district will be the renovated former Sears Building (known as Ion building) (Ionhouston.Com, n.d.). Ion District's objective is to gather large firms in light-filled office, to provide co-working spaces for active and agile startups(Ion District, n.d.). The planning stage for "Ion District" started in 2019. This innovation district is near the Houston Medical Center, and therefore, it mainly targets healthcare and medical industries. The primary anchor of the district is an urban node (Houston Innovation District, Sears Building). "The four-mile-long Corridor is linked by light-rail, bike lanes, and pedestrian thoroughfares, and offers easy access to key industry and institutional players along with an

unparalleled array of amenities (Houston Innovation Corridor, n.d.).” Rice Management Company, a division of Rice University, is the primary governing arm of the Ion District (community.iondistrict.com). The spatial analysis regarding the geographical location of Houston Innovation Corridor in relation to the central business district (CBD) or downtown is depicted in Figure 4-11.

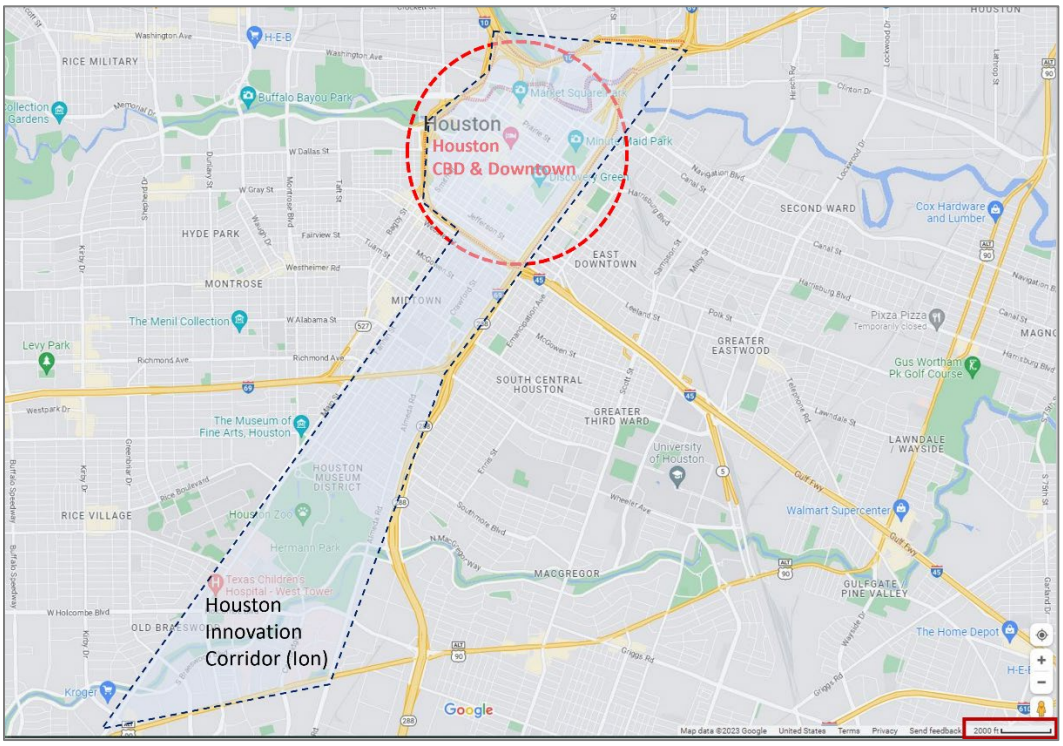


Figure 4-11. Geographical location of Houston Innovation Corridor in relation to Houston CBD

4.1.12 Midtown Detroit TechTown District

The Midtown Detroit TechTown District (TechTown) is initiated to transform 4.3 square-miles of Detroit into a vibrant place that stimulates the innovation economy (“Neweconomyinitiative.Org,” 2023). TechTown plans to revitalize the Midtown area of Detroit from a place characterized by surface parking, vacant properties, and inward-facing, siloed hubs of activity to an inspiring location that accelerates innovation, promotes entrepreneurship, and builds community around the generation of ideas in a vibrant, mixed-use setting (Sasaki Associates, Inc., 2023). The primary

anchor institutions of the district are "Wayne State University, College for Creative Studies, and Henry Ford Health System." Also, the district will feature "a community park and two additional plazas that are connected along landscaped corridors to provide a range of amenities (Sasaki Associates, Inc., 2023)." TechTown targeted industries include energy, healthcare, and other creative industries and the driving force behind the formation of this district is attributed to grassroots efforts from a range of actors (Barnett et al., 2014). Midtown Detroit Inc. is a nonprofit development organization which is the governing arm for the district (Barnett et al., 2014). The spatial analysis regarding the geographical location of Detroit Tech Town in relation to the central business district (CBD) or downtown is depicted in Figure 4-12.

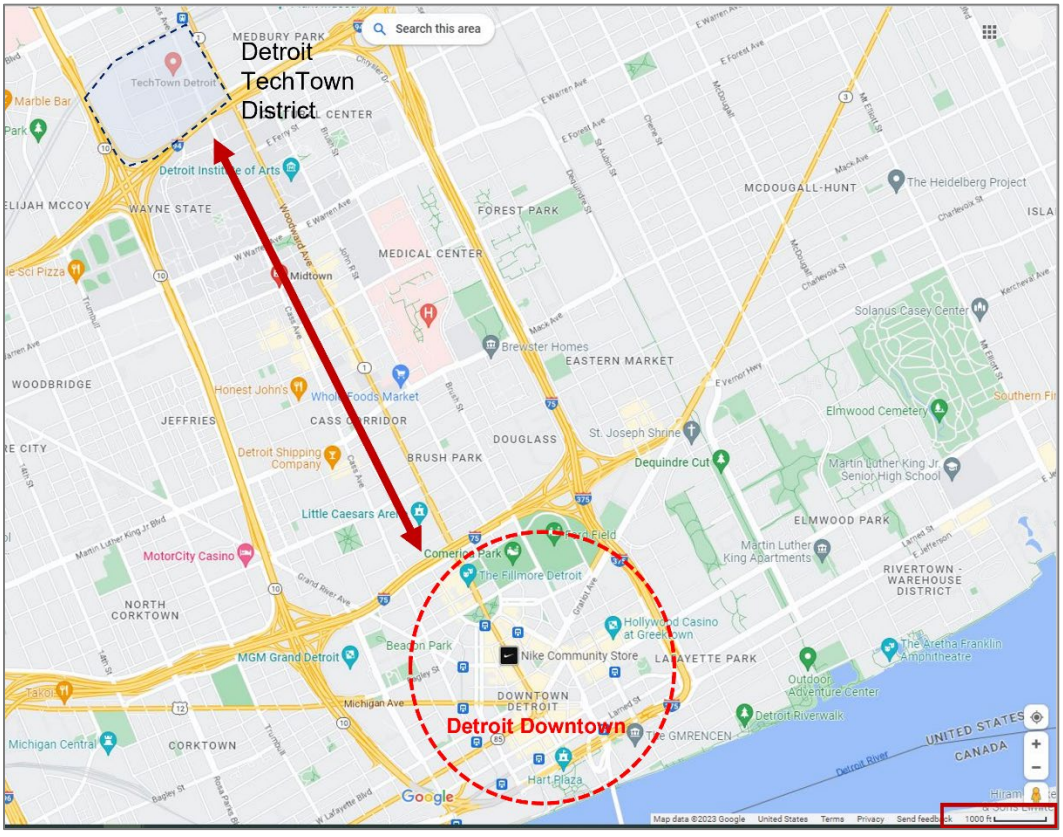


Figure 4-12. Geographical location of Detroit Tech Town in relation to Detroit CBD

4.1.13 Tech Center at Oyster Point (Tech Center)

Tech Center at Oyster Point (Tech Center), located in Newport News, Virginia, includes an area of 100 acres. The planning stage for Tech Center started in 2015 and it is still growing and under development (D. C. Read, 2016). Tech Center targets industries in technology, energy, aerospace, and subatomic particles. The "Thomas Jefferson National Accelerator Facility known as "Jefferson Lab is a world-renowned research center subatomic particles (D. C. Read, 2016)." This center is the primary anchor institution of this innovation district. Tech Center is planned to include a vibrant, urban marketplace, walkable streets, onsite luxury housing and new public spaces (Tech Center, n.d.). The project is driven by public-private partnerships involving Tech Center developers W. M. Jordan Company, S. J. Collins Enterprises, and CRESS Ellis-Gibson with Jefferson Lab, the Virginia Tech Corporate Research Center, and the City of Newport News (D. C. Read, 2016). The spatial analysis regarding the geographical location of Tech Center in relation to the central business district (CBD) or downtown is depicted in Figure 4-13.

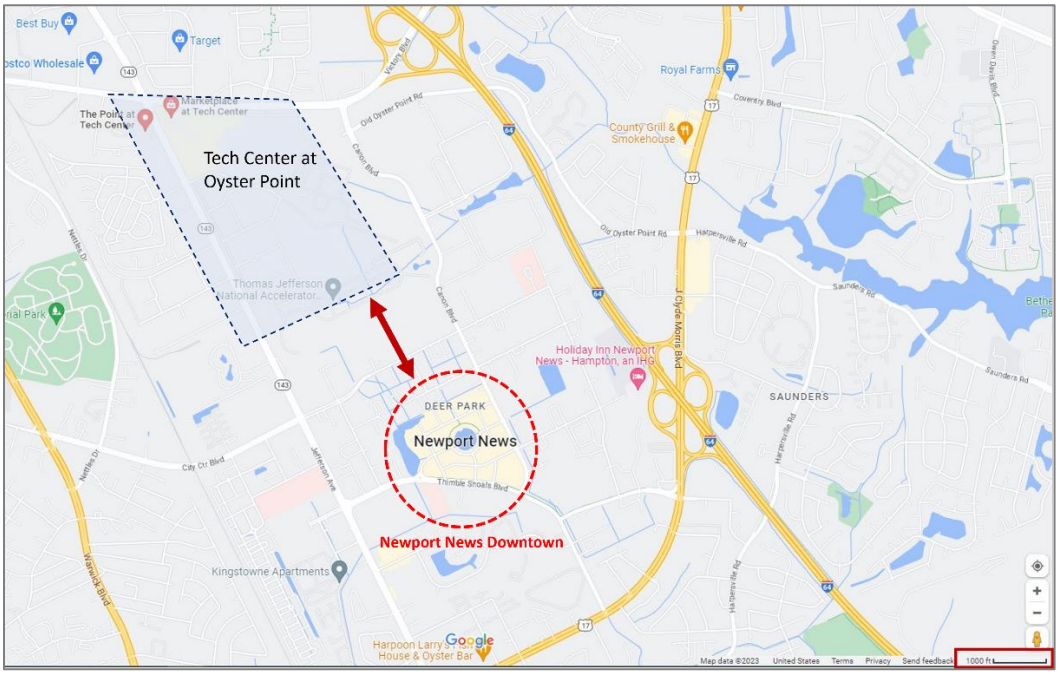


Figure 4-13. Geographical location of Tech Center in relation to Newport News CBD

4.1.14 Richardson Innovation Quarter (Richardson IQ)

The Richardson Innovation Quarter (Richardson IQ), located in Richardson, Texas, encompasses an area of 1,200 acres and is home to more than 1,000 business, including technology-related start-ups, corporate research and development, manufacturers, education institutions, nonprofit organizations, restaurants, entrepreneurs, designers, researchers, inventors, educators and students (richardsoniq.com, n.d.). The University of Texas at Dallas (UT Dallas) is the primary anchor institutions of the Richardson IQ, and it targets industries related to technology and information technology. Richardson IQ features several placed-based characteristics, such as access to transit station (Arapaho TOD), Bike-able and walkable lanes, open spaces, mixed land use, and shared workplaces for start-ups and scale-ups to collaborate . The University of Texas at Dallas (UT Dallas) is the main anchor institution, and the City of Richardson is the primary governing arm, in close collaboration with the university (UT Dallas). The spatial analysis regarding the geographical location of Richardson IQ in relation to the central business district (CBD) or downtown is depicted in Figure 4-14.

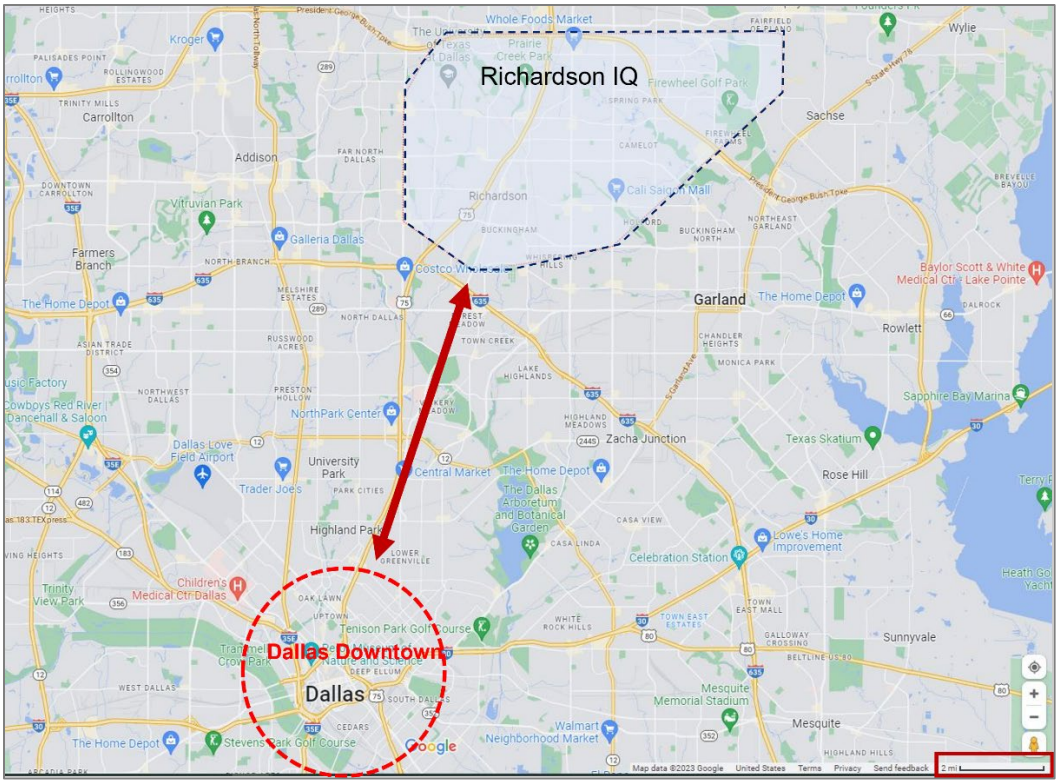


Figure 4-14. Geographical location of Richardson IQ in relation to Dallas CBD

4.2 Findings for Key Contributing Factors Shaping Innovation Districts: Evidence from 14 Case Studies in the United States

Based on the analytical framework created in the methodology section (Chapter 3, Figure 3-3) to understand the key contributing factors shaping innovation districts, the analysis of the 14 case studies of innovation districts in the U.S. leads this research to the following findings mentioned in Tables 4-1 and 4-2.

Table 4-1. Typology of ID's economic, physical, and networking assets and governance features

	Major Categories	Subcategories	Item Number
Economic Assets	• Innovation Drivers • Innovation Cultivators • Neighborhood-Building Amenities	Educational Institutions	1
		Medical Institutions	2
		Private Mega-firm/HQ	3
		Art/Civic Center	4
		Industry Cluster	5
		Mixed-use: live, work, dine, play businesses	6
		Locational Assets (Proximity to CBD)	7
		A New Multi-Purpose Innovation Hub	8
		Grassroots Efforts	9

		Regular Business Incubator/Accelerator	10
		Airport Adjacent District	11
		R&D Organization (Non-Medical)	12
Physical Assets	• Public Infrastructures • Private-led Facilities • Design Codes	Adaptive Reuse of Historic Node (old Industrial land)	1
		Transit-Oriented Development Attributes	2
		Enhanced Access via Transit Line (non-TOD)	3
		Open Space for Work & Entertainment Purposes	4
		Active Transportation Infrastructure for Internal Circulation	5
		City Branding: streetscape, signage, wayfinding	6
		Design Elements Which Inspire Technology Advancement	7
		Mixed-use: compact residential developments	8
		Educational or Cultural Community function	9
		Urban Vitality Amenities	10
		Visitor Accommodations	11
Networking Assets	• Formal Encounters • Informal Encounters	Physical Place-Making Strategies	1
		Virtual Elements	2
		Frequent Events for Informal Interactions	3
		Design-Code Elements	4
		Industry Clustering Enforcement Activities	5
Governance Structure	• Public Sector • Private Sector • Public-Private Partnership (PPP)	Federal/State/Regional Agencies	1
		Primary Anchor(s) or LLC.s or Non-profit organization(s)	2
		Combination and coalition of both private sector and public sector	3

Table 4-2. List of the identified economic, physical, and networking factor, and the governance structure of the 14 case studies of innovation districts in the U.S.

Case Studies	**Economic Assets**: Item Number*	**Physical Assets**: Item Number	**Networking Assets**: Item Number	**Governance Structure**: Item Number
Buffalo Niagara Medical Campus	1, 2, 5, 6, 7, 8	1, 5, 10	1, 3, 5	2
San Francisco Mission Bay Area	1, 2, 3, 5, 6, 7	4, 5, 8	1	2
Boston Seaport Innovation Districts	1, 4, 6, 7, 8	1, 7, 10	2, 4	3
Cortex Innovation Community	1, 2, 6, 8, 12	1, 2, 5, 6, 10	1, 3, 4	3
Atlanta Technology Square	1, 5, 12	3, 5, 9	1, 3, 4	2
San Diego I.D.E.A	1, 5, 6	4, 5	1, 4	2
Oklahoma City Innovation District	1, 2, 6, 8, 11	1, 5, 6	1,2	2
Innovate ABQ	1, 2, 7, 8,	1, 3, 4, 8	1	2
ASU SkySong Innovation Center	1, 10, 12	4, 7, 11	1, 3	3
Destination Medical Center (DMC)	2, 8, 9, 11	1, 4, 11	2, 5	2
Houston Innovation Corridor (Ion)	1, 2, 7, 10	1, 4, 9	1	2

Midtown Detroit TechTown	1, 3, 7, 9	4	1, 4	2
Tech Center at Oyster Point	1, 3, 9	2, 5, 8, 10	1, 2	3
Richardson IQ	1, 6, 8, 9	3, 8, 10	1	3

*Note: Refer to Table 2, fourth column for more explanation about "Item Number."

4.2.1 Economic Assets

Looking into the economic assets of the 14 case studies of innovation districts in the U.S., the analysis reveals that while several cases happen to have multiple anchors, the most frequent anchor institution across cases is an education institution(s), particularly universities. Universities play a significant role in enhancing economic development as they can improve and cultivate innovation and innovative actors. Proximity to universities provides convenient access to university resources, which includes both intellectual assets (e.g., students, instructors, and researchers) and physical facilities (e.g., research labs) for innovation, as well as the amenities to attract both students and investors. Hence, there exist many cases that incentivize and attract universities by providing space for them and/or involving them in programming and planning phases (e.g., Richardson IQ). In most cases, innovation districts do not target a specific industry type or size and a variety of industries are planned to be housed within the innovation districts. The diversity of industry types and sizes could enhance the economic sustainability of an innovation district. Therefore, in several cases, the initial programing tends to encourage and house startups, entrants and entrepreneurial activities of firms and establishments. While diversity of targeted industries is a frequent attribute between the cases, early physical presence of hospitals, medical campuses or universities highly affect the type of the innovation district (e.g., BNMC and DMC branded as medical innovation districts). Furthermore, the innovators are recognized in a variety of scales such as "grassroots innovation" and "institutional innovation."

4.2.2 Physical Assets

Regarding the physical assets of innovation districts, the empirical analyses show that it has been a common strategy in several cases to reuse and renovate obsolete and abandoned buildings to create new anchors for the district (e.g., Houston Ion). On the other hand, several cases drew upon innovative façades, buildings, urban elements, infrastructures, and urban furniture to showcase and inspire the technological advancements and inspire innovativeness (e.g., SkySong). Additionally, using design strategies is another influential strategy to enhance innovation districts place quality and attractiveness. Some of the most noticeable design strategies in the evaluated case are: enhancing internal mobility via active transportation infrastructures (walkability and bike-ability), providing access to transit network, increasing density in design and construction, creating and promoting co-working spaces for startups and entrepreneurial activities, improving outdoor infrastructures and creating open spaces, improving district's edges, gateways and beautification of districts, removing any physical barriers that separate the districts from its surrounding and reduce the visibility of the districts. In addition, innovation districts tend to enhance diversity in land use by providing amenities such as green spaces, public spaces and parks, restaurants, retail and shopping centers, athlete fields, hotels, and residential elements.

4.2.3 Networking Assets

Innovation will not spillover and will not be communal without the networking assets in place (Katz & Wagner, 2014a). Therefore, creating spaces that increase networking, communication, and collaboration between the actors of the innovation districts is a common strategy between the case studies. Accordingly, physical-place-making strategies such as construction of multi floor/purpose buildings designated for co-working spaces, rental chambers for the startups, libraries, and convention or conference centers are among the most influential networking assets within innovation districts. Additionally, virtual elements, such as strong online presence, the use

of multimedia devices in the public areas, and social media presence are among the impactful features to enhance collaboration in innovation districts.

4.2.4 Governance Structure Typology

Innovations districts benefit from having a governance structure, which manages and controls several policies and financial issues in relation to the entire district. While in some cases this governing arm is created as a new organization, in some other cases it is an existing one that is repurposed. Although in some cases the local federal entities, such as cities, are governing the innovation district in collaboration with private sector organizations/firms, in many other cases the primary anchor(s) and/or the non-profit organizations take the control of such districts. Hospitals, universities, medical campuses, or private headquarters are some examples of these primary anchors. The analyses (depicted in Table 4-3) show that while public-private funding and collaboration is the governance structure for four cases of innovation districts, five of the cases studies are governed by non-profit organizations and the remaining five IDs are governed by their primary anchor institutions. The public-private partnership involves corporations, universities, hospitals, civic groups, and other stakeholders under the leadership of a dedicated institution. Besides, it is shown to be critical for the governing arm to be formed at an early stage of the planning process to place policies and secure sufficient financial resources in advance.

Table 4-3. Summary of the government structure typology for the 14 cases of IDs in the US

Innovation District (Case studies)	Government Structure Typology	Item Number**
Buffalo Niagara Medical Campus (BNMC)	Non-profit Organization (Name: BNMC Inc.)	2
San Francisco Mission Bay Area	Primary anchor (Name: UCSF Medical Center)	2
Boston Seaport Innovation Districts (BSID)	PPP (Public Sector: City of Boston Private Sector: Boston Global Investors)	3
Cortex Innovation Community	Non-profit Organization (Name: Cortex Innovation Community)	2
Atlanta Technology Square	Primary Anchor (Name: Georgia Tech University)	2

San Diego Innovation+Design+Education+Arts (I.D.E.A)	Private Firm (Name: I.D.E.A. Partners)	2
Oklahoma City Innovation District	Primary anchor (Name: Oklahoma Health Center Foundation)	2
Innovate ABQ	Non-profit Organization (Name: Innovate ABQ Inc.)	2
ASU SkySong Innovation Center	PPP (Public Sector: City of Scottsdale Private Sector: private real estate firms Holualoa Companies and Plaza Companies And nonprofit ASU Foundation)	3
Destination Medical Center (DMC)	Non-profit Organizations (Name: DMC Corporation (DMCC) and DMC Economic Development Agency)	2
Houston Innovation Corridor (ion)	Private organization (Name: Rice University)	2
Midtown Detroit TechTown District	Non-profit Organization (Name: Midtown Detroit Inc.)	2
Tech Center at Oyster Point	PPP (Public sector: City of Newport News Private sector: W. M. Jordan Company, S. J. Collins Enterprises, CRESS Ellis-Gibson, Jefferson Lab, and the Virginia Tech Corporate Research Center)	3
Richardson Innovation Quarter (Richardson IQ)	PPP (Public sector: City of Richardson Private sector: UT-Dallas)	3

*Note: PPP: Public-Private Partnership
**Note: See Table 3, column four to see the features each asset number designates.

4.2.5 Geographic Location Typology

In the final round of analysis, I evaluated the typology of IDs in terms of geographic location within metropolitan areas. The results (Table 4-4), show that except for one innovation district (ASU SkySong Innovation Center), all the other 13 cases of IDs are located within urban areas. While some of the cases are located within the Central Business District (CBD) and some are in close proximity to the downtown area, some others are a bit farther from CBD. However, the ID cases in the second group still lie in urban areas. These results are in accordance with what the literature discusses regarding the geographical typology of IDs and the fact that unlike previous models (industrial districts, science parks, and research parks), innovation district develop in the central parts of cities.

Table 4-4. Summary of the geographical location typology for the 14 cases of IDs in the US

Innovation District (Case studies)	Geographic Location Typology	Location in relation to the Downtown/CBD*
Buffalo Niagara Medical Campus (BNMC)	Urban Area	C
San Francisco Mission Bay Area	Urban Area	C
Boston Seaport Innovation Districts (BSID)	Urban Area	B
Cortex Innovation Community	Urban Area	D
Atlanta Technology Square	Urban Area	D
San Diego Innovation+Design+Education+Arts (I.D.E.A)	Urban Area	A
Oklahoma City Innovation District	Urban Area	B
Innovate ABQ	Urban Area	B
ASU SkySong Innovation Center	Outer edge of the city (Suburb)	E
Destination Medical Center (DMC)	Urban Area	A
Houston Innovation Corridor (ion)	Urban Area	A
Midtown Detroit TechTown District	Urban Area	D
Tech Center at Oyster Point	Urban Area	C
Richardson Innovation Quarter (Richardson IQ)	Urban Area	D

*Note: IDs location in relation to the downtown area is categorized in 5 groups:

- A: Lie within downtown area
- B: Adjacent to downtown area
- C: In close proximity to downtown area
- D: Far from downtown, still in urban area
- E: Far from Downtown, in the Suburban area

4.3 Empirical Analysis of Community Engagement and Civic Inclusion in Developing Innovation Districts: A Case Study of Fort Worth Medical Innovation District in Texas, U.S. (RQ2)

In this section, I conducted a series of content analysis and narrative analysis of a specific case study (Fort Worth Medical Innovation District) to understand the role of residents' in developing a medical innovation district and their perception of this new type of economic development. This section of analysis aims to address the second research question of "What are the impacts of innovation districts on civic inclusion and social equity? And how and to what extent is the community engaged in different stages, from developing the idea to operating the innovation districts?" Data was collected from three primary sources, including City Council Meeting Minutes, technical reports, and major media outlets (magazine articles and newsletters). The

analysis and finding to address the second research question are described in the following sections. The data analysis procedure is shown in Table 4-5.

Table 4-5. Data Analysis Procedure (Content analysis and narrative analysis)

Topic Searched	Source Citation	Major Finding related to Stakeholder Engagement
Fort Worth Medical Innovation District	Dallas Regional Chamber. (2018b). Dallas-Fort Worth regional Innovation Study (p. 16). https://www.dallaschamber.org/wp-content/uploads/2019/01/DallasInnovationStudy_2018.pdf	This document, which is in a presentation format, provides information about the potentials of DFW and the economic benefits of innovation opportunities in DFW: "The Dallas-Fort Worth (DFW) region is an exhilarating melting pot of successful cross-industry businesses, eclectic cultures, diverse talent, significant wealth and a booming arts & philanthropic scene." When identifying gaps and opportunities (page 6) the document mentions that they interviewed 50 stakeholders, including: corporate executives, civic leaders, local academics, social movers (non-profit leaders), startup community. As we can see, the local residents were not included in the interviews. Again, when talking about conducted focus groups, local residents are not among the people included in this project.
Fort Worth Medical Innovation District	Dallas Regional Chamber. (2018a). Dallas- Fort Worth Regional Innovation Assessment (p. 37). https://www.dallaschamber.org/wp-content/uploads/2019/01/dallas-assessment_Final_low.pdf	No part/section of this document mentions the role of local residents, perceptions, or anything related to them in relation to DFW innovation ecosystem. First, the document mentions that the population is a potential source to develop the innovation; however, it indicates "More people won't necessarily translate to greater innovation." It adds that for being innovative, a region needs to attract talent that can support Innovation Economy. But again, there is no mention of engagement of local residents.
Looking for any data related to FW Medical innovation district (FWMID), and any hearings from citizens	It was not paper! I studied all city council minute meeting available online between 08/06/2019-12/01/2020. **A total number of 41 documents.** The meeting before 08/06/2019 were not available- Also, between 8/6/2019 to 12/1/2020, the following City Council Meeting- Minutes were not available online: 3/17/2020 – 3/24/2020 – 3/27/2020 – 4/21/2020 – 5/19/2020 – 6/19/2020 – 8/31/2020 – 12/1/2020.	All the documents include the city council meeting agenda and topics covered in the meeting, such as purchase of equipment, land, planning & zoning, award of contract, upcoming & recent event, budget, report of the city manager, report of the city staff, no citizen presentation, is evident in council action, public hearings, or zoning hearings. I looked for any data related to FW Medical innovation district (FWMID), and any hearings f citizens, and none were found. (I scanned the meeting PDF file and also searched for the key words, such as innovation, medical, Iter8, Near Southside, people, residents, local, and affordability, and did not find any relevant data related to my study.)

Fort Worth Medical Innovation District	Maddox, W. (2019, May 24). What is Fort Worth's Medical Innovation District? D Magazine. https://www.dmagazine.com/healthcare-business/2019/05/fort-worths-medical-innovation-district-will-arrive-this-fall/	Looking for data related to local residents' perceptions and acceptance (their opinion) of the FWMID; however, this document just included information about the aims of the MID, which are more focused on financially helping the area. FW-MID: 1,200 acres, south of downtown FW – located in the area called Near Southside (NSS). FWMID aims to attract "healthcare business and serving as an innovation partner with the soon to open TCU and UNTHSC Medical School." Also, "The hope is for innovative healthcare businesses to collaborate with more established entities, which already employ 30,000 people in the healthcare industry in the area." NSS is home to several important and big medical centers including Cook Children's Healthcare System, Texas Heath Harris Methodist, Baylor Scott & White, and Medical City Fort Worth.
Fort Worth Medical Innovation District	Murray, L. (2019, May 22). Medical Innovation District: Fort Worth Targets Near Southside for New Hub » Dallas Innovates. Dallas Innovates. https://dallasinnovates.com/medical-innovation-district-fort-worth-targets-near-southside-for-new-hub/	In this document, I looked for information and data related to local residents' opinion about the FWMID. Like the other documents, this one also indicates the economic benefits of the MID and how it aims to attract new talented workforce and become a medical hub! The only noticeable information in this document is the indication of the work done by UTA's Center for Transportation Equity, Decisions, and Dollars (CTEDD) as a report to study the district's needs and strengths. It mentions that the stakeholders' input was collected for this report. But it does not mention who are these stakeholders and from which groups and by what criteria are they selected!
Fort Worth Medical Innovation District	Hamidi, S., Zandiatashbar, A., & Mozaffarian, L. (2019). Future @ Fort Worth: Capacity Analysis, Success Factors, and Growth Vision for the Fort Worth Medical Innovation District (FW-MID). https://ctedd.uta.edu/research-projects/future-fort-worth-capacity-analysis-success-factors-and-growth-vision-for-the-fort-worth-medical-innovation-district-fw-mid/	For this document I referred to the chapter which had collected input from community members and stakeholders. I wanted to see what type of community members are included and what their opinions are regarding the development of the FWMID. This chapter indicates that a group of stakeholders and core team identified the key factors in relation to FWMID and this report code and categorized them into 4 groups: Strengths, Weaknesses, Opportunities, Threats (SWOT). In this document I was looking for information related to engaging the local residents and small local business owners as stakeholders in order to collect their input. These two groups were not included nor in the Core Team, neither in the stakeholder group. All data collected from the survey and input from Core Team is related to business, culture of collaboration between businesses (hospitals, research centers, ...), lack of bio-tech resources, lack of funding and mentorship, lab space, etc., and lack of physical space for more medical business-related activities.

Fort Worth Medical Innovation District	Mauch, R. (2019, May 15). Council Report: Medical Innovation District can fuel citywide growth. Fort Worth Business Press. https://fortworthbusiness.com/health-care/council-report-medical-innovation-district-can-fuel-citywide-growth/	This document talks about what was indicated in the City Council work session on May 14, 2019, in relation to planning and developing the FWMID. I was curious to see if in this session the city officials or the mayor had considered the local residents and small business owners, how and to what extent they might get affected by this development, and the social impacts of the MID; however, I did not find any related information. The document again emphasizes the economic benefits of the MID for the city and the potentials that FW must become the place for this development. (For example, in one part it considers the reasons that NSS is the best location for MID: "In stressing the advantages of Near Southside, officials noted: *An eclectic blend of the medical, industrial and creative economies, calling it one of the most interesting they've seen in the United States. It is all situated within a community that is seeing the growth of purposefully driven mixed-use development. (Does not mention residential areas)
Fort Worth Medical Innovation District	Ranker, L. (2019). More than nightlife: How Near Southside could be DFW's health-care hub. Star-Telegram. https://www.star-telegram.com/news/local/article230379739.html	I was looking to see if any public engagement (Local residents) has been considered while making decisions in the first stages of developing the idea of the FWMID! Like other documents, this one, also, focuses on the economic benefits of the MID and the ways that it is going to add to jobs, in particular high-paid jobs. "This development is to foster collaboration between hospitals and corporations related to life science and biotechnology (specific jobs and high-paid jobs)." New apartments are going to be built in the area by NSS Inc. When talking about the small business in the area, again Mike Brennan, focuses on the new and small business related to technology.
Fort Worth Medical Innovation District	Nishimura, S. (2018, May 2). Shiny New Toy. Fort Worth Magazine. https://fwtx.com/api/content/0c133fd8-dba9-56b3-b7d0-fdfb072b4c38/	Looking for any evidence or information regarding the local resident's perception of the MID or their engagement when developing the idea, and I found nothing in this document. Like other documents, this one also, focuses on the economic benefits of developing a MID in the area by attracting more talented workforce and providing high-paying jobs. It is mentioned that the MID "help the city draw the kinds of high-paying jobs and creative talents it craves." According to Mike Brennan, "the final product helping small companies find real estate within the district."

Fort Worth Medical Innovation District	Katz, B., & Kent, F. (2016, March 16). Innovation districts, Texas-style. Brookings. https://www.brookings.edu/blog/metropolitan-revolution/2016/03/16/innovation-districts-texas-style/	This document contains information regarding the analysis that Brookings (Katz and Kent) had done about the Near Southside area and the potential of this area to become an innovation district: "There, we witnessed an eclectic blend of the medical, industrial, and creative economies—one of the most interesting we've seen in the US. " They believe that "This is a true medical district which has substantial growth possibilities" Also, it has mentioned that "In addition to private development, the neighborhood benefits from a TIF district (administered by NSI) that has obligated $53.6 million in funding of public improvements since its inception in 1997." It has been mentioned that this money has been intended to be used for public improvements, and now it seems that the development of the MID is going to be where the money is going So, the question here is that: Is it truly public improvement and does it public (local residents of the area? If yes how?

4.3.1 City Council Meeting Minutes

As mentioned, to understand the local residents' perception of FW-MID and to see their engagement level while making decisions about developing and operating the FW-MID, this study first looked at the Fort Worth city council minute meetings' documents. The study evaluated 41 city council meeting documents seeking information related to FW Medical Innovation District, any consideration from the city manager, mayor, other city officials, and any hearings from citizens regarding the FW-MID. Among the 41 documents analyzed (line-by-line), the study found no evidence and no related information regarding the consideration of local residents regarding the FW-MID. However, out of 41, only four documents briefly mentioned some specific issues related to the Medical District and/or the Near Southside area.

Accordingly, the following statement was found in the city council minute meeting document held on 11/05/2019, which states: "Adopt Ordinance Vacating a Portion of an Alley in Block 10, Southland Subdivision of Block 10, Fields Welch Addition between West Terrell Avenue and West Pulaski Street to be Replaced with the Adjoining Property for a Parking Garage for Cook

Children's Medical Center (COUNCIL DISTRICT 9)." This statement clearly indicates to provide more land for a for a Parking Garage for Cook Children's Medical Center. In another document dated on 12/03/2019, one statement indicates to "Adopt a Resolution Authorizing the Execution of Amendment No. 1 to City Secretary No. 45858, the Funding Agreement with Fort Worth South, Inc. in the Amount of $3,000,000.00 for the Near Southside Medical District Street Repair." This part of data also shows that the city is allocating funds for street repair in the medical district. Moreover, in another document dated on 05/05/2020, a statement indicates "A Resolution to Authorize Text Amendments to the Near Southside Development Standards and Guidelines and Initiation of Rezoning for Certain Properties in the Hemphill Street Corridor in Accordance with the Comprehensive Plan." This statement also shows that the city allows rezoning for certain properties in the Near Southside area. Finally, in the fourth document a statement indicates that "Planned Development for all uses in "NS-T4" Near Southside General Urban Zone with waivers from development regulations for height, individual unit ground level entrances and parking space count." This statement also shows that the city lifted some limitations and eased up on some regulations for the Near Southside area, which is the area allocated for the Medical Innovation District.

4.3.2 Major Media Outlets (magazine articles and newsletters)

The findings from five different magazine articles and newsletters reveal that none of these documents included any information or evidence of considering the residents of the FW-MID, their perception of the FW-MID, their engagement level while developing the FW-MID, and their understanding of the impacts of MID on their life. The first document titled "What is Fort Worth's Medical Innovation District?" from D-Magazine published in May 2019, includes information regarding the aims and purposes of the FW-MID as it mentions that FW-MID aims to attract "healthcare business and serving as an innovation partner with the soon to open TCU and

UNTHSC Medical School (Maddox, 2019).” Also, it mentions that “The hope is for innovative healthcare businesses to collaborate with more established entities, which already employ 30,000 people in the healthcare industry in the area (Maddox, 2019)."

In the second document titled “Medical Innovation District: Fort Worth Targets Near Southside for New Hub” published by Dallas Innovates in May 2019, the author mentions that the MID “would have the potential of adding thousands of medical and technology-related jobs, and it is a creation of a first-of-its-kind regional medical innovation district, which will attract new medical-related enterprises to the city (Murray, 2019)." This document also quotes Robert Sturns, economic development director for the City of Fort Worth, as he indicates that "the vision was to compete successfully on the national and international stage for creative, high-growth businesses and the talented individuals who fuel them (Murray, 2019)."

The third document titled “Council Report: Medical Innovation District can fuel citywide growth” published by Fort Worth Business Press in May 2019, reveals information about the city council meeting held on May 14, 2019 (this city council meeting was not available) and what was covered in this meeting regarding the medical innovation district. All discussed in this council meeting, according to this document, is about the economic benefits of the MID and the steps for developing a prosperous innovation district, including “build a collaborative leadership network, set a vision for growth, pursue talent and technology, promote inclusive growth, and enhance access to capital (Mauch, 2019)." This document also quotes Brenda Hicks-Sorensen, Assistant Director of Economic Development, as she said: “The Near Southside is a tax increment financing district which has already leveraged over $100 million in private development since its inception (Mauch, 2019).”

The fourth document is titled "More than nightlife: How Near Southside could be DFW's health-care hub" and was published by Fort Worth Star-Telegram in 2019. Like the other ones, this document focuses on the MID's economic benefits and the increase in the number of jobs that it will cause. The document indicates that "FW-MID draws nearly 40,000 to work in the hospitals, clinics and treatment centers of the Near Southside, which is the largest concentration of medical jobs in DFW," and therefore, "it cultivates thousands of medical, tech and health care jobs (Ranker, 2019).” In another part, the author mentions that "the result would be a concentration of high-paying jobs that would bolster Fort Worth's economy (Ranker, 2019).” This document also quotes Mike Brennan, president of NSS Inc., as he mentioned that "the Near Southside Inc. is planning in promoting development in the area, estimating about 3,000 apartments will be available based on recently completed projects and those in the works (Ranker, 2019).” Brennan also indicates that "If our intention is to attract thousands of residents, we need to take steps to ensure the housing responds to all socio-economic backgrounds, so we have fair housing for everybody (Ranker, 2019)." This quote is the only consideration towards the residents and the housing issues in this area, while the document mostly focuses on FW-MID's economic benefits. However, the document does not reveal further information about the apartments' price ranges (rent/lease).

The last document is titled "Shiny New Toy" and was published by Fort Worth Magazine in May 2018. This document also pays a great deal of attention to the economic benefits of FW-MID when it mentions that "MID will help the city draw the kinds of high-paying jobs and creative talents that it craves (Nishimura, 2018)." The document also quotes Mike Brennan as he says: "the final product will help small companies find real estate within the district (Nishimura, 2018)."

4.3.3 Technical Reports

The findings from four professional reports show that there was little attention towards the local residents' engagement when developing the FW-MID, and mostly these documents focus on the economic benefits and the potentials of the area in terms of being a thriving innovation district. The first retrieved document is a report by Brookings Institute in 2016 over a visit to Fort Worth and the Near Southside area to analyze this area's potential to become an innovation district. The authors of this report said: "We have witnessed an eclectic blend of the medical, industrial and creative economies—one of the most interesting we have seen in the US, and we believe that this is a true medical district which has substantial growth possibilities (Katz & Kent, 2016)."

The second document is the professional report prepared by UTA-CTEDD researcher team to study the district's needs and strengths and provide a strategic plan for FW-MID development. This document is titled "Future @ Fort Worth: Capacity Analysis, Success Factors, and Growth Vision for the Fort Worth Medical Innovation District (FW-MID)" and was prepared by the Center for Transportation, Equity, Decisions, and Dollars (CTEDD) in 2019. In this document, one chapter focuses on collecting input from stakeholders and the community. According to this document, the stakeholder and the community who were involved in the decision-making meetings (mentioned as Core Team) and are surveyed (mentioned as stakeholders) are mostly the business owners, developers, and directors of big corporations/hospitals (Hamidi et al., 2019, p. 5). Thus, the residents of the area were not included in the meetings and the survey.

The third and the fourth report are published by the Dallas Regional Chamber. These documents titled "Dallas- Fort Worth Regional Innovation Study 2018" and "Dallas- Fort Worth Regional Innovation Assessment 2018" were published in 2018. These documents provide information about the potentials of DFW and the economic benefits of innovation opportunities in DFW. As

mentioned by these documents, they "interviewed 50 stakeholders, including corporate executives, civic leaders, local academics, social movers (non-profit leaders), startup community to identify the gaps and opportunities in the DFW (Dallas Regional Chamber, 2018b)." The report also indicates that "for being innovative, a region needs to attract talent that can support Innovation Economy (Dallas Regional Chamber, 2018a)." Thus, these two reports' attention is also on the economic benefits, attracting talented workforce, and only engaging the business owners and developers while making decisions about developing an innovation district.

4.4. Findings for Community Engagement and Civic Inclusion in Developing Innovation Districts: A Case Study of Fort Worth Medical Innovation District in Texas

While the economic benefits of innovation districts have been discussed broadly in the literature, the negative externalities of innovation districts that will affect the residents, such as economic/social inequalities, gentrification, displacement, and exclusion, are not highly considered. On the other hand, policymakers, developers, business owners, and city officials are interested in developing innovation districts to promote cities' economic conditions. That is the main reason that concepts such as innovation districts are highly supported and incentivized by city, state, or even federal authorities. While the developers, business owners, and city officials will be receiving the least impact from the new development in the urban areas, they are the most potent group for decision-making and operating an innovation district. On the other hand, the local residents will be significantly influenced by the new development; however, they have the least amount of power when new developments are added to their urban areas. It is significant to know the local residents' perception of the innovation district developed and operated in the urban area they live in, the extent of residents' engagement when developing innovation districts from the decision-making stage to the operating stage, and the amount of attention to residents' needs and opinions when cities are developing the innovation districts.

According to the demographics data acquired from US Census Bureau, Fort Worth has a population of 956,709 as of July 2022 and is the 13th largest city in the U.S. by population. Data shows that "Of all cities over 50,000 people, Fort Worth had the largest gain in population in the past year, adding 19,170 people (approximately 53 people per day)[7]." Fort Worth's racial and ethnic makeup is reported as: White Alone: (Non-Hispanic): 37%- Black (Non-Hispanic): 19%- Hispanic (All Races): 35%- Asian Alone: 5%- Other: 4%[8]. The Median Household Income in FW is $69,972, which is very close to Texas's ($67,321) and lower than the national average ($69,021)[9]. The following map of Fort Worth employment density (current) shows that the Near Southside area has a medium to high density of employment. The Map of the employment density for 2045 indicates that the employment density in the Near Southside area will be increased, which can become a concern regarding the local residents and how they will be affected (Figure 4-15).

[7] https://www.fortworthtexas.gov/about/population
[8] US Census Bureau ACS 1-year 2021
[9] US Census Bureau ACS 5-year 2017-2021

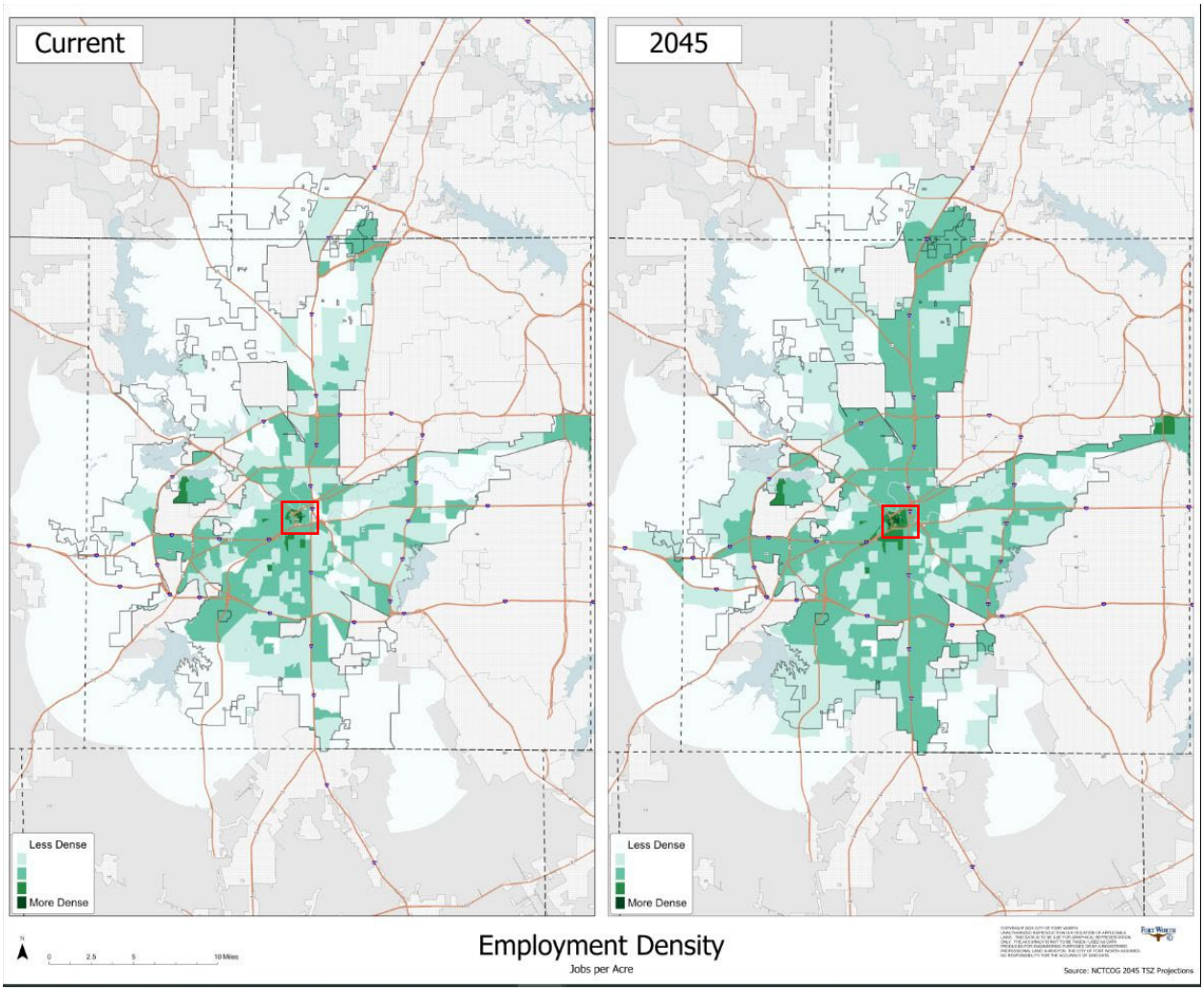


Figure 4-15. The Employment Density in Fort Worth and Near Southside (showed in red rectangular) [10]

Furthermore, the following map (Figure 4-16) shows that the population density in the Near Southside (NSS) area where FW-MID is located is low to average. The population density in the South-west and East part of the NNS area is lower, which indicates the presence of single-family housing in these parts. In addition, the map showed in Figure 4-17 illustrates that the low-income population residing in the NNS are above the regional average and also the minority population residing in the area are above the regional average.

[10] Source: https://www.fortworthtexas.gov/files/assets/public/planning-data-analytics/documents/comprehensive-planning/data-mapping/employment_density.png

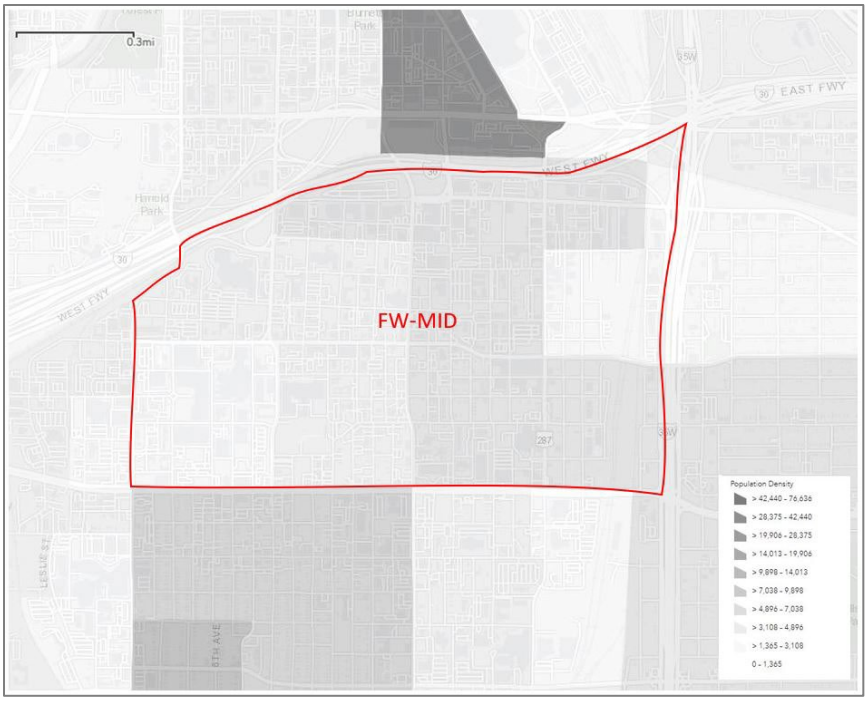


Figure 4-16. The Population Density in Near Southside [11]

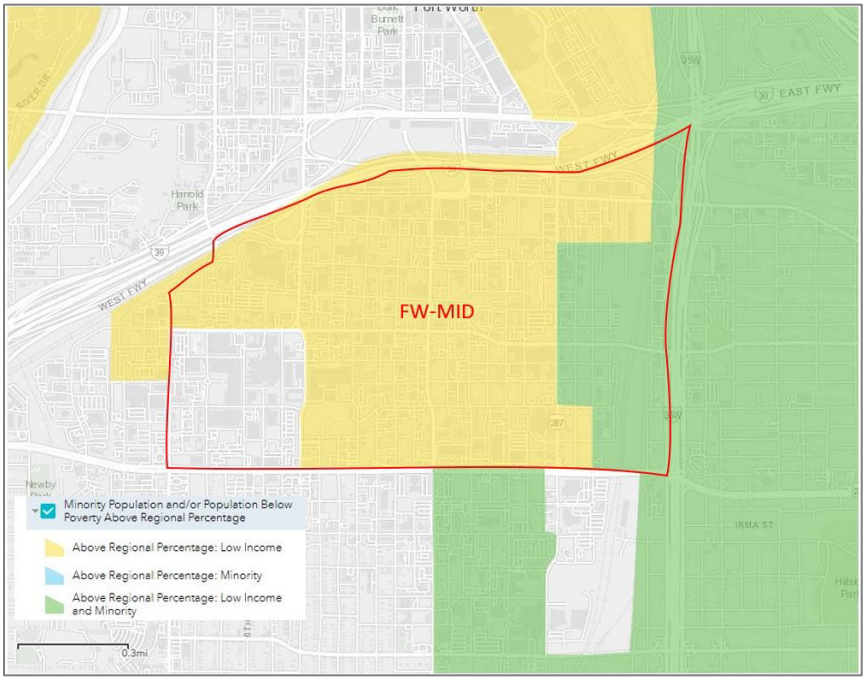


Figure 4-17. Minority Population and low-income population in Near Southside [12]

[11]Source:https://nctcoggis.maps.arcgis.com/apps/webappviewer/index.html?id=662cdb8023e2469387ea33c3c68bed41

[12]Source:https://nctcoggis.maps.arcgis.com/apps/webappviewer/index.html?id=662cdb8023e2469387ea33c3c68bed41

This study explains that while a large portion of the Near Southside area, where the Fort Worth Medical Innovation District (FW-MID) is located, belongs to residential use, including both low-density and high-density housing (Figure 4-18), there has been little attention to residents' needs, opinions, and perception about the FW-MID and its impacts on their life.



Figure 4-18. The distribution of different land uses in the Near Southside area

According to the data collected from different sources, the FW-MID will add to the number of jobs and specifically the high-paying jobs in the medical sector. The FW_MID will also attract highly educated people to the area expected in resulting in land/property value increase, rent/lease prices increase, and more demand for parking spaces. These are among the most critical impacts on local residents' life that are not considered in the documents analyzed by this study.

As mentioned, this study employs document analysis and narrative analysis as the primary method to analyze the data collected via document review and document retrieval method. The analysis of the data collected from the city council minute meeting's documents shows that among the 41 documents, neither of them has directly considered the impacts of the FW-MID on residents of the Near Southside area. There was no hearing from the residents considering this issue and no notion from the mayor, city manager, city council members, and other city officials. The only consideration towards the medical district and Near Southside are mentioned in these documents was concerning more parking areas/lots for a medical center, more funding for NSS to repair streets, and easing up on zoning limitations and other limitations in NSS to develop the FW-MID.

Furthermore, the five magazine articles and newsletters' analysis reveal that none of these documents had considered the residents' role and their inclusion when the innovation district concept was introduced and developed. All five documents consist of information regarding the economic benefits of the medical innovation district, such as the potential of adding thousands of medical and technology-related jobs (Murray, 2019; Ranker, 2019), opportunities for innovative healthcare businesses to collaborate with more established entities (Maddox, 2019), become the most livable medical district in the US (Murray, 2019; Ranker, 2019), the concentration of high-paying jobs that will bolster FW's economy (Nishimura, 2018; Ranker, 2019), and helping the companies find real estate within the district (Nishimura, 2018). These documents have quoted

several people, such as Robert Sturns (economic development director for the City of Fort Worth), Mike Brennan (president of the Near Southside Inc.), Brenda Hicks-Sorensen (Assistant Director of Economic Development for the city of Fort Worth), and Stuart Flynn (TCU-UNTHSC School of Medicine Dean) all concerned about the economic benefits of the FW-MID. However, there is no evidence that the authorities responsible for residents-related issues, such as housing, are involved in the decision-making process.

The analysis from four professional reports reveals that when evaluating the area in terms of potentials and gaps and during the decision-making process on developing the medical innovation district, the community that has been included as stakeholder is usually a group of business owners, developers, directors, hospital managers, corporate executives, non-profit leaders, and local academics (Dallas Regional Chamber, 2018b; Hamidi et al., 2019). Therefore, the findings suggest that regarding the engagement of the community members in the planning process of the FW-MID, while residents and community-based organizations were engaged and vocal, there is not enough evidence to show that their voices were included and therefore, the impacts of FW-MID on residents' life has been thoroughly considered. . Moreover, these four documents' primary focus is on evaluating the area in terms of potentials and gaps for developing a thriving innovation district, and issues such as impacts on residents' life have not been considered in these documents.

The analysis of the data collected for this study reveals that despite the extreme impacts that the FW-MID may have on residents of the district and considering that a large part of the district being recognized as residential land-use, there is little attention to local residents, their needs and their opinions regarding the development of the MID. While people residing in the area are the most influenced group by MID, they have the least amount of influence in the decision-making process to impact the decisions made for their living area. According to the collected data and the analysis,

the MID's economic benefits are the only and highly considered issue by the city officials, policymakers, and developers. Hence, the area residents have been excluded when developing the MID from the decision-making phase to the operating phase. The findings also reveal that there has been a missing link between social impact assessment to understand the impacts of the FW-MID on the local communities and the planning process.

4.5 Content Analysis of the Impacts of Placelessness and Remote Working on Future Planning for Innovation Districts (RQ3)

Urban areas that foster economic growth through innovation are receiving more attention lately. Consequently, "Innovation Districts" as place-based strategies for economic development, have become a crucial intervention in urban planning and land-use policy. The literature highlights the typology of innovation districts and the built environment attributes that shape them (Esmaeilpoorarabi et al., 2018; Katz & Wagner, 2014a; Morisson, 2020; Yigitcanlar et al., 2020). However, there needs to be more understanding of the role of the built environment amid growing remote working. Thus, this section of my research conducts a series of content analysis and presents findings through a systematic review of the scholarly texts to investigate how the future planning for innovation districts will be influenced and how it can tackle the challenge of rising placelessness resulted from remote working. This section of my analysis aims to address the research question of "What are the policy solution and recommendations for the future of place-based economic development planning supporting equitable and inclusive innovation districts amid rising placelessness and remote working?"

Systematic reviews of the scholarly texts are becoming increasingly common in social science and are becoming tremendously useful to not only planning scholars, but also planning practitioners and policymakers. They help to combine cross-referencing between scholarly texts (e.g., journal

articles, technical reports, and book chapters) and researchers, practitioners, and policymakers, through a comprehensive and systematic search of the research databases and applying inclusion/exclusion criteria to ensure that their research is both theoretically sound and methodologically rigorous. This provides scholars and practitioners with a reliable basis to formulate decisions and act accordingly. The following sections present my analysis and findings based on a systematic review of the existing literature to understand the Impacts of Placelessness and Remote Working on Future Planning for Innovation Districts.

4.5.1 General Classifications

The search results show that the topic of innovation districts (IDs) and the built environment attributes associated with developing IDs has got more popularity during the last decade. Among the 76 selected literature for this topic, 51 (nearly 67%) of them have been published after 2011. Accordingly, out of 30 reviewed literatures for this topic, 22 (nearly 73%) of them have been published 2011 onwards. These analyses are even more specific for the topic of "remote working" and "teleworking" and "their impacts on urban planning and built environment attributes." The analysis of the publication year shows that "remote working" and "teleworking" are among the topics that have become increasingly popular in the last decade. Accordingly, 92% and 79% of the reviewed publications in our dataset are published after 2011 for the keywords of "remote working" and "telework" respectively. However, the COVID-19 pandemic restrictions and the quick switch to remote working can be explained as the most important reason for this jump in publishing regarding remote working. Figure 4-19 and Table 4-6 summarize the analysis based on the year of the publication.

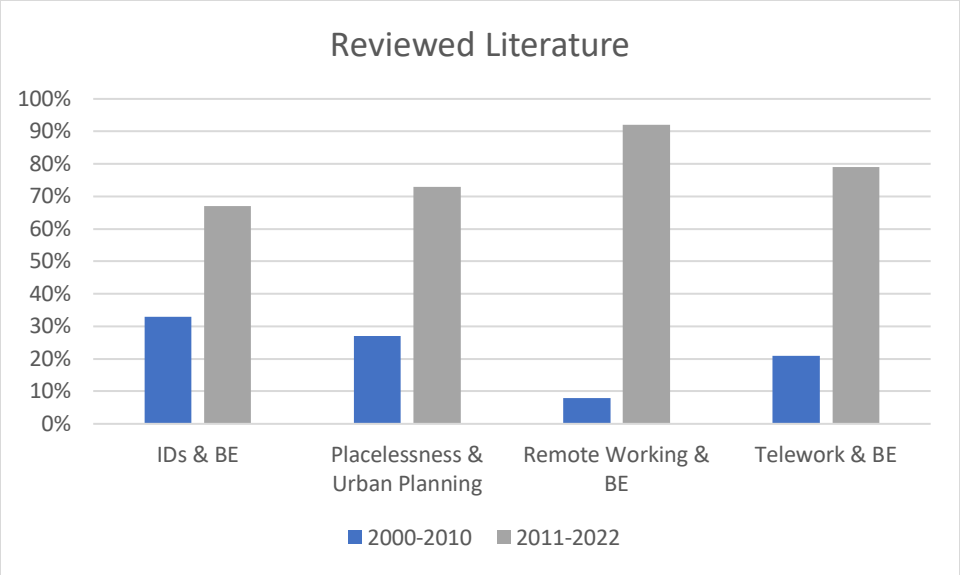


Figure 4-19. Publication year of the reviewed literature for the four keywords associated with Placelessness, Remote Working, and Innovation Districts

Table 4-6. Number of reviewed publication based on the study scope/established keywords during 2000-2022

Year	Number of Literature (ID & BE)	In 5 years	Number of Literature (Placeless-ness)	In 5 years	Number of Literature (Remote Working)	In 5 years	Number of Literature (Telework)	In 5 years
2000	2		3		0		0	
2001	2		0		0		0	
2002	2		1		1		0	
2003	1		0		1		0	
2004	1	8	1	5	0	2	0	0
2005	2		0		1		0	
2006	1		0		1		0	
2007	4		1		0		2	
2008	5		2		0		0	
2009	1	13	0	3	0	2	1	3
2010	4		0		0		1	
2011	1		1		0		0	
2012	0		1		0		0	
2013	2		1		1		1	
2014	3	10	0	3	0	1	1	3
2015	9		0		2		0	
2016	3		14		0		1	
2017	7		0		1		1	

2018	10		1		0		0	
2019	4	33	0	15	2	5	3	5
2020	5		2		6		2	
2021	5		1		24		4	
2022	2	12	1	4	16	46	2	8
Total Number	**76**		**30**		**56**		**19**	

Furthermore, the following table (Table 4-7) lists the types of the reviewed publications for each of the four keywords. This reveals that to address the third research question of "What are the policy solution and recommendations for the future of place-based economic development planning supporting equitable and inclusive innovation districts amid rising placelessness?" this study mostly relies on the analysis based on peer-reviewed journal articles, and peer-reviewed book chapters (Figure 4-20). However, still technical reports and thesis/dissertations are among the other scholarly texts that have been reviewed and analyzed for this section of the research. This should be noted that that literature reviews in journals often disregard unpublished documents, or non-peer reviewed papers. Also, some disregard published papers in other languages different than English.

Table 4-7. Type of reviewed publication based on the study scope and designated keywords.

Publication Type	IDs & BE	Placelessness & Urban Planning	Remote Working & BE	Telework & BE
Journal Articles	71	8	40	15
Book Chapters	5	19	3	3
Technical Reports	0	0	5	1
Thesis/Dissertation	0	3	8	0
Total	76	30	56	19

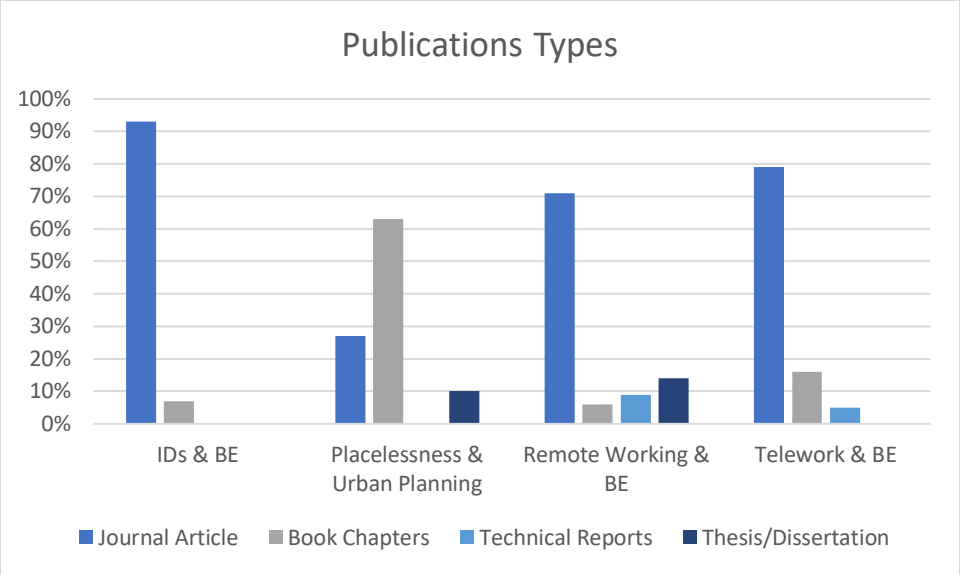


Figure 4-20. Type of the selected publications for the four keywords

4.5.2 Classification by Themes and Concepts

Innovation Districts and Their Built Environment Attributes

The analysis shows that almost all the selected scholarly texts have a consensus over the significance role of the built environment attributes in defining innovation districts. Accordingly, most of the analyzed literature discuss that innovation districts are place-based development strategies/policies that are developed and created to help improve and enhance cities' economic growth. According to the content analysis of the 76 scholarly texts, the most indicated built environment attributes associated with the concept of innovation districts include mixed land-use (diversity in land-use), concentration/agglomeration of anchor institutions, density (physically compact), access to public transit, walkability, bike-ability, proximity to urban amenities, proximity to research universities, proximity to R&D or other research facilities, and presence of shared working spaces. Table 4-8 and Figure 4-21 illustrate how the mentioned BE factors are discussed in the reviewed literature.

Table 4-8. Classification of BE attributes of innovation districts within the scholarly publications

Theme/concept	Number of studies indicated the theme/concept
Mixed Land use	17 (22%)
Density	23 (31%)
Firm agglomeration/Anchor proximity	70 (92%)
Proximity to urban amenities	38 (50%)
Presence of University/educational institutions	54 (71%)
Shared working spaces	8 (11%)
Availability and access to public transit	38 (50%)
Walkable	23 (31%)
Bike-able	8 (11%)

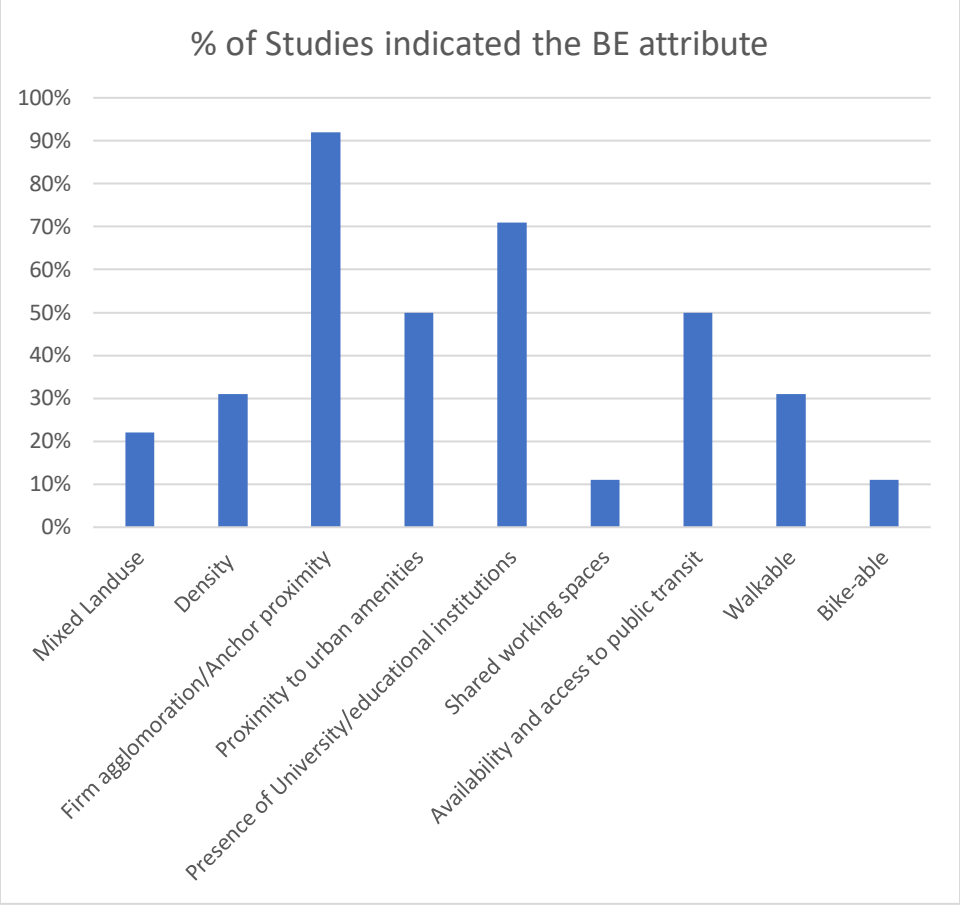


Figure 4-21. The Built Environment attributes discussed in the reviewed literature.

Placelessness and Urban Planning

Regarding the keyword "placelessness," my initial search led to 305 publications; however, throughout the inclusion and exclusion criteria, only 30 publications were selected for analysis. Besides the obvious reasons to exclude some of the publications, such as non-English published papers, or duplications, the main reason for this decrease in the number of selected publications refers to the topic, theme, or scope of the studies that were excluded. Many of the publications that had covered the keyword "placelessness" have no connection with urban planning research and urban studies. Some of the most repeated themes/concepts of the excluded publications are English Literature, Religious Studies, Psychological Studies (memory issues and sense of belonging), tourism, and finally architecture. Therefore, the number of studies that had a connection to urban planning research and urban studies are limited. After reviewing 30 scholarly texts that were selected through the inclusion and exclusion criteria for the keyword of "placelessness" and how it may be related to urban planning, the analysis shows that concepts such as placelessness and place-making, cultural ties to place and placelessness, placelessness and virtual work, and digitalization and placelessness are among the most repeated themes. Table 4-9 provide a list of the reviewed literature along with their most significant theme/concept. (See Table A-1 in the Appendix for more details on primary themes for the keyword of Placelessness).

Table 4-9. Number of the reviewed literature based on major theme/concept- **Keyword: Placelessness**

Primary Theme/Concept	Number of literatures	Publication Title
Place, placelessness, definitions, and evolution of the term	10/30	A summary version of place and Placelessness
		The paradox of place and the evolution of placelessness
		"Prospects for Places": from Place and Placelessness (1976)
		Place and Placelessness, Edward Relph
		The study of placelessness: Toward a conceptual framework
		The pedagogy of the American city: revisiting the concepts of place, non-place, and placelessness
		Back to Phenomenological Placemaking
		Author's response: Place and placelessness in a new context
		Place and Placelessness. Commentary 2
		Place and placelessness. Commentary 1
Placelessness & urban planning, urbanism, and urban design	10/30	Placelessness of urban design and industrial branding in small town planning
		Revisiting place and placelessness
		Place as multiplicity
		Theory's Role in Placelessness
		Extraordinary Ordinariness: An Outsider's Perspective on Place and Placelessness in the Japanese City
		Extending place: The Global South and informal urbanisms
		Examining Place-making in Practice: Observations from the Revitalization of Downtown Detroit
		Place-making in the Rise of the Airport City
		Reclaiming and making places of distinction through landscape architecture
		Beyond placelessness: place identity and the global city
Placelessness & globalization, and digital world	6/30	A city of placelessness: digital nomads and Tallinn's urban future
		The production of 'placelessness': Digital service work in global value chains
		My company is invisible'—Generating trust in the context of placelessness, precarity and invisibility in virtual work
		Losing control at home?
		"Themes of Postmodern Urbanism"
		Mobility, portability, and placelessness
Other	4/30	Place, Placelessness, and Sustainable Entrepreneurship
		Sense of Place and Placelessness of Urban Open Spaces in Dar es Salaam
		Tuning in and out of Place
		Urban squares: A place for social life

In the early 1970s, geographers such as Yi-Fu Tuan (1974), Anne Buttimer (1976), and Edward Relph (1976, 1981, 1993) grew dissatisfied with what they felt was a philosophically and experientially anemic definition of place. They probed place as it plays an integral role in human experience. They are sometimes called "humanistic geographers" and their work is devoted to

illustrating and clarifying space. From a humanistic perspective, the meaning of a place (landscape, region) is inseparable from the consciousness of those who inhabit it (Seamon & Sowers, 2008). In 1976, Edward Relph coined the term 'placelessness,' which he defines in phenomenological and experiential terms. He argues that a place's identity is contributed by three aspects - its physical setting, its activities, and the social meaning attributed to it (Montague, 2016). In Relph's early works (e.g., Relph 1976), placelessness referred to a weakening identity of place due to the homogenizing processes of modernization. He described placelessness as a ubiquitous landscape, or a meaningless pattern of buildings. In his more recent writings (e.g., Relph 2007, 2016), he smoothens his stance by stating that postmodernity has dismissed the placelessness of modernity and celebrates diversity instead of standardization. He argues, however, that placelessness still exists as detachment from the particularity of places and is manifest wherever human-planned landscapes have little connection with their geographical contexts (Kortelainen & Albrecht, 2021).

"Placelessness" refers to a state of people and activities that are not confined to fixed places. Digital connectivity redefines work-live habits by creating a placeless ground for work and social activities. This contributes to a growing population of digital nomads who utilize remote work and personal mobility to avoid restrictions of fixed places in their living (H. Wang, 2020). The analysis of the reviewed literature concerning placelessness and its relation to urban planning, urban studies, an urban economic development reveals that there is gap within the literature regarding the relationship between urban planning and design and the phenomenon of placelessness. Some studies discuss that digitalization and virtual work resulted from digitalization may increase placelessness. Also, some other scholars have discussed that globalization and global cities are responsible for reducing the "place identity" and for creating placelessness. It has been also stated that Environmental engagement helps to remedy the negative externalities of placelessness.

Remote Working and Telework and Their Impact on the Built Environment Attributes

With the recent technological advancements that allow mobile connections at affordable rates, telecommuting has become more accessible to workers worldwide. Recent analysis has shown that commuting patterns in the US are undergoing a significant change. More and more workers are opting to work from home, which studies have shown can help reduce transportation costs, enhance individual and firm productivity, and improve overall organizational outcomes (Gallardo & Whitacre, 2018).

During the selection process of the scholarly texts with the keywords of "remote working" and "telecommute," one obvious findings was that a majority of the literature is focused on topics such as employees well-being, impacts of remote working on employers and employees, the economic issues associated with remote working, the productivity of remote workers, managerial and human resource issues associated with remote working, psychological impacts of remote working, and, in general, advantages, disadvantages, and challenges of remote working. Also, many of these scholarly texts have been published in disciplines other than planning, such as economy, business, management, medical/psychological-related field, and computer science. Thus, the exclusion and inclusion criteria established for this research and explained in the chapter 3, led my search to 56 scholarly texts for the key word of remote working (out of 530 results from initial search), and 19 scholarly texts for the key word of telework (out of 118results from initial search)[13]. Also, it should be noted that the number of scholarly publications focusing on remote working and teleworking has experienced a sudden increase after 2020 due to the (mandatory) restriction resulted from the COVID-19 pandemic.

[13] A great number of publications were removed from the list of "Keyword: TELEWORK" due to duplication of the item with those already included in the list of "Keyword: REMOTE WORKING."

After conducting content analysis of the scholarly texts including the key words "remote working" and "telework" in relation to urban planning, urban studies, and built environment attributes, the results showed that the reviewed literatures are emphasizing issues which could be classified in three primary themes or concepts, including "Transportation-related factors," "place-based factors," and "Workplace/office-related factors." See Tables A-2 and A-3 for a more detailed illustration of the finding of analysis for the keywords "remote working" and "telework" respectively. The following table (Table 4-10) summarizes the list of the reviewed studies with their specific attention to the impacts of the remote working and telework on place-based economic development that shaped in the central parts of cities such as innovation districts.

Table 4-10. Number of the reviewed literature based on major theme/concept- **Keyword: Remote Working & Telework**

Primary Theme/Concept	Number of literatures/all reviewed literatures	Specifically indicated terms
Transportation-related factors Keyword: Remote Working Keyword: Telework	48/56 14/19	Travel distance Travel Time Travel costs Travel demand Transportation infrastructure Active transportation Traffic/congestion Emissions Use of private vehicle Commute (general term)
Place-based Factors (BE attributes) Keyword: Remote Working Keyword: Telework	24/56 14/19	Employment density Population density Moving to rural and peripheral Moving to suburb Moving to more distant areas from office Being detached from certain locations Reduce economic activities in city centers Reduce tourism and visitors in city centers Need for a more efficient use of urban space Absorb and retain talent without locational obligations Change in urban facilities requirements Changes on transport & urban structure planning Geographical dispersion (employment and population)

Workplace/office-related Factors		Emptying office buildings
		Reduce office costs
Keyword: Remote Working	14/56	Downsizing the office space
		Relocating office spaces from city centers to less expensive locations/out of city cores
Keyword: Telework	3/19	Office can be anywhere
		Emerging alternative workplace models, such as coworking spaces, digital working hubs, on-demand spaces, and office clubs
		Geographical dispersion of firms

4.6 Findings for the Impacts of Placelessness and Remote Working on Future Planning for Innovation Districts- A systematic Review of the Literature

The findings of the systematic review of scholarly texts reveals that the built environment attributes, such as mixed-land use, density, firm agglomeration, access to transit, presence of R&D and educational centers, walkability, proximity to urban amenities and shared workspaces are explicitly defining innovation districts as place-based economic development strategies. On the other hand, the literature discusses that in the last couple of decades, remote working has become more popular specifically among knowledge workers and in the knowledge-based economy. In addition, remote working is discussed to enhance placelessness, which could be described as less attachment and independence on place, since work can be done from any location.

According to the content analysis of the scholarly text regarding the impact of remote working and teleworking on built environment attributes in urban planning and urban studies, the findings suggest that factors such as reducing travel time, travel cost, and travel demand along with reducing traffic congestions and emissions are among the most considered transportation factors mentioned within the literature. Also, items such as “less need for transportation infrastructure to connect homes to workplaces” and “more need for active transportation infrastructure (walk and bike) in residential areas” are among the other indicated factors. Furthermore, many scholars and scholarly texts has mentioned the remote working will increase geographical dispersion of

population and employments as employees are no longer tied/attached to specific locations to work. Many scholars also discuss that due to geographical independence; remote working will enhance migration to outer edges of cities and out of urban areas. Besides, some scholars discuss that the fact that employers are no longer needed in the actual/physical workplace increases the opportunities for both employees and employers to be recruited or absorbed in specific firms without the need to move in a specific location. Finally, many scholarly texts discuss that remote working will provide financial benefits for employers to reduce office spaces and office costs. It is also discussed that firms can move their office location out of city cores and thus, pay less for property value or rent. It is also discussed that remote working can contribute to creating and developing remote working spaces, which are located outside of city centers and closer to employees housing.

While literature discusses the impacts of remote working on enhancing placelessness, less travel demand, and flexibility in mobility, there is a huge gap within the scholarly publication in understanding the impacts of remote working and placelessness on innovation districts and in understanding how the future of innovation districts will be affected by the changes resulted from remote working. These findings can be expanded to help planning practitioners and policymakers consider the impacts of placelessness and remote working for operational innovation districts and those in their planning stage. These findings reveal that innovation districts that solely rely on computer-based science, IT, ICT, and education may be more affected by the impacts of remote working. In contrast, medical innovation districts and those that still need their employees to perform the job physically are less likely to lose their population and employment density.

4.7 Summary

The findings regarding the first research question, "*What are the main contributing factors to shaping innovation districts? And how understanding the potentials and challenges for a thriving innovation district helps with generalizability of the innovation district model?"* shows that a general overview of the common traits of innovation districts (IDs) can be outlined. IDs are often anchored by educational institutions and prioritize a diverse range of industries rather than focusing on one specific field, even when the anchor (such as a university or medical campus) acts as a magnet. They tend to revitalize abandoned areas and buildings, invest in place-based access to transit, prioritize walkability, mixed land use, open areas, and green spaces, and encourage networking through various facilities such as multi-floor/multi-purpose office buildings, co-working and startup spaces, libraries, conference centers, and shared research facilities. While digital technology connectivity is not yet a typical feature, it is becoming increasingly prevalent in some IDs. Additionally, IDs are predominantly governed by non-profit organizations and anchor institutions, although public-private partnerships are also common in government IDs. Finally, IDs are mainly situated in urban areas and close to CBDs.

Concerning the second research question "*What are the impacts of innovation districts on civic inclusion and social equity? And how and to what extent is the community engaged in different stages, from developing the idea to operating the innovation districts?*" the research on the Fort Worth Medical Innovation Districts shows that residents have no voice in city council meetings regarding the FW_MID. From my analysis of various magazine articles and newsletters, the economic benefits of the innovation district are the only aspect that has garnered attention. Interestingly, when surveys or meetings were conducted to gather ideas from stakeholders and

core teams, residents were not included in the stakeholder groups. Thus, community engagement has been overlooked in establishing and developing this particular innovation district.

Finally, this study's findings regarding the third research question "*What are the policy solution and recommendations for the future of place-based economic development planning supporting equitable and inclusive innovation districts amid rising placelessness?"* explains that there are several reasons why remote working has become increasingly popular in businesses today. From an urban industrialization perspective, it makes sense to allow employees to work from home or other remote locations in order to avoid the congestion and high costs associated with commuting to a central office location. Additionally, with the rise of digitalization, the way work has been done is changed dramatically, and remote working offers a more flexible and efficient way to keep up with these changes. Finally, remote working provides workers with greater flexibility and work-life balance, which can lead to increased productivity and job satisfaction. Overall, it's clear that remote working is a trend that's here to stay, and businesses that embrace it will be better positioned to succeed in the years to come. However, the systematic review of the scholarly publications does not explicitly indicate the impacts of remote working on innovation districts as place-based economic development policies in urban planning. The results of this research can assist planning experts and policymakers in assessing the effects of placelessness and remote work on operational innovation districts, both those currently in operation and those in the planning stages. The study suggests that districts that focus exclusively on computer-based fields such as science, IT, ICT, and education are more vulnerable to the impacts of remote work. On the other hand, districts in medical fields and those that require physical work from employees are less likely to experience a decline in population and employment density.

CHAPTER 5

5. CHAPTER 5- Conclusions and Policy Implications

This research aims to develop a methodological framework through empirical analysis and qualitative analysis to shed light on 1) the ambiguities about the potential and challenges for a prosperous innovation district and the generalizability of the innovation district model, 2) the social externalities associated with the development of innovation districts regarding civic inclusion and equity, and 3) the future of innovation districts as place-based urban strategies amid rising remote working and placelessness. This study's methodological frameworks and findings can provide insights for planners, local city officials, and policymakers who aim to encourage and establish knowledge-based policies and enhance economic growth by developing an innovation district in their cities. It also emphasizes the significance of social aspects, such as the impacts of innovation districts on residents, particularly the vulnerable populations (in terms of race, ethnicity, and income), when making decisions to add these new economic developments into urban areas. Therefore, this study's primary contribution is to help planners and policymakers develop more effective policies and initiatives and fulfill the shortcoming or enhance their cities' resources through educated decisions.

5.1 Conclusions and Policy Implications: The main contributing factors to shaping innovation districts (RQ1)

The development of innovation districts has become a prevailing policy in many cities around the world. During the past two decades, planning scholars, policymakers, and urban planners and economists have been drawn to the concept of innovation districts due to their role in enhancing economic development and their support of the knowledge economy and entrepreneurial activities. The popularity of innovation districts has resulted in multiple types of theoretical studies aiming

to understand the evolution, typology, and economic impacts of innovation districts. While some studies have evaluated cases of innovation districts, there have been limited number of studies that have conducted empirical analyses of innovation districts from a practitioner and/or policymaker perspective. Besides, these studies evaluate few cases of innovation districts (2-4 cases), which causes limitations and affects the results of the research. In this article, we address this gap by evaluating 14 cases of innovation district in the U.S. to explore the driving forces and key factors forming innovation districts.

Innovation districts are described as an urban development model, where economic actors (economic assets), place-making qualities (physical assets), and collaborative activities (networking assets) are all gathered at specific geographical location. For innovation districts, it is essential that all three types of assets are combined and supported by governing acts to create an innovation ecosystem. The presence and strength level of these assets is different depending on the location and the community. While some places might have a strong presence of cluster of economic assets but lacking some important physical assets, there are other locations that have a considerable accumulation of physical assets while missing on economic assets and networks to build upon. Consequently, the strategic approach to develop an innovation district would be different based on the locational needs and must be evaluated in the planning phase. Therefore, it is particularly important to understand the contributing factors of economic, physical, and networking assets, and the potentials of the governance structure for different urban areas to lead the development of an innovation district to a prosperous urban strategy.

Based on my analytical framework (borrowed from Brookings and re-visioned by the author), this research identifies several categories for each asset of the innovation districts. In addition, this study identifies the governance structure, the primary anchors, the targeted industries, and finally,

the challenges and take away(s) for the 14 cases of innovation districts in the U.S. I discuss that concerning economic assets, innovation districts might have multiple anchors and mixed-used type of assets; however, the most frequent anchor across cases is education institution(s), particularly research-based universities. Innovation districts mostly do not target a specific industry type and they welcome industrial diversification. Diversity of industry types and sizes could enhance the economic sustainability of an innovation district. Also, the early physical presence of hospitals, medical campus or universities highly affect the type of the innovation district.

Regarding the physical assets, I conclude that it is a common strategy to revitalize and transfer obsolete and abandoned buildings (located in the boundaries of the district) to form new anchors is a common strategy. Also, design strategies and place-based qualities, such as access to transit, walkability, mixed land use, and presence of amenities such as open and green spaces are among the most significant physical assets in innovation districts. In relation to networking assets, I discuss that physical placemaking strategies, such as multi floor/purpose buildings for co-working spaces, rental chambers for the startups, libraries, convention or conference centers and shared research labs, are among the most common ways to enhance collaboration among innovative actors. Furthermore, the virtual elements, such as strong online presence will greatly help innovation district to create more networking. Finally, we discuss that a robust and strong governance structure is necessary for an innovation district to prosper. While primary anchors are seen to be the most frequent type of governing arm in the districts, for an innovation district to reach to its greatest potential, both public-private funding and collaboration are necessary. Besides, the governing arm should form at an early stage of the planning process and needs to maintain a balance of all assets (physical, economic, and networking) within the district.

The findings of my comprehensive empirical analyses will become helpful not only to urban planning and urban economy scholars, but more significantly to planning practitioners, policymakers, and city officials who tend to develop this urban model within their cities. Accordingly, the results of our study regarding the driving factors shaping innovation district help local actors (e.g., city officials and policymakers) to better understand the potentials and challenges of their cities and make informed decisions in the planning phase before rushing to the development phase.

It is recommended that further research be conducted to create statistical models that incorporate quantitative methods for analyzing the economic and social effects of innovation districts. This can be achieved by utilizing data such as socio-economic and socio-demographic information of residents, property tax, revenue, and other relevant sources. By comparing the early stages of development of various innovation districts with the time before they were established, we can gain valuable insights. This model would help researchers understand the impact of innovation districts on the community and how they can be developed in a way that benefits everyone. The model would be designed to analyze data from different innovation districts and identify patterns that could be used to improve the development process. By using quantitative data, researchers can gain a better understanding of the factors that contribute to the success of innovation districts and how they can be replicated in other areas.

5.2 Conclusions and Policy Implications: The extent of community engagement and the impacts of innovation districts on civic inclusion and social equity (RQ2)

Innovation has become a key driver of success for businesses across a range of industries. By embracing new ideas and technologies, companies can stay ahead of the curve and adapt to changing market conditions. In fact, many organizations are now actively seeking out innovative

approaches to help them stay competitive and thrive in today's rapidly evolving business landscape. Whether it is through new product development, process improvements, or other initiatives, innovation is increasingly seen as a critical means of achieving sustainable growth and long-term success.

Innovation districts have the potential to greatly impact society by addressing a wide range of socio-economic challenges. The development of these districts is a complex process that requires careful planning and the combination of many disparate elements. However, if done successfully, innovation districts can become productive, sustainable, and inclusive areas that drive long-term growth and success. Innovation districts are mainly promoted and invited to the cities due to their alleged economic benefits. As a result, city officials, policymakers, developers, and business owners are often strong supporters of such developments, and in many cases, firms and anchor institutions receive financial incentives and grants to operate in urban areas where an innovation district is planned to be established. However, the negative impacts of these new developments are often overlooked by these same groups.

Innovation districts can bring in new investment, attract tech-based corporations, and increase the number of high-paying jobs, which can lead to higher property values and rent prices. Unfortunately, this can also lead to gentrification, displacement, and economic inequality, as well as housing unaffordability, unequal access to opportunities, jobs, and amenities, socio-spatial polarization, and labor division, which can disproportionately affect residents. To minimize these harmful impacts, it is crucial to consider the effects of innovation districts on residents and involve them in the planning process.

It is important to prioritize the opinions and feedback of local residents or the community when introducing new developments like innovation districts. From our analysis of 50 documents related

to the development of FW-MID, it appears that residents often have limited decision-making power when it comes to these projects, despite being the ones who will be most impacted by them. Specifically, my study found that the planning process for the Fort Worth Medical innovation district did not adequately engage with or include residents and the community. City council meetings focused solely on the economic benefits of the district, without considering the perspectives or concerns of the community. The content analyses of 5 technical reports also reveals that residents were not included in stakeholder groups or core teams, and that the economic benefits of this new development I smore of central attention for policymakers. Additionally, the focus of the local news outlets through their interviews with local authorities and city officials is also on the economic benefits that this new development will bring.

As policy makers and local urban decision makers increasingly turn to emergent place-based strategies like innovation districts to support a growing and robust knowledge economy, it's important to consider potential negative consequences of innovation districts on local residents and the community. While these developments aim to drive long-term growth and success, it's crucial to understand how they affect the community and consider participatory planning and decision-making while inviting these new developments into urban areas.

This section of my research focuses on equity and inclusion implications of innovation districts. This section explicitly evaluates the extent to which the community is engaged in planning and developing an innovation district. Additionally, this research section aims to understand residents' perceptions of innovation districts and their potential impacts on their living areas. Finally, this research will dive deeper into understanding how planners, developers, city officials, and policymakers are willing to engage the community when inviting and developing innovation districts within urban areas. This study will contribute to the literature on innovation districts by

revealing the significance of community engagement when adding new economic developments into the city. This study argues that it is essential to consider the residents and ensure their voice has been heard. While the impacts of innovation districts will significantly influence the residents, according to our analysis, residents have the least power to decide about the new development coming to their living area. Development such as innovation districts can significantly affect social equity, diversity, and inclusion by causing displacement and gentrification and attracting knowledge workers into specific urban areas. Therefore, their social impacts should be considered and addressed appropriately before any rush into the decision-making process.

While there are limitations to our study, such as the small sample size of documents analyzed, future studies should prioritize engaging residents through surveys and other data collection methods. It is also recommended to perform similar studies in other innovation districts across different states to gain more reliable insights into the impacts of these developments on local communities.

5.3 Conclusions and Policy Implications: Future planning for innovation districts amid rising remote working (RQ3)

Innovation Districts are a policy and practice concept that recognizes a new geography of innovation in urban areas. These districts are characterized by a place-based approach to innovation, which occurs not in large industrial labs or suburban innovation campuses, but in the heart of cities. To qualify as an innovation district, a specific set of physical characteristics and built environment attributes must be present, including mixed land use, density, firm/institute agglomeration, transit accessibility, walkability, and amenity-richness. These models of urban economic development aim to attract knowledge workers and sophisticated employees to the central parts of cities, thereby enhancing the knowledge economy. However, recent changes in

working modes, from working in city offices to remote working/telework, are expected to have an impact on how employees approach job opportunities in these districts.

The concept of working from home utilizing information and communication technologies (ICTs) began in California during the mid-1970s. Companies such as Yahoo helped promote telecommuting in the 1980s, which later became known as telework. Nowadays, with the abundance of cheaper, smaller, and increasingly connected devices, it is easier than ever for employees to stay connected with their colleagues from anywhere at any time. Smartphones and tablet computers are just a few examples of these so-called new ICTs that have revolutionized the way we work. Jack Nilles' book "The Telecommunications Transportation Tradeoff" introduced the term telecommuting in 1973 as a solution to traffic congestion and pollution (Bjursell et al., 2021). A decade later, companies saw telework as a tool to reduce the expense for office space. However, this has shifted again into telework as a strategy to attract and retain top personnel.

In recent years, remote work has become increasingly popular in cities. Technological advancements have driven this trend, the rise of the global knowledge economy, changing lifestyle preferences, and the COVID-19 pandemic's impact on disaster management response, forcing many office workers to work from home. As a result, more and more individuals are empowered to work remotely, enjoying the benefits of flexible schedules, reduced commute times, and increased autonomy in their work. Despite the challenges of remote work, such as maintaining a work-life balance and staying motivated, it is clear that this trend is here to stay and will continue to shape the future of work in cities worldwide. It is discussed that "37% of jobs in the United States can be performed entirely at home, with significant variation across cities and industries. These jobs typically pay more than jobs that cannot be done at home and account for 46% of all US wages. Analysis of other countries reveals that lower-income economies have a lower share of

jobs that can be done at home (Dingel & Neiman, 2020, p. 1).” Another study discusses that “Seventy-nine percent of US private sector employees and 87 percent of federal workers say they would like to telework/telecommute at least some of the time (Lister & Harnish, 2019, p. 129).”

Remote working is gaining popularity among knowledge workers, but this research's findings, through a systematic review of the literature, show that the impacts of remote working on cities and place-based economic development need to be explored more. Specifically, innovation districts designed to house knowledge workers and enhance the knowledge economy may be affected, but there needs to be a clear understanding of how they will be planned and developed in the future when remote working is even more common. While the literature touches on the potential transportation benefits and office space reduction, more attention is needed on the broader impacts.

The shift to remote working has impacted the spatial distribution of work and workplaces, which were once intentionally separated. Now, work proximity is no longer a priority when selecting a location, which has resulted in an increase in lifestyle migration. This change also challenges the allocation of infrastructure investment, demand for employment land and office buildings, local traffic patterns, suburb's role, and the design of residential dwellings and neighborhoods. However, remote work still needs to be sufficiently addressed by urban policy. For remote workers to fully participate in the collaborative brilliance that cities offer, urban planners and policymakers must have a sound understanding of their needs and preferences, as well as their daily interactions with each other and the urban environment. A city that understands and caters to remote workers better than other cities is more likely to succeed in the global competition for talent, skilled individuals, entrepreneurship, and innovation.

Telework has seen a significant rise in computer-related industries and jobs in information technology, as well as software programming and computer network operations. However, industries such as manufacturing and jobs that require a personal presence have seen little growth in telework. The difference between these jobs may be related to the nature of the job and how independent it is from others. Jobs that rely heavily on technology or involve responsibilities largely independent of others are more suited for telework (Golden, 2009). In order to avoid turning innovation districts into urban areas that lack population density and employment opportunities, it's important for planning and policymaking to take into account both types of jobs - those that are compatible with remote work, and those that are not. By ensuring a balance of both types of jobs within the innovation district, we can prevent the "shrinking city" phenomenon and promote sustainable growth and development for the area. In addition, developing and creating neighborhoods that combine residential amenities with place-making and urban design interventions could help economic performance, networking, and communication among remote workers.

Empirical analysis of cases of innovation districts through qualitative (interview and surveys) as well as quantitative analysis can expand this study for future research. This will better evaluate the impacts of remote working on innovation districts and the future planning and policymaking aspects that can enhance the aim of innovation districts.

5.4 Discussion and Summary of Conclusions

Innovation is widely considered one of the most powerful ingredients for spurring both productivity and economic growth. Accordingly, urban models that can support innovative activities have become a critical focus for planning and policymaking over the past two decades, paralleling the important transition from an industry-led to a knowledge-intensive economy. Many

cities in the United Staes and worldwide are in the hunt for strategies that promote innovative endeavors capable of attracting both investment and a sophisticated workforce. The result has been a variety of urban models. Among them, innovation districts (IDs) stand out as principal guides to urban development policies and tools for urban planners and urban economists.

The innovation district concept has certainly attracted urban planning and urban economy scholars, but it has also captivated policymakers, city officials, and planning practitioners. Due to the success stories of early IDs such as 22@Barcelona, many cities in the US and around the world have either planned or are planning innovation districts. When it comes to developing urban innovation districts, there is no "one size fits all" blueprint for planners and decisionmakers. That means a lot of variability from city to city in ID typology as well as locational potentials and challenges. As IDs become a significant strategy for urban economic growth and cities allocate increasing financial resources to developing them, it becomes important to clarify the driving factors and primary components of innovation districts' prosperity, their potential social contributions and equity implications, and their future planning while work and life are going under tremendous changes due to the excessive technology advancements.

A wide range of scholarly studies discuss ID typology, place-based qualifications, economic impacts, success stories, and their role in enhancing city attractiveness to firms and investors. However, the literature tends to be theoretical or based on a few observations. The multi-dimensional nature of innovation districts points to the value of systematic, empirical analyses for teasing out the primary factors shaping innovation districts and identifying commonalities and differences in how these factors play out in real-world cases. Additionally, innovation districts have gained significant attention due to their potential economic benefits such as increasing job opportunities, enhancing revenue, and attracting a talented workforce. However, there has been

less attention given to the negative social externalities driven by innovation districts. While some of these negative impacts such as polarization of highly paid employees, housing unaffordability, and displacement are discussed within the literature, very few scholars have considered the role of local communities in developing these districts and the local residents' perceptions of the impacts of these new developments on their lives. Furthermore, as technology advancements are altering the course of life and work by new work-life models such as remote working and teleworking, the number of employees, and in particular knowledge-workers who have chosen the flexibility of remote working over being attached to the workplaces is increasing. However, it is still unclear how IDs as place-based economic development strategies shaped in the central parts of cities will be affected by these changes in work-life modes.

Intending to address the identified gaps in the literature, this study 1) draws a general picture of the most significant contributors of IDs, 2) explores that the community engagement process is a missing part in developing innovation districts, which needs to be addressed, and 3) concludes that while the future of IDs will be affected by the changes rising from remote working and placelessness, this vital matter has not been adequately addressed within the scholarly publications. The findings of the empirical analyses of this study will be helpful to planning professionals, policymakers, and city officials who generally develop this urban model. These results can help these local actors better understand the potentials and challenges of their cities when making informed decisions in the planning phases, to consider the impacts of IDs on the community and specifically low-income populations and minorities in order to develop strategies and policies that are inclusive and equitable, and to have a better understanding of how IDs may be affected by phenomena such as remote working and to act accordingly, in order to protect city cores of being emptied and/or shrink.

5.5 Research's Contributions to Planning Theory and Practice, and Policy

Innovation districts are emerging across the world as tools for enhancing economic development, increasing job opportunities, revitalizing urban spaces, and promoting sustainable growth. As city officials, planners, and policymakers are becoming increasingly attracted to these urban development models and as they continue to be developed in urban areas, there is a need to evaluate and understand ***the primary implications of innovation districts for planning, equity, economic prosperity, and policymaking*** in order to lead these developments to support sustainable, equitable, inclusive, and prosperous growth.

Policymakers are usually drawn to the concept of innovation districts because of their role to increase the growth of their economies and promote employment and the creation of well-paid jobs. This has led the city officials and policymakers to rush decisions in developing innovation districts in urban areas, with less/no attention to the potential, challenges, and capabilities of the host urban area. Therefore, this study's analytical framework and findings contribute to the planning theory, planning practice, and policy development by identifying the key contributing factors that shape innovation districts through conducting a comprehensive empirical analysis of 14 case studies if innovation districts in the U.S. The findings of this study help planning practitioners and decision-makers to better understand the potential of their urban areas and to make more informed and educated decisions before rushing to decisions.

In addition, the economic advantages of innovation districts have obscured planning practitioners and policymakers from recognizing and considering the possible adverse of these developments. While few scholars have stated the negative social impacts of IDs, such as displacement, housing unaffordability, gentrification, and income inequalities. However, this study's findings reveal that there is not enough attention to the communities' needs and their perceptions when innovation

districts are being added to specific urban areas. In terms of planning theory, planning practice, and policy, this study discusses that planners, policymakers, and decision-makers need to acquire a better understanding of the equity and social justice implications of IDS in addition to economic benefits. This research concludes on the fact that local population and residents, specifically low-income and underserved population, are poorly engaged, considered, and included within the decision-making process while the impacts if IDs will be more significant on them. Alternative planning approaches such as scenario planning[14] can help understand the negative social impacts of innovation districts, including gentrification and exclusion. Scenario planning is a strategic planning method that involves creating multiple hypothetical scenarios to explore how different factors might interact and affect the future of a particular area or project. By using scenario planning, policymakers can better understand how different policies and planning decisions might affect the social and economic outcomes of innovation districts. This can help them identify potential negative impacts such as gentrification and exclusion and develop strategies to mitigate these impacts. The Sacramento Regional Blueprint Plan is an example of a scenario-based plan that examines alternative transportation and land use patterns. The plan proposed a set of regional land use and transportation patterns that could be used to guide future development in the region. [15]This is just one example of how scenario planning can be used in urban planning to explore different possible futures and help policymakers make more informed decisions.

On one hand, it is well-discussed and understood that place and geography play a vital role in enhancing the success of innovation districts, and therefore, this fact has been also incorporated into policy decisions. Accordingly, innovation districts are introduced and defined as place-based

[14] How to Design Your Scenario Planning Process. https://www.planning.org/pas/memo/2019/jul/
[15] Scenario Planning for Smaller Places: Aligning Methods and Context: https://www.lincolninst.edu/sites/default/files/pubfiles/goodspeed_wp20rg1.pdf.

economic development strategies that rely on built environment factors, such as firm clustering, employment density, mixed land use, proximity to universities, richness of urban amenities, transit accessibility, and walkability. On the other hand, the findings of this research reveal that the emergence of remote working and teleworking plays a significant role in enhancing placelessness, where employees are no longer attached to their physical workplace. While place is discussed to be a significant aspect in shaping innovation districts and they are identified to be formed in central parts of the cities, remote working and the placelessness resulted from that will affect on the meanings and functionalities of clustering, agglomeration, and proximity in developing innovation districts. The findings of this study contribute to the planning theory and practice by enhancing planners' and decisionmakers' knowledge regarding the impacts of remote working on IDs and may lead to them to diversify the role and definition of IDs by including more of service-based jobs in the innovation districts to reduce the risk of shrinking cities. There are several ways that policy and planning can respond to placelessness in innovation districts. One way is to focus on creating a sense of place within the district by promoting public spaces and amenities that encourage social interaction and collaboration among workers. Another way is to promote policies that encourage the development of affordable housing and transportation options that make it easier for workers to live near their workplaces. Additionally, policymakers can work to promote the development of new technologies and industries that are more resilient to the effects of placelessness, such as creating work hubs and other forms of collaboration.

Planners can support affordability and community engagement for present and future innovation districts by taking several steps. One way is to focus on creating affordable housing options within the district to ensure that workers can live near their workplaces. Another way is to promote policies that encourage community engagement and participation in the planning process. This can

include holding public meetings and workshops to gather input from residents and other stakeholders. Finally, planners can work to create a sense of place within the district by promoting public spaces and amenities that encourage social interaction and collaboration among workers[16] [17].

[16] https://www.brookings.edu/articles/new-insights-on-how-innovation-districts-are-challenging-economic-and-social-divides
[17] https://research.monash.edu/en/publications/how-can-an-enhanced-community-engagement-with-innovation-district

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APPENDIX

Table A-1. Classification of the reviewed literature by major theme/concept- **Keyword: Placelessness**

	Authors	Title	Year	Primary Theme/Concept
1	S Karray, S Voß	Place, Placelessness, and Sustainable Entrepreneurship	2022	Sustainable development
2	J Kortelainen, M Albrecht	Placelessness of urban design and industrial branding in small town planning	2021	Architecture- Physical attributes of place
3	EE Sanga, DA Mbisso	Sense of Place and Placelessness of Urban Open Spaces in Dar es Salaam	2020	Sense of place, Cultural ties and placelessness
4	H Wang	A city of placelessness: digital nomads and Tallinn's urban future	2020	Remote working and digitalization, and future of urban spaces
5	E Relph	A summary version of place and Placelessness	2018	All about place & placelessness
6	E Relph	The paradox of place and the evolution of placelessness	2016	Evolution of placelessness
7	J Flecker, A Schönauer	The production of 'placelessness': Digital service work in global value chains	2016	Placelessness and digital world
8	E Liu, R Freestone	Revisiting place and placelessness	2016	Placelessness & Place-making
9	NC Koslowski	My company is invisible'—Generating trust in the context of placelessness, precarity and invisibility in virtual work	2016	Placelessness & virtual work
10	K Dovey	Place as multiplicity	2016	Placelessness resulted from car-dependency and informal settlements.
11	L Montague	Theory's Role in Placelessness	2016	Placelessness & Urban meaning
12	M Carmona	Extraordinary Ordinariness: An Outsider's Perspective on Place and Placelessness in the Japanese City	2016	Placelessness and urbanism and urban design
13	A Inam	Extending place: The Global South and informal urbanisms	2016	Place, Placelessness and informal urbanism
14	L Crommelin	Examining Place-making in Practice: Observations from the Revitalization of Downtown Detroit	2016	Placelessness & urban Place-making
15	R Cogger	Tuning in and out of Place	2016	Place and sense (hearing in particular)
16	N Marshall	Urban squares: A place for social life	2016	Place & public social life
17	R Freestone, I Wiesel	Place-making in the Rise of the Airport City	2016	placelessness and airports as urban features and BE attributes
18	L Corkery	Reclaiming and making places of distinction through landscape architecture	2016	place, placelessness, and landscape architecture + BE

19	H Easthope	Losing control at home?	2016	Placelessness, sense of place, and attachment to place in the age of globalization.
20	E Relph	“Prospects for Places”: from Place and Placelessness (1976)	2013	Place, placelessness, and definitions
21	Nan Ellin	“Themes of Postmodern Urbanism”	2012	modern urbanism
22	M Southworth, D Ruggeri	Beyond placelessness: place identity and the global city	2011	place, placelessness, urban design and urban planning
23	D Seamon, J Sowers	Place and Placelessness, Edward Relph	2008	Place, placelessness, and definitions
24	AL Hooykaas	The study of placelessness: Toward a conceptual framework	2008	Place, placelessness, and definitions
25	J Kupfer	Mobility, portability, and placelessness	2007	Digitalization and placelessness
26	M Arefi	The pedagogy of the American city: revisiting the concepts of place, non-place, and placelessness	2004	Place, placelessness, and definitions
27	Iris Aravot	Back to Phenomenological Placemaking	2002	Place, placelessness, and definitions
28	E Relph	Author's response: Place and placelessness in a new context	2000	Place, placelessness, and definitions
29	M Stock	Place and Placelessness. Commentary 2	2000	Place, placelessness, and definitions
30	JR Gold	Place and placelessness. Commentary 1	2000	Place, placelessness, and definitions

Table A-2. Classification of the reviewed literature by major theme/concept- **Keyword: Remote Working**

	Author(s)	Title	Year	Transportation Related Factors	Place-based Factors (BE attributes)	Workplace/office-related Factors:
1	M Urbaniec, A Małkowska, H Włodarkiewicz-Klimek	The impact of technological developments on remote working: insights from the polish managers' perspective	2022	_Transportation infrastructure _Congestion		
2	K Delany	What challenges will organisations face transitioning for the first time to the new normal of remote working?	2022	_Travel distance _Travel time _Travel costs		
3	A Sinitsyna, M Di Marino, T Paas	Virtual coworking and remote working: Lessons and perspectives on the COVID-19 pandemic from Estonia and Norway	2022	_Work Commute		
4	I Mariotti, D Di Matteo, F Rossi	Who were the losers and winners during the Covid-19 pandemic? The rise of remote working in suburban areas	2022	_Work Commute	_reduce employment density in city cores	
5	B Caulfield, A Charly	Examining the potential environmental and travel time saved benefits of remote working hubs	2022	_Travel time	_Moving to periphery	
6	OD Adekoya, TA Adisa, O Aiyenitaju	Going forward: remote working in the post-COVID-19 era	2022	_Replace phydical travel		_ Emplty office Spaces/Buildings
7	N Nikbakhsh	Assessing the impact of authentic leadership and the conflict management on the performance of remote-working employees: the example of software/online …	2022	_Commute _Travel time _Travel costs		

8	MA RIZMALDI, R JAYADI	HOW REMOTE WORKING CAN AFFECT EMPLOYEE PERFORMANCE USING SCRUM IN SOFTWARE DEVELOPMENT COMPANIES	2022	_Travel time		
9	SP Williams, S Grams	Remote Working Study 2022	2022			_ Digital workplaces replace physical office space
10	Oluyemi Adeosun, Waliu Adegbite, Temitope J. Owolabi	Remote working and covid-19: Determinants of productivity output in service firms	2022	_Travel cost		
11	C Metallo, R Agrifoglio, F Maria	Effective management of a remote workforce for Covid-19: A proposed research model toward smart working adoption within organizations	2022	_Traffic & Congestion & Emissions _ Travel costs _ Travel time	_ Live further from office	_ Empty office Spaces/Buildings _Office costs
12	D O'Neill	An exploratory analysis of remote working preferences among tech workers and managers in Ireland	2022	_Travel time _Commute	_ living a large distance from the office	
13	T Jaqua	A Case for a Remote Workforce: Why the Return to the Office is not Working	2022	_Travel time _Commute		
14	I Silva	Remote Working Models and their impact on employee performance levels	2022	_Travel time		_Office costs

15	D Akan	Remote working and relocation after COVID-19. The case studies of Istanbul and Milan	2022	_Public transportation infrastructure _Travel time _Emissions _Travel costs	_ living a large distance from the office (solve accommodation issues and less rent/property value) _Location independence _Reduce density (population and employment) in city centers _Less visitors to city centers _Less economic activities in city centers	_Downsizing the office space _Relocating office spaces from city centers to less expensive locations _ Developing remote working hubs outside city cores.
16	B Caulfield, A Charly	Examining the potential benefits of remote working hubs	2022	_Travel distance _Travel time _Commute _Less use of cars _More use of active transport (walk & bike) _More use of public transport		Workplace-related Factors: _ Developing remote working hubs outside city cores (.
17	M Sako	From remote work to working from anywhere	2021	_Commute		
18	R Donnelly, J Johns	Recontextualizing remote working and its HRM in the digital economy: An integrated framework for theory and practice	2021		_ being detached from fixed places to live & work. Moving to more distant areas	_ Moving workplace out of city cores.
19	A Davies	COVID-19 and ICT-supported remote working: Opportunities for rural economies	2021	_Travel costs _Congestion _Need for travel _Travel time _More use of active transport (walk & bike) _More use of public transport	_ Change in the spatial distribution of employment _Increase rural-based workers (satisfaction & more opportunities) _Work from more geographical distant locations	_ Reshape employment opportunities in rural settings _Retain talent without need to locate in the office

20	C Fabiani, S Longo, AL Pisello, M Cellura	Sustainable production and consumption in remote working conditions due to COVID-19 lockdown in Italy: An environmental and user acceptance investigation	2021	_Commute _Emission _Need for travel	_Work from distant locations
21	KDV Prasad	Remote Working Challenges and Opportunities during Covid-19 Pandemic	2021	_Travel time	
22	AE Green, R Riley	Implications for places of remote working	2021		_Working will become independent from place and geographical location _Less attachment to city centers (working and shopping online) _Less visitors to city centers _Move to outer edges and rural areas _May cause socio-spatial inequality
23	PD Karunarathne	A SWOT analysis of remote working based on review of literature	2021	_Travel time _Traffic congestion	
24	M Noussan, M Jarre	Assessing Commuting Energy and Emissions Savings through Remote Working and Carpooling: Lessons from an Italian Region	2021	_Reduce mobility demand _Decrease work commute (may increase non-work commute)	

25	D Reuschke, N Clifton, J Long	Remote working–spatial implications in Wales	2021	_Congestion _Travel tine _Need for active transportation infrastructure (walk & bike) in residential areas _Work Commute _Travel flexibility	_Live further away from workplace location _Migration from urban areas to suburbs _reduce population and employment density
26	J Sutton-Parker	Determining commuting greenhouse gas emissions abatement achieved by information technology enabled remote working	2021	_Emissions	
27	M Radović-Marković, M Stevanović	Remote Working in Terms of COVID-19	2021		_employees are not attached to work location _Absorb and retain talent from distant locations
28	S Maipas, IG Panayiotides	Remote-Working Carbon-Saving footprint: could COVID-19 pandemic establish a new working model with positive environmental health implications?	2021	_Use of private vehicles _Emissions	
29	MH Rahman, SM Rahman	Impact of remote working on human resource management: the role of IT in the COVID-19 ERA	2021	_Travel time	
30	H Taylor, L Vigneau, R Florisson	Hybrid and Remote Working in the North of England	2021	_Travel time _Travel flexibility	_Reduce economic activity in city centers

31	I Mariotti	Is remote working emptying the city?	2021	_Traffic, congestion, and emissions _Commute	_Suburbs and peripheral areas becoming more attractive to live and work _Moving to peripheral neighborhoods and suburban municipalities	_new demand for working spaces for remote workers
32	NTT Ha	Workplace Isolation in the Growth Trend of Remote Working: A Literature Review	2021	_Travel costs/expenses		
33	N Amir, SB Varma, SFM Razi, NH Rahmat	Working Amidst Covid-19: A Study of Growth, Relatedness, and Existence among Remote Workers	2021	_Travel time _No need for travel to work		
34	DH Steude	Challenges of remote leadership in a digitalized working world 4.0	2021	_Travel time _Traffic _Emissions	_Ease housing situation in cities/moving to outer edge of cities	
35	AN Al-Rfou	Remote Working Environment Challenges in the Context of the Covid-19 Pandemic	2021	_Traffic accidents		
36	E Nikkilä	Future model for remote working in a case organization	2021	_No/Less work commute		
37	C Tomkins	New Working Practices: Examining the future of remote working	2021	_Congestion & emissions _Travel time _Commute		
38	T Piik	Software production in remote working environments: Agile methods and challenges to adapt to the COVID-19 era	2021	_No/Less work commute		

39	I Hille	Impact of Remote Working on the Employees During COVID-19 Pandemic—Conclusions from Creative Specialists and Software Developers in the Perspective …	2021	_No/Less work commute		
40	Matthew Zenkteler	Planning and city policy responses to remote work in urban environments	2021	_Less work commute but more non-work commute _Foster need for walkable neighborhoods _Less use of private cars _More active travel (walk and bike) _Traffic & congestion & emissions	_Moving to outer edge of cities (suburb/rural/close to beach) _Need for a more efficient use of urban space _Reside in mor peripheral areas (contributing to urban sprawl) _Increase freedom in locational preference	
41	S Phillips	Working through the pandemic: Accelerating the transition to remote working	2020	_No/Less work commute		
42	A Kylili, N Afxentiou, L Georgiou, C Panteli…	The role of Remote Working in smart cities: lessons learnt from COVID-19 pandemic	2020	_Save energy and environmental benefits Due to less need for transportation		
43	I Hermann, CM Paris	Digital Nomadism: the nexus of remote working and travel mobility	2020		_Moving to outer edge of cities _location-independence for workers _No ties to workplace	_No/less need for office space
44	J Ferreira, P Claver, P Pereira	Remote Working and the Platform of the Future	2020	_Reduce pressure on transportation infrastructure _Commute	_Moving to outer edge of cities _reduce pressure on housing and schools _moving to suburbs & rural areas (resulting in shrinking cities)	

45	F Crowley, J Doran	COVID-19, occupational social distancing, and remote working potential: An occupation, sector and regional perspective	2020		_reduce employment density in city cores	
46	A Clancy	How to make remote working work	2020			_No/less need for office space
47	MF Flores	Understanding the challenges of remote working and its impact to workers	2019	_Travel costs/expenses		
48	Rongrong Yu, Matthew Burke, Nowar Raad	Exploring impact of future flexible working model evolution on urban environment, economy, and planning	2019	_Less travel demand _Congestion & emissions _Commute	_Change in urban facilities requirements _Impacts on urban planning: Changes on transport & urban structure planning _Impacts on urban management	_Emerging alternative workplace models, such as coworking spaces, digital working hubs, on-demand spaces, and office clubs _Less office costs
49	M Kłopotek	The advantages and disadvantages of remote working from the perspective of young employees	2017	_Less/No Commute to work _Travel time _Congestion	_Flexibility to relocate (housing)	
50	TD Allen, TD Golden, ...	How effective is telecommuting? Assessing the status of our scientific findings	2015	_Less/No Commute to work _Travel time _Congestion & emissions	_Live in more remote locations and might therefore contribute to urban sprawl _Live in a more distant location	
51	P.S. Reshma, P. S. Aithal, Sridhar Acharya	An Empirical Study on Working from Home: A Popular E-Business Model	2015	_Travel costs _Travel time _Traffic		_Saving office space (costs & physical space)
52	S Direction	The end of flexible working? Has Yahoo!'s Marissa Mayer sounded the	2013	_Travel time	_Freedom to live farther from office	

		death knell for remote working				
53	CB Gibson, JL Gibbs	Unpacking the concept of virtuality: The effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation	2006		_Geographical dispersion (employment and population)	
54	G Hertel, S Geister, U Konradt	Managing virtual teams: A review of current empirical research	2005	_Travel costs _Commute & emissions	_Geographical dispersion (employment and population)	
55	I Hardill, A Green	Remote working—altering the spatial contours of work and home in the new economy	2003	_Less commute to work _Traffic & congestion & emissions		_Office can be anywhere (employers are reducing real estate costs by closing or scaling down costly office facilities)
56	DE Bailey, NB Kurland	A review of telework research: Findings, new directions, and lessons for the study of modern work	2002	_Travel time _Travel distance _Commute		

Table A-3. Classification of the reviewed literature by major theme/concept- **Keyword: Telework**

	Authors	Title	Year	Transportation Related Factors	Place-based Factors (BE attributes)	Workplace/office-related Factors:
1	T Okubo	Telework in the spread of COVID-19	2022	_Travel time		
2	F Wöhner	Work flexibly, travel less? The impact of telework and flextime on mobility behavior in Switzerland	2022	_Less work Commute But more non-work commute _Less VMT _Traffic congestion	_Living in larger distance from work	
3	A Ollo-López, S Goñi-Legaz, ...	Home-based telework usefulness and facilitators	2021	_Travel Costs _Commute _Traffic congestion _Emissions _Travel time	_Live far away from workplace _Recruit and retain talented workforce _Overcome geographical constraints and employees' geographical dispersion _	
4	C Athanasiadou, G Theriou	Telework: systematic literature review and future research agenda	2021	_Less work commute	_Employees can live farther to the workplace _absorb and retain workforce	
5	C Bjursell, I Bergmo-Prvulovic, J Hedegaard	Telework and lifelong learning	2021	_Travel Costs _Commute _Traffic congestion _Emissions _Travel time		
6	D Ker, P Montagnier, V Spiezia	Measuring teleworks in the COVID-19 pandemic	2021		_moving to periphery to rural areas	
7	E Elldér	Telework and daily travel: new evidence from Sweden	2020	_Less travel demand _Active transportation modes _Travel distance _Travel time _Less VMT _Traffic		

8	P López-Igual, P Rodríguez-Modroño	Who is teleworking and where from? Exploring the main determinants of telework in Europe	2020		_Moving outside of urban areas (Living in urban areas is no longer significantly associated with telework once different arrangements are considered-p.11)	
9	L Gschwind, O Vargas	Telework and its effects in Europe	2019	_No/less work commute		_Reduction in office space
10	K Lister, T Harnish	Telework and its effects in the United States	2019	_Travel time _Traffic congestion _Emissions _Travel costs	_Retain talent: talented workforce can work from anywhere and everywhere	
11	JC Messenger	Introduction: Telework in the 21st century–an evolutionary perspective	2019	_No/less work commute _Travel costs _Travel time	_ Spatial independence from workplace	
12	R Moeckel	Working from home: Modeling the impact of telework on transportation and land use	2017	_Travel time _Commute burden	_Moving out of central parts of cities-Household relocation: "may induce urban sprawl _Housing locations may be affected: teleworkers are more flexible in housing search and often will select more remote areas, where housing is cheaper	

13	B Vilhelmson, E Thulin	Who and where are the flexible workers? Exploring the current diffusion of telework in Sweden	2016	_Travel time _Less physical transportation _Congestion & Emissions	_Attract qualified workers (from distant locations) _Spark economic growth in remote regions _Offer more locational flexibility among both employers and employees _Allow towns and rural areas at a distance from urban centers to improve their relative attractiveness	
14	M Hynes	Telework isn't working A policy review	2014	_No/less work commute _Reduce need for transport infrastructure Emission & noise pollution		
15	P Neirotti, E Paolucci, E Raguseo	Mapping the antecedents of telework diffusion: firm-level evidence from I Italy	2013		_Create broader geographic scope for firms	
16	EH Offstein, JM Morwick, L Koskinen	Making telework work: Leading people and leveraging technology for competitive advantage	2010		_To do work without limitation of geography _Secure talents without need to relocate in a specific workplace	_reduction in office space _Reduction in office infrastructure
17	TD Golden	Applying technology to work: Toward a better understanding of telework	2009		_Work independently from location	_Save office space
18	V Helminen, M Ristimäki	Relationships between commuting distance,	2007	_Travel distance _Travel reduction _Traffic & congestion	_Work is no longer bound to a certain location	

		frequency and telework in Finland			
19	D Hislop, C Axtell	The neglect of spatial mobility in contemporary studies of work: the case of telework	2007	_Less need for transportation infrastructure to connect homes to workplaces	_spatial distance is less and less of a barrier