Article

Innovation Districts: Assessing Their Potential as a Strategy for Urban Economic Development

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Abstract

Innovation districts have gained attention as a fast-spreading urban economic development strategy, raising numerous questions. What are their distinguishing attributes? Are they a substantive policy innovation? Are they likely to succeed in fostering innovation and economic dynamism? We propose a definition of innovation districts based on their characteristic features. Given the ambiguity of the term in practice, this is crucial for understanding and analyzing the strategy. We then evaluate innovation districts by applying theories and current understandings of the spatial and economic development aspects of innovation, entrepreneurship, and human capital, illustrating with examples from Boston, Detroit, Saint Louis, and San Diego. We conclude that the combination of components that comprises innovation districts is both new and valuable. Innovation districts present a potential pathway for advancing regional economic development goals via the pathways of innovation and entrepreneurship. We stress the importance of rigorous empirical evaluation and research regarding a variety of practical and strategic concerns.

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Introduction

Bennett Harrison penned "Industrial Districts: Old Wine in New Bottles?" (1992) thirty years ago. He argued that industrial districts, then being promoted as a regional economic development model based on several European case studies, constituted more than a re-emergence of the long-recognized importance of agglomeration economies. The crucial addition, according to Harrison, was the recognition that local economic relationships are mediated by institutional actors and regulated by cultural norms and values. This conceptualization of the embedded nature of economic transactions—outside of the dominant neoclassical logic—conveyed a new perspective and carried important implications for formulating regional development policy.

This article examines innovation districts, an urban economic development strategy that became prominent in the United States during the 2010s. Like industrial districts in the early 1990s, the innovation district notion resembles ideas that have been part of the American local economic development toolkit for decades (and it borrows from an early European case). Yet the boundaries of the concept are not distinct. The idea of innovation districts has been elaborated mainly through praxis, as the strategy has diffused and been customized across locations.

To evaluate the innovation district strategy, we apply leading theories in economic geography, innovation, and economic development to understand the extent to which the features of innovation districts correspond with the implications of the theories as well as traits of innovation-intensive local economies. We do not evaluate the innovation district strategy on the basis of empirical outcomes, since most innovation districts have not been in place long enough to support valid empirical assessment. Although the antecedents of some innovation district efforts trace further back, formal innovation district policies in United States cities only began in 2010. This generates a dilemma common in policy analysis: the need for appraisal precedes the capacity for rigorous outcome-based empirical research. Once sufficient time elapses to permit examination of the impacts and effectiveness of economic development programs, considerable time, effort, and political capital have been committed irretrievably, and lasting changes made to the urban fabric. This predicament reveals the value of preliminary assessments prior to widespread and irrevocable policy actions. Consequently, we do

not aim for either a wholehearted endorsement or a full repudiation of innovation district policy. Instead, our purpose is to provide an accounting of the foundational characteristics and key design factors that shape innovation districts as an urban economic development strategy.

First, we carefully define the innovation district concept. Recognizing the shared features that constitute innovation district policies and approaches is an integral step toward providing useful guidance for designing and implementing effective local economic development policy. Next, we analyze how innovation districts are positioned with respect to current understandings of innovation and urban economic development, illustrating and contrasting with selected examples. Then we address the question of whether innovation districts offer something new and helpful to the repertoire of local economic development practice, or instead are a repackaging of existing approaches and practices into a "shiny new bottle." Even if innovation districts are not at all novel, the label itself may generate value as a tool for marketing the set of policies and attention to the public and to economic development practitioners at large.[1] Finally, we discuss issues of concern and offer suggestions to guide future research on innovation districts.

What are Innovation Districts?

Innovation districts have fast gained attention as a new urban economic development strategy, buoyed by well-publicized early models in Barcelona and Boston.[2] (Barcelona's 22@ district was established in 2000 and the Boston Innovation District in 2010.) Cities across the United States have designated locations and enacted a variety of economic development policies under the rubric of innovation districts. Bruce Katz of the Brookings Institution and several co-authors have been especially energetic in promoting the strategy (Katz and Bradley 2013; Katz 2014; Katz, Vey, and Wagner 2015; Vey et al. 2018; Wagner, Katz, and Osha 2019; Vey and Wagner 2020).

Innovation districts, however, are not a well-defined concept. The innovation district idea has become "fuzzy," that is, too diffusely applied for positive identification and targeted policy prescription (Markusen 1999). As enthusiasm about innovation districts has spread, so has latitude in applying the term (Katz, Vey, and Wagner 2015). Katz and Bradley's (2013, 114) description refers to their ambition and supporting features: "innovation districts cluster and connect leading-edge anchor institutions and cutting-edge innovative firms with supporting and spin-off companies, business incubators, mixed-use housing, office and retail, and twenty-first-century amenities and transport." These traits—spatial proximity, transportation, mixed-use development, and modern amenities—imply an urban environment without explicitly specifying the setting. Innovation, a complex and contested concept itself, is included

recursively in the description and elsewhere is applied broadly. Crucially absent from the perspective of policy design are the action agents. Is the public sector or are anchor institutions responsible for developing innovation districts?[3] Katz, Vey, and Wagner (2015) suggest that they can arise from undirected market forces—would such an origin make innovation districts unsuitable for purposive policy direction?[4]

Katz and Wagner (2014) add the descriptor "urban," proclaiming three types of innovation districts. One type is not urban but would like to be: the "urbanizing" exurban science park. The other two classes are "reimagined urban areas"—underutilized places, often industrial and run-down, where existing physical assets can be remade to support innovation activities; and "anchor-based" districts, areas of activity surrounding institutions engaged in innovation. Their discussion skirts the question of the actors involved, and only the reimagined urban area examples incorporate policy action as a central factor in their development. Moreover, some "innovation districts" sport the label only as a hopeful signal or inexpensive marketing device (Katz, Vey, and Wagner 2015).

We propose a more precise definition: innovation districts are spatially delineated urban areas in which firms and other organizations aim to foster innovation, deliberately supported by policies and programs, contemporary amenities and infrastructure, and conducively structured economic and social spaces. We constructed this definition to systematically separate innovation districts from apparently similar policies, mediating between the breadth of ideas expressed in the literature and the need to bound the scope of the concept for analysis. The definition encompasses many of the most prominent innovation districts, while imposing limits sufficient to permit analysis and draw implications for urban economic development.[5] We drew upon the understandings and attitudes of stakeholders involved in innovation district design and operation as one input in formulating the definition (see "Innovation District Case Examples" below). To restate, the required components of innovation districts according to our definition are (1) active and intentional fostering of innovation, (2) physical demarcation, and (3) urban spaces, amenities, and infrastructure.

Innovation districts aspire to create conditions to spur innovation in entrepreneurial ventures and possibly in established firms as well. Toward this end, local governments, non-profit organizations, and private firms engage in various direct and indirect approaches. Beyond establishing the physical boundaries of the district, local governments may provide enabling infrastructure, redevelopment funding, supportive land use regulations, or marketing. Local governments may administer the innovation district or help to establish a quasi-public agency to operate the innovation district. Non-governmental organizations may

commit assets and resources or can draw attention by publicizing their support and encouragement.

Physical demarcation places innovation districts in a specific urban space, fixed either initially or after the fact with some degree of intentionality. This excludes predominantly market-formed regions with indefinite boundaries, such as Silicon Valley in California and Massachusetts's Route 128 area. Innovation districts vary in size, but follow the shifting geography of innovative organizations and talent toward compact, connected environments that encourage face-to-face interactions and networking while reducing or even disregarding separation between work and leisure (see "Are Innovation Districts Primed to Succeed?" below) (Glaeser and Gottlieb 2006; Polese 2014). Such places feature accessibility, density, and cultural and recreational amenities distinct from suburban business locations, targeting younger generations and building their activity into what Florida terms "buzz" (Florida 2002b; Carlino and Saiz 2008).

We note that our definition retains the extensiveness of the innovation concept. In contrast to the assertion by Katz and Wagner (2014) that innovation districts endeavor to produce new ideas and products by combining disparate industries and specializations, innovation district organizations and promotional materials normally do not explain their understanding of innovation. Most innovation districts implicitly consider innovation broadly as the application of new ideas and technology in economically valuable production, driving the growth and dynamism that is the rationale for the strategy. Innovation also may encompass cultural and artistic novelty, underpinning creativity-based development strategies. Whereas innovation districts can constrain the meaning of innovation as part of a targeted development approach, such as is pertinent to a particular industry (e.g., new financial analytical methods and instruments), we do not observe this as a common practice.

Innovation District Case Examples

This analysis uses four innovation districts as demonstrative examples for the discussions below. Table 1 summarizes the key components of the four innovation districts. In addition to meeting our definition and labeling or promoting themselves as innovation districts, we selected these cases to exhibit comparisons and contrasts along several dimensions of interest: geographic location, regional economic structure, district organizational ownership and management, and anchor institution presence. These four cases are not representative of the breadth of innovation districts throughout the United States (or worldwide). Our aim in this study is to assess innovation districts overall as an approach to economic development, not to judge individual

Table 1. Features of Four Innovation Districts.

	Boston Innovation District/Seaport	Detroit Innovation District	Cortex Innovation Community	I.D.E.A. (Innovation + Design + Education + Arts)
Region	Boston	Detroit	St. Louis	San Diego
Established	2010	2014	2010*	2011
Instigating Actor(s)	City of Boston	Non-profit community	Anchor (research) institutions	Private developers
Antecedents	No major antecedents	TechTown entrepreneurship hub, Midtown revitalization	Multiple technology- and innovation-based development plans	No major antecedents
Physical delineation	1,000 acres in South Waterfront	2,750 acres in Downtown, Midtown, and New Center	187 acres in Midtown	Ninety-three acres in East Village
Urban spaces and amenities	Mixed land uses, compact residences, co-work spaces, physical connectivity	Residential and commercial/industrial uses in proximity, co-work spaces	Uses separated but in close proximity, public transportation enhancements	Intended mixed-use buildings and co-work spaces, public transportation
Anchor Institutions	District Hall, Convention Center, Contemporary Art Institute	Wayne State University, College of Creative Studies, Henry Ford Health System	Washington University, St. Louis University, University of Missouri-St. Louis, BJC HealthCare, Missouri Botanical Garden	University of California, San Diego Division of Extended Studies
Entrepreneurship emphasis	Start-ups	Mix of established firms and start-ups	Mix of established firms and start-ups	Start-ups

(continued)

Table 1. (continued)

	Boston Innovation District/Seaport	Detroit Innovation District	Cortex Innovation Community	I.D.E.A. (Innovation + Design + Education + Arts)
Industry emphasis	No industry emphasis	Healthcare, manufacturing, design	Life sciences	Arts and design, information technology

* Founded in 2002 as Cortex; reimagined and renamed in 2010 as an innovation district.

innovation districts or their constituent policies. Detailed selection information and analysis of each of these four cases are available in Drucker, Kayanan, and Renski (2019).

We collected the information for each case through a review of primary and secondary documents, on-site tours of the districts and their environs, and a collection of 119 semi-structured interviews. The documents included news and other media items, reports and development plans authored by organizations involved with the innovation districts, policy documents, marketing materials, and archival references as available. The site visits occurred between March 2015 and August 2017, combining direct site observation with interviews and occasional attendance at local meetings and events when possible. The interviews were conducted with local actors and stakeholders: those involved in planning and implementing the innovation district, economic development officials, local planning experts, and residents and business owners either directly involved with or located near the district. We recruited interview subjects by email and telephone and conducted most of the interviews in person during the site visits. The initial interview subjects were identified through the document analysis. We solicited suggestions for additional subjects at the conclusion of each interview, continuing this form of snowball sampling until few or no new possibilities were proposed. The interviews inquired into the concept of the innovation district, goals and intended outcomes, policy design features, challenges, and engagement and relationships with public, private, and community actors (see the Appendix for a sample interview guide).

Are Innovation Districts Primed to Succeed?

For local leaders and policymakers, the crucial unanswered question about innovation districts is what they are likely to achieve. As described above, the relative recency of innovation districts and the diversity in their implementation make it problematic to evaluate their economic achievements directly. Instead, we assess how well innovation districts are positioned to accomplish their fundamental aim, illustrating with examples from the four cases studied in depth. According to theories and observations of the modern economy, are innovation districts suited to encouraging innovation and stimulating economic development?

The Spatial Geography of Innovation: Scale and Proximity

Innovation activity benefits from locating in proximity to other innovations. A primary reason is the capability of innovative enterprises to access useful knowledge produced externally by the firm (Marshall 1910; Audretsch

2003). Co-location encourages specialized knowledge to diffuse within industries and also supports the process of combining knowledge across different domains to produce original insights. The distance across which such knowledge spillovers are effective depends on the kinds of knowledge and actors involved. Empirical studies find that knowledge generated by large research institutions (i.e., universities and research centers) may travel readily across metropolitan-scale distances, but firm-to-firm knowledge transmission requires much closer proximity (Goldstein and Drucker 2006; Drucker 2016; Sonmez 2017; Fang and Drucker 2021). As might be expected, innovation-intensive industries tend to be more dependent on nearby knowledge spillovers than other industries (Audretsch and Feldman 1996b; Drucker 2012; Fang and Drucker 2021).

Beyond knowledge spillovers, spatial propinquity facilitates face-to-face contacts and chance meetings among innovative actors, helping to establish professional and interpersonal networks (Autant-Bernard, Mairesse, and Massard 2007; Christopherson, Kitson, and Michie 2008). Informal and cross-sector links (i.e., "weak ties"), especially valuable for generating imaginative ideas, are particularly difficult to form and maintain across distances (Sonmez 2017). Many of the events and activities that innovation districts sponsor or host relate to forming linkages and strengthening networks.

The Cortex Innovation Community in St. Louis is predicated upon proximity. Its location leverages a confluence of prominent research institutions in the Central West End neighborhood, four miles west of the central business district. Three anchors (Washington University's Medical Center Campus, St. Louis University, and BJC HealthCare) adjoin Cortex; two others (University of Missouri-St. Louis and Missouri Botanical Garden) are only a few miles distant. With substantial innovation activity transpiring nearby, the innovation district is positioned to bridge institutional divides and to recruit and retain business and commercialization activity to connect with knowledge producers. Cortex's programming features regular networking events for tenants and the broader community, entrepreneurship mentoring, and assistance connecting start-ups to venture financing opportunities.

Innovation districts are not the only economic development strategies that rely on proximity. Before it became an innovation district, four of the anchor research institutions initially funded Cortex as a non-profit planning and redevelopment organization focusing on the life sciences.[6] In this earlier iteration, Cortex also emphasized the strategy of bringing together the many scientists, researchers, and students already close by and connecting them to private sector entrepreneurs and innovative activity.

During the 2010s, some city centers became desirable locations for technology-intensive and high-paying service industries, stemming or reversing long-term trends of downtown employment decline (Moretti 2012; Polese

2014; Giuliano, Kang, and Yuan 2019). Business and professional services especially favor densely occupied areas that facilitate direct personal interactions; for these industries, the greater space costs are balanced by modest physical space requirements. The benefits of knowledge spillovers and networking generate a comparable locational calculus for technology-based innovation and entrepreneurship activities, which innovation districts seek to satisfy (Florida, Adler, and Mellander 2017; Jones, Granzow, and Shields 2019).

The strategy of the Seaport Innovation District, as established by Boston Mayor Thomas Menino in 2010, was to leverage location to redevelop the neglected South Waterfront. The approximately 1,000-acre peninsula of underutilized warehouses and disinvested factories, situated across the Fort Point Channel from Boston's central business district, had recently become well-linked to the city center, and the rest of the region, through highway and public transit extensions and the pedestrian HarborWalk.[7] The site's centrality justified the innovation district approach. The location readily supported the creation of a landscape with attractive proximity, connectivity, and urban texture and features. Seaport was promoted as offering relatively affordable space in a strategic location and rapidly acquired appeal for startups, small firms, and entrepreneurs. Soon, though, escalating development momentum attracted larger, established corporations pursuing the district's trendiness to attract workers and signal imaginative workplace cultures. The city's acceptance and indeed approval of this shift demonstrates that the manner of redevelopment was less important to the city than achieving economic revitalization in whatever form. Ultimately, mushrooming demand and upward-spiraling prices, jumpstarted and then propelled further by the location's advantages, have turned the Seaport into a mostly traditional mix of expensive offices, luxury retail, and high-rise residences.

Although their footprints vary somewhat in size, innovation districts operate on a neighborhood scale, consistent with maximizing knowledge spillovers and supporting chance encounters, informal interactions, and networks. Boston's Seaport Innovation District, relatively large at more than a square mile, managed to merge four historic neighborhoods through plan consistency and public investments. The Detroit Innovation District was much bigger. The district boundaries enclosed some 3,000 acres extending from Detroit's central business district northward. Much of this area lacks both public transportation options and density. Large edifices surrounded by surface parking predominate the built environment. In addition to fostering innovation, concessions to multiple aims enlarged the innovation district: accelerating revitalization around existing anchors and firms, developing physical infrastructure (buildings and public spaces), creating accessible opportunities for residents, and attracting additional state and federal

funding. The extensive district footprint encompassed most of Detroit's innovation assets, including Wayne State University, several satellite locations of other Michigan universities, multiple hospitals and medical research centers, and venture capital firms. The size and lack of density of the area, however, precluded the proximity-based mechanisms of innovation from operating effectively and also hampered efforts to signify and market the innovation district. Perhaps recognizing this fundamental disconnect, Detroit leaders and stakeholders have transitioned from the innovation district to development strategies better aligned with community goals of wider regional inclusivity and neighborhood-based business and employment opportunities.

The idea of innovation districts fits well with current understandings of the spatial geography of innovation. Through propelling entrepreneurial and innovative firms to cluster spatially and facilitating networking and contact development, innovation districts should lead to more or higher quality innovations, and thus to increased economic activity. On the other hand, taking advantage of the knowledge produced in universities and research institutions may not require gathering potential recipients into their immediate vicinity; locations across the city and region and even extending to neighboring metropolitan regions may be close enough. A different concern is that rapid transportation, sophisticated telecommunication, firm, and employee mobility, and urban scale-up disadvantages all may limit the local impact of innovation districts on the outcomes of jobs and income that matter to communities and politicians (Potter and Watts 2011; Shearmur and Bonnet 2011; Duranton and Kerr 2018). Furthermore, innovation and the benefits of concentration tend to decline as firm or industry life cycles progress and multi-location firms implement a spatial division of activity (Audretsch and Feldman 1996a). If firms can enlarge profits by moving to less costly locations once innovation intensity and proximity advantages diminish, the economically lagging, less-desirable cities may be those least likely to reap long-term benefits from creating active and successful innovation districts.

Entrepreneurial Ecosystems

An entrepreneurial ecosystem is the set of actors, assets, and activities external to entrepreneurs that constitute the environment within which entrepreneurs operate. The quality and features of the entrepreneurial ecosystem affect the likelihood of individuals choosing to become entrepreneurs, the type of business entrepreneurs establish, and the probability of entrepreneurial success, thus contributing to local competitiveness.[8] Some common elements include knowledge-producing organizations, human capital and workforce characteristics, financial capital, government regulations and supports, business services, interfirm networks, and local business climate and culture.

Their title notwithstanding, entrepreneurial ecosystems is sturdier if they incorporate a variety of types of firms and organizations: not only start-ups but also established ventures, not only small and vigorous enterprises but also large and mature companies (Audretsch et al. 2018). Each type of firm is capable of contributing something different to the mixture, from dynamism or inventiveness to stability or resourcefulness. Regional innovation outcomes are advantaged similarly by the combination of entrepreneurial endeavors with older and larger firms (Cohen and Klepper 1992; Martin and Scott 2000; Feldman, Link, and Siegel 2002, Ch. 4; Agrawal et al. 2012). Companies with established products tend to pursue more incremental, time- and cost-saving innovations, whereas start-ups are more likely to seek and find entirely new technological and market niches. In addition, the greater resources of large firms enable them to bear greater risk, investing in projects that offer potentially large returns across long time horizons.

Ecosystems of any kind take time to develop. Communities attempting to create or complete an effective entrepreneurial ecosystem should expect the process to be ongoing for many years (Audretsch and Pena-Legazkue 2012). The measure of an entrepreneurial ecosystem's strength is not its number of entrepreneurs. Indeed, all else equal, more entrepreneurs imply more business attempts of marginal quality or potential (Shane 2009). One measure of success may be that the ecosystem requires relatively less public sector support and guidance over time in order to sustain high levels of innovation and entrepreneurship (Colombo et al. 2019). Vibrancy is another desirable end, as ongoing activity and flux represent opportunities for entrepreneurs (Stangler and Bell-Masterson 2015).

Innovation districts are a long-term strategy (in political terms), expected to take many years or even decades to reach maturity and contribute substantially to the economic vitality and footprint of the region. Therefore, they may be vulnerable to shifts in local governance or political cycles. In accordance with the ecosystem perspective, innovation districts may, and often do, involve a wide variety of actors (i.e., firms, employees, anchor institutions, and government) and kinds of policy support for entrepreneurship. The focus on attracting (or retaining) suitable human capital and workforce talent appears in the attention to urban quality of life and residential options. At least within the spatial confines of the innovation district, however, there is not an impetus for achieving the balance of firm types that is inherent in the strategy.

The Boston Innovation District specifically targeted entrepreneurial ventures, initially housing few established firms. The city claimed 200 new companies between 2010 and February 2013 (City of Boston 2013). The institutions that anchored the innovation district were public venues and cultural organizations, not private firms. With the design and support of the

innovation district aimed at new enterprises, an entrepreneurial firm graduating into a growth stage likely would not have been able to enlarge its scale within or close to the district in a cost-effective manner. The intention was for the district to serve as a nursery for start-ups, with successful growth-oriented ventures relocating elsewhere within the metropolitan region—a reasonable approach within the robust Boston regional economy, perhaps, but one that does not produce a healthy entrepreneurial ecosystem at the local scale. Then the city began pursuing established firms using combinations of local and state tax incentives and infrastructure investments, recruiting Vertex Pharmaceuticals from Cambridge in 2014, and rapidly escalating to snare the headquarters of General Electric in 2016.[9] As described above, the city was content to redeploy its development efforts from entrepreneurship to upscale office and residential properties.

Cortex is embedded in a very different economic environment. St. Louis is known as a corporate and manufacturing center, a traditional strength that has been suffering a decades-long deterioration. To offer one illustration, from 1980 to 2016 the number of Fortune 500 companies headquartered in the St. Louis region plummeted from twenty-three to nine. Acquisitions and consolidations continue to diminish the corporate presence (Feldman 2016). The primary economic development rationale for Cortex (as for its earlier iteration as well as some preceding efforts) is to establish entrepreneurship as a driver of the regional economy, bringing diversity and dynamism to both new ventures and established companies, and balancing the historic dominance of large firms. Cortex has deliberately encouraged and attracted a mix of firms in terms of size and tenure. Alongside start-up ventures, university research laboratories, and industry support organizations, the innovation district is home to Boeing, DuPont, General Dynamics, and Microsoft, among other national and multinational firms. Importantly, these companies' facilities in Cortex are not headquarters but research divisions, most of them focusing on innovation in the areas of biotechnology or information technology. The firms choose to operate within the innovation district to take advantage of the active entrepreneurial environment. In so doing, they help to buttress the potency of the entrepreneurial ecosystem, benefitting themselves, other firms, and the regional economy.

Anchor Institutions

Anchor institutions occupy a distinctive role in economic development. Essentially, they are tied to a region, usually because of their size and spatially committed investment, sometimes also because their responsibilities or even raison d'être relate to the particular location (e.g., a locally oriented philanthropy).[10] Anchor institutions engage with their communities in order to

facilitate their mission, generate goodwill, improve their own operating environment, satisfy the wishes of resident leadership and staff, or for a combination of these reasons. Universities are the most common type associated with innovation districts, but other knowledge producers also may be effective anchor institutions, such as laboratories, research institutes, and civic institutions.

Public universities in the United States, in particular land grant institutions funded initially through the sale of federal lands, have had public service as one of their primary functions since their inception.[11] The original public duty of land grant institutions was to provide military, agricultural, and later industrial, training to state residents. The public responsibilities of land-grant and other public institutions of higher education gradually broadened to include making higher education accessible throughout the community, engaging in community-based and shared research and learning processes, and providing expertise and guidance to governments and projects in the public interest. More recently, many private educational institutions, as well as public universities and other non-profit anchor institutions such as hospitals and medical systems, have responded to criticisms of selfishness and detachment by devoting resources and establishing permanent programs to interact with and improve their surrounding communities (Kleiman et al. 2015). The focus on economic and community development reflects the belief that the institutions themselves benefit from being located in healthier and more desirable locations. Policymakers and institutional leadership alike increasingly perceive the civic role of anchor institutions as core to their organizational missions (Uyarra 2010).

The innovation district strategy frequently seeks to leverage anchor institutions, their knowledge or innovation output, in particular, and also pursuing commitments of physical and financial resources, effort, and expertise in collaboration with private and public sector actors. This approach is overt in St. Louis: Cortex was directly initiated and funded by the surrounding research institutions; the Washington University School of Medicine was an early tenant of Cortex, anchoring its second building. Anchors often provide assembly and meeting space, sponsor events, underpin networks, and supply education and workforce training of great value to entrepreneurial ventures. Such was (and continues to be) the role of the publicly funded District Hall in the Seaport in Boston; however, District Hall does not engage in direct innovation or knowledge production activity. Three important local research and educational institutions—Wayne State University, the College of Creative Studies, and the Henry Ford Health System—anchored the Detroit Innovation District, the boundaries of which were configured so as to also encompass many of the city's cultural institutions.

The I.D.E.A. District in San Diego lacks an effective anchor institution.[12] The East Village is not near to the major research institutions of the region. Indeed, the innovation district founders envisioned the I.D.E.A. District as a vehicle to draw more of the region's existing innovative activity into San Diego's downtown, and so sought to recruit a suitable anchor institution. The new East Village branch of the University of California, San Diego Division of Extended Studies, which opened in May 2022, realizes a primary development goal of the innovation district (University of California 2022). The branch location is expected to supply event space and workforce development programming, and possibly additional anchoring functions.

It is evident that large, prominent, active anchor institutions benefit innovation districts, but it is not clear whether anchors are necessary for innovation district success, and if so at what scale or with what range of activities. The variation in types, resources, and engagement levels of anchor institutions across innovation districts form a natural experiment that may eventually help to provide an answer.

Urban Amenities and Lifestyle

The so-called new economy, advancing services over physical production and expanding the division between knowledge-intensive and routine work, privileges urban sites as places where coveted employees prefer to live, work, and play all in the same location (Moretti 2012). The shift is partly generational. As a generalization, younger workers tend to prefer compact and walkable neighborhoods, varied cultural and social opportunities, and ready public transportation connections. They reject the bland, homogenous, automobile-dominated suburbs and exurbs in favor of the excitement and stimulation of urban living (Florida 2002a: Polese 2014). Innovative and entrepreneurial businesses seek highly talented workers as a decisive competitive advantage and therefore perceive locations that appeal to such individuals as a business imperative.

Cultural amenities and infrastructure are key elements of innovation district strategies. Through developing in dense fashion, with a mix of land uses, co-working spaces, compact residential options, public spaces, and convenient physical connections via public transportation, innovation districts are able to attract entrepreneurs and the highly qualified workers that fledgling companies require. Innovation districts often sponsor recreational, social, and cultural attractions, and promote a mix of residential and commercial opportunities as central to their character. Although they are not the only urban sites to promote desirable amenities and features, innovation districts bring together many positive aspects in a circumscribed location. In so

doing, innovation districts provide an opportunity to help shape the outward-facing image or brand of the city or urban region (Clark, Moonen, and Couturier 2016; Saffron 2016).

Urban lifestyle is thus a key characteristic that modernizes innovation districts in comparison to the older economic development approach of research parks. In stark contrast to the suburban landscapes and separated structures of the La Jolla and Torrey Pines communities surrounding the University of California, San Diego, the East Village location of the I.D.E.A. District presents a distinctly urban fabric. East Village occupies a regular street grid, and together with the blocks immediately adjacent features varied building types that house an assortment of offices, retail services, and residences. The mix of activities and residences supports neighborhood-scale liveliness that extends well beyond typical business hours.[13] Moreover, the opening stage of the development of the I.D.E.A. District focused on publicizing and "activating" the location via the Makers Quarter—a six-block section of the innovation district containing a brewery, a co-working facility, an outdoor event space, a community and educational garden, and a fabrication shop geared to community amateurs. The innovation district is within comfortable walking distance or a quick transit ride from the convention center and the bustling Marina and Gaslamp neighborhoods.[14] The urban texture and diverse activity feature prominently in the promotional materials and efforts of the innovation district. The early marketing of the Boston Innovation District similarly touted the integration of living spaces with offices and other workplaces, supported by altering city zoning to ensure the provision of compact residential units.[15] A substantial share of the practical effort of developing the Detroit Innovation District was devoted to fostering a welcoming atmosphere, in order to convince talented individuals to both work and reside locally (Berglund 2020). These actions centered on the provision of amenities such as bars, restaurants, and entertainment, as well as improvements in public safety.

The development of the Cortex Innovation Community has brought urban amenities and facilities, such as a MetroLink (light rail) station, bicycle paths, greenways, and a centrally located public park that doubles as an arts and outdoor event space. Some other services are more upscale, such as a couple of stylish independent eateries, a fitness center, and a boutique hotel. The location presents a more suburban character than the other innovation districts studied, with widely separated buildings surrounded by ample parking. This blend of qualities may reflect Cortex's roots as a more traditional bioscience park, its location near the edge of the city of St. Louis, and its continued emphasis on life sciences firms, whose entrepreneurs and employees tend to be older and more family oriented than in other innovative sectors.

Summary

The structure and features of innovation districts seem to deliver a reasonable fit with characteristics of modern urban economies and strategic theories of innovation and entrepreneurship. Not every feature of innovation districts is a necessary match for each facet of the innovation economy, yet each component is important in some manner. For example, whereas the knowledge produced by universities and research institutions likely is accessible to firms and other innovative actors well beyond the boundaries of the innovation district, these and other types of anchor institutions serve important guidance, hosting, and networking roles within the entrepreneurial ecosystem of an innovation district.

Narrowing the scope of innovation districts may have led to the conclusion above. In other words, in applying our definition we may have restricted our examination to those innovation districts that correspond better with the implications of prominent innovation and entrepreneurship theories. The wider range of strategies that are termed innovation districts in practice may not offer as consistent a fit with innovation theories. Nevertheless, that is useful information for policymakers. Innovation districts that are designed to suit the definition proposed for this analysis—districts that concentrate their multiple elements together in a single location and with a coordinated set of policies—are potentially better suited to foster innovation and entrepreneurship.

Are Innovation Districts New?

We contend that innovation districts do represent something new in urban economic development. The combination of the components of spatial designation, active cultivation of innovation activity, and modern urban amenities and spaces creates an admixture that exceeds the sum of its parts. Spatial designation, on its own or accompanied by geographically targeted business incentive programs, serves to promote and market a location, spotlighting it for the media, investors, relocation consultants, etc. Yet without a strong and supportive entrepreneurial ecosystem, firms that originate or locate there are no more likely to achieve innovation success than elsewhere. Policies supporting innovation across a large city or region are common; whereas they may enhance the sum total of innovation, enterprises dispersed across space lack the knowledge spillover and networking advantages of a spatially clustered setting. Involvement with innovation districts channels the efforts of economic development entities toward a specific location, and furnishes a structure for coordinating the goals and efforts of government agencies, non-profit organizations, and private firms (Kleiman et al. 2015).

Many cities offer and promote the kinds of physical environments, cultural attractions, and recreational opportunities that are in demand among coveted segments of the workforce. The innovation district strategy coordinates public and private providers such that appealing characteristics are available together in a particular location intentionally selected for development.

A useful variant of the question is *how different* innovation districts are from the other strategies in the economic development repertoire. Such a comparison could be quite lengthy; we briefly discuss a few examples here (see Table 2). Research parks aspire to supply a beneficial location for research-intensive firms or the research arms of multi-site companies. Co-location with other firms and often with a knowledge-producing institution establishes the potential for agglomeration benefits, and research park affiliation can offer direct advantages such as preferred access to personnel and specialized equipment. Innovation districts similarly generate agglomeration advantages through proximity and may provide preferential or exclusive access to the resources of associated institutions. The plainest contrast between the two strategies is in the physical characteristics and mix of uses. Research parks, often located in suburban or exurban locations, insulate their occupants from bustle, commotion, and distraction. Uniformity of uses, with minimal commercial or other activities (mostly a few minor conveniences), avoids disruption in support of clear, concentrated thought (Mozingo 2011). Innovation districts typically take the opposite approach, fusing functions into a "live-work-play" environment and encouraging energy and excitement, though the extent of the contrast varies (see subsection "Urban Amenities and Lifestyle" above).

Incubators are organizations or programs that provide services and assistance to fledgling businesses to nurture them toward self-sufficiency (Qian, Haynes, and Riggle 2011). An incubator may provide a building or a portion of a building to congregate early ventures physically or may operate "virtually." An innovation district may include an incubator as part of its programming to encourage and sustain innovative activity. Incubators by themselves, however, do not encompass a physical area offering uses and amenities beyond entrepreneurial space and associated support services, nor do they sustain more established companies. Enterprise or empowerment zones share several features with innovation districts, but not their mechanisms of economic development. Industrial parks are similar to innovation districts only in the aspect of spatially concentrating a type of use. To reiterate, these comparisons demonstrate that the features of innovation districts are not novel, but act in concert to produce a distinctive environment that maximizes the potential for successful innovation and entrepreneurship.

Table 2. Innovation Districts Compared with Selected Economic Development Strategies.

	Innovation District	Incubator	Research Park	Industrial, Business, and Office Parks	Enterprise and Empowerment Zones
Physical setting and urban spaces	Urban Dense, mixed-use amenities (cultural, recreational, residential) Integrated with surroundings	Varies: may be urban, suburban, or rural	Suburban Park-like Insulated from surroundings	Often suburban, but may be urban or rural Separated from residential and recreational uses	Often urban, but maybe suburban or rural Economically distressed
Physical scale and spatial delineation	Delineated district	Not delineated spatially Typically one or a few buildings	Delineated district	Delineated space ranging from one building to a district or neighborhood	Delineated district or neighborhood
Innovation and other economic development mechanisms	Spatial concentration of innovation Knowledge spillovers among innovators and anchor institutions Vibrant entrepreneurial ecosystem	Entrepreneurial services Some incubators focus on innovation-oriented enterprises Whether innovation-focused or not, may support innovation through networking, entrepreneurial	Spatial concentration of innovation Knowledge spillovers from anchor institution(s) to individual innovative entities	Spatial concentration of type or intensity of activity Some parks focus on innovation-oriented enterprises Suitable and comprehensive infrastructure	No innovation focus (in the United States) Tax and regulatory advantages Other public assistance

(continued)

Table 2. (continued)

	Innovation District	Incubator	Research Park	Industrial, Business, and Office Parks	Enterprise and Empowerment Zones
		training, and/or financing			
Entity types	Mix of entrepreneurial businesses, established businesses, and non-profit and support organizations	Entrepreneurial businesses	Innovative businesses	Businesses engaged in similar type or intensity of activity	Mix of entrepreneurial businesses, established businesses, and non-profit and support organizations
Governance	Can be public, private, or mixed	Can be public, private, or mixed	Can be public, private, or mixed	Typically private	Typically public

Conclusion: Issues and Concerns for Future Research on Innovation Districts

The idea of the innovation district has been expounded through praxis, with stakeholders and policymakers in different regions developing their own distinct versions of the concept. Identifying a consistent definition and baseline set of factors important to the success of an innovation district is valuable for guiding policymakers, economic development planners, and other stakeholders, as well as for facilitating further research into the economic development strategy. This paper draws upon our empirical investigation of four innovation districts in the United States to present a coherent definition of the currently fuzzy innovation district concept. We then assess this conception of innovation districts with respect to four subjects that stand out in economic development and economic geography theory as important considerations for fostering innovation and entrepreneurship in modern urban economies: proximity and scale, entrepreneurial ecosystems, anchor institutions, and urban amenities and lifestyles.

We find that the structures and features of innovation districts largely align with extant theories. Success in fostering innovation does not necessarily require the combination of all the characteristics outlined in this article. What distinguishes the innovation district from other place-based and innovation-focused economic development strategies is that it brings active efforts to foster and support innovation together with infrastructure, social spaces, and modern amenities in spatially demarcated urban spaces. We evaluate innovation districts on the basis of this distinctive convergence of features.

Innovation districts are continuing their expansion phase, and ongoing analysis is necessary as the approach continues to broaden in popularity and application. We advocate for rigorous empirical evaluation of economic development outcomes once innovation districts around the nation and the world have progressed far enough to enable such studies. In the meantime, we conclude by proposing several questions or issues for future research regarding innovation districts. Some topics may benefit from investigation of a larger set of innovation districts than we were able to examine for this study.

First, it would be helpful to further refine our understanding of the factors that enable innovation districts to achieve their aims. Are some features more influential than others? Some innovation districts exhibit certain characteristics more thoroughly than do other innovation districts. The anchor institutions in the Boston Innovation District—a convention center, an art institute, and a center for innovation (see Table 1)—provided cultural attractions, assembly and working space, and programs and services for innovators,

but did not produce economically valuable knowledge. Did the absence of a large innovation-focused anchoring organization contribute to the city's willingness to desert the innovation district strategy? Do the suburban aspects of Cortex in St. Louis diminish its distinctiveness and its appeal to potential entrepreneurs and employees relative to alternative locations within the region or in other metropolitan areas? Will different factors become more influential as innovation districts develop and mature?

Second, there are a number of issues pertaining to how innovation districts are applied as an economic development strategy. How will innovation districts respond to the successes of their constituent entrepreneurial ventures? Will firms seeking to scale up their production and reduce marginal costs be able to access affordable space? Or will those companies depart (perhaps relocating elsewhere within the region) and be replaced by new start-ups? Should cities concentrate on developing a single innovation district? The alternative is several, likely smaller, districts that target distinct industries or innovative capacities. Could several innovation districts better serve the peculiar tendencies and needs of entrepreneurs and innovative firms, or will multiple districts spread regional innovation resources too thinly to be effective? One explanation for the city's shift in the development strategy for the Boston Seaport might be a perceived lack of need, with innovative activities already concentrated and thriving in Cambridge and other locations around the region. A broader question, then, is for what types of cities and regions are innovation districts an efficient method of supporting innovation and entrepreneurship?

A longer-term worry is the degree to which innovation districts as currently constituted are dependent on the re-urbanization of population and business to be successful. The strategy burgeoned during the city resurgence of the 2010s (Kayanan 2022); both the designation of new districts and the development of existing innovation districts largely paused during the COVID-19 pandemic (as did so much else) but show signs of resuming (Wagner 2021). If the trend of entrepreneurs, innovators, and talented workers favoring urban lifestyles were to reverse, due to health concerns or changes in work arrangements, or another generational swing, will innovation districts adapt effectively? To proffer a brief response, whereas general inward flows of income and talent are helpful, innovation districts ought to be attractive absent overall urbanization trends, and would benefit from prudent designs that preserve substantial flexibility to revise spatial attributes and amenities if preferences shift.

Third, concerns are emerging regarding unintended or secondary consequences of innovation district development. The Boston Innovation District was criticized as lacking in charm and attractiveness, the product of a widely spaced street and building layout leftover from an earlier industrial

era, and prohibitions on building height due to the district's proximity to Logan Airport (Campbell 2014). Is an urban environment lacking in architectural diversity and visual aesthetics capable of attracting and maintaining economic and social diversity? Can lackluster development style be remedied through infill, artistic trimmings, or other efforts emplaced over time? Another problem is rising property costs. Boston, again the readiest example because of its longer history, witnessed a rapid appreciation of land and rental prices in the innovation district and the directly adjacent South Waterfront neighborhoods (Drucker, Kayanan, and Renski 2019; Kayanan 2022). The same issue impacts the other innovation districts in this study to somewhat lesser degrees (e.g., Swanstrom and Ploger 2022; Rossmeier and Weber 2023).

More generally, policymakers regularly promote innovation districts for goals other than producing innovative economic activity, including neighborhood placemaking and community revitalization. Promising additional goals, regardless of how necessary or worthy, may lead to structural or operational conflict with the original economic development purpose. The activation efforts in the San Diego I.D.E.A. District, the gradual growth of activity and expansion of services within Cortex, and the development of the Boston and Detroit innovation districts all are associated with changing population demographics within the district boundaries and in adjacent neighborhoods (Drucker, Kayanan, and Renski 2019; Kayanan, Drucker, and Renski 2022). Gentrification certainly is not a consequence that is unique to innovation districts, but its incidence may undermine their ability to attract potential entrepreneurs, and even more so to benefit existing residents. Fittingly, issues of equity and displacement that compel the question of which populations within a region stand to benefit from "successful" innovation districts are starting to receive attention within economic development circles (Morrison and Bevilacqua 2019; Zandiatashbar and Kayanan 2020; Filion, Reese, and Sands 2021; Kayanan, Drucker, and Renski 2022).

Appendix: Innovation District Interview Guide

Scope: Innovation District, Innovation (for policymakers, administrators, and economic developers)

1. What is the mission or predominant purpose of the innovation district?
2. Does the innovation district formally define what is considered innovation?
3. What kinds of economic activities are being sought for the innovation district?

Scope: Innovation District, Innovation (for firms and other stakeholders)

1. What do you consider to be innovation within the intentions of the innovation district?
2. Is your [firm/organization] innovative? Why or why not?

Innovation District Development and Features

1. What are the key features of the innovation district that encourage innovation?

   [Note possible contrast of material (amenities, infrastructure, participants) versus support (leadership, finance, governance, marketing) elements.]
2. What policies and programs encourage and support innovation?
   a. Are these policies specific to the innovation district (as opposed to city- or region-wide)?
   b. Which of these policies and programs are most important and why?
3. What current developments are occurring in the innovation district?
4. Which features and programs of the innovation district…
   a. are fully in place?
   b. are partially in place?
   c. are planned but are not yet in place?
5. What is the anticipated sequence or schedule for policies and features to be put into effect?
   a. What are the reasons behind this sequencing?
   b. Are portions of this sequence dictated or constrained? If so:
      i. which portions and why?
6. Are there other features that would be desirable that are not yet planned?
7. Are you familiar with other innovation districts? If so:
   a. How is this innovation district similar to those?
   b. How is this innovation district distinct from those?
   c. What are the reasons for the differences?

Outcomes

1. What do you envision the innovation district being like in five years? In ten years?
2. What outcomes or measures are being used to judge progress or success?
3. Are there other ways to measure the success of the innovation district that you think would be suitable or preferable?

4. What is the time frame for ascertaining success?
5. What would an ideal surrounding environment for supporting the success of the innovation district be like?

Rationales [for policymakers, administrators, and economic developers]

1. What is the purpose or justification for the innovation district?
2. What can the innovation district uniquely accomplish that could not be achieved through other means?
3. What do you hope the innovation district achieves?

Financing (for policymakers, administrators, and economic developers)

1. What features and programs of the innovation district require financing?
   a. Initial capitalization
   b. Funding on an ongoing basis
2. How was the innovation district financed initially?
3. How are the various programs of the innovation district anticipated to be funded on an ongoing basis?

Outreach and Involvement (for policymakers, administrators, and economic developers)

1. For whom is the innovation district aimed?
   [Note possible contrast of existing residents and firms versus attraction.]
2. How and by whom has the involvement of different organizations been determined?
   a. Are specific individual organizations targeted?
3. Have any organizations rejected participation? If so:
   a. Why did that rejection occur?
4. Have any organizations themselves requested participation?
5. How is the innovation district promoted and marketed?
6. How are firms, innovation workers, and other entities targeted or selected?
7. How do organizations participate in the innovation district?
   a. What are some of the different roles played by different types of firms and organizations?

Involvement and Benefits (for firms and other stakeholders)

1. What does the innovation district provide in general?
2. How did you find out about the innovation district?
3. In what ways have [you/your organization] been involved with the innovation district?
4. What do you expect to gain from your [involvement with/location within] the innovation district?
5. Does the innovation district aid your interactions with other firms/organizations at the regional, national, or international scales?
6. How responsive are innovation district policies and designs to the needs of your [business/organization]?
7. How responsive have innovation district [administrators/policymakers/economic developers] been to the needs of your [business/organization]?

Challenges (for policymakers, administrators, and economic developers)

1. Are there any issues or circumstances that have been particularly challenging with the innovation district?
2. Are there or have there been discrepancies in the vision for or implementation of the innovation district? If so:
    a. Have they been resolved? If they have been resolved:
        i. how were they resolved?
        ii. are they resolved satisfactorily?

Challenges (for firms and other stakeholders)

1. Are there any circumstances that have been particularly challenging with regard to the innovation district?
2. Are there any issues currently preventing [you/your organization] from participating fully or gaining the most possible benefits from your involvement with the innovation district?

Follow Up

1. May we contact you again later [in four to six months] to ask how some of the responses you gave us may have changed?
2. Can you suggest particular issues or developments we ought to consider to better understand the innovation district?
3. Are there any additional individuals you suggest we speak with?
4. Is there anything else you wish to tell us?

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Notes

1. Similarly, many critics of Richard Florida's creative class prescriptions for regional economic development acknowledge that his efforts have drawn attention to and increased support for a broad range of constructive strategies that promote education, innovation and entrepreneurship, arts and culture, social diversity, and workforce training and skills development (e.g., Markusen 2006; Donegan et al. 2008; Perry 2010).
2. Innovation districts should not be confused with two similarly titled concepts. African innovation districts, also termed innovation hubs, are national programs for jump-starting technology-intensive industry activity with co-working, incubator, and accelerator facilities. These are normally sited in a primate capital city and many involve partnerships with international firms. Urban innovation, sometimes urban entrepreneurialism, is a mode of economic development that seeks to initiate rather than manage growth, borrowing private sector tactics such as risk-taking, policy innovation, and self-promotion.
3. Anchor institutions are sizable, immobile organizations. They tend to be, but are not exclusively, non-profit organizations.
4. Feldman and Francis (2004) pose the same question for industrial districts.

5. Because economic development approaches are modified or evolve, a particular action may not meet this (or any) rigorously applied definition consistently over time. We assessed the components of the definition at the time of case selection, according to our observations from the preliminary stages of empirical data collection.
6. The Missouri Botanical Garden did not contribute to Cortex's establishing financial investment.
7. The extension of the Massachusetts Turnpike was part of the huge project infamously known as the "Big Dig" (Murphy 2008).
8. The causality is likely bidirectional, a virtuous cycle, as regional economic output and growth augment the elements of the entrepreneurial ecosystem (Audretsch and Pena-Legazkue 2012).
9. General Electric downsized its relocation plan in 2019 (Carlock and Ryan 2019).
10. Most anchor institutions are not mandated to stay in place but are extremely unlikely to relocate. Sometimes the improbable does occur, however. The town of Wake Forest, North Carolina, lost its anchor institution when the eponymous university was convinced by huge gifts from the Z. Smith Reynolds Foundation to move to Winston-Salem in 1956 (Wake Forest University n.d.). Although universities, hospital systems, and cultural institutions occasionally relocate, the incidence rate is far lower than for large private firms. A more common action is to establish satellite campuses or ancillary locations.
11. A few land grant universities are private not-for-profit institutions: the Massachusetts Institute of Technology, the University of Delaware, and Cornell University (Association of Public and Land-Grant Universities n.d.).
12. The New School of Architecture and Design, a private for-profit design university, can serve some anchoring functions (such as hosting gatherings), but the institution is not research intensive and is too small to serve as a primary anchor for the I.D.E.A. innovation district.
13. A quip we heard along these lines is that the area is home to more dogs than people.
14. Public transit options include buses, a light rail trolley, and Free Ride Everywhere Downtown (FRED)—a free on-demand shuttle service funded by downtown parking revenues.
15. The zoning regulation mandated that at least 15% of residential units in the Boston Innovation District follow compact standards, and permitted microapartments as small as 350 square feet, below the 450 square foot minimum applied elsewhere (Ross 2013).

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