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Planning for Local Economic Development: Research into Policymaking and Practice

Editors
Godwin Arku and Evan Cleave

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Table of Contents

COGITATIO

Urban Planning (ISSN: 2183–7635)
2020, Volume 5, Issue 3, Pages 319–322
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Editorial

Planning for Local Economic Development: Research into Policymaking and Practice

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Abstract
This thematic issue of *Urban Planning* brings together a collection of seven articles that explore and critically engage with contemporary issues with local economic development and connect with the broader fields of urban development and planning. The articles presented here provide a complementary mix of broader conceptualizations and research and narrower case-studies which draw from a range of geographies. Contributions include the development and application of a vulnerability and risk measures for economic prosperity; examinations of how urban planning and zoning are used as tools to address industrial decline and spur new forms of economic production; complementing investigations into the role of innovation within local economic development examining the role of public and private institutions as well as broad and targeted policy interventions; and the relationship between 'big-tech,' economic development and urban planning and governance.

Keywords
local economic development; planning; policymaking; research and practice

Issue
This editorial is part of the issue "Planning for Local Economic Development: Research into Policymaking and Practice" edited by Godwin Arku (University of Western Ontario, Canada) and Evan Cleave (Ryerson University, Canada).

1. Introduction

This thematic issue of *Urban Planning* examines the current state of local economic development planning and policymaking. Local economic development is no longer focused solely on attraction of large manufacturing facilities (i.e., 'smokestack chasing') and pure wealth-generation (see Taabazuing, Arku, & Mkandawire, 2015), nor is it solely managed by local public administrations (Cleave, Arku, & Chatwin, 2019). Instead, it is a much more holistic process concerned with all aspects of the community beyond the economy—with greater focus on quality of life, effective use of urban space, and service provision (Arku, 2015; Leigh & Blakely, 2016). This 'new' economic development paradigm also privileges new sectors—such as creative and knowledge industries, advanced manufacturing, and high-tech—as the backbones of future growth. This redefining of local economic development has also emphasized a shift away from traditional, *managerial* forms of governance towards *urban entrepreneurial* approaches, where power has been decentralized and engaged by both private and public institutions.

This transition is particularly needed by cities in the advanced economies of Europe and North America—where the research presented in this thematic issue is situated. These regions have faced a number of economic challenges over the past half-decade, including increased global competition and stiff competition from new markets (Wolfson & Frisken, 2000), which has re-

sulted in the closure of large production facilities and the loss of manufacturing jobs (Cleave, Vecchio, Spilsbury, & Arku, 2019), declining tax bases and fiscal shortages (Arellano & Bai, 2017), which have led to severe austerity-focused policies and reduced government capacity (Donald, Glasmeier, Gray, & Lobao, 2014), greater polarization and disparity within cities (Walks & Bourne, 2006), and demographic change and stunted population growth in smaller, more peripheral cities (Hall & Hall, 2008). The impact of these changes is multifaceted, as planners now need to consider what they will do to address these changes, how they will pay for them, and who they will benefit.

The next section introduces the seven articles that form this thematic issue. Despite the range of geographies, methods, and viewpoints on local economic development, there are several thematic and conceptual through-lines, including the connection between local economic development policymaking and urban planning. In addition, many of the articles in this issue contemplate how effectively the issues, policies and approaches they are discussing contribute to fostering positive economic change for the city as a whole.

2. Overview of the Thematic Issue

Sadler, Walling, Buchalski, and Harris (2020) provide a comprehensive investigation into the economic vulnerability of 117 mid-sized cities in the Eastern United States through their Prosperity Risk Index for Evaluating Multi-Scalar Economic Development and Equity Patterns (PRIMED) measure. This measure is comprised of municipal fragmentation, geographic sprawl, racial segregation, economic inequality, and overall poverty which have been key nodes of urban research and practice since at least the 1970s. The research being situated in the Eastern United States is important, as the cities in this region have been among the hardest hit by the structural changes to the global economy. Beyond this, the authors' findings present new directions for research, as they identify socio-spatial patterns that deserve further exploration within economic development theory and discourse, as well as potential for identifying at-risk areas requiring policy interventions and evaluation of existing policy and practice.

Situating their research in another region that has experienced considerable economic disruption and transformation, Vecchio and Arku (2020) directly address the interface between economic change and urban planning by asking the following: What are cities doing with their former industrial lands? Framed through a post-industrial lens, the article explores how cities in Ontario, Canada use urban planning—as codified in city master plans—as a tool to confront the impacts of manufacturing decline and to reclaim urban space with an eye towards producing both economic and societal benefits. Of note, the authors find that adaptive reuse is the key strategy cities are using to address issues of affordable housing, intensification, and revitalization—with focus on creating spaces for creative and knowledge-based industries that are vital in the 'new economy.'

This research is complemented by De Boeck and Ryckewaert (2020) who use the narrower case of the Brussels Capital Region, Belgium, to examine how zoning strategies are used to regulate urban space and the implications for places of economic production in the post-industrial city. Their research identifies four key land-use typologies and finds that industrial gentrification is occurring in three of these. Interestingly, this is a dynamic process as gentrification both fills spaces in Brussels where deindustrialization has occurred, but also driven further decline through displacement of industrial and commercial land. A key contribution is that different institutions play different roles across the city—public authorities driving change in industrial zones and private actors facilitating land-use conversions in mixed-use areas. This suggests that there is currently a tenuous balance of actors driving development of spaces of production within cites, with the planners and the public being locked-out of decision-making in how large swaths of the city will be developed. This has strong implications for understanding urban governance and land use planning in post-industrial cities.

Phan, Cleave, and Arku (2020), is one of two articles in this issue that explores the role of innovation within local economic development. Here, the authors frame local governments and economic development practitioners as key institutions responsible for facilitating innovation. Using interviews with city officials from across Ontario, Canada, the authors critically examine how cities approach innovation and what they are actually doing to foster it. Despite its prevalence within economic policy, Phan et al. (2020) find that innovation varies considerably in conception across cities. Despite this, the article finds that there is actually considerable homogeneity in the approaches being implemented. This is a key finding with practical implications, as it suggests that cities are not being efficient in their approaches to planning or creating a local context with the determinants of innovation needed for emerging innovation-centric sectors to establish and thrive.

Zandiatashbar and Kayanan (2020) use examples from three American cities (Boston, MA, St. Louis, MO, and Buffalo, NY) to focus on a specific place-based innovation planning policy: Innovation Igniting Urban Developments. Complementing Phan et al. (2020), this article focuses both on the role of public/private urban growth coalitions play on these developments and on their impact on urban spaces. A key finding that emerges from these authors' work is the increased polarization that these spatially target strategies cause within cities.

Sands, Filion, and Reese (2020) explore the emphasis on services and investment in human capital through the examination of Amazon's proposed HQ2 in New York City and the Sidewalk Labs' Quayside proposal for the City of Toronto. Their examination of the two projects demon-

strates that even if the target has changed from manufacturing to 'big tech,' the playbook local governments are using to entice them—incentives and tax-breaks—has not. This, the authors argue, is problematic as the incentivization within this traditional approach to business attraction is beyond the means of most cities. A striking conclusion of this research is 'big tech's' role within local economic development does not help 'lift up' distressed areas, but rather privileges "wealthy cities, to wealthy firms, for the benefit of wealthy residents" creating increased potential for economic disparity (Sands et al., 2020, p. 400).

Braumann (2020) provides an interesting extension of this research through a comprehensive summary and critical examination of the HQ2 competition, through an exhaustive examination of Amazon's site selection criteria. This article refocuses away from the city and planning to that of business—asking what location factors are important to them. The findings here complement those in Sands et al. (2020), as they suggest that for 'big-tech' the desired characteristics of a city preclude all but the largest and wealthiest places. Braumann (2020), however, makes an interesting connection with broader urban planning in his identification of 'project-oriented' location-decision factors which focus on suitability, expandability, and feasibility of managing and transforming urban space so it meets the needs of the Amazon HQ2 project. Generalizing the work, urban planning has to consider current and future needs of companies and integrate these into larger business and investment attraction strategies.

3. Future Research and Conclusions

Local economic development is a broad field, and the research presented here—while substantive—only scratches its surface. There are many directions that can emerge from the research presented here to ensure that local economic development can occur in a way that takes a holistic view, where efforts are made to address issues of entire cities to reduce disparity and exclusion and raise the overall quality of life for all residents. This is a challenge, in part, due to the multitude of issues cities in North America and Europe have and continue to face. Within the comprehensive research presented here, however, the authors discuss ways to turn research into practice, and identify key strategies or pathways to better local economic development. It is hoped that the contributions of this thematic issue stimulate new ideas for research and practical solutions to issues facing cities globally.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Are Metropolitan Areas Primed for Success? A Prosperity Risk Index for Evaluating Economic Development Patterns

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Abstract
Urban areas differ greatly in their exposure to economic change, their trajectory toward recovery and growth, and the extent to which development and equity are paired. Some of this differentiation can be explained by regional dynamics, policies, and migration flows that influence the composition of economic activity, land use, and population characteristics. Simultaneously, the fortunes of center cities are known to often correlate with metropolitan characteristics, yet the interaction of socio-spatial conditions with multi-level governance and development processes—particularly with respect to how prosperity is shared across municipal lines and is distributed among communities—is under-researched. In this article, we use a GIS-based and quantitative approach to characterize such patterns and evaluate regional differences among 117 mid-sized metropolitan areas in the Eastern US with a population between 250,000 and 2,500,000. Our analysis rests on initial GIS-based inquiries to define city, urbanized area, county, and core-based statistical area-level measures of municipal fragmentation, geographic sprawl, racial segregation, economic inequality, and overall poverty. These five characteristics are combined to propose a prosperity risk index for each region. Further, indicators of economic performance such as job and population growth are inverted to create an economic vulnerability index. An interaction model is run to determine relationships among the indices to highlight both the regional differences in these characteristics that became noticeably significant in the analysis and the linkages of spatial patterns of economic growth and social equity. Analyzing these multi-scalar regional dynamics illuminates the socio-spatial patterns that deserve attention in urban economic development theory and, subsequently, offers a framework for evaluating public policy and development practices. We likewise offer two comparisons of outliers as a means of illustrating potential directions urban areas can take toward economic development. These findings are valuable for local economic development practitioners who may be seeking further contextual/comparative information on urban regions, or for others interested in understanding the dynamics behind urban planning that may drive regional competitiveness and prosperity.

Keywords
economic development; inequality; land use planning; prosperity; regional studies; spatial analysis; urban geography

Issue
This article is part of the issue “Planning for Local Economic Development: Research into Policymaking and Practice” edited by Godwin Arku (University of Western Ontario, Canada) and Evan Cleave (Ryerson University, Canada).

1. Introduction

The persistent struggles of distressed central cities, particularly older industrial cities and those with large communities of color, represent significant unresolved challenges to contemporary urban planning and local economic development policy and practice. Analyses of population or economic change alone are insufficient for

understanding the complex interaction of, for instance, the multiple factors contributing to concentrations of poverty, residential segregation, and variations in health outcomes (Sadler & Lafreniere, 2017; Squires & Kubrin, 2005). To respond to these issues, the spatial relationships between characteristics of development and equity need to be identified and described at the scales commensurate with the levels of public and other governance institutions that set and put into practice local economic development policies.

Our main starting points are: 1) the importance of the wider metropolitan context in affecting fortunes of central cities (Hill, Wolman, Kowalczyk, & St. Clair, 2012; Wolman, Hill, Blumenthal, & Furdell, 2008); 2) the recognition that "the real city is the total metropolitan area—city and suburb" (Rusk, 1993, p. 5); and 3) the significance of the linkage of social equity with sustained economic growth (Benner, 2015; Pastor & Benner, 2008). Practically, how do US metropolitan areas in different regions compare in terms of economic performance and prosperity? Furthermore, what are the barriers and opportunities around equitable economic development of applicable state, metropolitan, county, and city levels? Taking a problem-driven approach and analyzing the multi-scalar metropolitan dynamics is intended to be useful for policymakers and practitioners aiming to improve their municipalities equitably (Markusen, 2015). These considerations are important for the fields of local planning and economic development, since they bring attention to what may be overlooked in many inquiries on the subject and they have implications for quality of life.

1.1. Comparative Work on Regional Economic Development

One major challenge in the study of urban development is the difficulty of taking into account the varied geographic elements of space, place, and scale. In fact, the scholarly work on urban redevelopment representing a wide range of academic disciplines often lacks an attention to scale. For instance, a significant body of work has examined the development trajectories of shrinking or older industrial places in the US (Beauregard, 2012; Booth, 1986; Hill, Wolman et al., 2012) and established that the statistical measures of industry sector and firm mix, workforce skills and human capital, and subnational regional demographic forces (i.e., the growth of the Sunbelt) have explanatory power with differing development patterns. A portion of the phenomenon of uneven redevelopment, however, remains undetermined according to recent assessments by the Federal Reserve Bank (Kodrzycki & Muñoz, 2015). Data in a recent report from the Brookings Institute shows that more than half of the urban counties that have lost the greatest shares of manufacturing employment since 1970 are performing competitively, and yet significant areas of distress still exist in those places (Berube & Murray, 2018). This illustrates that the relationships among economic change, demographic shifts, public policy, and urban redevelopment are complex.

The multi-scalar nature of the macrostructures and microprocesses associated with urban development, therefore, require careful attention to spatial patterns of population, the economy, and governance at the metropolitan, county, city, and other sub-state and municipal levels. Indeed, for over a century, scholars have labored to understand the complex relationships among the global economic order, national policies, urban politics, civic cultures, and community action and the corresponding uneven pattern of urban growth, decline, and quality of life across the scales of the nation, regions, metropolitan areas, cities, neighborhoods, and even city blocks—the geographical context of urban development (Huggins & Thompson, 2017). This requires a robust analytical framework and broad base of empirical data that supports sophisticated spatial analysis.

1.2. Important Geographic and Population Characteristics Linked to Economic Development

Many important spatial characteristics of metropolitan regions—such as land use and population settlement patterns—are linked to one another and to economic outcomes. After a review of the literature, and considering our overarching research objectives, we consider five characteristics that vary inter-regionally and are thought to impact upon economic growth and vulnerability, albeit in ways that show mixed correlations: fragmentation, sprawl, racial segregation, economic inequality, and poverty. Many variables are also nested in a contrast between city or county boundaries and census regions, owing to the use of such measures in past work (Beauregard, 2012; Hill, St. Clair et al., 2012).

Fragmentation dilutes and separates out the resources available to a region. Decades ago, Hill (1974) was criticizing political fragmentation for many of America's urban challenges. Others have subsequently remarked on how the antitheses of consolidation or collaboration are important for promoting economic competitiveness (Cooke & Morgan, 1998; Martin, Kitson, & Tyler, 2012; Scott, 1998; Storper, 1997). Fragmentation has been positively correlated to all of our other characteristics. More fragmented governance leads to greater sprawl, as entities seek to compete against one another by authorizing surplus land for development (Razin & Rosentraub, 2000). Fragmentation also contributes to differentiation in racial composition of municipalities (what we operationalize here as segregation) and socioeconomic status, making inequalities explicit in the socio-spatial landscape (Rusk, 2003; Weiher, 1991). Fragmented regions "perpetuate if not intensify the racial, ethnic, and class differences that have long been the bane of the large US metropolis" (Morgan & Mareschal, 1999, p. 579).

Sprawl is less clearly connected to our other characteristics under consideration. More sprawl can exacer-

bate inequality via the socio-spatial differentiation of populations into far-flung suburbs and isolated inner-cities (Jargowsky, 2002; Rusk, 1993; Wheeler, 2006). And while, increasingly, levels of poverty in the city are connected with middle-class residents moving outwards, sprawl can multiply regional poverty and strain public services as municipalities struggle to maintain the legacy costs of excess infrastructure or, alternatively, the demands of new residents (Orfield, 1997, 2002; Wiewel & Schaffer, 2001). But sprawl's connections to racial segregation are less clear. Denser urban regions beget sprawl via a desire to demarcate clear racial boundaries; in contrast, lower density regions may yield less direct perceived effects from integration (Galster & Cutsinger, 2007). Sprawl can of course also be used as a tool to escape racial integration, especially by way of covertly racist housing practices (Farrell, 2002) and in inelastic regions, where annexation is no longer a viable option (Rusk, 1993).

Racial segregation has clear links to economic inequality and poverty. On both accounts, the notion is that spatial differentiation of populations by race occurs in regions that are more unequal and poorer (Ananat, 2011; Bresson, Madre, & Pirotte, 2004; Massey & Fischer, 2000). This is thought to be both cause and effect: Separating population by race may reflect existing inequalities and regional economic status, but this separation also makes new investments more tenuous. Likewise, economic inequality and poverty are often linked to one another within the US (Friedman & Lichter, 1998): While a region can be more or less equitable, the fortunes of a region and its relative distribution of wealth are associated.

Thus, overall, a general argument can be made that all five of these characteristics of urban spaces are positively correlated to one another. The assumption that these all impact upon one another the same from one region to another is a simplification, however, and the desire to make this distinction drives our motivation for this article. In addition, however, each of these impacts upon economic vulnerability in different ways that must also be considered.

The relationship between fragmentation and economic growth is mixed. While some provide support for Tiebout's hypothesis that more fragmented regions foster competition and increase prosperity (Akai & Sakata, 2002; Grassmueck & Shields, 2010), others are more apprehensive (Hendrick, Jimenez, & Lal, 2011; Stansel, 2005). Long-term fiscal liabilities that result from fragmented governance may have a negative feedback loop on local development and economic opportunity (Highsmith, 2015; Sadler & Highsmith, 2017). Similarly, although sprawl itself is an outcome of economic growth, its proliferation is often found to be at odds with prosperity (Burchell, 1997; Ciscel, 2001). In other words, regions that grow with less sprawl are considered to be more competitive for continued future growth.

Racial segregation, inequality, and poverty are all negatively correlated to economic growth (Hobor, 2013; Li, Campbell, & Fernandez, 2013; Pastor & Benner, 2008; Sunley, 2000). The links to inequality and poverty are perhaps more intuitive, given their direct connection to the presence of well-paying jobs. But the link to racial segregation is, as noted above, possibly an outgrowth of how institutions are organized and policies are implemented in ways that have racist implications (Tighe & Ganning, 2015), all of which ultimately make regions less competitive.

The further spatial consideration then is around the relationship between the central city and the wider region. Prior studies include comparisons of a variety of measures between city or county boundaries and census regions (Beauregard, 2012; Hill, St. Clair et al., 2012) as a means of accounting for the uneven patterns of regional economic development and capturing the differences between core cities and their surrounding geographic areas, usually analyzed as their suburbs, periphery, or outer cities (Markusen & DiGiovanna, 1999; Orfield, 2002). In fact, more than having different characteristics, the trajectories of growth and decline in central cities and metropolitan areas are linked (Squires & Kubrin, 2005). In regards to the actual relationships across cities and regions, however, they are not clearly understood and deserve greater scrutiny (Farole, Rodríguez-Pose, & Storper, 2011; Huggins, 2016).

1.3. Study Context

This study incorporates data from metropolitan areas, counties, and central cities utilized in recent scholarship. We initially combined the conventional set of distressed, weak-market or shrinking US cities and urban regions defined by economic and population measures (Beauregard, 2009; Hartt, 2018; Pastor & Benner, 2008; Wolman et al., 2008) with the group of places that have a common legacy of extensive deindustrialization (Berube & Murray, 2018; Booth, 1986). Our initial limiting factor was to include only Metropolitan Statistical Areas from four census regions (representing seven divisions) to capture wider geographic factors associated with economic vulnerability (Hill, Wolman et al., 2012). Prior research found that the West region had significantly less economic stress in metropolitan areas (St. Clair, Wial, & Wolman, 2012). Further, of the 79 counties that experienced a substantial shift of more than 20% in manufacturing share of employment from 1970 to 2016 (Berube & Murray, 2018), 76 are outside the West region. The goal of the parameters is to be able to compare more and less successful places among and within common economic, cultural, and political contexts.

Given the ways that such phenomena overlap in economic regions, we present here the creation of a Prosperity Risk Index for evaluating Multi-scalar Economic Development and equity patterns (PRIMED) and investigate its relationship to regional economic vulnerability. Given that census regions have been used as a dummy variable in past work, we are similarly framing effects from that level (Hill, St. Clair et al., 2012). Our sam-

ple includes mid-sized urban regions in the Eastern US—here defined as areas in the Northeast, Midwest, and South census regions—and having populations between 250,000 and 2,500,000 (N = 131). Fourteen regions were removed because of missing Brookings data, leaving 117 in the final sample. Initial investigation revealed heterogeneity in the data for the South census region, and it had twice as many cities as the other regions (65 compared to 20 in the Northeast and 32 in the Midwest). For our subgroup analysis, therefore, we subdivided the South into the South Atlantic census division (n = 30) and a South Central grouping that included the East South Central and West South Central census divisions (n = 35).

Our key research questions are two-fold: 1) Do land use and population-based characteristics making up the PRIMED predict economic prosperity or vulnerability? 2) How do these relationships vary across regions? Our hypotheses are that PRIMED characteristics will broadly correlate with measures of economic vulnerability, and that regional differences attributable to land use policy and economic trajectory will lead to differences in how the PRIMED manifests itself on economic vulnerability.

2. Methods

Our article revolves around the central concept that various land use and population characteristics impact upon regional economic vulnerability. As such, we leverage data from the US census (population and socioeconomic characteristics), census boundary shapefiles, and county-level data from the Brookings Institute on economic development that point to our construct of economic vulnerability.

US census data were downloaded at the census tract level for every mid-sized urban region in the Eastern US. Key variables included population by race, as well as four variables commonly used as proxies for material and social deprivation, which included the percent of: people living in poverty, adults with low educational attainment, people in the workforce who are unemployed, and lone parent families. A composite socioeconomic distress index was computed by taking the sum of the z-scores of these four variables (as in Pampalon, Hamel, Gamache, & Raymond, 2009). Average distress scores were then appended to each level of geography (noted immediately below) for which analyses were conducted. Glaeser, Scheinkman, and Shleifer (1995) used similar measures—including income, unemployment, and educational attainment—in a study of economic growth.

In addition to compiling sociodemographic data for census tracts, census boundary shapefiles included cities, counties, urbanized areas, and core-based statistical areas (CBSAs). We differentiated between center cities (the largest city in the CBSA) and other incorporated municipalities outside of the center city. For each center city, we linked the county of which it was a part, or which immediately surrounded it (e.g., in the case of independent cities in Virginia). The urbanized area of each center city is a census-defined metric indicating the densely settled land area in a region, regardless of whether or not it falls inside of an incorporated municipality. The CBSA represents one or more counties that encompass a metro region's commuting zone. An example of the differentiation is shown in Figure 1.

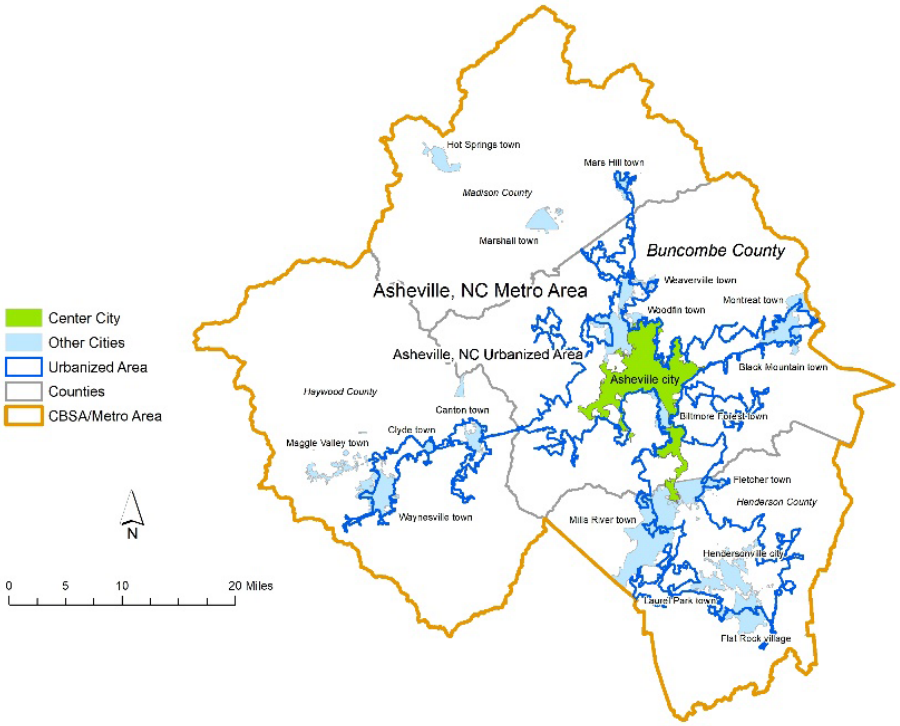

Figure 1. Example of city-urban area-county-CBSA.

2.1. Construction of Indices

With data appended at multiple levels, we then treated each city-county-urbanized area-CBSA set as a one-to-one join. That is, only the largest city in a metro area is included in our analysis, and is linked to its corresponding county, urbanized area, and CBSA. As a result, mid-sized cities within the metro area of big cities (e.g., Kenosha outside of Milwaukee, or Troy outside of Detroit) were not included. For each of the five characteristics noted above (fragmentation, sprawl, segregation, inequality, and poverty) and the measure of economic vulnerability, we created an index. Each index is a composite of the sum of z-scores for constituent variables. Variables were chosen based on their past use, and on the potential utility of explaining the phenomenon in question.

2.1.1. Fragmentation

The fragmentation index is comprised of three variables: the number of municipalities per 10,000 population (Dolan, 1990; Hendrick et al., 2011; Ostrom, Parks, & Whitaker, 1974; Stansel, 2005), the percent of the center city population in the CBSA, and the percent of the center city population in the urbanized area (Foster, 1993; Stansel, 2005). Ours reflects earlier indices like the one created by Grassmueck and Shields (2010) but makes use instead of municipalities' land use decision-making power rather than political and economic power.

2.1.2. Sprawl

The sprawl index has five variables: the ratios of three population densities (urbanized area vs. center city, CBSA vs. urbanized area, and outside of cities vs. inside cities) and two land areas (center city vs. urbanized area and all cities vs. urbanized area). Frenkel and Ashkenazi (2008) recommended measures of density and compactness, while Ruiz, Cuevas, Braçe, and Garrido-Cumbrera (2018) offered that an ideal measure of sprawl would take a sub-municipal measure into account. Kew and Lee (2013) used National Land Cover Datasets to measure changes in the amount of developed land. Our use of only census data in calculating population densities and land area ratios is to highlight the utility of that singular dataset. On the land area side of the equation, Morgan and Mareschal (1999) used a measure of land area in the center city.

2.1.3. Racial Segregation

The racial segregation index signifies the difference in the percentages of white and non-white residents at three levels: CBSA vs. center city, urbanized area vs. center city, and county vs. center city. Although this contrasts with the use of segregation indices constructed for *within* cities, our purpose here is to construct indices with similarities to one another, and across municipalities in a metro region.

2.1.4. Economic Inequality

The economic inequality index is similar in composition to the segregation index, but instead of race considers differences in socioeconomic distress at three levels: CBSA vs. center city, urbanized area vs. center city, and county vs. center city. Logan and Schneider (1982) used a ratio of suburban to center city income in calculating regional inequality; this forms a primary motivation behind our index.

2.1.5. Poverty

The poverty index is similarly composed, but instead of the difference between center city and other geographic units, it is simply the composite of center city, urbanized area, and county socioeconomic distress.

2.1.6. Economic Vulnerability

Every city and metropolitan area is a dynamic economic center that changes over time. To assess a general level of economic vulnerability, data is drawn from a Brookings report that examined recent changes in population and employment at the county level within a context of changing economic sector mix and performance against national trends (Berube & Murray, 2018). Population change alone is a strong indicator of both growth and decline, as the analyses of shrinking cities has determined (Hartt, 2018; Pallagst, Wiechmann, & Martinez-Fernandez, 2013; Richardson & Nam, 2014; Weaver, 2017). The change in share of manufacturing employment from 1970 to 2016 points toward the strength of the longer waves of economic and social change that have been part and parcel of deindustrialization. Cities, counties, and metropolitan areas that have experienced a high level of deindustrialization have developed uniquely challenging circumstances with urban form (Ryan, 2012), culture (Dewar & Thomas, 2013), and human capital (van Agtmael & Bakker, 2016).

2.2. Analysis

Our analytical plan includes a multi-level modeling approach, nesting cities within their constituent census groupings (Northeast, Midwest, South Atlantic, South Central) and controlling for sociodemographic characteristics, to determine the independent influence of our land use and population-based indices on economic vulnerability.

3. Results

3.1. PRIMED Characteristics

The PRIMED was composed of the unweighted average of the z-scores for each of the five land uses and population characteristics. For each of the four census group-

ings, the average z-score for the five characteristics and the PRIMED are shown in Table 1 below. The Northeast is the most fragmented, sprawling, segregated, and unequal grouping, while the South Central is the most poverty-stricken. Conversely, the South Central is also the least fragmented and sprawling. The South Central and South Atlantic are tied for the least segregated, while the Midwest is the least unequal. Overall, the Northeast has the highest PRIMED score (denoting prosperity risk), while the South Central has the lowest.

The PRIMED characteristics scores for each region in our sample are also illustrated in Figure 2, with counties and states colored by their respective census divisions and regions colored by the PRIMED score (with blue

Table 1. Z-scores for PRIMED characteristics by census grouping.

	Fragmentation	Sprawl	Segregation	Inequality	Poverty	Prosperity Risk
Northeast	0.46	0.17	0.82	0.80	0.31	0.53
Midwest	0.13	−0.08	0.04	−0.30	−0.53	−0.14
South Atlantic	0.02	0.16	−0.28	−0.27	−0.59	−0.19
South Central	−0.45	−0.22	−0.28	−0.10	0.87	−0.56

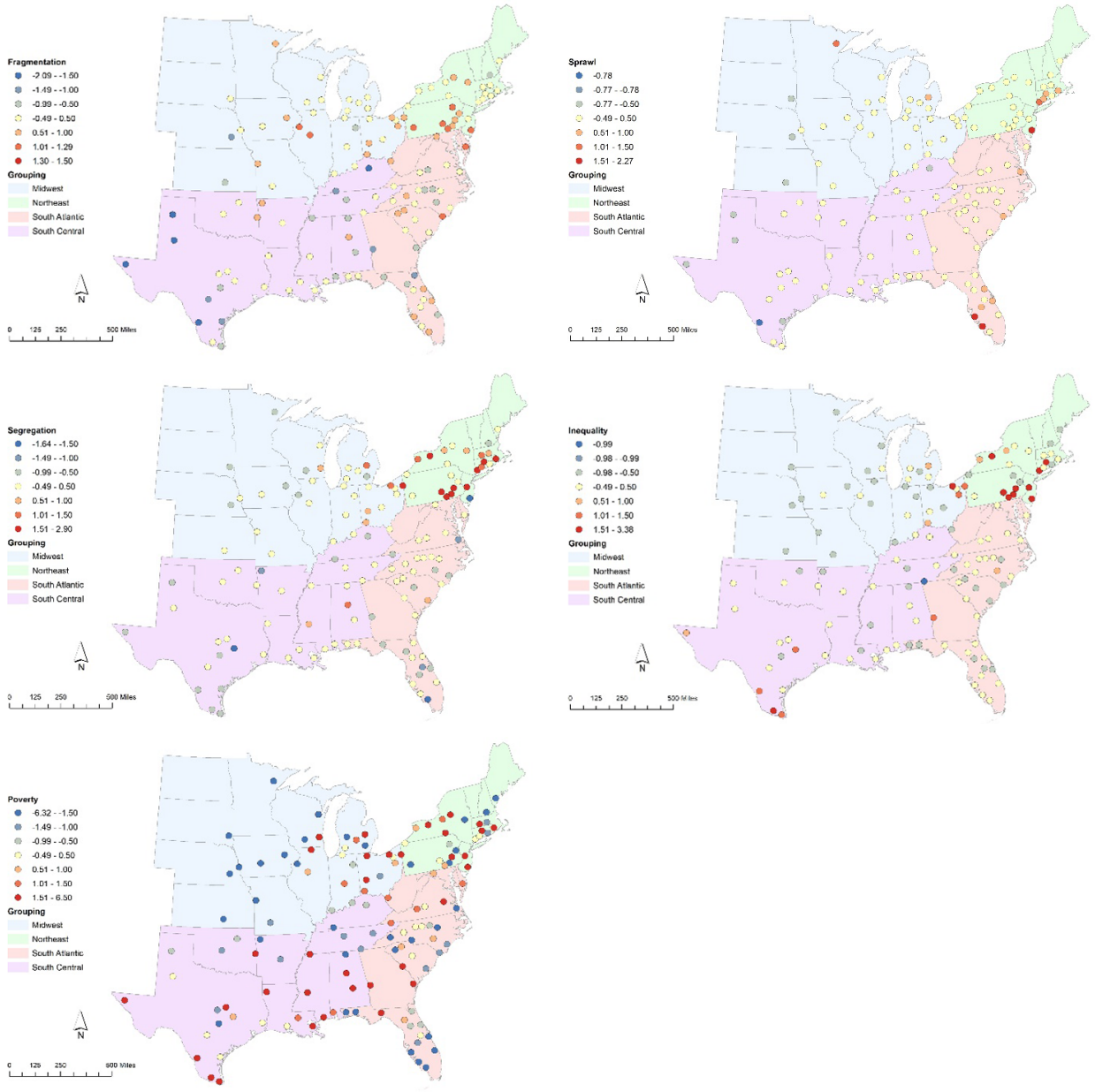

Figure 2. PRIMED characteristic z-scores for each urban region.

shades representing lower risk scores and red shades representing higher risk scores). Generally, higher risk scores are seen in the Northeast and Eastern Midwest, while lower risk scores can be found throughout the study area.

The most fragmented urban regions tend to fall in the Northeast and South Atlantic, while the least fragmented areas are typically in the South. The sprawl index did not have as many large deviations from the mean, with most areas falling within half a standard deviation (yellow in the map). Regions with more sprawl out from the center city can be found in Florida, up the Atlantic coast, and in a couple spots in the Midwest. Regions with less out-of-city sprawl, by contrast, tend to be out west. As with the fragmentation index, the most segregated regions are in the Northeast, while less fragmented urban regions can be found throughout. Center-to-out-of-center city economic inequality is highest in the Northeast and along the Rio Grande Valley in Texas. Lower inequality can be found throughout the Midwest and South. Overall regional poverty saw the biggest deviations from the mean, with most falling at least one standard deviation away. Unlike the clear spatial/regional patterns for the other indices, no clear pattern is seen with poverty: wealthy regions about poorer regions throughout the study area.

Our motivation is not only to illustrate regional differences, but to highlight exemplars within regions as well. As another descriptive result, Tables 2 and 3 show the least and most municipally fragmented, geographically sprawling, racially segregated, economically unequal, and poverty-stricken regions in each census grouping (with their ranking shown in parentheses). The general pattern supports the base hypothesis: that cities suffering more from economic decline appear more frequently in the 'most' categories (Table 2), while cities that have more recently been growing appear in the 'least' categories (Table 3).

As with the PRIMED characteristics in Figure 2 above, the economic vulnerability index is illustrated spatially in Figure 3. Blue shades once again signify lower vulnerability, while red shades represent higher vulnerability. The pattern of high scoring areas for vulnerability is similar to that for the prosperity risk indices, being primarily concentrated in the Northeast and Midwest. In contrast, however, vulnerability is more consistently low in the South Atlantic and South Central groupings. By our measure, all of the lowest vulnerability regions lie in the south. Regionally, the most economically vulnerable urban regions are: Scranton, PA, in the Northeast (9 overall); Flint, MI, in the Midwest (1); Columbus, GA, in the South Atlantic (10); and New Orleans, LA, in the South Central (4). Conversely, the least economically vulnerable urban regions are: Manchester, NH (55 overall); Sioux Falls, SD (19); Virginia Beach, VA (5); and McAllen, TX (1). In our discussion, we introduce key outliers in each region that may yield meaningful inquiry in future work.

Table 2. Highest scoring urban regions by census grouping (overall rank in parentheses).

	Fragmentation	Sprawl	Segregation	Inequality	Poverty	PRIMED Overall
Northeast	Scranton, PA (1)	Atlantic City, NJ (1)	Hartford, CT (1)	Hartford, CT (1)	Reading, PA (6)	Reading, PA (1)
Midwest	Davenport, IA (4)	Duluth, MN (5)	Youngstown, OH (10)	Cleveland, OH (10)	Flint, MI (2)	Flint, MI (3)
South Atlantic	Salisbury, MD (3)	Cape Coral, FL (2)	Charleston, SC (22)	Columbus, GA (13)	Augusta, GA (10)	Augusta, GA (16)
South Central	Fayetteville, AR (13)	Fayetteville, AR (20)	Birmingham, AL (16)	McAllen, TX (5)	Brownsville, TX (1)	McAllen, TX (5)

Table 3. Lowest scoring urban regions by census grouping (overall rank in parentheses).

	Fragmentation	Sprawl	Segregation	Inequality	Poverty	PRIMED Overall
Northeast	Manchester, NH (21)	Binghamton, NY (16)	Atlantic City, NJ (2)	Norwich, CT (23)	Portland, ME (10)	Portland, ME (10)
Midwest	Lincoln, NE (8)	Lincoln, NE (5)	Ann Arbor, MI (7)	Toledo, OH (2)	Cedar Rapids, IA (2)	Lincoln, NE (1)
South Atlantic	Jacksonville, FL (7)	Tallahassee, FL (10)	Naples, FL (1)	Ocala, FL (3)	Naples, FL (1)	Raleigh, NC (5)
South Central	Laredo, TX (1)	Laredo, TX (1)	College Stn., TX (3)	Chattanooga, TN (1)	Austin, TX (12)	Austin, TX (6)

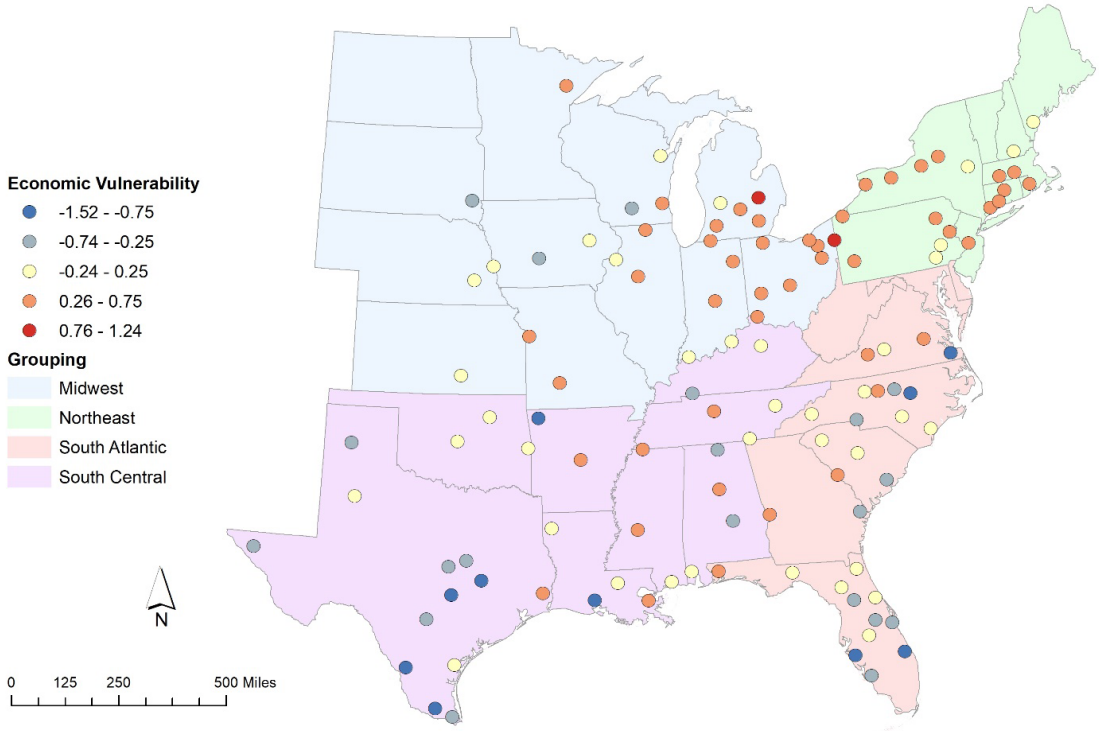

Figure 3. Economic vulnerability z-scores for each urban region.

3.2. Regression Models

In pursuit of our main objective to illustrate regional differences in the relationship between our prosperity risk indices and the economic development outcomes (low levels of which point to economic vulnerability), we illustrate here the results of a series of linear regression models. The first is a regression model without interactions that omits region as a covariate (to reflect overall trends). The second is an interaction model that includes region and an interaction term between each characteristic in the PRIMED and region to capture differences between regions in these trends. To ensure the indices in the PRIMED reflected different constructs and were acceptable for both of these models, we ran a series of diagnostic tests. A check for multicollinearity revealed acceptable VIFs (all below 2.5), while the residuals followed an approximately normal distribution with reasonable homoscedasticity.

Table 4 shows the results of the first regression model linking the PRIMED indices to economic vulnerability. The model illustrates significant positive associations with segregation ($\beta = 0.42$, $p < 0.001$) and poverty ($\beta = 0.05$, $p = 0.01$; e.g., more segregation and poverty equate with more economic vulnerability), and a significant negative association with inequality (e.g., more inequality equates with less economic vulnerability, echoing Rusk, 1993). While not significant, fragmentation is slightly positively associated and sprawl is slightly negatively associated with economic vulnerability.

Although these overall relationships are instructive for viewing the connection between the PRIMED indices and economic vulnerability, it is harder to see exactly what is happening—and the direction of the associations—within each region. In this step, an ANOVA was run (with results shown in Table 5) to determine if there were significant differences between regions for each PRIMED index. We can observe that significant differences exist between regions ($F = 14.089$, $p < 0.001$), and (in agreement with the results in Table 4) in rates of segregation ($F = 15.058$, $p < 0.001$) and poverty ($F = 10.175$, $p < 0.01$). The interaction model suggests that segregation is strongly significantly different between regions ($F = 5.323$, $p < 0.01$), while sprawl is marginally significant between regions ($F = 2.584$, $p = 0.058$).

Figure 4 highlights the slopes for each region between the 5 PRIMED indices and economic vulnerability. Fragmentation is positively associated with economic vulnerability in the Midwest, Northeast, and South Atlantic. But in the South Central, less fragmented regions connote more economic vulnerability. The general pattern is similar for sprawl. In the Midwest, sprawl is significantly positively associated with economic vulnerability. It is less strongly but slightly positively correlated in the Northeast and South Central, but in the South Atlantic, more sprawl connotes less economic vulnerability.

Racial segregation is generally not a strong predictor of economic vulnerability in the Midwest, Northeast, and South Atlantic, but is strongly correlated to economic vulnerability in the South Central. Economic inequality is only positively correlated to economic vulnerability in the South Atlantic. Elsewhere (particularly

Table 4. Regression model highlighting relationships between PRIMED characteristics and economic vulnerability.

	All Cities
N	117
Intercept	−0.03 (t = −0.64, p = 0.53)
Fragmentation	0.11 (t = 1.61, p = 0.11)
Sprawl	−0.16 (t = −1.56, p = 0.12)
Segregation	0.42 *** (t = 6.33, p = 0.00)
Inequality	−0.23 *** (t = −3.95, p = 0.00)
Poverty	0.05 ** (t = 2.80, p = 0.01)
R-squared	0.42

Notes: **p < 0.001; ** p < 0.01; * p < 0.05.

Table 5. Type II ANOVA for interaction model.

	Sum Sq	Df	F	p
Fragmentation	0.012	1	0.116	0.735
Sprawl	0.036	1	0.347	0.557
Segregation	1.554	1	15.058	0.000
Inequality	0.042	1	0.410	0.524
Poverty	1.050	1	10.175	0.002
Region	4.362	3	14.089	0.000
Fragmentation:Region	0.320	3	1.034	0.381
Sprawl:Region	0.800	3	2.584	0.058
Segregation:Region	1.648	3	5.323	0.002
Inequality:Region	0.328	3	1.060	0.370
Poverty:Region	0.462	3	1.493	0.221
Residuals	9.597	93	NA	NA

in the South Central), more economic inequality connotes less economic vulnerability. Poverty is very significantly positively correlated with economic vulnerability in the Midwest, but only marginally significant in the other regions.

From examining the subgroups in Table 6, we see the main differences between regions for segregation occur in the South Central region, where segregation is strongly positively associated with economic vulnerability ($\beta = 0.78$, $p < 0.01$), while the other regions are weakly associated. Further, the differences with respect to sprawl are due to the South Atlantic being strongly negatively associated with economic vulnerability, while the other regions have a positive association between sprawl and economic vulnerability.

By introducing these interaction terms, some of the variance originally explained by inequality is being explained in the interaction terms, and inequality is no longer a significant predictor. We note that the significant differences between regions in segregation are accounted for by the South Central's strong positive association to economic vulnerability, while the association is weak or slightly negative in the South Atlantic, Midwest, and Northeast.

4. Discussion

4.1. National Trajectories and Regional Variations in Prosperity Risk

Our article presents data and analysis that describes important geographic characteristics influencing economic performance and vulnerability, namely: fragmentation, sprawl, segregation, inequality, and poverty. We used census data to compute indices for each of these characteristics and combined them into an index we call the PRIMED. We then examined the relationship among the PRIMED sub-indices and economic vulnerability and

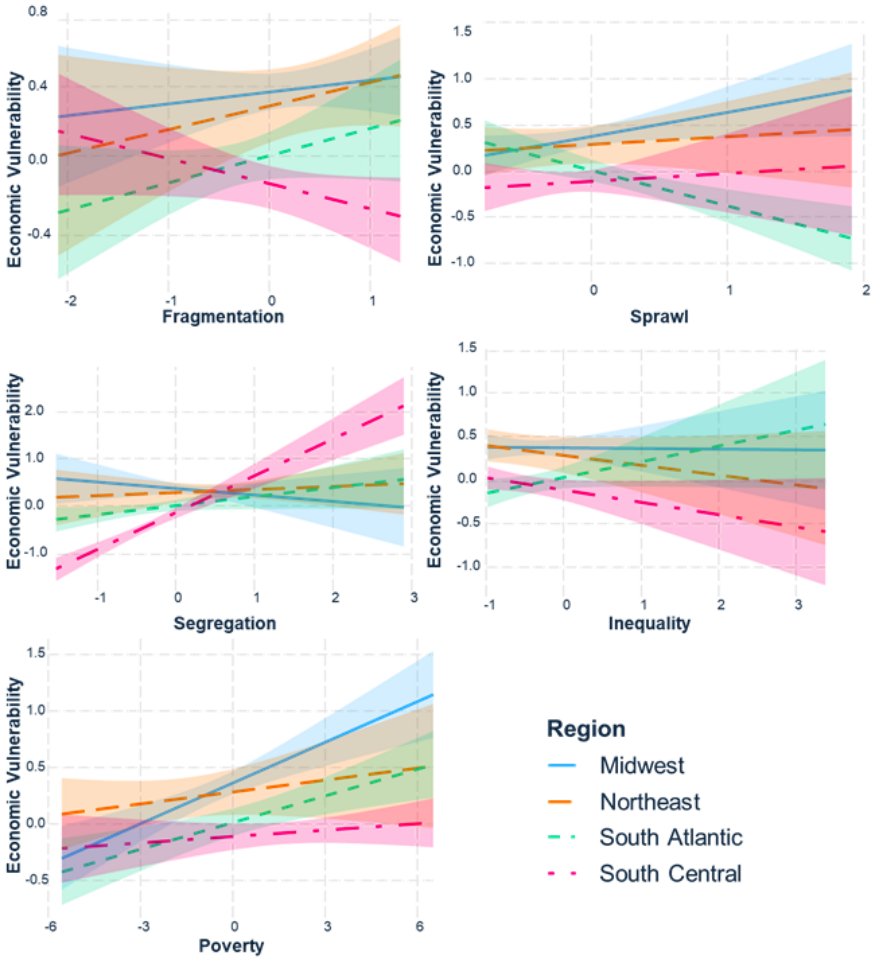

Figure 4. Subgroup plots by region for interaction model.

found the model illustrates significant positive associations with segregation and poverty (e.g., more segregation and poverty equate with more economic vulnerability), and a significant negative association with inequality. This affirms the general trajectories of urban areas in which high economic growth is linked with low inequality, termed positive development, and vice versa (Rusk, 1993).

At the same time, the factors contributing to positive development vary across regions. We observe that significant differences exist between regions ($F = 14.089$, $p < 0.001$), and (in agreement with the results in Table 4) in rates of segregation ($F = 15.058$, $p < 0.001$) and poverty ($F = 10.175$, $p < 0.01$). The interaction model suggests that segregation is strongly significantly different between regions ($F = 5.323$, $p < 0.01$), while sprawl is marginally significant between regions ($F = 2.584$, $p = 0.058$).

These findings illustrate that the barriers to positive local economic development manifest in dissimilar forms in each region. In the Midwest, Northeast, and South Atlantic fragmentation and sprawl, to varying degrees, are positively associated with economic vulnerability. But in the South Central area, less fragmented regions

Table 6. Standardized regression coefficients in subgroup analyses relating PRIMED to economic vulnerability.

	Northeast	Midwest	South Atlantic	South Central
Intercept	0.29	0.38	0.02	−0.16
Fragmentation	0.13	0.06	0.15	−0.14
Sprawl	0.08	0.26	−0.39	0.09
Segregation	0.07	−0.14	0.19	0.78
Inequality	−0.11	−0.01	0.18	−0.14
Poverty	0.04	0.12	0.08	0.02
N	20	32	30	35
R-squared	0.58	0.88	0.51	0.51

and less sprawl connote more economic vulnerability. Furthermore, the main differences between regions for segregation occur in the South Central region, where segregation is strongly positively associated with economic vulnerability ($\beta = 0.78$, $p < 0.01$), while the other regions are weakly associated. These findings are valuable for local economic development practitioners who may be seeking further contextual information on their region, or for others interested in understanding the dynamics that drive regional competitiveness and prosperity.

4.2. Metropolitan Dynamics and the Place of the Central City

Generally, the prosperity risk index trended in the same direction as our index of economic vulnerability, contextualizing regional differences in the influence of specific characteristics on vulnerability. Yet not all urban areas neatly fit into the regression line. For example, in Figure 4, the South Central region is distinct from the others in terms of fragmentation and segregation, with fragmentation being negatively correlated and segregation being positively correlated to economic vulnerability. Factors such as date of urban development, differences in rights and responsibilities of municipalities, and regional variation in economic trajectory may all be potential explanations for this regional outlier effect.

Here we briefly explore two pairs of outliers where regions were ranked 'high' in one index but not the other. Examining a pair of outliers by region illustrates the relationships among variables for particular places but also points to the limitations of the quantitative analysis and brings into focus the policy and institutional features shaping these characteristics that may be driving the differential between the prosperity risk and economic rank at the individual metro scale of analysis.

4.2.1. Example 1: Northeast

In general, the Northeast is the most fragmented, sprawling, segregated, and unequal, and therefore, the region has the highest PRIMED score (0.53). In the regional interaction model highlighted in Figure 4, we found fragmentation and sprawl were positively associated with economic vulnerability in the Northeast. The Bridgeport, CT, and Allentown, PA, urban areas are both outliers to the general national pattern of how prosperity risk and economic vulnerability are correlated. Bridgeport is overperforming economically (74/117) given its very poor prosperity risk (109/117; Table 2).

One distinctive feature of Bridgeport is that it is contained within one county, which may create a public environment that cuts against the trend of fragmentation being positively associated with economic vulnerability. The city is not viewed as having reinvented itself from its industrial peak, but with significantly less governmental complexity, it may have enabled economic development activities to be conducted within a single policy framework with feedback loops among economic activity, tax revenue generation, service provision, and quality of life. For instance, the leading economic development voice for the region, the Bridgeport Regional Business Council, explicitly recognizes the need for increasing the county's grand list (Connecticut's term for tax base), whereas most business-led economic development agencies prioritize reducing tax burdens (Bridgeport Regional Business Council, n.d.).

Allentown has higher economic vulnerability (76/117), despite a low prosperity risk ranking (36/117). Allentown has relatively lower levels of poverty and inequality, but slow population growth as a legacy city is likely dragging down economic revitalization. Indeed, the area has experienced extreme deindustrialization since 1970: the percent of jobs in manufacturing in Lehigh County declined from 58% to 12% in 2016 (Berube & Murray, 2018). Compared to the single-county geography of the Bridgeport area, the four counties that now constitute the urban area also extend into New Jersey; this bi-state orientation deserves greater scrutiny.

4.2.2. Example 2: South Central

The South Central group has the lowest average PRIMED z-score (−0.56). Although the South Central has the most impoverished urban areas, it is also the least fragmented and least sprawling by our metrics. The group likewise has relatively less segregation and economic vulnerability. Our regional analysis identified that economically vulnerable regions are less fragmented but more racially segregated. Waco, TX, and Little Rock, AR, are interesting outliers in the South Central. While Waco has noticeably less economic vulnerability (75/117) than prosperity risk (16/117), Little Rock is the reverse (53/117 in economic vulnerability, 89/117 in prosperity risk).

Waco contrasts with the regional pattern where less fragmentation and more racial segregation lead to economic vulnerability. One factor that may be supporting better economic outcomes in the Waco area that is not evident in the indices is the recent growth of Baylor University. Universities, especially research-intensive universities and other anchor assets in central cities, have positive effects on regional employment as well as local housing markets (Ehlenz, 2019). Indeed, Bagchi-Sen and Smith (2012) conclude that universities play a significant role in their regions. The post-recession revitalization efforts in Waco that have included Baylor University would not likely be reflected fully in our analysis.

Segregation is higher in Little Rock than in Waco, and there is more economic vulnerability despite an overall higher PRIMED score. The Little Rock area has been successful to a point in diversifying from an industrial and manufacturing economy, but transitioning to a knowledge-based economy has been challenging in Arkansas overall (National Research Council, 2012). The design of the University of Arkansas system is such that fewer than 25% of enrolled students are in the Little

Rock area, with the flagship University of Arkansas in Fayetteville accounting for nearly half of all students and a majority of research activity (University of Arkansas System, n.d.). Certainly, other private and public institutional factors are shaping the fortunes of individual metropolitan regions and this deserves attention in future research.

4.3. Implications for Economic Development Practice

Economic development practice should acknowledge that spatial patterns of economic growth and social equity are linked at the national, regional, and metropolitan scales. This affirms the value of the panoply of development approaches that seek to simultaneously achieve better outcomes economically and socially for a broad base of people and places within an urban area. Furthermore, the results of the interaction model highlighting how PRIMED characteristics vary inter-regionally may have practical benefits for those interested in understanding the dynamics driving competitiveness and prosperity in a particular place. For instance, in the South Central region as noted above, the higher rate of racial segregation is associated with more economic vulnerability. Therefore, as Li et al. (2013) have argued, in these cases a need may exist for mobility policies that support non-White and lower income households as part of comprehensive economic growth strategies. Future work should therefore make use of this and related indices to study a more fine-grained approach whereby researchers develop deeper understandings of what leads some regions to succeed while others do not.

One disconcerting result of our analysis of 117 mid-sized urban regions is the spatial clustering of areas in the bottom third of both indices. These include 29 regions from 20 different states, including both a well-known group of places in the Midwest and Northeast such as Buffalo, NY, Flint, MI, Trenton, NJ, and Youngstown, OH, that have experienced high levels of deindustrialization, and a number of others in the South such as Birmingham, AL, Jackson, MS, Memphis, TN, and Richmond, VA. Part of our larger research agenda is to analyze additional quantitative and qualitative data layers relative to regional inequality and economic vulnerability at closer scales. For instance, the PRIMED results raise questions about relevant state, regional, county, and city public policy and fiscal features in the most vulnerable and fragmented metropolitan areas and how institutions and networks performing economic and community development map onto the political geography (Rusk, 1993). Further assessments will illuminate the distinguishing relationships between metropolitan sociodemographic characteristics, spatial patterns, and development dynamics. Indeed, the presence of these diverse urban areas at the bottom of both indices suggests a direction for future inquiry and serves as a prompt for further research.

Interestingly, places with varied economic histories including Augusta, GA, Birmingham, AL, Memphis, TN, and Richmond, VA, in the South were also in the bottom third of both indices. One implication for economic development in older industrial cities is that the barriers to growth in the 21st century may be less about historical economic patterns and more about the socio-spatial relationships that exist today. Likewise, a broader set of urban areas is struggling with the challenges often associated with deindustrialization, and policy and institutional innovation around equitable development is needed in socially divided and economically depressed areas.

5. Conclusion

The development and equity patterns of metropolitan urban areas are of great consequence for people and for local communities. Seeing that it is not only feasible, but prevalent, for places to achieve both high levels of economic performance and low levels of prosperity risk opens up numerous paths for policymakers, planners, and practitioners in local economic development to pursue. The fact that relationships exist among the 5 PRIMED characteristics and economic vulnerability has implications for public health, not least because of the links between inequality and poverty on the one hand and health outcomes on the other. Moreover, the particular regional and metropolitan patterns may guide interventions to be more effective than reliance on national trends alone.

Our inter- and sub-regional analysis of urban areas highlights the multi-scalar geographic context in which uneven development processes literally take place. At the same time, the further examination of individual urban areas illustrates the importance of taking stock of public and private institutions at the metropolitan, county, city, and local scales. In reality, the construction of social, political and cultural scales at the metropolitan, local, and neighborhood levels are also important elements to consider, especially regarding how they shape economic relations and spatial contexts (MacKinnon, Cumbers, Pike, Birch, & McMaster, 2009). The central challenge for urban geographers is "understanding the role and significance of the shifting array of actors and institutions shaping urban social, political, and economic geographies" (Elwood, 2005, p. 262). Ultimately, we believe the PRIMED and these findings are valuable for local economic development practitioners who may be trying to better understand the dynamics of their own or comparable urban regions. Likewise, the PRIMED can be used in future research aimed at understanding the dynamics behind urban planning that may drive regional competitiveness and prosperity.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Promoting Adaptive Reuse in Ontario: A Planning Policy Tool for Making the Best of Manufacturing Decline

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Abstract
The exodus of manufacturing jobs from industrialized cities has increasingly altered the way municipalities plan and cope with buildings and areas that once served as industrial and economic centres. Now these often derelict and costly structures sit as an eyesore in many communities which experience symptoms of post-industrialism. The practice of adaptive reuse is a unique concept of city building, where demolition and traditional brownfield redevelopment have been common practice. Though an already established method, adaptive reuse is becoming increasingly popular due to a greater intensity to protect heritage, reuse materials and structures, and offer unique architectural spaces, there has been a demand to reuse former industrial buildings for other uses such as commercial and recreational spaces. To achieve this, there must be sufficient policy in place to incentivize and mitigate the increase cost and risk which are usually associated with this type of development. This article will focus specifically on Ontario, Canada, and the current Official Plans of all 51 of the province's cities, and how they are addressing adaptive reuse in former industrial areas and unique ways in which they address this problem. A content analysis of the documents showed that there is a wide difference in reuse contextualization and suggested policy directives. However, Cities in Ontario have proposed that affordable housing, intensification, revitalization in the urban core, and creating spaces for creative and vibrant industries can be addressed by the promotion of reuse in the community. For those with strong industrial history, the applicability of reuse allows for communities to preserve their industrial heritage, while at the same time shift uses to the new economy.

Keywords
Canada; cities; economic development policy; industrial decline; land use planning; Ontario

Issue
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1. Introduction

What are cities doing with their former industrial lands? This article explores how cities in the Province of Ontario, Canada are approaching this question through a comprehensive analysis of Official Plans. While situated in an urban planning context, this issue is also very much one of local economic development practice as it considers how official planning is used to respond to economic change, as well as a tool to stabilize, redefine, and grow local economies. Additionally, these planning efforts are embedded within the transformation of traditional economies, which relied heavily on manufacturing and resource extraction, to new-economies that rely on knowledge and service-based industries (Bunting & Filion, 2006; Hobor, 2013; Sands, 2010). These service-based industries require human capital–and as a result, cities are now in need of housing (both quality and quantity) to help attract and retain workers.

Over the last two decades, in particular, cities in Ontario have experienced the pervasive trends of deindustrialization and economic restructuring similarly seen

in other industrialized societies. Historically, manufacturing formed the backbone of Ontario's economy, as industrialization was part of government economic policy for well over a century. The province's aggressive industrial policy has been helped by its proximity to the United States which facilitated trade, and the availability of capital, manpower, and resources—all of which gave the province and its cities the necessary ingredients to build their economies around manufacturing and related activities. Since the early 2000s, however, hundreds of industrial plants across Ontario have shut their doors, no longer able to keep afloat in an increasingly globalized and post-industrial economy (Bourne, Britton, & Leslie, 2011; Bradford, 2010).

This transition has had an impact on the urban landscape of cities, due to where industrial sites were located. Traditionally, industry focused on minimizing the transportation costs of materials and the finished product to large urban markets, as well as the access to an ample low wage workforce (Blair & Premus, 1987). Thus, manufacturing and industrial firms were typically located in cities to make use of these locational proximity advantages, including access to rail lines (Ward, 1998). Surrounding the industrial plants were often low-density residential and commercial uses to serve the large working-class populations.

Due to the historic location of industrial complexes, many of the current abandoned industrial buildings are situated in prime areas in the city, often close to the downtown core and major transportation nodes. In most cities, the buildings are often below the standards of other areas in the city and therefore have been relatively untouched by the real estate market. As a result, the spaces once occupied by factories have not been replaced and these areas now sit unused, slowly deteriorating as a stain on the urban landscape (Collaton & Bartsch, 1996). Indeed, the development trends from the last several decades have increased the chance of urban industrial buildings in downtown areas to become vacant and derelict (Wilson, 2010). Many cities have been inundated with a large supply of expensive, use-specific, and sometimes hazardous properties.

Beyond the aesthetics, the lack of redevelopment also means that cities are not maximizing tax revenue, nor are they addressing issues of urban sprawl. Eidelman (2010) argues that it is underutilized lands within the core, which have the opportunity to increase the marketability of these areas and prevent the often easily profitable, sprawl-like development. The impact of this is two-fold. First, in Ontario and other advanced economic regions, cities are increasingly responsible for providing services to residents (rather than upper levels of government), so a lack of economic activity in these areas means that less capital is available for reinvestment. Similarly, there has been concurrent movement within city planning to increase population density within urban cores. In part, the push for intensification is a reaction against the prevailing sprawling patterns of urban development. The policy foundation for this in Ontario is situated in the *Places to Grow Act* of 2005 (Government of Ontario, 2005). This act was paramount in addressing the growing concerns of urban sprawl within the populated Greater Golden Horseshoe (a relatively small geographic area of Ontario which accounts for 24.5% of Canada's entire population). The province has made it clear that through practices such as intensification, brownfield redevelopment, and core revitalization, cities can address the challenges faced in urban areas today. As a result of this and other guiding provincial policies, there is a need for cities to find adaptive reuses for these underutilized buildings which are often found in the core and most economically deprived areas of the city. Thus, concepts of infilling and brownfield development have become synonymous with contemporary planning and private sector activity in the last decade (de Sousa, 2017). However, in a climate characterized by financial stress, there is a lack of direct financial assistance to remediate the risks which come with brownfield and industrial reuse projects (Hayek, Arku, & Gilliland, 2010), rather the Province prefers a less intrusive voluntary cleanup approach that has created a reactive response by cities and developers (de Sousa, 2017).

Despite this increase in identifying the benefits of building reuse, there is a missing link when considering how Ontario municipalities are guiding their policy collectively and what themes of industrial building reuse are dominant. It is well understood that current industrial and economic practices in a specific location are path-dependent on the history of economic composition and decisions made by stakeholders (Martin & Sunley, 2006). Thus, a city's stock of underutilized industrial buildings is indicative of the unique historic timeline of that locale.

In light of this context, where cities need to consider what to do with these areas, this article asks: How are cities contextualizing and responding to local economic development change—specifically related to industrial and manufacturing decline—within their official plans? To evaluate this question, there are three major areas that this article will focus on: (1) catalogue economic development contextualization within Official Plans, including identifying specific strategies; (2) identify emerging themes related to adaptive reuse within the policy; and (3) investigate whether the local economy (through its industrial base) impacts what policies appear in these plans.

This investigation provides insight into how cities choose to create policy for reuse based on their own unique localized factors and creative incentive platforms. Understanding the policies and themes within the document can provide a useful tool for comparing how market stakeholders are reacting to this policy and create potential for future studies into the stakeholder-policymaker interaction. This comes from the well-discussed relationship between land-use policy and actual development practices (Leffers, 2018).

1.1. Local Institutional Context for Planning in Ontario

All levels of government regulate land use in Canada, each with their own distinct jurisdiction and legislative powers. In Ontario, the province enacts planning policy framework through legislative tools including the *Planning Act* (1990; Government of Ontario, 1990a), *Ontario Heritage Act* (1990; Government of Ontario, 1990b) and the *Provincial Policy Statement* (2005 and 2014; Ministry of Municipal Affairs and Housing, 2005, 2014) which are meant to guide municipalities in their localized land use planning. Despite the broad provincial legislation, local governments have traditionally been the greatest actors of land-use control, which has occasionally been critiqued as an inhibitor to more collective regional planning (Eidelman, 2010). The policy vehicle for local planning is the Official Plan, a binding piece of legislation that describes how land, infrastructure, and planning objectives should be utilized within the municipality (Ministry of Municipal Affairs and Housing, 2010). These documents are an imperative piece of policy when dictating the process and trajectory of land and building use, within their jurisdictional area.

In Ontario cities, this presents itself as Official Plans; a provincially mandated policy document that each municipality must pass through their governing body and must be regularly revised and updated (Government of Ontario, 1990). The Planning Act requires municipalities to update their plans ten years after a municipality prepares a new comprehensive Official Plan or every five years after an update is done through an amendment to the plan. There were cities who had plans dating back to the 1980s (e.g., Brantford) and several in the 1990s. Though this itself, is no indication of whether cities are accounting for economic decline, it does bring up questions of how plans whose main structures predate NAFTA (which was replaced in 2019 by USMCA) adequately account for modern economic trends in their planning policy. These policy documents are typically written in-house by municipal planners, but at times they are contracted out to private consultants.

From this central document, development of urban space (i.e., vacant industrial building reuse) is controlled through secondary plans, Zoning By-Laws, and Community Improvement Plans. Furthermore, direct measures are also available, including financial incentives such as waiving development charges, breaks on property taxes, and providing height and density bonuses used by municipalities to become a partner in the process (Hayek, Novak, Arku, & Gilliland, 2010; Shipley, Utz, & Parsons, 2006). These direct measures are done on a case-by-case basis, so interpreting the success of their applications has to be on an individual development project level.

2. Methods

As noted, this article seeks to understand how cities in Ontario are contextualizing and responding to local economic development change within their Official Plans and to determine if local economic realities influence policy. To achieve this, a comprehensive content analysis was performed on the Official Plans for the 51 cities in the province. In Ontario, cities are municipalities that have populations over 10,000 and have applied and received official designation based on the parameters set out in the Municipal Act (2001; Government of Ontario, 2001). Data was collected before Richmond Hill officially became Ontario's 52nd city. There are several reasons why these documents are key sources of analysis. First, all cities in Ontario have an Official Plan as they are mandated by the province who holds strong institutional control over cities. Second, all Official Plans are publicly available on city websites. Third, the plans contain information about how the built environment within the jurisdiction will be governed and zoned and provide a framework for local regulation and standards, providing a unique local interpretation of how the land and buildings should be used. Finally, unlike economic development documents—which have been well studied (see Arku, 2014; Cleave, Arku, & Chatwin, 2017, 2019; Cleave, Vecchio, Spilsbury, & Arku, 2019; Reese & Sands, 2007)—that act as broader strategy guides for cities and their development, Official Plans are legally binding documents that local governments must adhere to when (re)developing their city. As a result, these documents represent a rich text to analyze and understand city priorities and strategy in their response to local economic development change.

Content analysis of city documents is a useful approach to understanding the perspective, strategy, tactics, and framing of issues by identifying, isolating, and describing the way that phenomenon, events, organizations, or programs are perceived and codified by local governments (Bowen, 2009; Kay, 2009). An advantage of document analysis is that broad conclusions can be drawn from a number of sources, as long as they are representative of the population being examined (Chatwin, Arku, & Cleave, 2019; Cleave et al., 2017; Moynihan, 2006)—which is true in this study as all cities in Ontario are examined. To ensure rigour in the analysis and validity of findings, a comprehensive approach was used to catalogue, classify, and analyze the content of the Official Plans. Initially, the complete plans were read independently by the two researchers to "achieve immersion and obtain a sense of the whole" (Hsieh & Shannon, 2005, p. 1279), and to conceptualize the broad understanding of land-use policy within each municipality. Following this initial read-through, a set of thematic codes was established based on a collection of data using a bank of key words related to the topic. 18 themes were initially found in the first comprehensive read through by the two researchers. Subsequently, these themes were then scrutinized and consolidated (based on repetition and redundancy) to the 10 used in this study (Table 1). The documents were then read a second time to assign content to each relevant theme. Afterwards, occurrences were doc-

umented using NVivo software to quantify incidences for each thematic code. These themes were then examined to understand the ways cities in Ontario are dealing with manufacturing decline and the resulting urban change, which is expanded upon in the results section of this article.

Table 1. Summary of theme consolidation process.

Original Theme List	Consolidated Theme List	Theme Description
Planning for an economic transition Deindustrialization and the increase of the service economy Increased incidences of brownfields and closed factories An employment shift within the urban area from manufacturing to service employment	Acknowledgement of Industrial Decline and Economic Transition	An overall recognition by the policy document that economic changes (predominantly occurring from industrial decline) require specific policy actions from a land planning perspective.
Encouraging specific industrial employers to move to more appropriate land types Make employment land available to attract both new and existing industrial employers	Support the Relocation of Industrial Uses to Targeted Employment Lands	Policy measures that enable more sensitive lands within an urban core to be freed up for the possibility of adaptive reuse, while existing employers operate in specific employment lands.
Specific policy for a closed down industrial building. Specific policy for a neighbourhood-wide derelict industrial land issue.	Site Specific Targeting Area for Industrial Reuse of Redevelopment	Policy which targets specific locations or neighbourhoods where industrial decline has left underutilized land or buildings.
Reuse as a Tool for Affordable Housing	Reuse as a Tool for Affordable Housing	Identifying the possibility for the adaptive reuse of buildings to increase the housing supply.
Reduction of urban sprawl by retooling the existing built environment. Meeting increased density targets by utilizing vacant buildings within the core.	Reuse as a tool for Intensification	Policy which identifies adaptive reuse as a tool to meet provincially and local density targets. This coincides with the reduction of peripheral sprawl and utilization of existing infrastructure.
Reducing core vacancies by encouraging alternative economic uses of existing buildings. Encourage the conversion of buildings to commercial, office, and high density residential within the core areas.	Reuse as a Tool for Revitalization of the Urban Core	Policy which identifies adaptive reuse as a tool to mitigate the recent trend of core and downtown decline within Canadian urban centres due to the dependency of suburbs and greenfield development.
Creation of a Community Improvement Plan for Brownfield Reuse/Redevelopment	Creation of a Community Improvement Plan for Brownfield Reuse/Redevelopment	Using a Provincially legislated sub-policy to offer financial assistance for community improvement.
Reuse of Industrial Buildings to Light Industrial Uses	Reuse of Industrial Buildings to Light Industrial Uses	Encouraging more compatible industry to other land uses.
Non-CIP related financial incentives. Unique Policy that Promotes reuse.	Grants, Subsidies, or Unique Policy that Promotes Industrial Reuse	These included incentives and policy outside the realm of Community Improvement Plans that enable a stronger environment for reuse.
Strong Protection from Building or Site Conversion within Employment Lands	Strong Protection from Building or Site Conversion within Employment Lands	Policy which was protective of any changes to industrial lands and did not support easy land conversion.

One limitation of the content analysis format was the lack of ability to capture thematic patterns which were only glanced upon or suggested as possible approaches within the policy documents. As such, it was difficult to quantify broad policy themes as they often did not have the specificity and detailed approach that more targeted policies had. This was especially true when attempting this without breaking from the sound methodological approach above. Though a limitation in this study, the researchers intend to investigate more individual city approaches in future research now that the broad provincial overview has been examined within this article.

As previously noted, the third key concern of this study is investigating whether the local economy (through its industrial base) impacts what policies appear in these plans. In short, are the themes that emerged from the content analysis different between cities at different economic stages—particularly related to manufacturing and its decline? To categorize cities, a location quotient (LQ) of the Goods Producing Labour Force of each city was used to compare its concentration within the economic base of cities in Ontario. Employment data was collected from Statistics Canada and comprises of information from the 2016 Census. Goods Producing Industries are defined as the combination of the North American Industry Classification System codes 11 to 33 (Statistics Canada, 2020), which provides a standardized classification cut off for the calculation of LQs. The local sums of these industries were divided by the local labour force, equating to the proportion of the city's labour force that was in the goods producing sector. Each proportion was then divided by the province-wide equivalent. The cities were then divided into four groups (Table 2) based on whether their LQ was 1.25 and above (High Industrial Base), 1.0–1.24 (Moderate Industrial Base), 0.75–0.99 (Moderate Non-Industrial Base), and 0.74 and below (High Non-Industrial Base). This classification is adapted from previous studies (Baer & Brown, 2006; McLean & Voytek, 1992) where targeted LQ cut offs of above 1.25 and below 0.75 were considered significant from a policymaker's perspective. Descriptive statistics were used to summarize the themes that emerged in the content analysis, allowing a comparison of the strategies of cities with different compositions in their economic base. This descriptive approach allows for an in-depth analytical examination, complementing and extending the qualitative and policy findings of the content analysis.

3. Results

All 51 cities in the Province of Ontario had an Official Plan. Both the mean and median of the plans were nine years old, ranging from 33 years (Brantford) to one (Norfolk County) seen in Table 2. 45 of the plans were written in-house by planners, while the remaining six used private consultants to formulate a plan for council approval. Within the Official Plans, local economic development themes were prevalent across all cities—every Official Plan analyzed contained at least two themes, ranging from two (Prince Edward County) to 10 (Windsor), with an average of 5.85 themes appearing in each document (Table 2). There were ten themes that emerged from the content analysis (Table 3). Although wide-ranging in focus, these ten themes do form three larger clusters of development strategy: (1) framing and planning; (2) industry-focused land reuse; and (3) urban-focused land reuse.

3.1. Framing and Planning Themes

The framing and planning cluster focuses on broader issues of governance and addressing local economic growth through key themes of 'Acknowledgement of Industrial Decline and Economic Transition,' the 'Creation of a Community Improvement Plan for Brownfield Reuse/Redevelopment,' and 'Grants, Subsidies, or a Unique Policy That Promotes Industrial Reuse.' These represent 'high-level' efforts by the cities to engage with issues of manufacturing decline. Notably, there was a pattern between whether this framing was included in the Official Plan and the city's industrial base (Table 4). The relationship between LQ and the themes contained in the Official Plans were tested for independence, though no significant result was found (using Chi-square). This suggests that there is homogeneity in the approaches cities use to contextualise and form policy. However, this study is in the uncommon position of analysing the entire population, so descriptive statistics will be used to describe the findings of the content analysis and draw conclusions. Cities with a high industrial base (100%) acknowledge industrial decline and an economic transition more often than those with a small base (50%). Similarly, high industrial based cities more frequently include policy measures like enacting Community Improvement Plans (91%) and unique grants and policies (55%), which are tangible tools to reuse former industrial lands for more sensitive uses. Inversely, it was the high non-industrial based cities that were more likely to support strong employment land policy (88%), compared to high industrial based cities (45%). A potential explanation for this pattern is that many of the cities which make up the high non-industrial based grouping are those surrounding Toronto, whose expansive residential, commercial, and office-built environment, makes industrial lands in high demand.

'Acknowledgement of Industrial Decline and Economic Transition' was the most common theme of the analysis as 81% of the Official Plans had some reference to economic decline and the need to plan for a transitioning economy. This theme is unique, as it is not a specific policy initiative, but rather a contextual framing of the changes and challenges that cities face. For example, the City of Elliot Lake (2018, p. 23) frames itself as, "a young, progressive community in a state of transition." Expanding on this, the City of Burlington's

Table 2. City characteristics.

City	Population	Original Date of Plan Creation	LQ	LQ Category	# of Theme Occurrences
Barrie	141,434	2010	0.95	Moderate Non-Industrial Base	5
Belleville	50,716	2002	0.87	Moderate Non-Industrial Base	6
Brampton	593,638	2006	1.01	Moderate Industrial Base	4
Brant	36,707	2012	1.55	High Industrial Base	9
Brantford	97,496	1988	1.28	High Industrial Base	5
Brockville	21,346	2011	0.86	Moderate Non-Industrial Base	6
Burlington	183,314	2008	0.81	Moderate Non-Industrial Base	4
Cambridge	129,920	2018	1.41	High Industrial Base	8
Clarence-Rockland	24,512	2020	0.91	Moderate Non-Industrial Base	6
Cornwall	46,589	2018	0.84	Moderate Non-Industrial Base	7
Dryden	7,749	2011	0.94	Moderate Non-Industrial Base	3
Elliot Lake	10,741	2018	0.88	Moderate Non-Industrial Base	5
Greater Sudbury	161,531	2006	1.02	Moderate Industrial Base	5
Guelph	131,794	1994	1.25	Moderate Industrial Base	8
Haldimand County	45,608	2006	1.57	High Industrial Base	6
Hamilton	536,917	2009	1.02	Moderate Industrial Base	8
Kawartha Lakes	75,423	2006	1.24	Moderate Industrial Base	4
Kenora	15,096	2015	0.87	Moderate Non-Industrial Base	6
Kingston	123,798	2010	0.50	High Non-Industrial Base	4
Kitchener	233,222	2014	1.17	Moderate Industrial Base	3
London	383,822	2016	0.82	Moderate Non-Industrial Base	6
Markham	328,966	2014	0.68	High Non-Industrial Base	2
Mississauga	721,599	2010	0.83	Moderate Non-Industrial Base	3
Niagara Falls	88,071	1993	0.74	High Non-Industrial Base	3
Norfolk County	64,044	2019	1.65	High Industrial Base	8
North Bay	51,553	2012	0.67	High Non-Industrial Base	6
Orillia	31,166	2010	0.81	Moderate Non-Industrial Base	7
Oshawa	159,458	2018	0.99	Moderate Non-Industrial Base	5
Ottawa	934,243	2003	0.41	High Non-Industrial Base	4
Owen Sound	21,341	2017	1.00	Moderate Industrial Base	9
Pembroke	13,882	2016	0.70	High Non-Industrial Base	3
Peterborough	81,032	2017	0.73	High Non-Industrial Base	8
Pickering	91,771	1997	0.80	Moderate Non-Industrial Base	4
Port Colborne	18,306	2013	1.22	Moderate Industrial Base	9
Prince Edward County	24,735	1993	1.20	Moderate Industrial Base	2
Quinte West	43,577	2011	1.07	Moderate Industrial Base	7
Sarnia	71,594	2016	1.07	Moderate Industrial Base	9
Sault Ste. Marie	73,368	2013	0.93	Moderate Non-Industrial Base	6
St. Catherine's	133,113	2010	0.88	Moderate Non-Industrial Base	8
St. Thomas	38,909	2018	1.25	High Industrial Base	6
Stratford	31,465	2017	1.39	High Industrial Base	8
Temiskaming Shores	9,920	2015	1.11	Moderate Industrial Base	2
Thorold	18,801	2015	0.88	Moderate Non-Industrial Base	5
Thunder Bay	107,909	2018	0.78	Moderate Non-Industrial Base	9
Timmins	41,788	2009	1.30	High Industrial Base	4
Toronto	2,731,571	2015	0.64	High Non-Industrial Base	6
Vaughan	306,233	2017	0.97	Moderate Non-Industrial Base	5
Waterloo	104,986	2012	0.77	Moderate Non-Industrial Base	7
Welland	52,293	2010	0.94	Moderate Non-Industrial Base	8
Windsor	217,188	2013	1.25	High Industrial Base	10
Woodstock	40,902	1995	1.55	High Industrial Base	8
AVERAGE	**187,917**				**5.85**

Table 3. Theme clusters and characteristics.

Theme	# of Occurrences in Plans	Characteristics
Framing and Planning		
Acknowledgment of Industrial Decline and Economic Transition	41	These themes represent 'high-level' efforts by the cities to engage with issues of manufacturing decline. Ranging from the recognition of economic trends—suggesting a shift from manufacturing to service-based industries, to specific financial measures and unique policies that actively target industrial decline within communities.
Creation of a Community Improvement Plan for Brownfield Reuse/Redevelopment	39	
Grants, Subsidies, or a Unique Policy that Promotes Industrial Reuse	18	
Industry-Focused Land Reuse		
Support the Relocation of Industrial Uses to Targeted Employment Lands	25	This cluster includes specific strategies that the cities use to support, maintain, and locate remaining industry within their jurisdiction to more appropriate lands. These themes shared a commonality of mitigating isolated traditional manufacturing buildings for more appropriate uses to the surrounding community. This included pure relocation efforts to employment lands, or refitting buildings for light, more 'community friendly' industry such as artisanal companies like bakeries, craft breweries and butchers.
Site Specific Targeting Area for Industrial Reuse or Redevelopment	40	
Reuse of Industrial Buildings to Light Industrial Uses	16	
Urban-Focused Land Reuse		
Reuse as a Tool for Affordable Housing	14	This group of themes emphasized ways former industrial lands could be re-deployed to address urban development goals. With both provincially mandated and municipal set urban growth goals, cities are creating policy to meet the common standards of higher density, increased affordable housing, and the revitalization of underutilized lands. Adaptive reuse was suggested by the policy as a tool to meet these goals within communities. Equally important, was policy from some cities that stated the importance of protecting industrial lands from possible redevelopment or conversion.
Reuse as a Tool for Intensification	40	
Reuse as a Tool for Revitalization of the Urban Core	32	
Strong Protection From Building or Site Conversion within Employment Land	34	

Official Plan (2018, p. 138) provides greater description of the transition occurring and the challenges it faces: "The manufacturing-based economy has entered a period of transition where issues of globalization, technology changes, including automation and labour force changes, all contribute to a new role in the economy for manufacturing."

Along with the 'Creation of a Community Improvement Plan for Brownfield or Industrial Reuse' and 'Grants, Subsidies, or a Unique Policy that Promotes Industrial Reuse' these themes create a framework for policy development. The City of Hamilton (2013, p. 36), for instance, has a measure to incentivize reuse, and policy goal of the city is "to facilitate the intensification and adaptive reuse of such properties…allow reduced parking or other site and amenity requirements." This idea of compromising on certain city requirements was a common theme across the board, though it formulated itself in different ways. Norfolk County (2019, p. 240) used a bonusing approach indicating that "brownfield sites may be developed at densities higher than 75 units per hectare, without amendment to this Plan, but should be of a scale and massing that is generally consistent with the Residential, Medium Density designations." Similarly, the City of Belleville (2002, p. 52) entices reuse with a circumvention of lengthy and costly Official Plan amendments:

> Where re-use of any land designated Industrial land use on the land use schedules for a purpose other than industrial is proposed and the alternative use is in keeping with the main objective for the Bayshore planning area, such reuse may be permitted without amendment to this Plan.

Table 4. Thematic descriptions by economic base.

	High Industrial Base (n = 11)	Moderate Industrial Base (n = 11)	Moderate Non-Industrial Base (n = 21)	High Non-Industrial Base (n = 8)
Acknowledgement of Industrial Decline and Economic Transition	11 (100%)	10 (91%)	16 (76%)	4 (50%)
Creation of a Community Improvement Plan for Brownfield Reuse/Redevelopment	10 (91%)	7 (58%)	17 (81%)	5 (63%)
Grants, Subsidies, or a Unique Policy that Promotes Industrial Reuse	6 (55%)	4 (36%)	7 (33%)	1 (13%)
Support the Relocation of Industrial Uses to Targeted Employment Lands	8 (73%)	6 (55%)	8 (38%)	3 (38%)
Site Specific Targeting Area for Industrial Reuse or Redevelopment	10 (91%)	8 (73%)	16 (76%)	6 (75%)
Reuse of Industrial Buildings to Light Industrial Uses	7 (64%)	5 (45%)	4 (19%)	0 (0%)
Reuse as a Tool for Affordable Housing	3 (27%)	1 (9%)	6 (29%)	4 (50%)
Reuse as a Tool for Intensification	10 (91%)	8 (73%)	18 (86%)	4 (50%)
Reuse as a Tool for Revitalization of the Urban Core	10 (91%)	7 (64%)	13 (62%)	2 (25%)
Strong Protection from Building or Site Conversion within Employment Land	5 (45%)	6 (55%)	16 (76%)	7 (88%)
Average	8 (73%)	6 (56%)	6 (29%)	5 (63%)

Similarly, the creation of Community Improvement Plans was by far the most common tool for promoting adaptive reuse and the related brownfield redevelopment. 75% of cities either had one in place or would consider the implementation of one. Made available by the province in the Planning Act of 1990 (Government of Ontario, 1990), Community Improvement Plans are plans that focus on the maintenance or rehabilitation of targeted areas, in which municipalities can make grants, loans, or tax programs to help pay for certain costs. These grant and loan programs are available for the city to setup in an attempt to promote reuse and brownfield redevelopment and is one of the few provincially mandated tools to address these issues.

3.2. Industry-Focused Policies

The industry-focused land reuse of grouping of themes focused on specific strategies that the cities used to support, maintain, and locate remaining industry within their jurisdiction. This includes 'Support the Relocation of Industrial Uses to Targeted Employment Lands, Site Specific Targeting Area for Industrial Reuse of Redevelopment,' and 'Reuse of Industrial Buildings to Light Industrial Uses.' Cities on a whole, targeted specific sites within their plans for redevelopment or reuse of industrial lands and buildings, this does not appear to change when accounting for industrial base composition (Table 4). This, however, is contrasted with policies that supported the relocation of existing industry to employment lands. For these policy tools, the high (73%) and moderate industrial based cities (55%) were more likely to include this tool in their policy than cities with lower concentrations of industry (38%). This result is not surprising, as one would assume that cities which are dependent on industry would likely have more focused industrial lands on which to move existing businesses. Finally, cities with a high industrial base (64%) and moderate base (45%) indicated in their policy the idea of transitioning traditional industrial buildings into more community sensible light-industry uses. When comparing this to moderately non-industrial bases (19%) and high non-industrial bases (0%), it is clear that cities with larger industrial compositions are actively targeting the transition away from traditional manufacturing, at least in the urban context.

Nearly half of the cities in Ontario indicated that they support the relocation of incompatible industrial

uses outside of planned employment lands. This often situated itself as pockets of existing industrial uses within predominately residential or commercial areas that were incompatible with the growing use around them. Predictably, these sites serve as prime examples of potential adaptive reuse projects. For example, from London:

> Remnant industrial parcels may exist within residential neighbourhoods, in locations where they are no longer compatible with surrounding land uses. On such parcels we will support the relocation of any remaining industrial land uses and the repurposing of these parcels for land uses that are compatible with the neighbourhood context. (City of London, 2016, p. 293)

The targeting of specific sites or areas of cities was widespread amongst the plans (79% of documents; second most common theme). Cities ranged in specificity from large areas like waterfront areas historically used for industrial purposes (a common theme in several lake bound cities) to more specific identification of individual closed plants. Port Colborne, who cites a goal of converting 150 acres of former industrial to tourism or recreational uses, notes: "The City has been actively involved in assessing and addressing underutilized lands throughout the community. [Specifically] through innovative approaches to brownfield and waterfront development" (City of Port Colborne, 2013, p. 26).

Haldimand County (2006, p. 191) further illustrates more specific targeting:

> The potential redevelopment and/or reuse of the former Smucker's plant should have consideration for the comprehensive redevelopment and/or reuse of the property to ensure compatibility with the character of the surrounding area through appropriate street and block patterns, and land use and built form transitions with the residential neighbourhood cluster to the east (Brant Street and Brace Street) and adjacent employment area.

3.3. Urban Land-Use Policies

The urban-focused land reuse cluster of themes emphasized ways former industrial lands could be re-deployed to address urban development goals. This grouping of themes included policies on 'Reuse as a Tool for Affordable Housing Reuse, as a Tool for Intensification, as a Tool for Revitalization of the Urban Core,' and 'Strong Protection from Building or Site Conversion within Employment Lands.'

Further, issues surrounding employment lands were often mentioned in the Official Plans. These areas were typically set aside for industrial uses, often near major transportation hubs such as highways, airports, and harbours, and the places that cities were trying to relocate isolated industries to. The stronger the protection of these lands through policy prohibiting conversion to non-employment uses, and major bylaw amendments and studies that are needed if someone tries, the more unlikely reuse in these areas will occur. Some cities, however, were more open to conversion of these lands and indicated that reuse in these areas could still be beneficial. The City of Vaughan's (2017, p. 302) plan, for example, is "supporting the reuse and/or repurposing of older industrial buildings and/or Employment Areas for cleaner and more affordable employment uses." Other cities like Brampton (2006, p. 74) were much more protective of their lands, noting: "Conversion of industrial or employment land will not be permitted unless it is assessed as part of a comprehensive review in accordance with the Provincial Policy Statement." Congruently, it was cities with a high non-industrial base (88%) and moderate non-industrial base (76%) that included strong employment land protection measures in their policy. When comparing this to moderate industrial based cities (55%) and high industrial based cities (45%) it is clear that cities which cannot provide vast swaths of land (especially those situated in urban dense regions like the Greater Toronto Area) are much more protective of their existing stock.

The City of Belleville (2002, p. 65), for example, discussed its West Village area as a target for intensification through reuse:

> The West Village neighbourhood is on the west side of the Moira River north of Bridge Street with older industrial and warehousing uses. Some of the intensification opportunities are: Conversion of the historic industrial buildings that back onto the River into loft condominium apartments or live/work spaces; Wherever possible, turning new infill development to face the river and add decking or terraces; Reclaiming or preserving public access to the River; and maintain and upgrade the street housing along Coleman Street.

In addition, nearly two-thirds of cities identified 'Reuse as a Tool for Revitalization of the Downtown Core.' The City of Peterborough (2017, p. 234) discussed core revitalization through reuse:

> The Industrial Conversion Area is situated in the southwest portion of the Central Area and recognizes a node of old, predominately single-storey industrial buildings. The focus of the Industrial Conversion Area is to provide policy flexibility allowing industrial buildings and sites to be utilized for a wide variety of alternative uses including retail commercial uses, office and studio uses, institutional and recreational uses, service commercial and service industrial activities.

Finally, it was cities which had a high non-industrial base (50%) that proposed 'Reuse as a tool for Affordable Housing' compared to the next three industry-based

groups (29%, 9%, and 27% respectively). When considering that cities in the high-non industrial base also include some of the Province's most expensive cities to live (Toronto, Ottawa, and Markham), it is not unexpected to see them actively addressing affordable housing issues with reuse.

4. Discussion and Conclusion

This research considers the implications of manufacturing decline and economic change on land planning policy—specifically focusing on how former industrial lands are being, or planned to be, used. Several findings provide distinct conclusions of how cities in Ontario are planning for this change. Firstly, it was evident from the collection of documents the wide range of composition of planning and policy. On the whole, Ontario cities do acknowledge that the economy is in transition, resulting in an influx of underutilized industrial lands. This replicates findings in Cleave, Vecchio, et al. (2019), who found that manufacturing decline was an established theme within a city's economic development plan. Although, the goal of an Official Plan is not necessarily to account for economic development policy, it is notable that there is congruence with land-use policy. It was clear cities with higher industrial composition (Tables 2 and 4) generally employed the policies and themes identified here at higher rates than those with smaller industrial bases. This suggests that cities that still have some remaining industry are both more acutely aware of the potential for losing it and are being pre-emptive in ensuring there are plans to efficiently and effective use this land to stabilize and support urban and economic development. What is interesting about this finding is that existing literature typically asserts that smaller cities are disproportionately affected by economic and industrial decline (Siegel & Waxman, 2001). This has seemingly set the stage for adaptive reuse to be implemented as a tool to assist in both the transition of the local economy and the reflection of the economy in the built environment.

Within the plans, it was clear that cities preferred a site-specific targeted approach, rather than a broader city-wide initiative. Though city-wide approaches such as a Community Improvement Plan for the city's whole stock of brownfield sites were suggested, the most common approach was targeting specifically in-need areas. What was interesting was that cities with higher industrial bases were more aggressively targeting specific areas, and more precisely, specific sites. The Smucker's plant in Haldimand County was already mentioned, but this was joined with the Bata Shoe Factory in Quinte West, Abitbi Mill in Kenora, Woolen Mill in Kingston, and the Waterford Mill in Norfolk County.

4.1. Adaptive Reuse: A Unique Policy Tool

One of the more evident discoveries was the lack of congruence when it came to policy promoting reuse. This was surprising given findings of past studies on economic development policy in the province (e.g., Cleave, Vecchio, et al., 2019). Indeed, previous studies find that cities approached policy in a homogenous, frankly cookie cutter fashion. Reuse policy seems to be a much more localized driven approach, where outside of Community Improvement Plans cities are left to their own creativity and determination to see these sites reused or redeveloped. It is worth noting that during the data collection phase, it was clear that the majority of Official Plans have been created in-house by the municipality itself, not with the use of consultants. Only 6/51 cities used consultants to create their official plans: Brockville, Clarence Rockland, Elliot Lake, Kenora, Prince Edward County, and Timiskaming Shores. It should be noted however that all six of these cities are under 25,000 people (Table 2), which suggests that some smaller cities do not have the in-house facilities to undertake a labour extensive task like formulating an official plan for provincial approval. On an interesting side note—this differs from the approach used by economic development plans, where a small number of prominent consultant firms provide the majority of policy for the province (Cleave, Vecchio, et al., 2019). This suggests there may be a relationship between in-house policy creation and the production of unique strategies to combat industrial decline with adaptive reuse, though further investigation into this phenomenon is necessary.

Emerging from the documents is an indicator of unique planning and land-use approaches for industrial lands in specific historical contexts. For example, the City of Brampton (2006, p. 17) directly addressed this in its plan, stating: "Large-scale industrial development started in Brampton only 40 years ago, but today this sector represents the major employer for Brampton residents. Office and service facilities have followed manufacturing but at a slower pace."

However, Brampton is unique for its short manufacturing history. Adaptive reuse is likely less prevalent in those cities where their industrial building stock is newer and planned in a more sensible fashion. Now that the broad policy themes of the province have been investigated, incorporating a metric to measure historic industrial composition would be an interesting next step to this study.

Notably were the narratives in many water-bound cities, which focused on revitalizing the waterfronts. This makes sense as waterfronts are traditionally important industrial lands used in importing and exporting resources. As the economy has transitioned away from the goods producing sector, there seems to be widespread demand to reclaim the waterfront for more community usable spaces. What once stood as the anchor for industry in Ontario, has now become the hottest area for adaptive reuse, often preserving the industrial architecture for a uniquely reclaimed atmosphere. The City of Owen Sound (2017, p. 124) articulates this within their plan as: "Commercial uses are slowly replacing the industrial uses

historically located along the eastern harbour. Potential for new development areas exists in the underutilized harbour areas."

The reclamation of waterfronts and the reuse of industrial buildings in these areas best describes the ability of reuse for communities to preserve their industrial past, offer a unique space for living and recreation, and meet the common goals in official plans of environmental remediation and reconnection to the cities natural resources. Reuse has the unique opportunity to both preserve the industrial spirit of these once bustling areas, while also allowing for a transition to the new economy.

A potential limitation of planning policy—specifically relevant to targeted planning and development efforts—is that policy in of itself is not a direct indication of actual practice (see Bobrow, Eulau, Landau, Jones, & Axelrod, 1977). This presents itself when considering the result of Community Improvement Plans being seemingly 'thrown in' by many cities to address reuse. Brownfield Community Improvement Plans read as buzzwords in many plans who showed no further attempts to actually implement one. Obviously, Official Plans serve as the broad stepping stone for other municipal policy, but there is no apparent reason why some cities went into specific detail on the implementation of their Community Improvement Plans while others mostly copied word for word the language in the Planning Act (Government of Ontario, 1990) putting forward that the cities had the opportunity to use Community Improvement Plans as a planning tool.

In a similar vein, intensification was one of the most common concepts in the documents as references to reuse as a tool to intensify a city's building stock was seen in all but 11 plans. Rather aggressive targets set out by the province, have seemed to cause many cities to enter into a frenzy with addressing their own intensification goals. As Peterborough (2017, p. 27) said in their plan: "The City will strive to ensure that at least 10% of new residential units resulting from new residential development and residential intensification through conversion of non-residential structures, infill and redevelopment, to be affordable housing."

The language itself is a common theme in almost every planning policy: 'Strive to ensure' indicates a rather soft target and was replicated repeatedly when discussing reuse policy.

An interesting aspect of the data presented itself in a temporal fashion, where cities in Ontario have been updating older outdated plans within the last decade. With a median age of nine years and the aforementioned literature discussing the growing number of plant closures since the early 2000s, it is understandable that addressing vacant industrial lands is ever-more pressing for municipal planning offices. Only six plans that remain in the catalogue of Ontario cities were originally drafted before the year 2000 (Table 2). Again, it is important to keep in mind that Official Plans undergo regular revisions and reviews, but what is clear is that as new plans continue to be drafted, industrial decline will be more evident to those writing the policy. Indeed, based on additional research by the authors, new plans in Ontario are largely cyclical in their formation due to the Planning Act (Government of Ontario, 1990) stipulation of continuous updates to the plan. Most cities drafted new plans every 20–35 years, and from the data in Table 2, it is clear that most cities have or are entering a new 'generation' of official plans in the last 10 years. These plans have and will be constructed in an era where the decline of manufacturing is well documented and the principles of policies such as the Growth Act (2005; Government of Ontario, 2005) will be well entrenched in municipal planning policy. Further research into the historic timeline of official plans in Ontario and their context of manufacturing decline between plans of different ages is the next logical step in investigating whether planning policy addressing deindustrialization is path dependent.

Ontario cities have clearly identified that industrial decline requires direct policy in the remediation of plant closure and underutilized industrial lands. Reuse serves as a common theme throughout Official Plans as a tool to address some of the most pressing issues de jour for municipalities. Cities have proposed that affordable housing, intensification, revitalization in the urban core, and creating spaces for creative and vibrant industries can be addressed by the promotion of reuse in the community. For those with strong industrial history, the applicability of reuse allows for communities to preserve their industrial heritage, while at the same time shift uses to the new economy, one where waterfront breweries, reclaimed industrial office space, and manufacturing themed loft apartments have become all the rage. If cities can develop unique policy to their specific local situation, which promotes reuse in their communities, they will be able to harness the positive benefits of this tool.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

The Preservation of Productive Activities in Brussels: The Interplay between Zoning and Industrial Gentrification

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Abstract
Urban activities such as housing, productive space, green space, offices, etc., compete for scarce urban land, especially in cities with population growth, such as London and Brussels. Thereby, low-value uses such as production have a more vulnerable position in a private property market governed by real estate dynamics in comparison to high-value uses such as offices and housing. While local authorities of post-industrial cities grow more susceptible to revitalizing their relationship with productive activities, they risk losing the space to do so due to industrial gentrification. Based on the disappearance of production space in the case of the Brussels Capital Region (BCR), this article aims at evaluating how the BCR supports urban production, with a clear focus on zoning and the provision of production space. Although the BCR is a post-industrial city, it continues to lose production space at a rapid pace. Employing an analytical framework of urban settlement patterns of production, we analyse the production-related zone typologies in inner-city areas as well as in more peripheral monofunctional and mixed areas of the BCR. Our analysis of the production-related zone typologies of the BCR land-use plan demonstrates that industrial gentrification plays an important role in current deindustrialization processes. This article presents zoning strategies to regulate the private property market as well as public land strategies to preserve urban production space.

Keywords
industrial gentrification; industrial retention; mixed-use development; urban development; urban production; zoning

Issue
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1. Introduction

In the Brussels Capital Region (BCR) as well as in other European post-industrial cities, there is a contradiction between renewed policy attention for urban production since the financial crisis of 2008 and the empirical observation of ongoing deindustrialization. The recent urban industrial policy plans, written after the 2008 crisis, describe a range of urban production strategies aimed at maintaining and growing production. Although almost none of these plans include direct guidelines or strategies concerning the provision of spaces in which these activities take place, several policy measures—such as land-use plans and zoning—have a spatial impact on urban production. The aim of this article is therefore threefold. First, it problematizes the provision of urban production space by empirically demonstrating the rapid disappearance of large amounts of production space in the case of the BCR. Second, the article identifies the actors and mechanisms responsible for the disappearance of production space in the various zoning categories of the BCR land-use plan. And third, it formulates recommendations to safeguard urban production space.

In doing so, this article does not question the legitimacy of the BCR’s policy goals of supporting urban production but accepts it as a given, nor does it question

the hypothesis that "a good city has industry" (Brearly, 2016). We refer to various authors who provide empirical evidence and arguments for the need for urban production, thereby using a variety of social, ecological, and economic arguments, together with data about sustainability, labour markets, urban ecosystems, circular economy, mobility, etc. To name a few: Cities of Making (2018), Fitzgerald and Leigh (2002), Hill (2020), Kampelmann (2017), Lane (1995), and Lester, Kaza, and Kirk (2013). Instead, this article aims at evaluating how the BCR supports urban production, with a clear focus on zoning and the provision of production space. Next to zoning strategies, mobility, logistics, and infrastructure policies also played an important role in deindustrialization and the suburbanization of production space (Ryckewaert, 2011). In this article, we focus on the use of zoning as a planning instrument in curbing deindustrialization. The logistics dimension exceeds the scope of this article, even if it is a crucial one and has clear links with zoning.

This article proceeds as follows: Section 2 describes the theoretical approach. Following the analysis of the micro-data, we hypothesize that industrial gentrification is a significant factor of deindustrialization in the BCR. We introduce the hypothesis via recent research about industrial gentrification (Curran, 2007, 2010; Ferm & Jones, 2016, 2017; Wolf-Powers, 2005), whereby high-value uses (e.g., offices, housing) displace low-value uses (e.g., recreation, production).

Section 3 deals with the methodological approach. The section starts with sketching the research context of the case of the BCR. This article uses an analytical framework of urban settlement patterns of production (USPPs) to demonstrate how production continues to leave the city. This framework allows us to describe the disappearance of production space by using a structured narrative that recurs in every section of this article and to link the disappearance of production space to land-use plans and urban morphologies. The main research question of this article, then, is whether the zoning strategies of the BCR land-use plan contain protective measures to preserve urban production land. Next to the use of macro-data on the disappearance of production space on the regional scale, we also use a set of micro-data on building permits (BPs) of the municipality of Sint-Jans-Molenbeek, the former industrial heartland of the BCR. This micro-data on BPs allows us to understand who the actors involved in industrial conversion are. Private persons are responsible for more than 50% of the transformations of former production spaces into housing.

In Section 4, we analyse the disappearance of production space in the case of the BCR in each of the zoning typologies related to the production of the BCR land-use plan (BCR, 2017). We illustrate how industrial gentrification is responsible for the loss of productive space in the BCR in all of the zoning typologies. While private actors drive conversions from production space into housing in inner-city areas, public authorities in particular are driving the transformation of mono-industrial zones. Just like in London (Ferm & Jones, 2017), in the BCR this mainly happens through changing land-use plans. If the current zone typologies do not protect production space, can other zone typologies preserve production space in inner-city areas? Or, can we improve the existing zoning measures?

Section 5 displays three 'passive' zoning strategies to regulate the private property market: (1) improving the zoning instrument enterprise area of urban development (EAUD); (2) heritage regulation; and (3) micro-zoning. This final section additionally presents two more 'active' public strategies to maintain production space: (1) expanding public production assets; and (2) the Community Land Trust (CLT) model, where long-term stewardship of affordable land replaces the barriers between ownership and leasing.

2. Theoretical Approach

2.1. Identifying Urban Production

Academics and policymakers use various definitions to delineate urban production. Recurring words in no particular order are manufacturing, industry, production, maintenance, and repair. Sometimes, construction is added (De Boeck, Bassens, & Ryckewaert, 2019) as well as activities related to the circular economy such as urban mining and recycling (Cities of Making, 2018; Hill, 2020). Conflicting opinions arise on whether to include immaterial activities in the definition of urban production, such as ICT, academic and technological activities, graphic design, etc. We adopt a broad definition that includes immaterial production because this allows us to study a diverse range of productive activities in terms of their spatial needs and their emergence in the USPPs.

2.2. Deindustrialization and Industrial Gentrification in Relation to Zoning Policy

Deindustrialization is usually explained by a combination of internal (Rowthorn & Ramaswamy, 1999; Tregenna, 2011) and external factors (Ryckewaert, 2011; Saeger, 1997), such as technological innovation and outsourcing to low-wage countries. This article focuses on a more recent account of deindustrialization: industrial gentrification, or the pushing out of production space through real estate dynamics, often underpinned by changing land-use policy. Two different bodies of literature reveal a clear link between planning instruments, real estate dynamics, and industrial gentrification: critical urban geography and urban planning. To name but a few studies: Camerin (2019) and Charnock, Purcell, and Ribera-Fumaz (2014) on the Poblenou district in Barcelona; Curran (2007, 2010) and Wolf-Powers (2005) on Williamsburg in New York; Ferm and Jones (2016, 2017) on London; and Savini and Aalbers (2016) on Milan. Both bodies of literature describe cities and regions that are predominantly governed by a private land market. Without explic-

itly naming Smith (1987), the authors mentioned above demonstrate that when there is a difference between the current rent of a property and its potential future rent, there is a strong tendency to increase the rent and value. They also demonstrate that this dynamic does not only apply to residential development, as Smith (1987) describes, where higher-value homes replace lower-value homes, but also to lower-value—and thus more economically vulnerable—uses such as parks, social services, and, in the case of this article, production space.

Based on an analysis of urban plans and research-by-design for urban production, urban planning literature comes to conclusions similar to those of critical urban geography readings about project development in cities such as Milan (Savini & Aalbers, 2016) and the transformation of the formerly industrial district of Poblenou into the 22@ area in Barcelona (Camerin, 2019). They frame the conclusions differently, however. The field of urban planning frames the relation between planning instruments, real estate dynamics, and industrial gentrification as an extra explanation of deindustrialization, and arguments are made in favour of reindustrializing the city (cf. Nawratek, 2017). The field of critical urban geography exposes this relation as a manifestation of violent capitalism aimed at developing entrepreneurial policy strategies and attracting foreign investors in a global intercity competition, without governmental concern for the former inhabitants and workers of these districts.

Concerning industrial gentrification and the preservation of affordable production land, most authors of industrial retention literature agree that mono-industrial zoning is the best strategy to guarantee the affordability of production land and reduce conflicts between production and housing (Borret, 2018; Fitzgerald & Leigh, 2002). However, where multiple cases show how speculation initiates abandonment (Camerin, 2019), Armstrong and Lund (2005) and Schleicher and Hills (2010) point to the risk of underuse and abandonment because of a lack of investment incentives. They state that owners do not have any incentive to redevelop or invest in these areas, as the low land prices for such uses yield only a moderate return on investment as compared to residential redevelopment. If owners do not need the infrastructure in mono-industrial areas, there is no pressure to do something with it. According to the authors, this observation causes resistance of policy makers and citizens in cities with a growing population and a historical structural housing crisis, such as New York and London. Section 4 on the analysis of production space in the BCR demonstrates that citizens do not oppose mono-industrial zones.

3. Methodological Approach

3.1. Research Context of the Case of the BCR

The BCR offers an excellent case to address the preservation of urban production space from a policy perspective. Although the BCR is a post-industrial city, it continues to deindustrialize and lose production land. The term 'post-industrial' refers to the transition of a producing economy into a service economy caused by deindustrialization or a continuous decline in the share of manufacturing employment (Saeger, 1997). The BCR, for example, lost more than 85% of its manufacturing jobs between 1970 and 2014 (Vandermotten, 2014). Furthermore, the BCR is experiencing an increased competition between urban functions such as housing, production, green space, offices, etc. Since the region's development is predominantly driven by a private land market, high-value uses (housing, offices) generally win in this competition from low-value uses (production, green space) because they can afford to pay a higher rent.

The former industrial areas along the canal connect Brussels to the port of Antwerp and the North Sea in the north and Charleroi in the south. They are situated in the former valley of the Senne river. In cities such as Paris, a socio-spatial divide occurs between a wealthier city centre and more deprived peripheral areas such as the banlieues. But in the BCR, poorer residents (by average annual income) live in the city centre and the more affluent population lives in the periphery. The canal zone hosts the most substantial part of the demographic growth of the BCR. The latest projections predict a population increase of 5.6%, or 68,063 people, between 2020 and 2040 (Brussels Instituut voor Statistiek en Analyse, 2020). This corresponds to an increase of approximately 840 extra households a year and illustrates the increasing pressure on land. In Figure 2, on the population growth of five inner-city neighbourhoods along the canal, we see the growth curve flattening, thereby indicating a slower growth than the previous decade.

3.2. Empirical Data

This article uses a mixed method of combining quantitative and qualitative data. To illustrate the disappearance of production space, we use macro-data on the evolution of land uses and their surfaces in the BCR between 2000 and 2018 from the Belgian Federal Land Registry Department (Statbel, 2018). To illustrate where and how production space disappears, we use a new local dataset of 447 BPs on 378 unique addresses in five out of 12 neighbourhoods of the Brussels municipality Sint-Jans-Molenbeek between 1995 and 2019. The BPs are related to the conversion of productive space in former industrial inner-city neighbourhoods (for a more specific account of the methodology, see De Boeck, 2020). These BPs give us more insights into the actors of conversion and the types of new uses. To analyse the BCR zoning measures and the provision of urban production land, we combine an analysis of policy documents with comparative research through a literature review of zoning approaches in the cities of London, Barcelona, and Vienna. These cities use new zoning strategies to preserve urban production land that are similar to those used by the

BCR. We focus on the conversion of mono-industrial into mixed-use zoning in combination with a set of strict planning rules that impose a vertical mix, with production on the ground floor and housing on the higher floors.

3.3. Analytical Framework of USPPs

To describe how and where production space disappears, we designed an analytical framework to categorize USPPs. This framework enables us to link the disappearance of production space in the BCR to academic literature about zoning, the BCR land-use plan, and the specific morphologies of production in the BCR.

The typology of our analytical framework consists of four distinct USPPs, as shown in Table 1. This section describes how our typology of USPPs is structured and clarifies the similarities to zoning categories for production as described in the academic literature, the corresponding zones in the BCR land-use plan, and the different morphologies, which together form the analytical framework.

3.3.1. Planning Production Spaces through Zoning in Academic Literature

The academic literature describes four main different types of zoning used to plan urban production: (1) monofunctional zoning; (2) horizontal mix with other economic activities or, (3), with housing; and (4) vertical mix with housing. We categorize these different types of zoning according to our typology of USPPs in Table 1. First, mono-industrial zoning corresponds to USPP-3 (Catungal, Leslie, & Hii, 2009; Chapple et al., 2017; Charnock et al., 2014; Ferm & Jones, 2016, 2017; Indegaard, 2009; Lester et al., 2013). Second, horizontal mixed-use zoning of production combined with other economic activities corresponds to USPP-2 (Cotter, 2012; Lane, 1995). Third, horizontal mixed-use zoning where production is combined with housing corresponds to USPP-1 and USPP-2 (Armstrong & Lund, 2005; Lane, 1995; Schleicher & Hills, 2010). And, fourth, Cotter (2012) and Leigh and Hoelzel (2012) propose a combination of densification and vertical mixed-use zoning with housing on top of production as a strategy to preserve and even expand urban industrial land, which corresponds to USPP-4.

3.3.2. Planning Production Spaces through Zoning in the BCR Land-Use Plan

The four zoning strategies for planning production in cities mentioned above also appear in the BCR land-use plan (BCR, 2017). This plan maintains a unique zoning methodology at the scale of the building block. Contrary to cities such as Barcelona or Vienna, who work with large zoning areas, every single building block in the BCR has its own set of uses and building prescriptions. The plan consolidated the existing land-use situation of 2001. The assigned use of a building block thus rather represents the dominant-use situation as it was 20 years ago, based on an intensive site survey. The land-use plan, therefore, reflects the historical mix of production and living of the BCR's inner-city areas, indicating that the mixed and strongly mixed residential zoning typologies still hosted many production facilities in 2001.

The floor areas that are allowed for production spaces in every zone determine the different zoning categories. USPP-1 hosts residential and mixed residential zones, where 250m^2 of production space per building is allowed in residential areas and 1,000m^2 in the mixed zones. When a request is well-motivated and has undergone a public inquiry procedure, production space can be expanded to 500m^2 in the residential areas and 1,500m^2 in the mixed zones. USPP-2 is home to strongly mixed residential zones, with production spaces of up to 1,500m^2 per building. USPP-3 contains only mono-industrial zones: the areas for urban production and the areas for port activities and transport, where logistics and wholesale activities are also allowed, as well as small service spaces (cafés, restaurants, etc.) up to 300m^2 per building. USPP-4 hosts the EAUDs, with production spaces up to 2,000m^2 per building. When they are well-motivated and have undergone a public inquiry procedure, building projects of a minimum surface of 10,000m^2 are allowed. Here, 90% of the ground floor needs to be dedicated to production or wholesale, and a minimum of 40% of the total surface needs to be dedicated to housing.

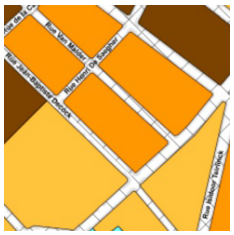
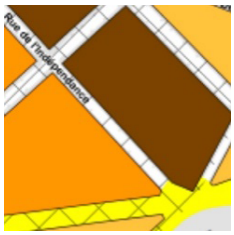
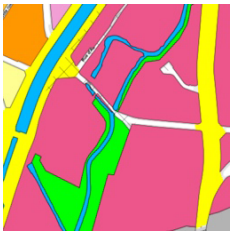
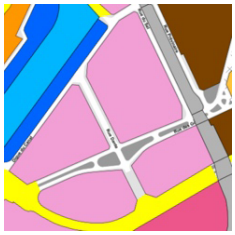
3.3.3. Morphologies of Urban Production Spaces

The production-related zones correspond to four morphologies, with each a different granularity, scale, and type of production and housing mix (horizontal or vertical, interwoven, juxtaposed, or stacked). We based this method of categorizing on Hoppenbrouwer and Louw's (2005) multidimensional model of mixed-use developments. This model describes a range of typological and morphological dimensions of mixing functions (residential, office, shops) and allows us to approach urban production from a spatial and morphological perspective (for a more specific account of the methodology, see De Boeck, 2020; Hoppenbrouwer & Louw, 2005).

To demonstrate the urban morphology of zones where production is allowed, we illustrate each USPP with a satellite image of a Brussels neighbourhood. To illustrate the interweaving of production and housing, we clarified the satellite images of the neighbourhoods in the colours blue and red. Blue stands for economic activities, red for housing (Moritz et al., 2013, p. 32).

USPP-1 represents fine-grained urban tissue with small-scale workspaces and warehouses, often built in the early 20th century, and an interwoven mix of functions in or between buildings. An example is a building block with production space in the courtyard surrounded by a closed front of housing (red surrounds blue in Table 1). USPP-2 represents mixed-grain tissue with

Table 1. Typology of USPP.

	USPP-1	USPP-2	USPP-3	USPP-4
Mono-functional or mixed-use zoning	Mix	Mix	Mono	Mix
BCR land-use plan regulations for zones where production is allowed + allowed m^2 of production space per building	Residential areas ($250m^2$–$500m^2$) Mixed residential areas ($1,000m^2$–$1,500m^2$)	Strongly mixed residential areas ($1,500m^2$)	Areas for urban production Areas for port activities and transport	Enterprise areas for urban development ($2,000m^2$; or projects of at least $10,000m^2$, of which 90% production on the ground floor and min. 40% housing)
Extract of the BCR land-use plan (BCR, 2017)				
Satellite image illustrating the morphology of a corresponding BCR neighbourhood (BCR, 2017)				
Abstracted image of the morphology (of the ground floor) of the corresponding BCR neighbourhood (Moritz, De Clerck, & Vanhaelen, 2013)				
Scale	Building, building block	Building block	District	Building, building block, and district
Granularity	Fine-grained	Fine- and coarse-grained	Coarse-grained	Coarse-grained
Type of mix	Horizontal Interwoven	Horizontal Juxtaposed	Horizontal Juxtaposed	Vertical Stacked
Notes:	production other economic function housing city-related function canal & water Source: Moritz et al. (2013).		areas of residence mixed areas of residence strongly mixed areas of residence areas for urban production enterprise areas for urban development areas for port activities and transportation areas BCR land-use plan production zones. Source: BCR (2017).	

the juxtaposition of production activities and housing at the scale of the building block. An example is a building block with mainly production spaces next to a building block of principally housing (a red building block juxtaposes a blue building block in Table 1). Both USPPs occur in the inner-city and former industrial area of Brussels. Table 1 illustrates this with two images from Sint-Jans-Molenbeek. USPP-3 or the horizontal mix at the district level in coarse-grained urban tissue appears as the juxtaposition of mono-functional areas, which is the case in the industrial zones in the north and south of the BCR. A vertical mix appears in USPP-4 at the scale of the building, the building block, and the district in coarse-grained tissue where functions are stacked upon one another (production on the ground floor in blue and housing on top in red in Table 1).

4. Analysis: Production Space in the Case of the BCR

4.1. The Disappearance of Urban Production Space in the BCR

Although Brussels was already established as a post-industrial city previously, empirical data from the BCR show a continuous and rapid decline of productive space since the year 2000. Table 2 shows how the BCR lost 106ha of productive buildings between 2000 and 2018. That is a loss of 16% of its industrial assets.

In 2000, 6% of the total surface of the BCR was allocated to industrial use. In 2018, that diminished to 4.2%. In comparison, in its new Productive City plan, Vienna aims at allocating 5% of the total surface to production space (Stadt Wien, 2015).

4.2. Where and How Does Production Space Disappear in the BCR?

4.2.1. Former Mixed Industrial Inner-City Areas

Most losses of production space occur in the former industrial BCR municipalities along the canal: Anderlecht (−34ha), Sint-Jans-Molenbeek (−16ha), and Schaerbeek (−12ha); also, in Uccle (−14ha), which is further away from the canal but touches the southern industrial areas of Flanders. These surface data comprise production units of 1,000m^2 or more (De Voghel, Strale, Boswell, & Coekelberghs, 2018). Since the regional government takes only surfaces of 1,000m^2 or more into account (De Boeck, Degraeve, & Vandyck, in press), we use a micro-dataset of BPs in five neighbourhoods of the municipality of Sint-Jans-Molenbeek where bigger and smaller surfaces are considered, and zoom in on a former industrial part of the BCR.

We see in Figure 1 that the increasing amount of BPs partly coincides with the population increase in the same five neighbourhoods in Figure 2. The perimeter of the local dataset consists of building blocks in three zoning typologies of the BCR land-use plan: residential zones; mixed residential zones; and strongly mixed residential zones (BCR, 2017).

This local dataset of BPs in Sint-Jans-Molenbeek represents the conversions of production space in USPP-1 and USPP-2, as shown in Table 1, and allows us also to gain insight into the actors of conversion of former industrial inner-city areas, the new uses after the conversion, the sectors, and the mix of functions of the converted building projects.

Private persons are responsible for 50% of the conversions of production space. 70% of the once-industrial buildings owned by private individuals were transformed into housing. This percentage is much higher than the regional average of 47% of conversion into housing (De Voghel et al., 2018, p. 64). Most of these conversions are back houses, warehouses, and workshops situated in the courtyard of building blocks, similar to USPP-1 in Table 1. Businesses, representing a diverse set of economic activities, are responsible for 39% of all Molenbeek industrial conversions. A couple of sectors stand out, such as real estate (29%), retail (24%), construction (7.5%), and wholesale (7.5%), especially of construction materials. When looking at the types of BPs, half of the conversions done by real estate developers consist of merging two or more parcels to create residential apartment developments. 7% of the actors are

Table 2. Changes in the share of land uses of the BCR between 2000 and 2018.

BCR	2000	2018	% of change between 2000 and 2018
Total built surface (ha)	7,143	7,670	7%
Housing	4,306	4,923	13%
Production and storage	791	685	−16%
Offices	281	274	−3%
Commerce	518	492	−5%
Public buildings and other	1,252	1,304	4%
Total unbuilt surface	5,692	5,180	−10%
Not cadastral surface	3,288	3,364	2%
Total surface	16,123	16,214	1%

Source: Statbel (2018), processed by Sarah De Boeck.

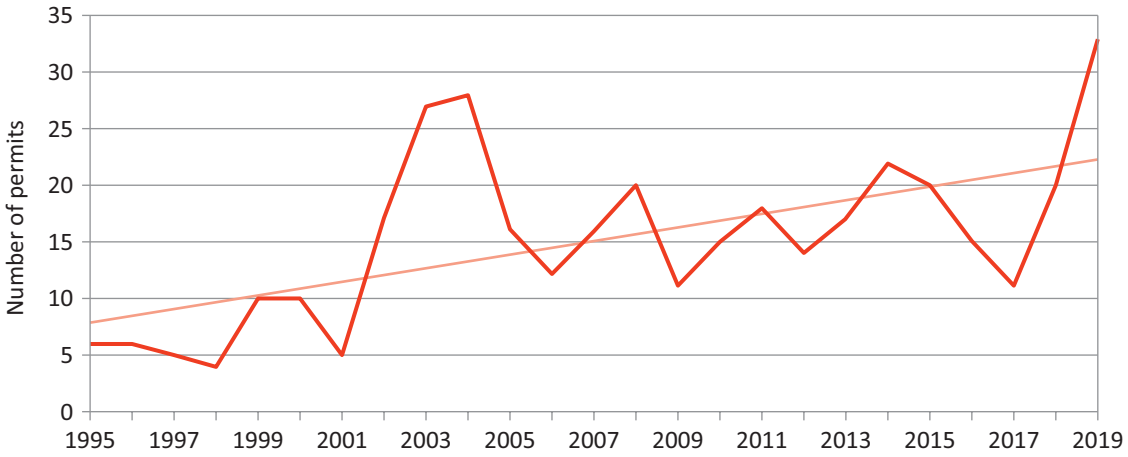


Figure 1. Number of permits for industrial conversions in Sint-Jans-Molenbeek between 1995 and 2019. Source: Courtesy of the Urbanistic Department of Sint-Jans-Molenbeek, processed by Sarah De Boeck.

non-profit organizations, of which half turn their industrial property into places of worship, principally mosques and evangelical churches. Fewer than 4% of these conversions are done by public bodies, mainly to construct social housing and buildings for social, cultural, and educational services.

Half of the reconversions are single-use projects, and the other half are mixed-use projects. The mixed-use projects of the Molenbeek dataset consist mostly of the conversion of production spaces into housing in combination with retail and parking. The main architectural typology is a shop on the ground floor and apartments on upper floors. Sometimes offices are added. In only two cases is the industrial back house demolished to make space for a garden. Only 10% of the BPs of single-use projects involve the renovation of manufacturing spaces. The other 90% concern: 37% housing; 28% commercial; 17% services and other uses (sports hall, cultural space, social space, artist studio, etc.), and 4% places of worship. The remaining 4% are two parking areas, three offices, and one brownfield.

Since the historical centre of Sint-Jans-Molenbeek along the canal has a fine-grained inner-city morphology, where most building blocks consist of a closed front of houses surrounding production spaces inside the courtyard of the building block, these conversions happen mainly out of sight. The slow, 'drop by drop' rhythm, with an average of 15 to 16 BPs a year (see Figure 1), seems to reinforce the invisibility of the disappearance of production land. De Boeck et al. (in press) argue that the invisibility of production spaces concerns especially small production spaces below 1,000m^2. While the BCR authorities map production space of only 1,000m^2 and more, their research of the construction sector demonstrates that construction enterprises remain spatially invisible for policy because they mostly operate from smaller parcels, between 130m^2 and 520m^2. The conversions in the residential, mixed residential, and

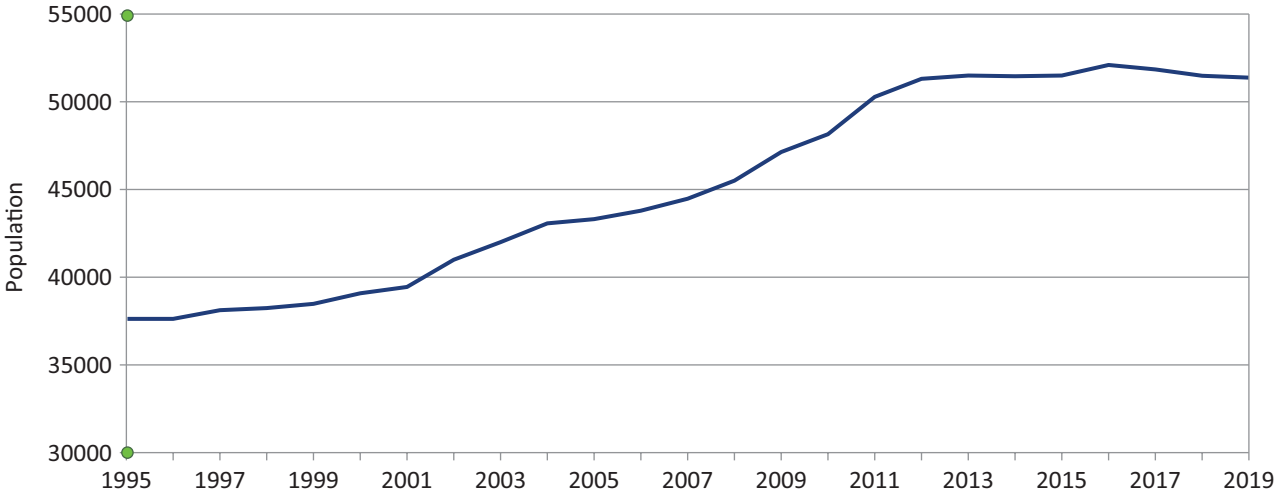


Figure 2. Evolution of population between 1995 and 2019 in Sint-Jans-Molenbeek. Source: Wijkmonitor Brussel (2019), processed by Sarah De Boeck.

strongly mixed residential areas hence remain out of sight for policymakers.

We conclude that the zoning measures to plan production space in the residential, mixed, and strongly mixed residential areas, namely the categories USPP-1 and USPP-2, do not contain protective measures to safeguard inner-city production space. Through the methodology of measuring production surfaces from 1,000m^2 upwards, the smaller conversions in these zoning areas are mainly invisible to policymakers. Although the building blocks maintained a strong mix in 2001, the year of consolidation of the current BCR land-use plan, these blocks develop step by step into mono-residential areas. We consider this change as industrial gentrification, mainly driven by individual actors in a context of demographic growth and a private real estate market.

4.2.2. Mono-Industrial Areas

In the category USPP-3 in Table 1, we find the traditional mono-industrial zone. The BCR has two peripheral areas for urban industry that consist of privately owned plots: one in the north and one in the south, both along the Brussels–Charleroi canal. Occasionally, private actors request permission to turn a part of the site into offices. The disappearance of production space for urban industry in these areas almost exclusively happens through a change of policy instruments, whereby public authorities transform former mono-industrial land into mixed-use land. This change of policy instruments is legitimized in the BCR by the same arguments as those used in London, namely the need to construct housing to host the demographic growth of the region (Ferm & Jones, 2016, 2017). The Port of Brussels is the public authority that hosts the smallest harbour of Belgium. It manages a large area for port activities and transport in the north of the BCR, adjacent to the area for urban industry, and several smaller inner-city plots along the locks to bridge the different water levels of the canal. Both kinds of mono-industrial zoning seem to provide the best guarantee of preserving production land and related logistic activities, since almost no conversions take place.

In the theoretical section, we saw that although most authors of industrial retention literature agree that mono-industrial zoning is the best strategy to guarantee the affordability of production land and reduce conflicts between production and housing (Borret, 2018; Fitzgerald & Leigh, 2002), Armstrong and Lund (2005) and Schleicher and Hills (2010) point to the risk of underuse and abandonment caused by a lack of investment incentives, which might make inhabitants protest against derelict buildings in mono-industrial zones. Therefore, they advocate for the conversion of mono-industrial zoning into mixed-use zoning. We examine this hypothesis for the BCR with the vacancy rates of production space. De Voghel et al. (2018), writing for the Brussels planning department 'Perspective,' register a vacancy rate of 12%, but immediately nuance this number. Only 4.2%, or 173,065m^2, of these 12% is truly vacant. The rest is on the market for sale or rent, or is part of a building permit, under construction, or under study. While more than half of this 4.2% of 'real' vacancy (58%, or 100,377m^2) occurs in the areas for urban industry and the areas for port activities and transport (13%, or 23,000m^2), the percentage is too small to support the hypothesis and argue against the preservation of mono-industrial zones. Most of these buildings are indeed underused, in a derelict state, or protected heritage, which might hinder a renovation. Still, however, the Brussels planning department describes this situation as 'tense' and expresses its worries about the lack of a cyclical stock of production spaces (De Voghel et al., 2018, p. 60).

Moreover, there is broad consensus on the preservation and protection of both private and public urban mono-industrial zones. The results of the public inquiry concerning the conversion of the land-use plan from mono-industrial zones to mixed-use development zones reflect this consensus. The resistance and negative appraisal expressed in residents' reactions (Commission Régional de Développement, 2012) contradicts the hypothesis of Armstrong and Lund (2005) and Schleicher and Hills (2010). Nonetheless, there is a debate on opening part of the areas for port activities and transport to recreation after working hours, to connect the cycling lanes and promenades along the canal.

4.2.3. Mixed-Use Development Areas

The enterprise areas for urban development of USPP-4 in Table 1 are a relatively new type of zone in the BCR, dating from 2014. This zone has a set of building regulations that imposes a vertical mix with production (and wholesale) on the ground floor and housing (and other functions such as offices or public services) on upper floors. Since the first public and private development projects are under negotiation or construction, it is difficult to evaluate the disappearance of production in the mixed-use development zones and to support this evaluation with data. Therefore, this article leans on academic literature and a review of regulations in the Brussels case to point to three risks concerning the preservation of production space in enterprise areas for urban development.

First, the introduction of housing into these zones negatively influences the affordability of land (Ferm & Jones, 2017). The introduction of higher value uses, whether these are commercial, industrial, or residential, generates industrial displacement through speculation and rising land prices. Even the diversification of mono-industrial zones with only closely related economic activities cannot avoid an increase in land prices (cf. Hutton, 2009).

Second, next to instigating a dynamic of industrial gentrification, the USPP-4 of vertical mixed-use development might constrain the possibilities for certain kinds of production. Regarding the needs and strategies for keep-

ing productive activities in cities, the compatibility of activities is a popular strategy used to address the need to reduce conflicts between uses, support the complexity of production processes, and make efficient use of scarce land resources. Academic literature and new urban industrial plans demonstrate how immaterial activities are popular in mixed-use environments. The recent transformation of the BCR land-use plan was accompanied by a change of the definition of urban production and introduced 'immaterial production' to facilitate the implementation of immaterial activities in the enterprise areas for urban development. Moreover, immaterial production activities subscribe to financial reasoning, since Cotter (2012), among others, argues that R&D and similar forms of light manufacturing can afford higher land rents. It appears that immaterial activities are attractive to urban governments as well as private developers because they are compatible with housing and because of higher rents, but they risk displacing material production activities.

Related to this hypothesis on the pushing out of material production activities for more lucrative uses in vertically mixed schemes, Ferm and Jones (2016) point to the speculative mechanisms and the promise of higher rents of converting production spaces into retail spaces in vertically mixed developments in London. The authors found that developers responsible for the sale and lease of the production spaces on the ground floor claimed not to find the proper production businesses as outlined in the zoning laws. The pressure of developers to relax the zoning laws, in combination with the fear of the negative impact of 'dead facades' of empty spaces on the ground floor, is convincing local governments to give in to the demands of developers and allow retail to replace production. This example illustrates how mixed-use development answers to financial reasoning of value-capturing rather than to the need for maintaining production in the city. The potential consequence of this evidence is not necessarily displacement of material production, but rather a complete absence of production whatsoever in mixed-use neighbourhoods.

Third, the zoning typology of enterprise areas of urban development goes together with rigid building regulations. Borret (2018) questions the combination of the increasing use of conflicts between housing and production on the one hand and the lack of lively ground floors on the other hand. The building regulations permit dense programming of the sites. Some of the issues that need to be addressed include the requirements for logistical access to productive activities; the problems of locating housing structures with smaller floor spans and building depth on top of productive buildings requiring larger floor spans and building depth; the need to provide high-quality outdoor spaces for residents or public amenities such as schools or day-care centres; etc. When you install production on the ground floor, the realm of the public, or the interaction between the private and public space, moves to the courtyard of the building block. This might also increase conflicts between uses, because the courtyard becomes a busy and lively place, hosting logistic activities and the loading and unloading of trucks, instead of a quiet backyard.

To conclude, the analysis of the disappearance of production space in the zones of the BCR land-use plan demonstrates that industrial gentrification is an important factor in continuing deindustrialization. In the mixed inner-city areas of USPP-1 and USPP-2, mainly private actors influence this process of displacement. In the EAUDs or mixed peripheral zones, this occurs principally through the introduction of housing in former mono-industrial areas by the public authorities.

5. Conclusions and Recommendations

In the analysis of the USPPs, industrial gentrification emerges as the main driver of the decline of productive space in the BCR.

First, the analysis demonstrates that mono-industrial zones in USPP-3 of Table 1 experience little to almost no conversions into uses other than production. The risks attributed to vacancy and dereliction, such as the development of a negative attitude among inhabitants towards productive activities in urban areas, are not supported by the Brussels case. Our analysis confirms that monofunctional areas remain the best strategy to preserve affordable production spaces in cities.

Second, the decline of production space in monofunctional areas is mainly driven by public authorities changing the land-use plan and transforming USPP-3 areas into mixed-use USPP-4 areas. These government-led processes of industrial gentrification contribute to reinforcing real estate dynamics. The analysis shows that the risks of this re-zoning strategy are twofold. First, because of the combination of financial reasons and reasons related to the compatibility of uses, these production spaces might prioritize immaterial production and retail over material production. Second, because of the rigid building prescriptions of vertical mix related to this type of zoning, this typology risks increasing the conflicts between uses of housing and production.

Third, the micro-data about BPs in Sint-Jans-Molenbeek shows that mainly private actors drive the conversions in residential and mixed residential areas of USPP-1 and USPP-2 of Table 1. Since many of these conversions of smaller production spaces happen in the courtyard of building blocks, and since the government measures production space only from 1,000m^2 upwards, this process is invisible to policymakers. The micro-data also indicates that the decline of production space is part of industrial gentrification, where especially housing replaces former industrial buildings. The transformation of these mixed-use zones into mono-residential zones takes place due to the absence of protection measures for production.

The question then is whether certain types of zoning measures can safeguard production space in mixed-use

inner-city areas. Considering industrial gentrification as a significant driver of the decline in production land, we suggest that remedying zoning strategies need to interfere in the real estate dynamics. We recommend three potential zoning strategies to regulate the private market of land in the BCR that need further research: (1) improving the zoning instrument of EAUD; (2) heritage regulation; and (3) micro-zoning.

First, can we use the zoning typology of the EAUD of USPP-4 the other way around and use it to implement a minimum of production spaces in the residential and mixed and strongly mixed residential areas of USPP-1 and USPP2? Instead of stipulating a minimum of 40% of housing in the current zoning prescriptions of the EAUD, a minimum percentage of productive space can be preserved in these mixed building blocks to guarantee small-scale inner-city production spaces. As a possible consequence, the introduction of low-value uses into high-value use residential areas might decrease real estate prices. Here we can learn from the current rigid building prescriptions going together with the zoning typology of the EAUD and allow enough flexibility to prevent the negative outcomes expected in the USPP4, where a vertical mix typology is enforced. Both horizontal juxtaposition and vertical stacking of housing and production should fit within zoning regulations for mixed-use areas.

Second, in USPP-1 and USPP-2, additional heritage regulation could help and support a mixed-use zoning strategy. Indeed, in these areas, productive spaces often take the shape of workshops and warehouses dating from the 19th and early 20th century, with distinct heritage values. Current heritage regulations focus on the preservation of the architecture of such buildings but not their original productive use, resulting in residential loft projects or offices (Vandyck & Degraeve, 2019). Expanding heritage regulations with the protection of productive uses could support the preservation of productive spaces in these USPP-1 and USPP-2.

Third, some authors, such as Lane (1995), criticize mono-industrial zones because they are unable to address the need to accommodate complex production processes. However, micro-zoning increases the degree of complexity in the areas surrounding mono-industrial zones as well as in more the fine-grained inner-city areas. Micro-zoning is the small-scale juxtaposition of productive and other uses at the level of the building block. Borret (2018) presents micro-zoning as a strategy to increase urbanity, where streets and sidewalks remain important places of interaction between private and public space. Starting from the uniqueness of the BCR land-use plan, where every building block has its proper zoning typology, further research could clarify whether micro-zoning can be implemented.

Zoning policy plays a significant role in maintaining urban productive spaces and indirectly impacting real estate dynamics to counter industrial gentrification in a private property market. But zoning remains a rather 'passive' spatial planning instrument. More active support for urban productive spaces comes from public land policies that directly intervene in the real estate market.

A first strategy consists of building and enlarging a production heritage based on the renovation of existing buildings or new construction. Leasing instead of selling this public production property guarantees affordable workspaces in the long term. In the BCR, Citydev is the public real estate developer operating a portfolio of productive assets as well as residential and mixed-use development projects. Citydev has 45 years of experience in constructing and leasing new production assets. They consist of extensive developments of industrial and business parks on brownfields or greenfields in peripheral areas of the region and hosted more than 24,000 jobs in 2016. More recently, Citydev also built a series of smaller production spaces of approximately 100m^2 per unit. Vacancy rates lower than 10% indicate the success of these assets in various sizes. Here, the public developer could join forces with other public authorities that have more field expertise in local economic development, such as Hub, or could co-govern these spaces through a mix of public and private actors. Most of Citydev's current assets are located in USPP-3 and some in USPP-4. Acquiring and managing assets in USPP-1 and USPP-2 as well, where Citydev is not very present, is a more active public strategy to counter the industrial gentrification of small-scale production spaces in inner-city areas.

Second, for mixed-use projects, similar leasehold schemes could be developed. Different regimes would emerge with leaseholds for the production spaces and owner-occupancy or private renting for the residential spaces. A possible alternative is the CLT model that separates home-ownership from ownership of the land (Davis, 2014; Midheme & Moulaert, 2013). When applied to productive activities and mixed-use projects, the CLT model potentially offers several advantages. First, the model takes the cost of land out of the equation, for residents and businesses alike, adding to that a mechanism to valorise the buildings. This implies more careful decisions about the re-use of buildings and reduces the vacancy risk. Second, as the trust is composed of public authorities, residents, and other users as well as neighbours/neighbourhood associations, any decision on new or future activities involves their concerns and needs. During occupancy, users and residents co-govern and manage the project (Aernouts & Ryckewaert, 2018). This creates an arena where potential conflicts between uses and nuisances are mitigated and resolved on a more permanent basis, rather than through 'passive' zoning regulations. Citydev is increasingly interested in leasehold mechanisms for residential projects, as illustrated by its recent collaboration with the Brussels CLT. This article presents the CLT strategy, therefore, as a viable way to develop and manage mixed-use projects where the barriers between ownership and leasing are replaced by a strategy of long-term stewardship of affordable land.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Innovation within the Context of Local Economic Development and Planning: Perspectives of City Practitioners

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Abstract
Although innovation is a major theme in current local economic development and planning, there is considerable uncertainty of what the concept specifically means, how it is measured, and how outcomes are identified. To date, no study has investigated this glaring gap in scholarship. To address this gap, we interviewed economic development practitioners across cities in Ontario to identify and clarify how they define, apply, and measure innovation within their cities' economic development strategies. Practitioners indicate that innovation plays a key role in their cities' economic development strategy, demonstrating the importance of the concept within local governments. Additionally, it is clear that local governments are key facilitators of innovation. While many cities claim to have some form of innovation in their economic development strategies, a wide range of framings and approaches to innovation exist. Cities may not be taking the most efficient approach to fostering local innovation, which is critical with the rise of knowledge-based economic development.

Keywords
cities; economic development; innovation; Ontario; policy; practitioners

Issue
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1. Introduction

This article explores innovation's place within local economic development planning and activity. In doing so, it also critically examines the role of local governments and economic development practitioners with the emergence and growth of innovation. The emergence of a globalizing, knowledge-based economy has accentuated the challenges facing policymakers, especially at the local level (Bramwell, Nelles, & Wolfe, 2008). Concern with both emerging sources of global competition and the necessity of continuous innovation has focused their attention on the available strategies to respond to these challenges.

The emphasis on innovation by local governments is an outcome of nearly five decades of political-economic change and challenges. Since the 1970s, cities and their governments have faced critical challenges within their local economies, spurred on by broad political-economic changes including the replacement of Keynesian theories of economy and employment with neoliberal ones, the decentralisation of state political and decision-making power, the transition to post-Fordism, and the rise of globalization (Arku, 2015; Bradford & Wolfe, 2013; Wolfe, 2009a; Wolfson & Frisken, 2000). For cities in advanced economic regions—like the province of Ontario, Canada—the outcome of all these processes was newly empowered city governments, now responsible for all

aspects of community development, managing local economies that were no longer efficient. The decades-long decline of tradition manufacturing in Ontario and other advanced economies has been well documented (see Cleave, Vecchio, Spilsbury, & Arku, 2019; Holmes, Rutherford, & Carey, 2017; Sadler, Cleave, Arku, & Gilliland, 2016; Wolfe & Gertler, 2001); but for the purposes of this article, the economic development response of cities needs to be considered. Within local economic development, practitioners have used their newfound power and autonomy to emphasize new approaches to economic development that focus on highly-skilled labour, advanced production practices, creativity, and knowledge-production to meet these emerging responsibilities and support their local constituents (Bramwell et al., 2008; Taabazuing, Arku, & Mkandawire, 2015). In short, local governments are now focusing on innovation as a key tool of local economic development, as "decision makers in large cities have fully embraced the idea that cities are key players in the innovation game" (Shearmur, 2007, p. 511).

But what does being in the innovation game mean for cities? While it is understood that the competitive success of cities is now "highly dependent on localized, or regionally-based, innovation" (Wolfe & Gertler, 2001, p. 577), there are still several areas of uncertainty about what cities can and should be doing. Economic activity, however, is situated and must be understood as embedded within structures of economic and political rules and procedures (Martin, 2003; Vidal & Peck, 2012). In this sense, the rise of innovation within local economies "cannot be fully understood without giving due attention to the various social institutions on which depends and through which it is shaped" (Martin, 2003, p. 77). Here, social institutions include local governments—and the practitioners and policymakers they employ—as key local actors who can shape the local context in which firms operate and innovation situates through planning, policy, and action. Indeed, Wolfe and Bramwell (2016, p. 460) argue that "a key question for policymakers at the local level is how to create the right conditions for generating the growth of more knowledge–intensive forms of economic activity." Answering this question is multifaceted, as innovation and how it manifests within cities is complex.

There is surprisingly limited knowledge on how those responsible for developing and integrating innovation into local economic development view it. And how they view it will have implications for what types of firms are targeted, the structure of the local economy, and how they interact with other institutions within their jurisdiction. Despite its emphasis as a policy approach, Lundvall, Johnson, Andersen, and Dalum (2002) argue that within both research and practice there is a lack of a consistent understanding about what innovation is. This creates challenges in how to apply effective and meaningful policies. This study aims to fill this gap by understanding how economic development practitioners contextualize and understand innovation through in-depth interviews with officials from cities in Ontario. In doing so, this study will investigate the following research questions: 1) What does innovation mean to cities and their practitioners in the context of economic development? 2) How do cities, as social institutions, operationalize innovation policy within their local context? In doing so, the strategies, challenges, and opportunities that cities face as being key institutions in developing and implementing innovation policy are explored.

To evaluate these research question, a series of semi-structured qualitative interviews were conducted with economic development practitioners from cities across the province of Ontario, Canada. This presents a unique avenue for research, as previous innovation studies have focused on regional development (see Asheim & Gertler, 2006; Bradford & Wolfe, 2013) or other institutions that contribute to economic growth (see Bramwell & Wolfe, 2008; Shearmur, 2011; Shearmur & Doloreux, 2009; Wolfe, 2009b). To date there have not been any comprehensive studies on how economic development practitioners view, understand, and approach innovation policy development despite the fact that they (and the local institutions that they represent) are central actors in creating the local framework for economic growth through the formulation and implementation of regulation and planning policies. The perspectives and knowledge of these practitioners is important, as local governments in Ontario have been forced to take more rigorous and proactive approaches to economic planning ahead of their contemporaries in other advanced economies. Understanding perspectives and processes related to innovation that have occurred in Ontario from those vital in framing it can help inform policy analysis and progression in other regions.

2. Study Context: Innovation and Local Economic Development Governance

The linkages between innovation and economy have long been understood, as innovation has been at the core of economic development since at least the industrial revolution (Hall, 1999; Shearmur, 2009, 2012), and remains a key driver of local and regional economic growth (see Brzustowski, 2012; Gault, 2018; Kerr, 2020; Organisation for Economic Co-operation and Development [OECD], 2010; Shearmur & Poirier, 2017; Vinodrai, 2010). It is understood that "knowledge, learning, and innovation are key to economic development" (Todtling & Trippl, 2005, p. 1203); however, the concept of innovation is multifaceted. Shah, Gao, and Mittal (2015) argue that it has different meanings in different contexts—particularly for cities that are trying to enter the innovation game. Innovation, at its core, is about creating and introducing something new or improved with the intention of creating value (Hisrich & Kearney, 2014; Sundbo, 1998). Schumpeter (1936) described innovation as a social activity leveraging new combinations or applications of

knowledge, resources, or equipment, carried out within economic spheres and serving a commercial purpose. While this has historically referred to technological improvement and invention, the Oslo Manual (OECD, 1997, p. 88) extends this to include "non-technological innovation" which suggests that innovation can include processes which do "not relate to the introduction of a technologically new or substantially changed good or service or to the use of a technologically new or substantially changed process." Extending Schumpeter, innovation is not simply about invention but also about new business opportunities (see Drucker, 2014; Hisrich & Kearney, 2014; Shah et al., 2015). In this context, innovation is not something that happens on its own, but rather a systematic process that can be introduced, learned, and refined. An implication of this is that innovation requires strategic and proactive efforts to occur (Dyer, Gregersen, & Christensen, 2011).

For cities and their local governments, however, innovation is not about creation but management. The OECD (2018, p. 111) describes innovation management as a process that "covers all activities to initiate, develop, and achieve results from innovation. The relevant capabilities are closely linked to general organisational and managerial capabilities." Processes here include (OECD, 2018, pp. 110–111):

- Identifying, generating, assessing and pursuing ideas for innovation
- Organising innovation activities (i.e., aligning different innovation activities)
- Allocating resources to innovation activities
- Managing innovation activities conducted in collaboration with external partners
- Monitoring the results of innovation activities and learning from experience

Paralleling knowledge-intensive business services, local governments and their practitioners can be seen as enablers of innovation, serving as initiators of innovation activities in a city, facilitators of innovation, and conduits of knowledge transfers (see Aslesen & Isaksen, 2007; Shearmur & Doloreux, 2009).

Influencing the role of cities as enablers of innovation is a change in local governance approach. For at least the past thirty years, there has been a spatial restructuring of political power (see Brenner & Theodore, 2002). For many local and regional governments this meant greater autonomy and responsibility in managing their economic fortunes (see MacCallum, Moulaert, Hillier, & Vicari, 2009; Shearmur, 2012). Spurred on by similar political-economic issues—including the crumbling of the Keynesian consensus, the shift to post-Fordism, and the rise of greater global competition for economic resources—cities began adopting forms of urban entrepreneurialism, where local governments and their practitioners adopted a more proactive and market-driven stance towards economic policy (Gillen, 2009; Harvey, 1989; Leslie & Rantisi, 2006), but also a shift "from a top-down, government-knows-best approach to a more inclusive, multi-sectoral style of local governance" (Wolfe, 2009b, p. 19).

As a result, the local context of a city is necessary for understanding the determinants of firm-level innovation within a city, as this cannot be done in isolation from the environment in which the firms are situated (Iammarino, 2011; Malecki, 1987; Shearmur, 2012). Local innovation system approaches—which explain the context in which firms operate—emphasize that each locality has its own institutions and culture, and the variability between places help explain local capacity to foster firm-level innovation (Asheim, Boschma, & Cooke, 2011; Cooke, 2004; Shearmur, 2011). When considering this local milieu, Wolfe (2009a) argues attention needs to be paid to the interactions of formal and informal institutions that can support this movement towards innovation. Firms and entrepreneurs are embedded within networks of institutions that have key roles in disseminating information, knowledge, and learning which helps facilitate both adaptability and potential for growth (Amin, 2001; Clarke, 1995). In practice, this network of institutions needed for local innovation—and the policy that supports it—becomes one of the partnerships between "businesses, government, post-secondary institutions, innovation centres, entrepreneurs, not-for-profits, and other stakeholders which allow regions to accomplish more by pooling resources and minimizing duplication" (Ontario Chamber of Commerce, 2019, p. 19). As a result, it is important to understand the role that local governments are playing in within this milieu to identify how they enable or facilitate innovation.

Spatiality also matters for innovation. Drawing from broader cluster research (see Porter, 2000), spatial proximity of firms within the same industry allow for sharing of talent, infrastructure, and market; and within the localized economies, the interactions and resulting knowledge spillover is a key determinant of innovation (Potter & Miranda, 2009; Wolfe, 2009a; Wolfe & Bramwell, 2016). Alternatively, innovation has been described as the outcome of the formal and informal interactions that occur in places with a diversity of firms, with learning opportunities and transfers of knowledge (both tacit and codified) occurring across different economic sectors (Audretsch, 2002; Florida, 1999; Gertler, 2003; Howells, 2002; Jacobs, 1969). Activity tends to be clustered because it is knowledge-intensive and closely associated with spatially sticky tacit knowledge (Asheim & Gertler, 2006; Seyfang & Smith, 2007). Underlying both, however, is that proximity is important—that firms and their workers aggregate within an area (i.e., a city) and that it is this co-locating that helps generate innovation. Again, identifying how local governments view these determinants of innovation helps inform on how cities play a role in enabling innovation.

3. Methodology

To explore the role that innovation plays in local economic development this study employs an inductive grounded theory approach designed to allow logical inferences to be made when evaluating the research questions. First, when evaluating what innovation means to cities and their practitioners in the context of economic development, focus is placed on understanding how practitioners define and conceptualize innovation and its key determinants. For the second research question, on how cities, as institutions, operationalize innovation policy within their local context, the role of local government (through its practitioners) is explored to identify how the policies, actions, and interactions with other institutions are used to shape how local innovation occurs.

Data was collected through semi-structured, in-depth interviews with 24 local economic development practitioners from 17 cities in Ontario (Table 1). For cities with multiple practitioners who were interviewed, their responses were weighted so that they did not skew or bias the results. For instance, though six practitioners participated from Richmond Hill (approximately one-quarter of the study participants), in the analysis and reporting, care was taken to make sure their responses were not over-represented, but instead equal to the sixteen other cities represented in the study. The use of interviews presents an opportunity to generate a deeper understanding of innovation and economic development (see Cleave, Arku, Sadler, & Gilliland, 2016). The practitioners that were recruited came from a range of geographic, political, and economic contexts to create a diversity of perspectives to draw inferences from (Table 1). A vital characteristic in the selection of practitioners was their experience with innovation. The interviews were conducted with economic development managers that specialized in innovation. If there was no such person, an equivalent role in economic development, or the most senior economic development practitioner was interviewed. Thus, the interviewees included Managing Directors (n = 2), Directors (n = 4), Sector Managers (n = 4), Economic Development Officers (n = 12), and Coordinators (n = 1). Experience ranged from 1 year to 34 years in economic development, with a median of 5 years of experience. All of the practitioners interviewed had experience with developing or managing a wide range of innovation-focused activities, including the creation of innovation districts (Hamilton, Kitchener, Markham), development of business incubators (Toronto), attraction and creation of high technology facilities such as autonomous vehicle testing sites (Ottawa, Stratford), facilitating improvement within agricultural sectors—both in approaches to farming and materials used—to create greater value-added uses (Prince Edward County, Stratford), and efforts to facilitate networking of entrepreneurs and businesses (London, Vaughan). In addition, purposeful sampling was used to ensure that practitioners from a range of cities were interviewed to ensure diversity of perceptions. As such, cities were grouped into three pools (an approach previously used by Cleave et al., 2019): small-sized (<75,000 population), mid-sized (between 75,000 and 350,000 population), and large-sized cities (>350,000 population), with participants drawn from all three pools (see Table 1).

The majority of the interviews were conducted over the phone, and some interviews were conducted in person. Interviews were semi-structured, ranging from 30 minutes to 60 minutes and averaging approximately 43 minutes in length. A semi-structured interview approach was used to ensure that data was captured in key areas, while still allowing for flexibility for participants

Table 1. Cities included in this study.

City	Population (2016 Census)	Size Classification	Participants
Barrie	145,614	Medium	1
Brampton	593,638	Large	2
Brant	36,707	Small	1
Hamilton	536,917	Large	1
Kitchener	233,222	Medium	1
Markham	328,966	Medium	1
Mississauga	721,599	Large	1
Ottawa	934,243	Large	1
Pickering	91,771	Medium	2
Prince Edward County	24,735	Small	1
Richmond Hill	195,022	Medium	6
Stratford	31,465	Small	1
Thunder Bay	107,909	Medium	1
Toronto	2,731,571	Large	1
Vaughan	306,233	Medium	1
Waterloo	104,986	Medium	1
Woodstock	40,902	Small	1

to add their own perspective and experiences. Key questions asked during the interviews included:

- Could you describe what innovation means—both to you and to the city—and how was this conceptualization developed?
- What does innovation mean in the context local economic development?
- Can you please describe how is innovation viewed in the city's economic development strategy? Is it a key strategic priority for the city? If so, how?
- Describe ways the city attempts to foster innovation?
- Does the city have the tools to develop the innovation sector of the economy internally? If so, what strengths or locational advantages to you think your city has? What are any potential weaknesses that might limit the growth of an innovation-sector? If not, how do you attract and retain the resources needed to support an innovation-sector?
- Are there other institutions (public and private sector) that you work with to help create an environment for innovation? What is the city's role in this network?
- Innovation-focused policy appears to be popular in Ontario. If that many cities are emphasizing it, how does your city differentiate itself?
- How do you measure innovation?
- In what ways do you think innovation will affect the city's economic development in the future?

All interviews were recorded and were then transcribed, reviewed, and analyzed using NVivo software to identify key themes to create a reliable, standardized framework from which to analyze the discussions and perceptions of the practitioners (Hay, 2005; Seale & Silverman, 1997). Overarching themes were identified along several general contexts (see Hay, 2005): conditions (the social, political, and physical contexts and the circumstances that necessitated innovation within the city); strategies and tactics (the actions of the city to foster innovation and the perspectives of practitioners related to innovation and its importance); and consequences, which contextualize the outcomes of interaction with a stimulus or phenomenon (as an example, how innovation was measured or policy success determined). The meanings that practitioners attached to innovation were also examined to further understand the relationship between innovation and local economic policy development (Hay, 2005). In the results presented in this article, economic development practitioners are referred to by the acronyms P1, P2, P3 through P24.

4. Results

This section presents the results of the interviews, identifying the key themes that emerged along with supporting quotations. The section is structured to evaluate the two research questions and overall objective of the article. First, it explores what innovation is and what its key determinants are from the perception of the practitioners. It then presents the roles, responsibilities, and challenges the practitioners and local governments face as social institutions, and how it shapes innovation. Throughout this section, the perspectives and actions of practitioners from different-sized cities are identified and contrasted.

4.1. Perspectives of Practitioners on What Innovation Is

Emerging from the perspectives of the practitioners (see Table 2), it is evident that innovation is a broad conceptualization with multiple dimensions—existing both as an abstract concept and as tangible set of actions. There was broad agreement amongst the practitioners on what innovation was as an abstract concept (15 of the 17 cities identified this in their responses). Common perceptions of innovation included "a mindset and a culture" (P5). This culture starts from the municipality's internal economic development department, with the goal of extending it across the city. For example, one practitioner described innovation as "fostering a culture of innovation in the team, then broadening out to [their] direct stakeholder community, then the broader city" (P17). To build a culture of innovation, one practitioner emphasized the importance of starting with the right people and processes first, then implementing the "technology and the tools as the last thing" (P11). Other commonalities in perspective included contextualizing innovation as "new ways of doing things" (P6, P7), and "thinking outside the box" (P8). A smaller subset of practitioners (representing 12 of the 17 cities in the study) described innovation as a tangible set of processes by the practitioners, including "improving services" (P9) or "finding efficiencies" (P1). Practitioners also described innovation as value creation, whether "creating new processes" (P17) or "creating an outcome, like a new product or business'' (P1). Within this tangible set of processes, innovation was framed as both internal and external to local government. Notably, the majority of practitioners (17 in total, representing 11 of the 17 cities) noted both conceptualizations, suggesting that they hold innovation in a comprehensive way.

4.2. Divergences in Understandings on Innovation

An interesting way in which perspectives of the practitioners diverged was about how innovation occurs. The practitioners from the four small cities expressed innovation occurring much more rapidly (closer to invention or *creation*-focused innovation). Practitioners from mid-sized (representing 6 of 8 cities) and large municipalities (5 of 5), however, took a Schumpeterian view of how innovation occurs, stressing the concept of incremental changes and imitative innovation rather than radical innovation (taking a more managerial approach). As one practitioner noted:

Table 2. Summary of practitioner perspectives on innovation.

Key question	Conceptualization	Examples/Description
What is innovation?	An abstract concept.	Culture of the city. A new way to approach problems (i.e., thinking outside the box).
	A tangible set of strategies for cities to use.	Improving city services. Designing more efficient government processes. Identifying, enhancing, and leveraging local assets and key determinants of innovation. Creating a value-added process or outcome for the city.
How is innovation conceptualized?	Firm-focused	Emphasis on fast innovation or radical change or improvements. Focus on outcomes—such as new products or ideas (i.e., creation). Private sector-led innovation, passive local government. Found primarily in small cities.
	Governance-focused	Local government-led, with focus on innovation management, rather than creation/invention. Incremental improvement rather than radical innovations. Focus on organizing local assets to address specific local issues.

> Innovation in economic development does not necessarily mean that we need to come up with a brand new approach to something that has never been tried, but we may try something that has not been applied or scaled to the city before. (P17)

One practitioner estimated that they were "95% focused on imitative and incremental innovation and 5% focused on new radical innovation" (P17). Imitative innovation may be more impactful in an economic development context because it is less risky, making it easier to work within funding and political constraints. The popularity of imitative innovation may explain the rapid convergence of innovation policies under the guise of using 'best practices' as a rationale to implement new projects and programs.

A second area where there was divergence—particularly when comparing cities of different sizes—was the context in which innovation was framed (i.e., firm-focused creation or government-focused management). Practitioners—particularly from all four small cities participating in this study—tended to perceive innovation as needing to create an economic outcome, such as a new product or business. The ability to commercialize an idea is critical, with one practitioner noting, "innovation ultimately needs to get to a point where something is being produced, bought, and sold, driving economic impact" (P1). It also needs to "add value from the customer's perspective" or "keep investment here'' (P10).

Practitioners from mid-sized (5 of 8 cities) and larger municipalities (4 of 5), tended to contextualize innovation from a governance and management perspective, focusing along themes of adding value, problem-solving, and solution creation, with one practitioner explaining: "innovation is not just a matter of creating new things, but it's a matter of creating solutions to address local issues" (P12). From the responses of the practitioners, it is evident that innovation is more than just a new idea, it must "address challenges" (P12) and "add value for the community" (P8). Interestingly, from the perspective of the practitioners, part of adding value means that innovation has to "find solutions to problems" (P9). For other cities, the emphasis is still on disruption and diversification, with one practitioner emphasizing that "innovation means high potential, high impact disruptive companies that can help our key sectors transition" (P11). In summary, a key finding that emerged from the conceptualizations of innovation is that practitioners from mid-sized and large cities see local government as a facilitator of how innovation is conducted.

4.3. Key Determinants and Drivers of Innovation

This shaping of innovation also occurs in what local advantages are identified and leveraged (see Table 3). Across all seventeen cities of this study, the practitioners identified technology, talent, entrepreneurship as the key determinants of innovation. This sentiment was reflected by the practitioners who acknowledged that innovation is commonly misperceived to be exclusively focused on technology. One practitioner stressed "the biggest challenge and misconception with innovation is starting with the technology, not the foundation," where the foundation refers to the people and processes of the organization (P11). However, emerging from the responses of the practitioners, it is clear that some cities are starting to shift their strategic priorities as it relates to spurring on local innovation—finding different ways to build up their local capacity. The primary area that was mentioned by all practitioners emphasized improving local characteristics to appear attractive to talent.

Table 3. Summary of key determinants of innovation.

Determinant	Description	Examples
Traditional	These approaches are more directly focused on innovation and are more similar to traditional economic development and innovation perspectives, where emphasis is placed on talent and technology.	Talent attraction/knowledge base . development Business attraction. Technology. Existing innovation infrastructure (i.e., universities, firms). Business Incubators/accelerators.
Holistic	Place-making approaches meant to improve quality of life and more generally the local context/characteristics of the city. Generally focused on broader urban or economic issues that have direct relevance for innovation.	Affordable family housing. Free city-wide Wi-Fi. Improved place (i.e., better social and cultural amenities, recreational activities and greenspace, improved infrastructure and city scape).
Speciality/Proximity/Interaction	The practitioners in this study emphasized the need for talent/entrepreneurs and businesses to be located in close proximity to one another to help facilitate interaction between different firms and people.	Innovation and research parks. Business incubators. Business accelerators.

Practitioners acknowledged that "talent needs to be supported with other amenities" (P13), because "you could have all the jobs and opportunities you want, but those are useless if you don't have anywhere to live" (P12). There is greater emphasis on livability and affordability in economic and community development, as it is becoming clearer to practitioners that employment and livability are becoming more inter-related. The type of people that are filling the jobs facilitated by economic developers want affordability and vibrancy. Focusing on jobs simply is not enough. One practitioner emphasized that "economic development is on a transition to a more holistic approach," which requires them to "start thinking about place-making and affordable housing," because "economic development cannot be pigeon-holed into just employment" (P11). Efforts to improve the local context ranged from "creating affordable and attainable housing for young working families" and creating a new "regulatory structure to regulate short-term accommodation" (P2) to "keeping the city in the cutting edge by investing in city-wide Wi-Fi," with the goal of eventually having every home and business in the city connected (P4). As practitioners recognize their role expanding in scope to involve community functions, they perceive innovation to play an increasingly important role in addressing challenges facing their communities. One practitioner noted that they "can't attract companies if there is nowhere for their employees to live" (P19), and this sentiment was echoed by three other practitioners. The recognition that "the perspective of economic development is changing" because "economic development is not just the business community, it's about attracting people and keeping them here too" (P23) is part of the shift in mindset to become more collaborative and creative with other community partners and municipal functions to solve problems.

Universities and training centres were unanimously identified as key foundational pieces of innovation among mid-sized and large cities. One practitioner noted that "if people aren't equipped with good education and the space to think about entrepreneurship and take risks, you won't get innovation" (P11). There was a common perception that linked research and post-secondary institutions with a strong high-tech sector: "We have a university, college, and an innovation centre" (P10). A further example that linked tangible local assets with broader local economic market characteristics was provided by one practitioner (P16), who highlighted their city's test site for autonomous vehicles which was described as a key part of the city's "huge high-tech sector, [containing] lots of leading-edge research." However, a concern raised by the practitioners was that the same strategies are being employed regularly by different cities, with one practitioner noting "this doesn't fuel innovation, it fuels replication" (P6). This highlights a potential convergence in innovation policies and strategies.

A final key determinant was the presence of existing innovation infrastructure, including innovation parks (Markham, Hamilton), research parks (London), business incubators and accelerators (Waterloo, Toronto), and technology test sites (Ottawa). Interestingly, the majority of practitioners (from 12 of the 17 cities) extended this to argue that the presence of this infrastructure in close spatial proximity was important. One practitioner described their efforts to "curate the innovation district to foster and attract higher value-added uses" improv-

ing upon previous models by noting that it is "not just a science park campus but will include more supportive amenities and uses for the spaces" (P7). A similar sentiment was expressed by another practitioner (P11) who described their city's plan to create "an employment area to respond to future trends in business" Underlying all of this was the perspective on clustering and proximity similar to that argued by Potter and Miranda (2009) and Wolfe (2009a) with knowledge transfer (11 of the 17 cities) and spillovers (10 of 17) being cited as tangible benefits from the practitioners. An offshoot benefit of this was the interactions that this proximity allowed (as described by Florida, 1999, 2002)—as one practitioner noted (P18): "We wanted to create a space where we could get the smart people together [businesses and talent]. If they can bounce ideas or share resources, that's where some cool ideas can come from."

In summary, the practitioners' responses indicate that the way to drive innovation is changing, mirroring broader changes in local economic development: shifting from more traditional roles of business attraction to a holistic view of developing the community. Many economic developers recognize that their role is more interlinked with fulfilling the needs of the community than with merely attracting businesses and job creation.

4.4. Economic Development Practitioners and the Institutions Driving Innovation

Unanimously, the economic development practitioners recognized the importance of innovation in their municipalities, linking it to "job growth, net GDP increase, pulling wealth into the community, and market penetration" (P5). Indeed, the practitioners viewed innovation as something that "drives [their] economy and growth'' (P6), with one practitioner indicating that "innovation becomes a higher priority every year" (P5). This critical necessity for innovation was contextualized as "if you're not changing, you're dying" (P6). This perspective was expanded upon by several practitioners, arguing: "The governments who are the best at adopting new things will be more likely to succeed, whereas those who stick with the same processes are unlikely to adapt to a quickly changing world" (P17) and "we know we have to be innovative, and we have to come up with new ideas'' (P12).

There was a notable divide—based on city size—when considering the role that practitioners and local government played in managing innovation. Aligning with their conceptualization that innovation was firm-based and emphasized creation, all four small cities agreed that "innovation is more private sector driven'' (P10), where there was a limited role for local government. Even in this case, however, the economic development practitioners did still acknowledge that the city had some power in shaping how innovation occurred, as through zoning and by-laws. In particular, this controlled where entrepreneurs and firms could locate within a city, as justified by one practitioner (P22):

> The city has made sure that land is available to support this type of innovation related activity and that's where we want the businesses to go. This is us putting a stake in a ground about businesses not coming in with land conversion requests.

For mid-sized (7 of 8) and large cities (5 of 5), more proactive management of innovation was described as occurring—generally being prioritized because of its importance within municipal governance and politics, as "[city] councillors will see the term innovation and agree with it, it will get attention" (P11). Overall, economic development practitioners noted the links between innovation and economic growth, which as a result made it a priority on the economic and political agendas. As a result, practitioners, the local economic development offices, and city governments exhibited tendencies of urban entrepreneurialism where they took an active role in shaping the city's local context by influencing how key determinants of innovation were cultivated and leveraged (summarized in Table 4), as well as taking more direct strategies. In particular, investment was identified as a key approach by the majority of practitioners from mid-sized cities. This approach included "directly funding a regional research facility" (P10), "accelerator funding," and "pooling dollars with other communities to conduct foreign direct investment programs such as international trade shows, trade missions, and investment seminars'' (P4). Other programs included "investing in a project to digitize the festival's shows to promote to the world, with the intention of helping the tourism industry" (P4). In this regard, while the cities are not the node of innovation, they are an important institution in creating the context for innovation and directly supporting it (contrasting the more passive approach described to be occurring in the small cities).

An example of investment guiding local innovation was expressed by practitioners when discussing Ottawa's focus on specializing in autonomous vehicle test sites. Driving innovation in this direction included "investing in infrastructure in stoplights so autonomous vehicles can communicate to the infrastructure in the city" (P4). The City of Ottawa's Innovation Pilot Program was identified as an initiative that allows companies to pilot innovative technologies that align with the city's line of business. Ottawa was not unique in their approach, as other cities were described as having similar programs, where local government works with companies to test an emerging technology that has not found a commercially viable market yet. This program is a novel approach to "test new equipment and technology that can help the business grow" (P9).

Across all cities, a common theme was the role of practitioners and the local government acting as a facilitator or conduit for networking with other institutions (i.e., firms, universities, venture capitalists, and business incubators). These networking activities were identified as shorter-term innovation-focused events that were

Table 4. Summary of institutional efforts and challenges.

Institutional issues	Context	Examples/Description
Approaches	Direct approaches—where the government takes a direct and leading role guiding innovation. Responses found this to be occurring in larger cities.	Zoning and by-laws controlling land use and where firms can locate.
		Direct financial interventions (i.e., grants, investments coming from the city—particularly mid-sized cities).
		Marketing (i.e., trade shows or missions).
	Facilitating approaches—where the government plays a role in facilitating innovation in a less direct way. Emphasis is on business-led innovation (particularly in small cities) and networking of firms and people.	Organizing pitch meetings/challenges.
		Operating mentorship programs.
		Hosting networking events with other local institutions (i.e., businesses, incubators, universities) to facilitate interactions and promote collaboration and partnerships.
Challenges	Policy convergence.	A key issue noted by the practitioners is that cities are attempting similar core approaches to innovation—such as business incubators—which the practitioners noted creates risk for communities with limited local strengths.
	Determining effective planning and quantifying innovation policy.	Policy and action are ways in which the city government shapes the local context that create the conditions for innovation. However, measuring outcomes is difficult, which limits the ability of cities to craft meaningful or useful policy.

perceived to be successful at gathering collaborators. Innovation projects such as "grant programs, pitch challenges, or mentor programs" are more "event-focused," making it easier for members of the community to commit to collaborating with each other and with the city (P22). More tangibly, this was described as:

> One of the most important roles for us is to be a matchmaker. We recruited corporate people (Ikea, Loblaws, utility companies) to come and act as mentors and judges and ecosystem players with startups. The goal is to connect startups with multinational corporations and their funding. If we can't connect startups with funding from the City, maybe we can connect them the corporations. (P20)

The key implications are that cities are not the only institution involved in driving innovation, but they feel they play an important management role, coordinating and managing all the different parts of the ecosystem to ensure optimal local conditions for innovation.

Based on the perspectives of the practitioners, two key institutional challenges related to policy were identified. The first considers policy convergence and how to measure outcomes or determine policy effectiveness (see Table 4). While there was divergence in the way innovation is framed within local economic development, there is convergence in the core strategies that cities have typically employed to foster it. There was wide agreement across the practitioners interviewed that demonstrates a convergence in innovation strategies employed. One area of convergence was the near unanimous identification of business incubators, accelerators and innovation centres as the foci of local development efforts—which stress the importance of public-private partnership in innovation. Nearly every practitioner (from 13 of the 17 cities) noted local centres that were meant to be "equivalent to MaRS in Toronto and Communitech in Kitchener" (P14). Inevitably, cities are competing for the same provincial pools of money, resources, and talent, so reliance on the same strategies may give places with natural advantages better ability to tap these pools. Cities that lack these natural advantages may find it difficult to catch up.

The second issue related to policy is a lack of measurement of outcomes. The majority of the practitioners noted that their local government did not measure innovation outcomes in their local economies, with one practitioner noting "innovation is not something we can measure" (P8). Part of the difficulty stems from ideas that metrics around innovation require more time and resources, through more "qualitative evidence rather than quantitative evidence" (P6), and that "there's also an intangible effect that is hard to measure" (P18). Closely

related is the lack of data on innovation outcomes. Practitioners noted that they "rely on [their] community partners, using different sources and methods" (P12), such as "workforce planning boards" (P6), "local accelerators" (P12), and "open data portals from the federal government" (P1). The challenge is typically relying on data from private corporations, with one practitioner highlighting that "sometimes companies don't want to share what they're doing…so there are challenges in collecting the information we need to track progress" (P1). As a result, there is an institutional challenge as incomplete data makes it difficult for relevant or useful policy, regulation, and action to be implemented.

4.5. Challenges Facing Cities and the Role of Innovation

Several of the challenges identified were related to the ability of cities to effectively foster innovation. This spanned both how innovation was conceptualized and operationalized (see Tables 2 and 4). While there was agreement among practitioners on innovation as a high-level concept, divergences emerged when deeper definitions and understandings were explored. Practitioners unanimously agreed that there is considerable disagreement on what innovation is, as it is dynamic and ambiguous, making it difficult to identify and target. This was articulated by one practitioner as "everyone has a different definition of what innovation is. What is innovative in one community may not be innovative in another'' (P12). The divergences in what innovation is ranged from emphasis on the commercialization of new products, to creating solutions and value through products, processes, or services.

When discussing how key determinants of innovation are operationalized and leveraged, several challenges emerged. The most commonly described challenge related to talent attraction and matching (8 of the 17 cities). Many cities are seeing a "large unmet demand for skilled labour and trades" (P12), while other cities are struggling with "attracting people to jobs in the region and the city and trying to keep them" (P12). One practitioner noted how this challenge manifests in different sectors. For example, "in the technology sector, companies are struggling to find senior staff and keep new graduates here for the long haul," whereas "in manufacturing, there is a shortage of skilled trades at both senior and entry level positions" (P13). These challenges place talent attraction as a top priority for many economic developers, making it more important for cities to establish close relationships with universities and colleges.

Another commonly described challenge among all cities is the uneven nature of economic development, as local context matters. Practitioners in smaller cities (4 of 4) felt that innovation was tough because "universities play a key role, and we [small cities] just don't have that building block" (P5). Another practitioner in a small municipality expressed frustration over a lack of messaging around innovation occurring in smaller cities, stressing that "there is more innovation happening beyond the Waterloo-Toronto corridor, but there is no messaging about innovation beyond the GTA on the federal level'' (P11). Even among larger cities, there is a challenge in ensuring more equitable access to job and capital opportunities, as many of these opportunities are concentrated in downtown clusters in the city. A practitioner from a large city (P10) noted that "there is lots of concentration of economic activity in the downtown core" and one of their main challenges is to "ensure that the outer parts of the city have access to the same type of opportunity.''

Other social institutions also were identified by the practitioners as hampering the ability of cities to drive innovation. Public scrutiny, the political climate, and government regulation were also challenges that were perceived to limit innovation. These challenges relate to the nature of the role of economic developers. One practitioner noted that "innovation requires risk-taking, but when you spend resources that don't immediately benefit, it can be perceived negatively" (P7). Additionally, the roles that economic developers play are "highly regulatory functions…so there is not a lot of room for innovation" (P7). Lastly, the political climate is also known to play a role in constraining resources. A practitioner described how before the Conservative government took power, "the provincial government was a big financial supporter of the innovation ecosystem. If we don't have the dollars to support our programming, it creates challenges" (P6). Overall, there are many challenges facing economic developers as it relates to developing innovation in their communities.

5. Discussion and Conclusion

The overarching goal of this study was to explore the way that innovation was conceptualized by local economic development practitioners and how it was operationalized by cities in Ontario. Framing these questions was that local economic development practitioners and the city governments they represent are key social institutions (Martin, 2003; Vidal & Peck, 2012) that had the potential to shape both the local context of the city and the way that innovation was approached (Wolfe & Bramwell, 2016). Interestingly, the responses of the practitioners were in strong agreement with each other and aligned with the academic literature: Innovation is a key driver of economic development in cities around the world (see Florida, 2002; Hall, 1999; Shearmur, 2009; Vinodrai, 2010). Beyond this there was considerable disagreement in how to conceive and operationalize innovation.

It was clear from the responses of the practitioners that views of innovation in economic development varied across different cities, reflecting a lack of a consistency in how it was conceived. There was division on whether innovation was tangible or intangible, creation-focused or managerial, private sector or public, and rapid or incremental. Interestingly, many of these deviations

occurred along the sizes of cities. This suggests that the local context, and perhaps the resources and capacity of local government play an active role in how innovation is understood and focused. Smaller cities with less capacity were far more passive and deferential to businesses; however, cities with larger populations (and by extension greater resources) described themselves as far more proactive, taking a leadership role in guiding innovation through investment, policy, and action.

Notably, while there were differences in how innovation was conceptualized, the projects being implemented across the province demonstrate a convergence in innovation policy and action, with many cities employing similar strategies. For example, innovation centres are described as the equivalent of other innovation centres in larger cities, with frequent comparisons to centres such as MaRS in the City of Toronto. Innovation centres are being established primarily to encourage the development of small businesses involved in advanced technology. It appears that local policies and projects such as innovation centres are being informed by the work of scholars that see future economic prosperity of nations and local economies as depending on creative industries, high-technology industries, and attracting highly educated workers (e.g., Florida, 2002; Gertler, Gates, Florida, & Vinodrai, 2002). This elucidates an incongruency—though cities and their practitioners have differing views on innovation the outcomes are ultimately similar. Three potential explanations are: 1) that the way innovation is perceived does not actually affect outcomes as all cities are operating in the same competitive global economic environment and facing the same challenges; 2) that there are other—external—social institutions (i.e., regional governments, consultants, and potentially other cities) which could lead to policy migration where local communities copy the practices of each other (Buttazzoni, Arku, & Cleave, 2019); and, most likely (based on the practitioners' responses), 3) that while there are core similarities and convergence of some policies and efforts, there are differences around the margins that are shaped by the local economic development office and city government. Examples of this include the focus on autonomous vehicles in Ottawa, or the efforts of high-tech agriculture in Prince Edward County, or the different placemaking strategies that were noted to attract entrepreneurs across all the study cities. Since talent and technology are seen as core elements to innovation—both in scholarship and practice—they may be what cities are most focused on. However, from the responses of the practitioners, there are many ways in which a local environment for innovation is created. Based on the scope of the institutional influence that local governments have and the entrepreneurial and proactive approaches to planning and policymaking being taken, it is likely that they are trying to adopt meaningful locale-specific policy to help address local challenges. However, because of the success of certain approaches (i.e., incubators), they are seen as best-practices and should be adopted. For cities, a potential solution to overcome this disconnect may be to focus on their local advantages (i.e., context-specific approaches), rather than high-usage and standard strategies, to better facilitate innovation. For example, while every city should act as a conduit between groups and help enable networking, they need to do so in a way that reflects the local context and configuration of innovation-related institutions.

Related, the commonality of policies raises questions about whether communities are leveraging their local assets and strengths as key determinants of innovation. This question is legitimate given scholarly evidence of a high rate of failure among small businesses that are located in innovation centres (Leigh & Blakely, 2017). The high failure rate has been attributed to the fact that the high-tech small businesses in innovation centres are removed from major businesses or users that they serve. This suggests the importance of local assets and environment in any policies and projects aimed at enhancing innovation.

Increasingly, practitioners see their role as becoming more holistic, extending beyond traditional functions in economic development such as business attraction and retention. Practitioners described how they are taking on more community-level functions such as ensuring the livability of the community through increased investment in arts and culture and affordable housing. The main challenges facing economic development practitioners are talent attraction and retention, especially in the smaller communities and to some extent in the mid-sized cities. This finding is consistent with recent evidence in Ontario about the difficulty mid-sized communities are facing in attracting and retaining highly skilled individuals (Clemens & Buzzelli, 2015). Practitioners also stressed a challenge in a mismatch in skills and job openings, both in filling jobs that require skilled labour, as well as retaining high-tech talent in the community. This also reflects a greater challenge in the uneven nature of economic development, which tends to cluster in larger cities.

The findings in this study provide interesting and significant perspectives on cities and an overview of recent approaches to innovation in economic development. With cities around the world continuing to prioritize innovation as a key to economic growth, this research contributes to a small but growing field about innovation in the public sector, which has not been studied as extensively as innovation in the private sector. Further research should explore the changing nature of the economic development function into a more holistic community development role, and the processes by which economic developers foster a culture of innovation in their communities.

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Conflict of Interests

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Article

Negative Consequences of Innovation-Igniting Urban Developments: Empirical Evidence from Three US Cities

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Abstract
Emergent economic development policies reflect the challenges urban growth coalitions face in attracting the footloose tech-entrepreneurs of the global economy. This convergence between the focus on place and the harnessing of global capital has led to the proliferation of innovation-igniting urban developments (IIUD)—place-based economic development strategies to boost the local knowledge economy. Economic developers are using IIUD strategies to convert areas of the city into entrepreneurial "launch pads" for innovation. However, because these developments remain young, considerations to implement IIUDs lack an evidence-base to show the potential for negative consequences on the communities where they are embedded. This research addresses this gap through: 1) a review of studies of similar developments to identify negative consequences; and 2) using a quasi-experimental method composed of Propensity Score Matching and Average Treatment Effect analyses from IIUDs in three US cities (Boston, MA, St. Louis, MO, and Buffalo, NY). Combined, results demonstrate that the greatest implications of IIUDs are the increased polarized division of labor, housing unaffordability, and income inequality. As IIUDs gain in popularity, it is critical to correlate negative consequences with IIUDs to inform economic developers in assessing trade-offs.

Keywords
innovation-igniting urban development; knowledge economy; local economic development; place-based policies; placemaking

Issue
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1. Introduction

Policymakers and economic developers continually search for tools to transition post-industrial and lagging economies into knowledge economies (Bell, 1976; Porat & Rubin, 1977; Yigitcanlar, O'connor, & Westerman, 2008). This is evident from the influx in place-based polices aimed at concentrating the knowledge economy in the city. Despite the differences in their names and constitution (i.e., the university park captures research spillovers, the innovation district may not include the presence of a university, the creative district may target creative, as well as tech workers), one commonality that binds these developments is the focus on place (Drucker, Kayanan, & Renski, 2019; Zandiatashbar & Hamidi, 2018). While there exists a wide-ranging body of scholarship on the role of place in increasing the attractiveness and value of the city, much of which draws connections between the City Beautiful Movement (Hall, 2004), urban renewal (Page & Ross, 2017), tactical urbanism (Lydon & Garcia, 2015), and placemaking practices (Fincher, Pardy, & Shaw, 2016), the contribution of this article is in draw-

ing the connection between the role of place in local economic development practices focused on siting innovative activity in the city.

In an effort to attract the firms, talent, and supports considered necessary for innovation, innovation-igniting urban developments (IIUD), as we label them in this article, are rapidly budding up in cities across the globe (Hamidi & Zandiatashbar, 2019a; Shearmur, 2012). IIUDs, which are often developed over post-industrial sites—such as Boston's Seaport Innovation District in the South Boston Waterfront (Drucker et al., 2019) or 22@BCN built over Barcelona's Poblenou neighborhood (Charnock & Ribera-Fumaz, 2011)—rely on a master plan for the designated area of development. These sites depend heavily on design and placemaking to create an entrepreneurial ecosystem attractive to the firms and individuals closely associated with startup activities and the technology sector (Acs, Stam, Audretsch, & O'Connor, 2017; Rossi & Di Bella, 2017). IIUD best practices and accompanying rhetoric suggest that design and placemaking are necessary factors to foster a vibrant and engaging environment conducive to the constant and spontaneous interaction integral to innovation (Chesbrough, Vanhaverbeke, & West, 2006). Innovation districts are a good example of IIUDs, as are extensions of college campuses, such as Cortex Innovation Community in Saint Louis, MO, and Buffalo's Niagara Medical Campus in Buffalo, NY (Drucker et al., 2019).

As the building of IIUDs trends, it becomes necessary to consider potential negative consequences and associated policy solutions (Peck, 2005; Scott, 2006). However, IIUDs are young developments and this challenges the ability to derive a concrete evidence-base of negative consequences. We address this through a mixed-method approach that incorporates: 1) a synthesis review of theoretical and empirical works explaining potential negative consequences and counter-empirical studies testing such consequences; and 2) a quasi-experimental analysis of empirical cases composed of Propensity Score Matching (PSM) and Average Treatment Effect (ATE) analyses from three prominent cases in the United States (Boston's Seaport Innovation District, MA, Cortex Innovation Community in Saint Louis, MO, and Buffalo Niagara Medical Campus [BNMC] in Buffalo, NY). Results show that IIUDs correlate strongly with a polarized labor division and issues of housing unaffordability.

This article is structured in four parts. The first part details the structural factors contributing to IIUDs. The second part uses examples of existing IIUDs to discuss four prominent negative consequences of these emergent spatial forms. The third section includes empirical findings from IIUDs in Boston, St. Louis, and Buffalo. The final section points to policy suggestions that can be used by urban development actors to mitigate the negative consequences of a continuing (and growing) trend in IIUDs that our empirical analyses confirmed.

2. Urban Development and the Siting of Innovation-Related Activity in the City

Over the last thirty years cities have undergone the resurgence of property-led regeneration programs (Turok, 1992). These developments have taken various forms and have targeted different sectors, for example, tourism (Smyth, 2005), waterfront development (Fainstein, 2008), arts (García, 2004), sports (Hall 2004), and of interest to this article, knowledge-based urban developments (Carrillo, Yigitcanlar, García, & Lönnqvist, 2014). The process of regenerating cities and making them more knowledge-intensive has contributed to policy prescriptions aimed at attracting young talented workers (Florida, 2002). The 2008 Global Financial Crisis and ensuing recession intensified the financialization of the urban property market (Aalbers, 2020) and placed increased emphasis on IIUDs to restart the economy, which has contributed to economic developers more directly engaging with placemaking principles (Kayanan, Eichenmüller, & Chambers, 2018). From the perspective of an evolving economic development practice, we identify three structural changes that contribute to the contemporary focus on place.

2.1. State Descaling

The first factor contributing to economic developers' contemporary focus on place is the descaling of the state (Harvey, 1989). Though not directly tied to theories on the practice of economic development, a wide scholarship exists on how descaling impacts the (re)development of the city and its governance. As a political objective, descaling has created pathways for private capital to interject in urban development (Harvey, 1989). Descaling imperatives do not necessarily come with financial supports, meaning that local governments are often left to scramble for financial resources, such as public private partnerships (Fainstein, 2001) or tax increment finance schemes (Weber, 2014). This form of collaboration is evident in innovation district strategies, which brings together a wide range of actors—to include representatives from the private, public, education, and civic spheres—working together to bring the innovation district to fruition (B. Katz & Bradley, 2013).

2.2. Economic Developers' Engagement with Science and Technology Policies

The second factor in a changing economic development practice more closely tied to place is economic developers engaging with science and technology policies. Prior to the 1980s, rarely did state economic development agencies focus on science and technology policies (Plosila, 2004). Within the urban realm in the western world, economic developers' engagement with industrial districts through to the 1980s existed at the state level and primarily consisted in the form of building

factories (Plosila, 2004). Increasing linkages with higher education and research institutions and discussing the role of talent and venture capital as economic development packages, activities related to supporting science and technology, came only in the 1980s after the success of planned science and research parks in Boston (Route 128), Silicon Valley (Stanford Research Park), and North Carolina (Research Triangle Park) were taking effect (Markusen, 1999; Saxenian, 1996). With the descaling of the state, economic developers, now working at the regional level, built upon the agglomeration benefits of the industrial districts (Marshall, 1890) to focus on clustering research and development activity (Fallah, Partridge, & Rickman, 2013). The onset of neoliberalism and entrepreneurial urban development (Harvey, 1989), opened up the need for city-regions to play a heavier hand in driving tech-based visions (Clark, 2014).

2.3. Urbanizing the Economy

The third factor contributing to local economic developers' engagement with place is the focus on the city—in both theory and in practice—as a generator of regional wealth and competitiveness (Glaeser, 2011). Evidence of this are calls by think tanks for the development of metropolitan-scale governance through the implementation of metropolitan mayors (B. Katz & Bradley, 2013), as well as the (OECD, 2015) encouraging policy prescriptions and spatial configurations that center economic activity within the metropolitan sphere (D'Albergo & Lefèvre, 2018; Kayanan, Moore-Cherry, & Tomaney, 2020). As discussed above, the shift from building IIUDs on suburban greenfield sites and pastoral environments to siting them in the city (Mozingo, 2016) add further supports to urbanizing the economy. For clarity on the connection between the urbanization of the economy and IIUDs, below we isolate two reasons that directly correlate with policies targeting innovative activity in the city: agglomeration logics and demographic preferences.

2.3.1. Agglomeration

The siting of innovation-related activity in the city is undergirded by agglomeration logics. Scholarship on agglomeration supports the idea that spatial clustering leads to specialization externalities of agglomeration by catalyzing spillover effects such as frequent knowledge exchange between similar industries, lower access cost to the larger labor pool and suppliers, and ultimately the product's value chain (Shearmur, 2012). Several empirical studies also confirm that such externalities of the agglomeration economy determine location patterns and innovation productivities of knowledge-based businesses. Building on this hypothesis, Boschma (2005) stated that the spatial proximity leading to knowledge spillover could be more effective when coupled with cognitive proximity. Cognitive proximity refers to the required knowledge similarity for intra- and inter-firm knowledge transfers and highly depends on an individual's level of knowledge, or in the aggregate, a knowledgeable workforce. A recent study of Canadian knowledge-based firms also shows that proximity to a larger pool of talented workers and university graduates play a critical role in their location pattern (Shearmur, 2012).

2.3.2. Demographic Preferences

The principle pillar of the placemaking strategies in IIUD policies is the local place-based characteristics that satisfy the life quality of skillful millennials, such as their car-free lifestyle and strong desire for urban social life, mixed-use and compact neighborhoods, transit quality, and walkable proximity to restaurants, retail, cultural, and educational institutions (Florida, 2002; Shearmur, 2012; Zandiatashbar, Hamidi, Foster, & Park, 2019). For instance, transportation infrastructure is often integrated in these policies as walkability and access to public transit are key characteristics of IIUDs (B. Katz & Bradley, 2013). Several European, American and Asian empirical studies show that college-educated millennials and members of the creative class have become more car-free and are more drawn to neighborhoods with walking and transit access to job and place-quality amenities (Credit, 2017; Weissmann, 2012; Zandiatashbar & Hamidi, 2018). On the other hand, public transit infrastructure reduces travel time and enhances the urbanization externalities of agglomeration by expanding the coverage area of a business. Furthermore, transit riders have more opportunities for face-to-face encounters leading to knowledge exchange (Chatman & Noland, 2011).

3. Method

Our discussion on the negative consequences of the IIUDs is built upon a mixed method of synthesis review and empirical analysis. First, we provide a summary of a pair-wise synthesis review of the theoretical and empirical works on each of the negative consequences. Second, as IIUDs are still young, resulting in a lack of empirical studies, we also include a series of analysis of three cases in the US: the Seaport Innovation District, in Boston, MA; Cortex Innovation Community (Cortex), in St. Louis, MO; and BNMC in Buffalo, NY. Figures 1–3 briefly summarize the location and history of each city's respective IIUD.

4. IIUDs and Their Negative Consequences—Synthesis Review

Having arrived at a theoretical understanding of why local economic developers engage with place and a contextual understanding behind IIUDs, we now shift our attention to the negative consequences that emerge from such place-based strategies. It is important to note that these negative consequences are not listed in chronological order. In addition, there is no guarantee that

Figure 1. Boston Seaport Innovation Districts (BSID; Boston, MA). In 2010 Mayor Menino declared intentions to build the Boston's Seaport Innovation District. A master plan for the northernmost part of the peninsula was developed to tighten the connection between igniting innovation and placemaking. Only a few developments existed in the area prior. Incubators, free wi-fi connected spaces, and dorm-like housing for entrepreneurs formed the strategy. Boston's IIUD strategy focused on startup and tech-entrepreneurship but remained sector agnostic (Drucker et al., 2019). Image source: Hamidi and Zandiatashbar (2019b).

Figure 2. Cortex Innovation Community (Cortex; Saint Louis, MO). As a legal entity, Cortex was established in 2002 following a series of attempts to create a research corridor between St. Louis University, Washington University, and BJC Healthcare research medical center. In 2010, Cortex was reimagined as an innovation district and renamed the Cortex Innovation Community. Incubators, hospital and university anchors, boutique hotels, and open spaces for quick wi-fi connectivity are all located within the designated space (Drucker et al., 2019). Image source: Hamidi and Zandiatashbar (2019b).

Figure 3. Buffalo Niagara Medical Campus (BNMC; Buffalo, NY). The BNMC is a medical innovation district established in 2002 in Buffalo, NY. It includes a medical campus, new hospitals, private-sector companies, and social innovators. Placemaking efforts in the form of street renovations and expansion of clinical, research, office, medical, and coworking spaces formed the strategy (Hamidi & Zandiatashbar, 2019b). Image source: Hamidi and Zandiatashbar (2019b).

one IIUD will exhibit all four negative consequences. However, based on an analysis of the existing literature of knowledge-intensive developments across the globe, below we list the most common negative consequences. Although the empirical studies did not focus on urban developments, we strengthened our argument by including empirical analyses of three cases of IIUDs in the US. Table 1 provides a matrix of the negative consequences reported from our literature synthesis. The matrix separates theoretical works from empirical studies for each negative consequence.

4.1. Negative Consequence 1: Polarized Labor Division

IIUDs promote high-tech clusters and are primarily dependent on two classes of the labor force: low-wage, unskilled workers (Rifkin, 1995) and high-skilled professionals (Florida, 2002). Policies that support the development of IIUD devote more focus on high-skilled professionals. Because these individuals are critical to high-tech growth, ample literature has addressed their life-quality amenities (Florida, 2014). This prioritizing of the high-skilled professional class in both the literature, in policy, and in practice often means that low-wage, unskilled workers are disregarded. When IIUDs do address job opportunities for these individuals it is done by rationalizing development in or near low-income neighborhoods as creating employment opportunities close to work. The lack of attention to low- or mid-wage jobs in these types of developments results in tangible gaps in terms of wage, job security, social position, wealth, education, and quality of life (Scott, 2006). High-skilled workers migrate to areas when the local workforce is unable to fill the demand for high-skilled jobs. This inflow migration of high-skilled professionals helps the high-tech economy grow and allows high-tech job opportunities to continuously emerge, while a higher portion of the original low-wage, unskilled residents might not have the opportunity to move into the high-skilled professional category. A shrinking middle class increases the gap between these two classes and deepens the social division of labor caused by the lack of equity in distribution of opportunities (McCann, 2007). Equity warnings related to pro-growth local development policies is not a new concern. Back in the early 1990s, Bartik (1991) discussed the distributional issues of economic development policies and pointed to their disregard in practice.

Economic segregation in US regions is positively associated with a stronger high-tech industry, higher percentage of a creative class workforce and college grads, and innovation intensity led by knowledge clusters (Berkes & Gaetani, 2019; Florida & Mellander, 2016). For instance, in Austin's creative city-region, the high-technology sector grew in the late 1990s and, over time, contributed to an income gap between the creative professionals and the city's poor, many of whom are African American and Latinx (McCann, 2007). During the 1990s, 13.1% of the city's population was living in poverty compared with the US average of 12.7%. Furthermore, in this period, the average wage in the high-tech sector increased by $26,500.

Table 1. Summary of literature synthesis.

		Empirical Study	
Negative Consequence	Theoretical Study Author(s)	Author(s)	(Supportive of/Contradicting the Negative Consequence) Finding Summary
Polarized Labor Division	Scott (2006); Peck (2005); Donegan & Lowe (2008)	Berkes & Gaetani (2019)	(Supportive) Innovation intensity led by knowledge clusters is responsible for 20% increase in the city's segregation between 1990 and 2010.
		Florida & Mellander (2016)	(Supportive) Economic segregation in US regions is positively associated with stronger high-tech industry and creative class workforce.
		McCann, (2007)	Supportive: In Austin the gap between high-tech workers and other industries has increasing led to a wider gap.
Housing Unaffordability	Donegan & Lowe (2008); Bevilacqua, Pizzimenti, and Maione (2020); Voith & Wachter (2009); Catungal & Leslie (2009)	Florida (2017);	(Supportive) Gentrification between 2000 and 2007 positively correlates with the concentration of high-tech industries, share of science and technology workers, and artistic and cultural activities across US metros.
		Grodach, Foster, and Murdoch (2018)	(Contradicting) Not all creative industries play a significant role in gentrification and displacement in the US. Growth of fine and commercial arts establishments are weakest in gentrifying US neighborhoods.
Unequal Access to Opportunities	Scott (2006); Gouldner (1979)	Weinreich, Hamidi, Bonakdar, Sardari, and Moazzeni (2019)	(Supportive) Dallas, TX experienced a strong job growth as the result of attracting high-tech industries; however, only 4% of Dallas' residents who live in the transit dependent core have access to regional jobs via transit.
Socio-Spatial Polarization	Scott (2001, 2006)	McCann (2007)	(Supportive) The victims of housing unaffordability and the wage gap in Austin are members of mostly African American and Latinx communities who moved out of the high-tech clusters.
		Zlolniski, (2006)	Supportive: Spatial colonies of low-wage Mexican workers in Silicon Valley, a major global tech hub, where there exists an increasing number of workers in unstable and low-paid status.
		Modai-Snir & van Ham (2018)	(Supportive) Integration in global economy and use of IIUD for urban developments to attract high-tech jobs and talented workers played a major role in intensifying the socio-spatial divide in Tel Aviv metropolitan area.

The average rise in wages for all industries, including high-tech, was only $18,000—a growth in line with the US average (McCann, 2007).

4.2. Negative Consequence 2: Housing Unaffordability

Housing unaffordability, gentrification, and displacement are points of tension related to urban development for their tangible impact on local residents (Voith & Wachter, 2009). The siting of innovation-related activity in the city contributes to the problem by creating opportunities only for high-skilled workers who can afford to live in close proximity to these jobs.

The place-based strategies that aim to attract high-tech firms have led to the significant role of real estate development companies in satisfying the strong demand for urban transformations (Bevilacqua et al., 2020). This urban transformation is tied strongly to

place-based amenity richness (McCann, 2007). Such amenity richness fosters an elevated quality of life that attracts the creative class, while also increasing housing prices. Disadvantaged populations are removed in order to make place attractive for capital (Catungal & Leslie, 2009; McCann, 2007) and the extensive introduction of place-quality amenities into these neighborhoods have become the standard descriptors to be appreciated by the high-skilled professionals who can afford it. Since the demand side is fulfilled, the increase in housing price continues (Fingleton, 2008). Urban real estate frameworks, such as the ones by Alonso (1964), Roback (1982), and Rosen (1974), explain the spatial equilibrium dynamic causing this negative consequence as such: Improvements to an urban area in the form of a rise of high-wage jobs and the extensive injection of place-quality amenities, all else equal, causes a demand increase. If the supply function does not change, then the equilibrium price will increase as a function of market clearing. As the result of this dynamic, local residents and renters will be priced out of the market. Without an adequate pre-growth management agenda in place, price increase will not stop due to this supply-demand dynamic.

Empirical evidence in the US also supports the fact that gentrification (defined as the share of neighborhoods in a region that escalated from the bottom half to the top half in distribution of home prices between 2000 and 2007) positively correlates with the concentration of high-tech industries, share of science and technology workers, and artistic and cultural activities across US metros (Florida, 2017). The initial plans for the Boston Seaport Innovation District (BSID), which was launched in 2010 following the 2008/9 recession as Mayor Menino's initiative for the South Boston Waterfront, included the provision of affordable housing units. However, with the uptick of the rental market in the South Boston Waterfront, these aims were discarded (Drucker et al., 2019). Rather than build the 20% required affordable housing into new developments, contracted developers were given permission to contribute money into a fund for development of affordable housing units elsewhere. Even the lack of affordable housing for high-skilled professionals is problematic and can lead to what Florida (2017) has called the 'flight of the creative class.' Dublin, which has witnessed a post-crash revival due in part to the expansion of the tech sector with large companies such as Google, Facebook, Airbnb, and many others located in the city center, is facing a housing affordability crisis across all income classes (Kayanan & Pajević, 2020).

4.3. Negative Consequence 3: Unequal Access to Opportunities

Without pre-growth management strategies in place, the growth of the high-tech economy in the city can result in negative impacts for communities at a regional scale. Local decision makers working to foster a local knowledge economy by attracting high-tech firms through tax abatements often negate to consider—or outwardly disregard—potential future negative consequences of their decisions at larger scales (Stiglitz, 2016). The concentration of urban amenities and economic growth in a designated urban area that is exclusive to the highly educated members of society could result in what Gouldner (1979) first called 'the dark side of the dialectic' and later Scott (2006) explained as the 'source of localized competitive advantage.'

Several high-tech clusters suffer from the lack of regional planning to provide a pre-growth agenda matched with accurate infrastructural capacities (Downs, 2005). In the case of Austin, the high-tech boom led to inequality, traffic congestion, urban sprawl, and environmental issues. The same issues are now raised in Dallas-Fort Worth Motorplex in North Texas, where cities offered ample tax incentives and are heavily focused on local place-based strategies to attract high-tech firms (Zandiatashbar, Hamidi, & Foster, 2019). Despite increases in job opportunities, a recent study shows how transit-dependent populations in Dallas do not benefit from this growth due to congestion increase and lack of supportive transit access (Weinreich, Hamidi, Bonakdar, Sardari, & Moazzeni, 2019). Silicon Valley, which is the prime model for innovation-based economic prosperity, has the fifth worst congestion in the world (Pishue, 2017). Housing shortage and ongoing transportation challenges constrain the growth of the Bay Area. While average monthly housing costs and apartment rental rates in the Bay Area are the highest in the nation, proximity to high-tech clusters exacerbate challenges to housing affordability. Workers locate further from employment centers and, due to the lack of enhanced regional multimodal mobility amenities, congestion grows. The increased commute times of Silicon Valley workers has resulted in an estimated $2.7 billion yearly loss in productivity (Joint Venture Silicon Valley, 2019).

4.4. Negative Consequence 4: Socio-Spatial Polarization

The polarized division of labor caused by the concentration of high wage jobs in IIUDs where housing unaffordability deters middle- and low-income households will result in uneven urban and regional economic development. One outcome of this uneven regional growth is the spatial concentration of low-wage workers in more affordable, mostly suburban areas (Scott, 2006). In several cases, local residents who face the negative consequences of the creative economy are also members of racially disadvantaged communities. Ample evidence shows that the members of racially marginalized communities tend to collocate with members of similar racial and socio-economic status (White, 1983). For instance, the victims of housing unaffordability and the wage gap in Austin are members of mostly African American and Latinx communities who moved out of the high-tech clusters (McCann, 2007). This is also evident in the spatial colonies of low-wage Mexican workers in Silicon Valley,

where there exists an increasing number of workers in unstable and low-paid status (Zlolniski, 2006). Several subcontracting agencies hire low-wage workers for entry-level custodial jobs comprised mostly of low-wage and undocumented Mexican immigrant workers (Zlolniski, 2006). In both the Austin and Silicon Valley cases, low-waged unskilled workers tend to cluster on affordable peripheries, which ultimately form the poor spatial patches in these high-tech regions.

5. Empirical Analysis of the Four Negative Consequences in Three US Cases

We adopted a quasi-experimental research design to assess the four negative consequences discussed above. Our focus was on whether implementation of IIUDs could result in an increased share of high-wage jobs, thus resulting in housing unaffordability, unequal access to opportunities, and income inequality (Osei & Winters, 2018). Our assessment needed to pair two neighborhoods: one within the territory of the IIUD with one outside of it. These neighborhoods needed to share similarities prior to the implementation of the IIUD and have significantly different outcomes after implementation of the IIUD in terms of the shares of high-wage jobs, housing and rent values, and income diversity. This was done through utilizing the PSM technique. PSM pairs any location (census block group) in the affected area by the IIUD (within a 1-mile buffer of IIUD boundary) with the most similar location outside of the affected area using the characteristics explained in Table 2. We conducted three PSMs, one for each case, including a series of variables to control for location and socioeconomic attributes of census block groups prior to the implementation of each respective IIUD. The PSM was implemented in Stata 16 using the PSmatch2 package and a caliber (maximum permitted difference between matched subjects) of 0.25 based on ample recommendation in the literature (Cochran & Rubin, 1973). Once pairing through PSM was completed, we calculated the ATE of IIUD on share of high-wage jobs, housing and rent value, and income diversity in 2018 to assess whether the share of high-wage jobs increases as the result of the IIUD, thus triggering housing unaffordability and income inequality.

Our study area for each IIUD is their hosting counties (BSID is in Suffolk county, Cortex is in St. Louis county, and BNMC is in Erie county). Our PSM analyses matched treated neighborhoods by IIUD with exactly similar control neighborhoods. First, we used Principal Component Analysis (PCA) to develop a measure of socio-economic status attributes of neighborhoods in 2000 composed of % of residents with college or higher degree, % of employed working age residents, and income per capita. The results of these PCAs are reported in Table 3 and we used comp. 1 for our PSM analysis.

Second, we matched the treated neighborhoods by the IIUD (within a 1-mile distance from the designated area) based on the socio-economic status measures and distance to the Central Business District. We selected the Central Business District for two reasons: 1) to ensure both treated and control neighborhoods are similar in terms of access to the market core, and 2) in all three cases, IIUD areas are adjacent to the Central Business District which could make our comparisons biased. Then ATE analysis between the treated and control neighborhoods shows the impact of the IIUD on housing unaf-

Table 2. Descriptions and sources of model variables.

	Variable	Definition	Source
Outcome variables: assessed in 2018 after the implementation of the IIUD	High Wage %	Percentage of high wage jobs (with earnings greater than $3333/month) in 2017	US Census Bureau (2017)
	Housing_Value	Median housing value	US Census Bureau (2018)
	Rent	Median rent value	US Census Bureau (2018)
	Inc_Div[1]	Income diversity was measured using Simpson's Index of Diversity of four consolidated census income categories: low income (US$0 to 24.9k), low middle income (US$25k to 59.9k), high middle income (US$60k to 99.9k) and high income (above US$100k) households	US Census Bureau (2018)
Matching variables: pre-IIUD; matching IIUD neighborhoods with non-IIUD neighborhoods in 2000	Clg %	% of residents with college degree and higher	Census (2000)
	Income	Income per capita in 2000	Census (2000)
	Emp %	% of employed residents	Census (2000)
	CBD-Dist	Distance to the closest Central Business District	Hamidi (2015)

Notes: [1] We used the Simpson (1949) method for measuring diversity which is as follows: Simpson's Index of Diversity $= 1 - \sum_k (n/N)^2$; n = Number of residents of particular category per block group; N = Total number of residents per block group; The index varies from 0 to 1, with higher values indicating higher diversity.

Table 3. PCA results for socio-economic status single combined measure.

	Components	Eigenvalue	Emp %	Clg %	Income	# of Observations
BSID	Comp. 1	1.87	0.42	0.64	0.65	603
	Comp. 2	0.81	0.90	−0.33	−0.27	
	Comp. 3	0.32	0.05	0.70	−0.72	
Cortex	Comp. 1	2.16	0.51	0.56	0.62	353
	Comp. 2	0.60	0.85	−0.47	−0.25	
	Comp. 3	0.24	0.14	0.65	−0.74	
BNMC	Comp. 1	2.12	0.49	0.60	0.63	726
	Comp. 2	0.67	0.86	−0.45	−0.23	
	Comp. 3	0.21	0.14	0.66	−0.74	

fordability and income inequality. Table 4 provides the results of ATE, analyzing the impacts of the IIUD in our three cases. BSID and Cortex demonstrate a higher increase in housing unaffordability and income inequality. This could be associated with the growth of high-wage jobs and high-income households. For instance, on aver-

Table 4. Results of post PSM ATE analysis, IIUD Impact on housing unaffordability and income inequality in 2018.

	Pair Type	Avg. Value	Difference	Standard Error	T-Statistics	P-Value	# of Paired Observations	Outcome Variable Name
BSID	Treated	%48.78	%5.02	4.75	1.16	0.140	72	% of High-Wage Jobs
	Control	%43.75						
	Treated	%47.37	%11.57	4.98	2.32	0.002**	72	% of High Income Households (HHs)
	Control	%35.80						
	Treated	0.58	−0.02	0.02	−0.72	0.312	72	Income Diversity
	Control	0.6						
	Treated	646.11	182.08	90.82	2.00	0.005**	72	Median Housing Value (in 000)
	Control	464.03						
	Treated	1680.44	146.28	158.12	0.93	0.255	72	Median Rent
	Control	1534.15						
Cortex	Treated	%34.63	%4.72	4.28	1.20	0.236	30	% of High-Wage Jobs
	Control	%29.92						
	Treated	%39.2	%5.54	7.75	0.72	0.435	30	% of High Income HHs
	Control	%33.66						
	Treated	0.57	−0.02	0.04	−0.47	0.617	30	Income Diversity
	Control	0.59						
	Treated	208.05	60.18	36.53	1.65	0.089*	30	Median Housing Value (in 000)
	Control	147.87						
	Treated	875.27	10.13	65.33	0.16	0.865	30	Median Rent
	Control	865.13						
BNMC	Treated	%30.92	−%1.42	9.48	−0.15	0.798	25	% of High-Wage Jobs
	Control	%32.34						
	Treated	%8.16	%1.49	3.26	0.46	0.544	25	% of High Income HHs
	Control	%6.67						
	Treated	0.65	0.04	0.06	0.67	0.183	25	Income Diversity
	Control	0.61						
	Treated	108.3	35.70	39.96	0.89	0.138	25	Median Housing Value (in 000)
	Control	72.6						
	Treated	760.32	58.24	72.98	0.80	0.205	25	Median Rent
	Control	702.80						

Note: * P-Value < 0.1; ** P-Value < 0.01.

age, nearly half of the households in the selected neighborhood geographically affected by the IIUD designation command a high-income and half of the total jobs are high-wage. On the contrary, on average, almost only a third of the households in the control neighborhood outside of the IIUD have such high annual income.

Once the IIUD neighborhoods attract more affluent households, income inequality increases. This could explain the nearly 14% increase in housing value (on average). This trend also had an impact on rent growth, while it appeared to be insignificant according to the observed P-value. We observed almost a similar pattern in Cortex, however not as significant as in Boston and quite different than in Buffalo. Boston is an example of a region needing active controlling policies for smart growth management. What is striking is that in Boston the gap is not between the IIUD (Boston's Seaport Innovation District) and the neighborhoods far from the IIUD, but that it is actually within the adjacent neighborhoods with shared similar socio-economic attributes prior to the implementation. This demonstrates the strength of the impact of the IIUD. The area of the BSID, as a result of the IIUD, has become more polarized and homogenous with more affluent residents earning higher incomes. Due in large part to its historical legacy with Route 128, its proximity to Cambridge, and the high clustering of universities and research centers, Boston has a long history of courting high-tech industries and science and technology research (Saxenian, 1996), thus differing significantly to St. Louis and Buffalo. In this respect, as evident in Silicon Valley, Vancouver, London and the many other city-regions with a strong knowledge economy, Boston's long-standing shift towards a knowledge economy may explain the significant differences in variables across cases (Scott, 2006). However, this only furthers the argument on the importance of considering the negative consequences of IIUDs. To date, BSID is no longer considered an innovation district, meaning that the original intentions to build a space to catalyze regional growth by fostering a knowledge economy fell secondary to building a high-income neighborhood (Drucker et al., 2019).

6. Concluding Thoughts and Policy Direction

Emergent place-based strategies aiming to support a growing and robust knowledge economy, such as innovation districts, innovation hubs, and innovation zones, have gained in popularity amongst policy makers, planners, and local urban decision makers. Despite this popularity, there have been scant studies addressing potential negative consequences associated with such place-based strategies. In this article we address the rise of IIUDs and their connection to place. We argue that while achieving a strong and prosperous economy is a principle goal of economic developers, these local actors need to be equipped with studies that detail the negative consequences of IIUDs to inform pre-growth agendas and maximize inclusive growth within their jurisdictions.

The use of IIUD strategies is quickly and uncritically spreading to cities across the globe. As discussed above, scholars and practitioners depend on knowledge-based industries to grow national employment, Gross Domestic Product, and innovation and this influences regional and local economic development planning efforts (Drucker et al., 2019; L. F. Katz & Krueger, 2016). In an effort to attract capital investment and human capital, IIUDs are based within a locality though they also function at a global level. While this is not unusual in the contemporary global era, what is important to recognize is how IIUDs may fail to address local needs as well as the sectoral differences between knowledge-based businesses (Zandiatashbar, Hamidi, & Foster, 2019). Therefore, IIUDs need to include policies focused on local residents as a way to control for the increased polarized division of labor, housing unaffordability, unequal access to opportunities, and socio-spatial polarization that we found to be the potential negative consequences of IIUDs.

As IIUDs trend, this study is certain to be the first of many. In this last section, while recognizing the need and urgency for increased research, we discuss a few policy directions to curtail the negative consequences of IIUDs. For instance, local advocate-driven leadership coalitions considering IIUD strategies can create partnerships with a wide range of actors to better inform development decisions. In addition to the standard representatives from high-tech firms, universities, hospitals, and the city's or region's official decision makers, IIUD coalitions can also include local residents, NGOs, and social justice activists. Collectively, the coalitions define the vision and pillars for IIUDs, overseeing the associated policies and developments, advocating for empowering local residents through social equity, inclusiveness, and resources to train local residents to participate in the high-tech job market.

As we show, IIUD strategies result in the spatial clustering of more affluent residents. In Boston, for instance, we observed that implementation of the IIUD led to a spatial core of high-tech high-wage jobs with a lower income diversification. Therefore, diversification of IIUDs should push beyond social, racial, and gender diversity to also focus on economic diversification of industrial activities and specializations. Diverse specializations could support social inclusion, lifelong learning, and robust R&D activities (Niebuhr, 2010). Studies show that industries have different location behavior: While design and consulting firms are drawn to more walkable and transit accessible neighborhoods, advance manufacturing sectors are drawn to areas with strong auto-accessibility and proximity to airports (Zandiatashbar, Hamidi, & Foster, 2019). Hence, this economic diversification can also balance the needs for both active and non-active mobility facilities and support better accessibility.

Rising housing prices as the result of the implementation of IIUDs is a major concern in the literature. While increased polarized division of labor and income inequality was not consistent across our three empirical cases, the

rise of housing value was a common outcome of IIUD in our three cases. This calls for a strong focus on affordable housing within the IIUD, as well as in the neighborhoods surrounding it. However, this concept needs to merge with empowering local entrepreneurship. Multifamily rental properties in tech-hub cores are a better alternative to single-family homeownership assistance programs. Such properties allocate better access to jobs, while development of single-family houses in the urban core contribute to sprawl and congestion. Existing affordable housing policies could include mixed-residential and retail/office properties with retail or office uses to support owners' or renters' entrepreneurial activities. Including affordable office spaces in such mixed-use developments could support high-tech startup activities while affordable retail space could sustain other economic activities that do not necessary require tech-based training. Implementing service amenities such as workforce development hubs, educational institutions, and workforce training opportunities in easy proximity to affordable housing residents is key.

As housing and land value inflation is capturing too much of the value of IIUDs, policymakers need to revisit and reserve the Land Value Taxation in IIUDs for mitigating the negative consequences of IIUDs. It is not only the tech businesses who could benefit from the IIUDs, but also large capital windfalls would go to landowners, as the result of attracting high-wage high-tech jobs, many of whom, according to Mulgon (2019), have contributed little to the wealth they capture. Hence, what is essentially needed in IIUDs is a novel approach to capturing land value gains within cities to divert them into new sources for mitigating the potential negative consequences of IIUDs.

In summary, though the Coronavirus pandemic of 2020 might recalibrate our understanding and role of cities, for the foreseeable future, IIUDs strategies will continue to reshape the socio-spatial demographic of the city. What we aim to demonstrate here is that an economic development practice increasingly attuned to and deriving profit from place has a responsibility to remain sensitive to its local residents. By first demonstrating the negative consequences associated with IIUDs and then pointing to possible policies to mitigate them, this article is a first step in the process.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Techs and the Cities: A New Economic Development Paradigm?

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Abstract
Large technology firms pose new challenges for local economic development in the 21st century. They are attractive targets for local economic developers because they have the potential of providing permanent, well-paying jobs. This article examines two mega-economic development deals. Amazon's proposed second headquarters in Queens and Sidewalk Labs' Quayside proposal for the Toronto waterfront pit large and prosperous Big Tech firms against local governments with healthy economies. Amazon abandoned the New York City site it had chosen, rather than open new negotiations with local officials and citizens. Sidewalk Labs withdrew from the Quayside proposal after two and a half years of negotiation focusing mostly on the size of the proposed development. Although the potential benefits may be substantial, incentivizing Big Tech's location decisions may be well beyond the means of most cities, especially those with distressed economies.

Keywords
Amazon; Big Tech; local economic development; New York City; Sidewalk Labs; Toronto

Issue
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1. Introduction

Over the past few decades, local economic development efforts, particularly in North America, have been affected by deindustrialization and the growth of information technology. The 'new economy' of the 21st century places greater emphasis on services and investments in human capital (Alcaly, 2003; Glaeser & Saiz, 2004). Manufacturing employment in North America has declined as a result of both automation and the transfer of routine production activity to lower wage locations (Bluestone, 2003). The Computer Revolution has not only led to expansion of new highly skilled jobs, but it has also exacerbated the uneven growth of urban areas (Berger & Frey, 2015).

The primary objective of this article is to assess how this ongoing economic restructuring has affected economic development practices in North America. We do this through an examination of two significant development proposals in which giant technology companies sought incentives and concessions from prosperous global cities. While development proposals at this scale are likely to be uncommon, we believe that these examples are indicative of how Big Tech may redefine the local economic development process.

For the past 75 years, governments have used incentives to redirect private investment to promote local economic development. Often, these efforts are justified as corrections for perceived 'market failures' (Seidman, 2005). Areas may be targeted because they are low income, with high unemployment and declining populations and property values. Incentives are perceived to be necessary to make these locations more competitive; private investments would not occur 'but for' the availability of incentives (Peters & Fisher, 2004; Sands & Reese, 2012).

Critics of economic development incentives argue that they are a form of 'corporate welfare,' in effect paying firms to do what they would likely have done absent the incentives (LeRoy, 2005). Peters and Fisher (2004) suggest that 90% of economic development spending is wasted. When large scale investments are at stake, however, as in the location of a large manufacturing plant or corporate headquarters, the firms frequently have the upper hand in negotiations (LeRoy, 2018). Although they are often characterized as win-win situations, the public sector is typically responsible for substantial upfront costs, while the corporate investors receive benefits long before the government or its citizens do.

Traditional economic development strategies have sought to attract manufacturing jobs and the attendant investment in plant and equipment. In recent decades, globalization and deindustrialization have contributed to the decline of manufacturing, making competition for new manufacturing facilities more intense. The growth of information technology and the 'knowledge economy' has introduced a new focus for economic development activity (Berger & Frey, 2015). Tech firms are desirable targets for economic developers because they pay high wages, are less restricted in their location choices by need for accessibility to raw materials, supply chains and customers, benefit from clustering of firms and contribute to a positive image for the host community.

The emergence of high-tech firms as a target of economic development efforts could fundamentally change the nature of local economic development. In this article, we consider several issues related to these potential changes: Does the focus on high tech firms represent a new local economic development paradigm, one that introduces new policy instruments, to attract high end jobs? Will this new focus also shift the balance of power between the public and private sectors, as well as among the communities seeking to attract new economy firms, those that are high tech and information intensive? How does this 'reaching for the top' in terms of firms and job categories and the economic status of residents differ from the previous economic development attempts to attract middle-class manufacturing jobs?

We offer two examples of urban economic development approaches that involve firms at the summit of the corporate hierarchy and that target, for the most part, high-income residents. One is the settlement of the headquarters of one of the largest US corporations and the other the planning and development by another giant firm of a central neighborhood according to a technologically driven model. While not claiming to cover all possible variants, these examples nonetheless illustrate how manifestations of this type of 'summit' development can differ from one another.

These examples share defining features of this top-reaching form of urban economic development. First, they target highly valuable, centrally located land in global cities at the summit of their national urban system. Second, the main proponents are Tech Giants. The developments target top corporations and, to a large extent, high-income residents. Although the attention in the article is on large projects deployed in global cities, analogous features of these projects are found in smaller-scale economic development initiatives occurring in variously sized urban areas. The focus is thus on iconic examples of an economic development transition that is widespread.

The next section of the article provides a brief overview of trends in local economic development policies. This is followed by a description of the cases, including a comparison of their key features. The article concludes with a discussion of the implications of these new economic development models for public policy.

2. Economic Development Policy Trends

Local economic development strategies have evolved through several phases during the last half of the 20th century (Eisinger, 1988; Jansa & Gray, 2017; Tassonyi, 2005). From the mid-1980s, the emphasis was on the attraction or retention of businesses by providing subsidized infrastructure or targeted incentives such as tax abatements (Hill, Wolman, Kowalczky, & St. Clair, 2012; Saiz & Clarke, 2013). The second period introduced a new focus on financial, technological and knowledge infrastructure (Tassonyi, 2005). In the early 2000s, it appeared that the emphasis had begun to shift to strategies based on human capital development and quality of life enhancement including arts and culture-driven strategies (Florida, 2002; Grodach, 2011; Stern & Seifert, 2010). These periods have been cumulative rather than evolutionary, however; once in place, early tools and strategies continue to be used. It appears difficult to 'wind down' the use of subsidies once they have been introduced (Jansa & Gray, 2017).

The Great Recession (2008–2009) provided a flashpoint for revisiting local development policy to explore potential impacts on how local governments approach development and the extent of resources allocated to that effort. The stresses of the Great Recession appear to have reinforced the path dependency of local development policy, pushing municipalities toward ever more intensive use of the same old set of incentives. Businesses come to expect particular incentives once they are offered by a number of cities or states, and the tool becomes locked in place as a standard part of development packages (Reese, 2006; Sands & Reese, 2012).

As manufacturing employment has decreased, local officials have become ever more focused on attracting higher order, often technology intensive employers. Research on cities that have managed to come back from economic distress has indicated that, while specific strategies have varied, investment in a technology-based economy and an 'environmentally friendly lifestyle' (read: a lifestyle for the upper and creative classes) has been common (Kodrzycki & Muñoz, 2015). For a particular group of cities, those world class ones in the top-tier, competition increases as they alone can afford the

types of 'deals' that rent-seeking firms' desire in their location processes (Markusen & Nesse, 2007). Although focused at the state level, some of the largest incentive deals in the US from 2006 to 2013 have gone to information technology firms and retailers that have substantial sales in e-tail such as Amazon and were provided by just "a few states subsidizing a few large firms" (Jansa & Gray, 2017, p. 56).

Examinations of local development policy trends post-Great Recession have come to similar conclusions: "A dramatic rise in the use of business incentives" (Warner & Zheng, 2013, p. 90) post-recession has led local officials to offer more and larger traditional incentives to attract new targets of employment, specifically the technology sector (Lowe, 2012). Analysis of the 2004 and 2009 International City/County Management Association surveys indicated that increasing numbers of local government respondents said that the technology sector was the primary focus of their economic development activities (Warner & Zheng, 2013). Direct government financial support of research and development appears particularly important in attracting multinational firms (Rodríguez-Pose & Wilkie, 2016) and the technology sector is increasingly the focus of local economic development (Warner & Zheng, 2013). Similar conclusions have been drawn about economic development policy at the state level where overall spending on subsidies to influence industry location decisions has increased as has the number of very large subsidy packages, although again, states vary in the size of their incentives packages if not their content (Jansa & Gray, 2017). In other words, the old dogs are being asked to perform the same tricks but for a different audience. But only a small group of cities can afford to have the largest dogs.

This is exacerbated by the fact that, along with the size of the incentive packages, the most sought-after businesses are increasingly those that provide high paying jobs for skilled workers. Research suggests that the largest firms and those most active in lobbying governments for incentives are likely to benefit the most from the increasing size of incentive packages (Jansa & Gray, 2017) although there is a chicken and egg quandary here: Are incentive packages larger because of the changing nature of the firms that cities are trying to attract or do larger firms have the resources to drive the incentive packages upwards? From an equity standpoint, multinational firms appear to favor cities with greater connectivity in terms of producer services, airport passenger traffic and international co-inventor activity when locating their headquarters (Belderbos, Du, & Goerzen, 2017), while high tech jobs are likely to locate in cities with a more advanced skills base (Berger & Frey, 2015). These are also the communities most likely to be able to afford expensive incentive packages, leading to a rich get richer dynamic.

There are a variety of reasons—both political and economic—why public subsidization of private firms has increased over time in both numbers of incentives and the magnitudes of the deals: the recession, the path dependent nature of economic development policy, competition between cities and states, the loss of large manufacturing entities forcing communities to compete for a smaller pool of higher tech jobs, capture of the policy-making process by business via both lobbying and campaign donations, and the tendency for local officials to view subsidizing business as being in the 'public interest' (Bartik, 2019; Jansa & Gray, 2017; Kwak, 2014; Posner, 2014; Sands & Reese, 2012). At the same time, and despite considerable research attesting to their effectiveness, there has been a shift away from economic development incentives that invest in the local community more broadly defined: education, job training, services, and small business start-up support (Filion, Reese, & Sands, 2019; Hill et al., 2012; Kodrzycki & Muñoz, 2015; Reese & Ye, 2011). Ten years after the end of the Great Recession and well into the global rise of high technology and Internet-dependent firms, has local economic development fundamentally changed?

3. Case Study Methodology

This article considers two examples of large economic development projects that made use of a variety of incentives to promote investment. The two case studies are based on a literature review and secondary analysis of publicly available documents, including government reports, corporate proposals, third party analyses and media reports. Details of the negotiations are not publicly available. As a result, we can be certain of outcomes but often not of the negotiations that led up to them.

In 2017, Amazon held an open competition to decide a location for its second headquarters (HQ2). The company announced its selection of Long Island City as one of two locations that would share the total investment and jobs, but then abandoned this location despite being offered a $3 billion incentive package. Sidewalk Labs (the city-building division of Alphabet, the parent company of Google) responded to a request for proposals to create an innovation neighborhood in Toronto, but after two and a half years of plan making and negotiations, dropped the project invoking economic uncertainty caused by the COVID-19 pandemic. These high-profile cases were selected based on several criteria. First, we believe they reflect a turn in economic development tendencies, focusing on high-status jobs and residents, firms at the top of the corporate hierarchy and the most appealing cities and sectors therein. Second, they represent cases that illustrate bargaining between the public and private sectors. Finally, the local government agencies in New York and Toronto are expected to be in a relatively strong bargaining position vis a vis the high-tech firms at hand.

3.1. Case Analysis: Amazon's HQ2

Amazon exhibits many of the salient characteristics of the modern technology driven firm. In a relatively short

period, it has risen from an on-line book retailer to become a diversified e-commerce conglomerate that is one of the most valuable companies in the world. The firm's profitability has been enhanced by some $2.4 billion in subsidies that it has received from state and local governments over the years (Weise, Fernandez, & Eligon, 2019). In initiating what has been described as a "Hunger Games-style civic competition" (Matsakis, 2018), Amazon's search for a location for a HQ2 epitomizes the superior bargaining power of Big Tech, as well as what can go wrong with economic development initiatives in the current post-manufacturing era.

The announcement by Amazon of an open competition to select the location for its HQ2 represents one of the single largest economic development opportunities in history. Amazon offered the winning city a $5 billion investment and the creation of up to 50,000 well-paid new jobs (Matsakis, 2018). Implicit in the announcement was the expectation that Amazon would be able to obtain larger incentives through inter-municipal competition. In addition, the proposal responses (more than 200 in total) provided Amazon with valuable intelligence on the communities that were not selected.

Amazon's request for proposals identified the criteria that would be important in their decision. The company sought a site in an urban area with a minimum population of one million that offered readily available sites, affordable housing, good public transportation, and a large pool of skilled workers. Amazon essentially asked communities what such a massive investment and job creation opportunity was worth to them, what sort of tribute they were willing to offer to secure the favor of the world's richest individual.

There are a number of reasons why local communities would consider Amazon to be worthy of receiving incentives. As initially proposed, the Amazon HQ2 would provide a substantial number of jobs. The jobs would be new to the selected community and to the local labor market in general; that is, they would not be transfers from a nearby existing location. The new jobs would be highly desirable because they would be well paid, an average salary of $150,000. These jobs are particularly attractive because they are 'new economy' jobs—digital, high-tech, information intensive—with good future prospects. Nor will they produce the negative externalities (such as air and water pollution) that a similar number of manufacturing jobs might. The Amazon HQ2 is perceived as being particularly footloose since it is not dependent on supply chains and distribution networks.

In November 2018, Amazon announced that it would split its HQ2 between New York City and Northern Virginia (Berube, 2018). Each location would see half of the total promised investment and half of the jobs. The New York site selected was Long Island City in Queens. The site is served by eight subway lines and the Long Island Railroad. Existing office space totals 2.5 million square feet, with 500,000 square feet available for phase one in the Court Square Building. In addition, Long Island City offered the potential for 7.6 million square feet of new construction, most on land controlled by the city and state (State of New York, 2017). Amazon's facilities would be integrated into the existing urban fabric, rather than being isolated on a separate campus; its space needs could be accommodated within a five-minute walk.

The Long Island City neighborhood, while somewhat neglected, could hardly be classified as distressed. Indeed, the demographic profile of the ZIP code area that includes the site closely matches that of New York City as a whole (Table 1). Census Bureau data indicate that the area's recent job growth rate was double the City-wide average.

The incentive package that the City and State of New York offered to Amazon was valued at $3 billion (Campbell, 2018). In return for creating 25,000 to 40,000 high paying jobs and occupying at least four million square feet of office space, Amazon's income taxes would be reduced by $2.1 billion and its property taxes by $386 million. An additional amount (up to $505 million) would be in the form of cash grants tied to job creation.

On February 14, 2019, Amazon announced that it was canceling plans for its HQ2 investment in New York City (McCartney & O'Connell, 2019). Amazon indicated that it was unwilling to proceed with the project in the face of grass roots and political opposition. Although there was a real risk that the project could be denied

Table 1. Socio-economic characteristics of the Long Island City area 2017 according to the American Community Survey (2017).

	New York City	Long Island City ZIP code 11101
Population 2017	8,426,746	25,880
Average household size	2.7	2.3
Adults with BA	36.7%	47.0%
Median household income	$60,819	$60,560
Poverty rate	20.6%	21.9%
Unemployment rate	4.2%	6.7%
Median home value	$836,226	$951,480

a necessary approval by the Public Authorities Control Board (Ritholz, 2019), for the most part, the proposal enjoyed the support of the City and State (de Blasio, 2019; Goodman, 2019). A mutually acceptable agreement had been reached between Amazon and New York City and State, the details of which have not however been made public. When confronted with community and some political opposition, the firm simply decided to walk away.

3.2. Case Study: Sidewalk Toronto's Quayside

Toronto, Ontario is the fastest growing major urban region in North America. For Toronto, the issue is not how to attract economic development but rather how the seemingly inevitable growth can be managed most successfully. Thus, the effort by Waterfront Toronto to find a partner for the redevelopment of the Eastern Waterfront area should provide an example of an economic development scenario in which the public sector retains the upper hand.

The restructuring of Toronto's economy in the later decades of the 20th century has created opportunities for the redevelopment of the city's manufacturing and port facilities to accommodate the rapid growth of financial, technology and professional services employment, as well as recreation and tourism. Waterfront Toronto, a public body created by the Municipal, Provincial and Federal governments, was charged with overseeing the transformation of Toronto's lakeshore through infrastructure (including investments in flood control, wastewater management and transportation projects), open space development and participation in the creation of new employment and residential centers. Since its creation in 1999, Waterfront Toronto has been responsible for 2.5 million square feet of construction, 2,600 housing units and 90 acres of parks and public open space (Waterfront Toronto, 2017).

The Quayside site is located south of Lake Shore Boulevard East, about two kilometers east of Union Station (at the center of Downtown Toronto). To the south and east of the Quayside parcel, the area consists primarily of vacant industrial and commercial properties, most of which are in public ownership. North of the site, but separated from it by the elevated Gardiner Expressway, is a residential area of mid-rise residential units. The demographic profile of the residential areas is similar to the city-wide statistics (Table 2).

In 2017, Waterfront Toronto issued a Request for Proposals for the redevelopment of Quayside, a 12-acre parcel on Toronto's eastern waterfront into a "globally significant demonstration project" (Waterfront Toronto, 2017, p. 9). Waterfront Toronto wanted more than just a builder: It sought "an innovation and financial partner" (Waterfront Toronto, 2017, p. 6). The Request for Proposals acknowledged that the agency lacked the in-house expertise and financial capacity to accomplish all its objectives. It was also expected that this initial mixed-use neighborhood could set the stage for the remaining 700 acres of eastern waterfront.

The winning proposal was submitted by Sidewalk Labs, a Google affiliated company headquartered in New York City. Sidewalk's 200-page proposal (Sidewalk Toronto, 2018) called for the creation of a neighborhood that embraced technologies ('built from the Internet up') that would realize maximum benefits and efficiencies through constant monitoring of activities. Not only would modular buildings allow for their adaptation to changing circumstances over time, but quotidian adjustments could also be made to increase comfort and energy efficiency. The traffic patterns on streets could be adjusted in response to fluctuations in volume, direction and mode. The public realm was seen as a critical component of Quayside; for example, to encourage increased activity in the public spaces, the proposal called for inducing climate protection devices that would substantially increase the time when people would be comfortable outdoors.

Several aspects of the proposed Quayside neighborhood would set it apart from other developments. The high density, mixed-use characteristics of Quayside would make it vibrant and attractive. The buildings, some up to 30 stories tall, would be wood framed. Private vehicles would be discouraged in favor of walking, bicycling, public transit, and ride sharing services. This shift away from private vehicles would be fostered by an attractive public realm, priority pedestrian areas and bike lanes and climate adaptations. Quayside would also incorporate technological advances that, although not readily visible,

Table 2. Socio-economic characteristics of the Quayside area 2016 according to Statistics Canada (2016).

	City of Toronto	Quayside Neighborhood CT 5350017.00
Population 2016	2,731,571	7,906
Average household size	2.4	1.7
Adults with BA	36.4%	49.8%
Median household income	$65,829	$63,104
Low income rate	20.2%	21.2%
Unemployment rate	8.2%	6.8%
Median home value	$601,922	$421,515

would be instrumental in achieving Waterfront Toronto's objectives with respect to realizing a climate positive development. An extensive digital network to collect, analyze and adjust these systems would be provided. Because of the experimental nature of the new technologies, one commentator described Quayside residents, workers, and visitors as "guinea pigs" (Sauter, 2018).

Sidewalk released a 1,500-page Master Innovation and Development Plan in June (Sidewalk Toronto, 2019). As proposed, Quayside would include some 2.65 million square feet of built space that would accommodate 3,952 workers and 2,670 residential units, along with retail, social infrastructure, and public spaces. The Master Innovation and Development Plan also outlined a plan for development of a second parcel, the nearby Villiers West neighborhood, proposed as the site of an innovation center that would include Google's Canadian headquarters and a new Urban Innovation Institute. Ultimately, Villiers West would include space for 7,680 jobs and 1,720 residences. Sidewalk Toronto would be the developer for these two neighborhoods (Sidewalk Toronto, 2019, Vol. 3, p. 87). The two areas would see a decrease in the total square footage built of about 7% from the initial Sidewalk proposal. Commercial development, however, would be increased by more than a million square feet, an increase of 150%.

In addition to the Villiers West development, Sidewalk's Master Innovation and Development Plan outlined its vision for the redevelopment of an additional 155 acres to be known as the Innovative Design and Economic Acceleration District. The District would be a major initiative, accelerating job growth and investment. When fully developed, it would include almost 44,000 jobs and 30,470 dwelling units. Sidewalk Toronto would be the lead developer for the Advanced Systems that would extend throughout the Innovative Design and Economic Acceleration District—the power grid, thermal grid, waste management, stormwater management, freight management, dynamic streets, parking management, digital access and mobility systems (Sidewalk Toronto, 2019).

Sidewalk Labs argued that the inclusion of the entire Innovative Design and Economic Acceleration District was crucial to the success of the development of the first two neighborhoods. Many of the proposed innovative Advanced Systems are not economically viable at the scale of one or even two neighborhoods, but without them the Quayside proposal would not be as innovative and leading edge as either Sidewalk or Waterfront Toronto desires. Two among the Sidewalk justifications to proceed at the scale of the entire Eastern Waterfront, were the economies of scale required to support the development of a mass-timber production system, and the need to reap value added at this large scale to finance a Light Rail Transit (LRT), connecting the sector to Downtown Toronto. Consequently, Sidewalk was prepared to invest heavily in the development of the Innovative Design and Economic Acceleration District. While Waterfront Toronto's Request for Proposals described Quayside as a pilot that could provide a model for the redevelopment of the entire Eastern Waterfront, the Sidewalk Labs' Master Innovation and Development Plan makes their participation in the subsequent development of the 155-acre Innovative Design and Economic Acceleration District essential. Sidewalk also requested 15 different regulatory adjustments and reforms, including pre-approval of flexible development regulations and innovative technology applications (Sidewalk Toronto, 2019, Vol. 3, pp. 224–226).

The Master Innovation and Development Plan proposed a financial partnership between Sidewalk and the public sector, primarily Waterfront Toronto and the City of Toronto (Sidewalk Toronto, 2019, Vol. 3). Sidewalk would invest $825 million in the Innovative Design and Economic Acceleration district, plus $400 million for optional credit support and $80 million for an offsite tall timber factory (Sidewalk Toronto, 2019, Vol. 3, pp. 154–155). In return, Sidewalk Toronto would receive revenue from a variety of sources (Sidewalk Toronto, 2019, Vol. 3, pp. 174–179). For example, it would be exempted from certain development charges and fees. The company would also share in the increased land values and receive fees based on the costs of municipal infrastructure and advanced systems. Sidewalk Toronto would also earn fees for advisory services and for reaching performance targets. The amounts of these fees will be negotiated in the Implementation Agreement. If Sidewalk Toronto advanced funds for infrastructure construction, they would be repaid at market interest rates. Note as well that Sidewalk Labs stood to benefit financially from the devices it would invent for the Toronto waterfront development, as well as from the reputation of this project and the worldwide commissions that would ensue. Finally, Sidewalk Toronto sought performance fees to recoup some of the tax revenues generated by the developments it will catalyze.

The Sidewalk Labs proposal encountered a good deal of public opposition, considerably more than Amazon did in Long Island City. Some of the issues, such as concerns about guarantees of privacy (Kirkwood, 2019) and the requested waiver of public development regulations (Sauter, 2018; Sidewalk Toronto, 2018) are specific to Quayside. There was also a feeling among civic organizations and a newly elected provincial administration that the Master Innovation and Development Plan did not respect the original terms of the Waterfront Toronto Request for Proposals and as such constituted a 'land grab' (Benzie & Rider, 2019). Other issues, such as complaints about inadequate public consultation and insufficient affordable housing opportunities (Bliss, 2019), are more general.

After several months of negotiation, Sidewalk Labs and Waterfront Toronto reached a tentative agreement on a list of critical threshold issues. The development was scaled back to the original 12-acre parcel, deferring decisions on the rest of the eastern waterfront until a later

date. Sidewalk Labs, in partnership with a development company, would be responsible for the vertical development, while Waterfront Toronto would install the basic public infrastructure. Additional commitments of public resources would be negotiated separately. Many of the proposed innovations, such as district heating, waiver of development regulations and the creation of a data trust, were eliminated. In February 2020, Waterfront Toronto launched a consultation process on the revised proposals of Sidewalk, with the aim of arriving at a final decision on the development on 31 May 2020.

Even though the company had spent two and a half years and over 50 million dollars planning and promoting their proposal, on 7 May 2020, Sidewalk Labs announced that they were ending their involvement on the Toronto waterfront, citing the uncertainties resulting from the COVID-19 pandemic (Doctoroff, 2020; Passifiume, 2020). Different interpretations were advanced to make sense of the Sidewalk decision. There was, of course, a possible downward COVID-induced Toronto real estate trajectory. But the decision was taken at a time when it was still too early to fathom the long-term economic consequences of the pandemic (O'Kane, 2020). Another possible explanation was that Sidewalk never felt comfortable with the idea of limiting its Toronto waterfront presence to the 12-acre Quayside site. Finally, the view was advanced that Sidewalk was frustrated by the political dynamics of Toronto, involving the participation of local politicians and community groups in debates about the Toronto waterfront (Lorinc, 2020).

4. Findings

The review of these two economic development megadeals suggests that, despite important differences, they share important attributes. Both Amazon's New York HQ2 and Quayside were proposed for large and prosperous cities. Both projects were located on the fringe of their respective core business areas. Although both developments are large scale, they would represent only a small part of the total growth in their respective areas.

Table 3 provides a summary of the key attributes of each of the projects. The types of incentives offered to the developers highlight the cumulative or path dependent nature of local economic development policies. Because Amazon withdrew from its development in Long Island City, less can be said about what the balance between the public sector's actual financial contribution and its returns might have been. Amazon asked each community to indicate what incentives they would be willing to give. New York City and State initially offered $3 billion in incentives to secure a $5 billion investment. Presumably, because Amazon would be splitting its investment and job creation between two locations, the value of the incentives would also decrease.

Bringing employment opportunities to the project location was an important component of both proposals. For Amazon, the development was all about jobs, well-paying, technical jobs. Access to a high-tech workforce appears to have been most decisive site selection criterion for Amazon. The New York and Washington metropolitan areas have the largest number of high tech (computer and mathematical occupations) workers in the country (Berube, 2018). The ready availability of existing sites and connectivity also seem to have been important factors.

The value of incentives, however, including grants, tax abatements and infrastructure investments, does not appear to have been a decisive factor in Amazon's decision. Locations close to the ones selected (Newark and Montgomery County) offered much larger incentive packages. As is often the case with economic development incentives (Sands & Reese, 2012), the incentives were frosting on the cake. Sidewalk Labs sought less in terms of traditional incentives but rather asked for expedited development approvals and participation in project revenues that would normally accrue to the government entities. Rather than asking for large payments from lo-

Table 3. Summary comparison of projects.

	Incentives sought	Nature of development	Who would benefit	Who would lose
Amazon	Land Grants Tax abatements Infrastructure investment	Office headquarters Highly paid jobs	Amazon Skilled, high tech workers	Lower income residents Foregone city revenue Reduced public capacity for services
Sidewalk	Land Revenue Capture Regulatory flexibility Development fee exemptions LRT	Office headquarters High density Mixed use neighborhood Technology test site Smart infrastructure Public spaces	Sidewalk Toronto Luxury residential market High tech workers	Lower income residents Foregone city revenue Reduced public capacity for services

cal governments, Sidewalk Labs offered to advance funds for the construction of the LRT connecting Quayside to Union Station.

The developers of these two projects also differed with respect to how they dealt with community reactions. Amazon's New York HQ2 encountered community opposition which Amazon cited as a reason for abandoning this location (Goodman, 2019). Amazon's approach to dealing with local governments in other locations strongly suggests that they were unlikely to make additional concessions to the community (Weise et al., 2019). The public opposition to the Sidewalk proposal was also substantial, but they continued to negotiate with Waterfront Toronto, eventually conceding a number of significant components of the proposals contained in their Master Innovation and Development Plan (Kirkwood, 2019; Zarum, 2019).

The projects discussed here involve high density developments serving largely high-end clienteles. As a result, the primary beneficiaries of both projects are skilled, educated, and better off residents, and of course, the bottom lines of the high-tech firms involved. Existing businesses, commercial and residential real estate interests are likely losers, as are middle and lower income residents who cannot afford the new housing or do not have the skills to benefit from the high tech jobs, and the general public that receives services from local governments with reduced revenues as a result of tax and fee diversion and the expenditures necessary to support the incentives. There is little evidence that the emphasis on high tech firms and clearer focus on higher income residents represents a new economic development paradigm. In our view, Big Tech has intensified the economic development incentive process, but has not fundamentally changed it.

5. Conclusion

We now return to the questions raised at the beginning of this article: First, does the focus on high tech firms represent a new local economic development paradigm, one that introduces new policy instruments to attract high end jobs? Communities continue to offer standard packages of incentives and abatements. Attempts to justify public investments in economic development are infrequent and often limited. For example, property tax abatements may be rationalized by projections of future income tax revenue, with little concern for indirect costs such as increased congestion and declining housing affordability. Amazon's original HQ2 proposal could be easily justified by the income tax revenue derived from an annual payroll of $750 million. The Sidewalk Labs proposal did incorporate some innovative approaches to the structuring of public private partnerships, but these were not acceptable to Waterfront Toronto.

One aspect of local economic development that may be changing with the emerging emphasis on high tech and new economy investments is the shift from economic development focused on distressed and declining areas to the already prosperous areas where the Big Tech firms want to be anyway. It is not surprising that these examples are drawn from cities that are generally regarded as global and prosperous. While New York City and Toronto experience significant problems of high housing costs, congestion and strained public services, there is little indication that these issues have made them unattractive to private developers. If the thriving markets in these cities require billions of dollars of incentives to attract investments, what does this say about cities like Detroit, Cleveland, or Winnipeg? How much subsidy would be required to make these weak market cities attractive to large scale investments?

Second, will Big Tech shift the balance of power between the public and private sectors, as well as among the communities seeking to attract new economy firms, those that are high tech and information intensive? The decision to abandon each of these projects was made by the developer, rather than by the government. Indeed, local government officials expressed regret over the cancellation (de Blasio, 2019; "Sidewalk Labs has walked away," 2020). But these cases may not be indicative of a permanent or wide-spread paradigm shift. Amazon had invested little in the New York site and clearly had plenty of other available options. The decision to concentrate on the Northern Virginia location returned Amazon to their original HQ2 plan. While Sidewalk Labs invested heavily in the Quayside proposal, their objectives were much grander than Amazon's. Sidewalk Labs sought development control to well over a square mile of well-located land in a prosperous community, participating in what are traditionally municipal revenue streams, access to detailed behavioral data and creating a test bed for technological innovations (that could be marketed to other cities). Such a proposal would likely be attractive to a community that was truly desperate, the sort of community unlikely to attract the interest of Big Tech.

Big Tech firms, such as Alphabet, are perhaps uniquely qualified to pursue these types of economic development strategies. Google has large cash resources that are readily available to be invested in projects such as the LRT. Obviously, it is easy for Sidewalk to obtain a commitment for the relocation of Google's offices to the District. Alphabet Companies are involved with development of autonomous vehicles and other technology applications that could be deployed in Quayside.

Third, how does this 'reaching for the top' in terms of firms and job categories and the economic status of residents differ from the previous economic development attempts to attract middle-class manufacturing jobs? It seems likely that the Big Tech firms will increasingly play a major role, seeking mega-deals that will support potentially transformative projects. Here we would include not only companies like Google and Amazon, but also advanced manufacturing firms which incorporate significant amounts of technology in their products, including motor vehicle and aerospace companies, computer

chip manufacturers, battery and solar power companies. These firms will likely continue to expand, requiring large capital investments for which public subsidies and incentives will be sought. But not all communities can compete effectively in this arena. Cities and neighborhoods within them that are already attractive and prosperous will garner the lion's share of these new economic prizes.

An important consequence of these trends will be widening inequalities. Prosperous communities will attract the lion's share of investment and new jobs, both because they can offer richer incentive packages and because they are the locations the tech elite prefer. Struggling communities will fall further behind with some, out of desperation, continuing to offer incentive packages that they can ill afford. Big Tech firms will enjoy lower taxes with other taxpayers bearing the subsidy burden through higher taxes and reduced service levels.

Social equity objectives occupied a more important place among prior economic development policies than they do within the present emanation of such policies. They indeed attempted to attract investments to deprived areas and to create middle-class jobs, generally in the manufacturing sector. The middle-class nature of these jobs was in itself the main economic and social achievement of this form of economic development (LeRoy, 2005). The types of policies described here contrast with this earlier model of economic development. They are directed at the most economically appealing cities and urban sectors therein and create jobs for highly paid people and residential areas mostly dedicated to the rich, raising doubts about the distributive effects of these policies. Most open to criticism is the allocation of different forms of public sector support to the most profitable firms and to the highly paid employment and high-income residents attracted to these developments. If an argument can be made for the filtering down through the economy of the wealth generated by these developments, it is important to point out that most of the employment created by their multiplier effects is in low-wage service jobs. Furthermore, in the inflated housing markets of prosperous global cities, the arrival of such developments can cause a crowding out of medium—and low-income residents, thus exacerbating the consequences of income polarization. In short, the 'new' economic development paradigm fostered by the drive for high tech firms appears to lead to bigger deals with public support but without public input, using the same old incentives, by wealthy cities, to wealthy firms, for the benefit of wealthy residents.

Conflict of Interests

The authors declare no conflict of interests.

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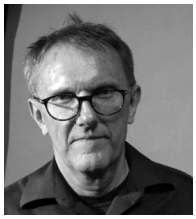

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Article

Amazon's HQ2 Site Selection Criteria: The New 'Gold Standard' in FDI Decision-Making

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Abstract
In 2017–2018, Seattle-based Tech behemoth Amazon executed a highly publicised location-finding process for a $5 billion investment project, dubbed 'HQ2'. Owing to the combination of high investment volume and the company's unique public exposure, the HQ2 process is on course to becoming a basic yardstick for future foreign direct investment (FDI) projects all over the world. This article compiles the company's previously unpublished site selection criteria and develops an evidence-based system of investment decision arguments which is employed to test the currently dominant approaches in location decision theory—behavioural, neoclassical, and institutional. Our results identify gaps vis-à-vis this emerging 'Gold Standard' and we propose the addition of a fourth, project-oriented approach to theory to fill the detected shortcomings. Furthermore, this system equips policymakers with a tool to evaluate their investment attraction strategies based on the decision criteria extracted from the HQ2 process.

Keywords
Amazon; economic policy; foreign direct investment; HQ2; impact assessment; local economic development; location decision; policy; urban development

Issue
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1. Introduction

In a market-based economy, local economic development depends on the potential to attract business investments from within or abroad. Location theory offers a way to describe and formalize this potential by proposing a set of criteria, or 'location factors': They are where place-based policies meet investors' interests, where location theory meets business practice. This article will focus on those criteria.

We base our analysis on one of the global technology sector's largest and best-documented investment projects of the late 2010s, US e-commerce giant Amazon's quest for a location for its second headquarters (henceforth referred to as HQ2). Following Liu and Muro (2017), we interpret this project as a signal of what investors consider state-of-the-art in urban economic development. Cities and regions that want to attract business investments from the tech-sector will have to deal with similar requests from potential investors.

Trying to add value to both research in location theory and local economic development practice, our central research questions aim to extract and analyse this project's decision criteria: What were the decision criteria applied in the location-finding process of Amazon's HQ2? How do they align with recent scholarly discussion? And what can policymaking learn from it?

By answering these questions, we detect and address existing gaps in the literature on location decision theory and offer a tool to identify gaps in individual regions' policy setup. First, we provide a literature review of location decision theory. Then we present the project 'Amazon HQ2,' including a critical discussion. Next, we discuss in detail the criteria applied throughout the pro-

cess. We develop a simple quantitative model that allows us to relate this process with location decision theory on a question-by-question basis. We use the results to comment on current literature and propose a conceptual extension to fill the gaps detected. Policymakers are equipped with a tool to evaluate their investment attraction strategies based on the dataset we extracted.

2. Literature Review

Discussion around the optimal location of business activities has a long history: Von Thünen (1826) delivered a seminal work arguing for the importance of factor distance to the definition of rent levels. Marshall (1890) pioneered the concept of industrial districts, a cornerstone of regional economics. The first to explicitly introduce and cluster location factors into theory was Weber (1909). Focused on the potential of minimising costs, he established the cost of transport, the cost of labour and (positive) costs of economic agglomeration as driving forces behind economic specialisation. Christaller (1933) built on this approach, deriving a concept for spatial hierarchy of locations and economic activities. The relationship between different locations was formalised by Lösch (1944). Starting in the 1960s, several researchers tried to consolidate location theory, including Böventer (1962) and Alonso (1964). However, no single dominant paradigm has evolved over the last decades (Pellenbarg, van Wissen, & van Dijk, 2002).

Hayter (1997) clustered competing strands of location theories into three approaches: behavioural, neoclassical, and institutional. The neoclassical approach is based on explicit strategies to reduce costs and maximize profits. In integrating categories such as transport costs, labour costs, or external economies, the neoclassical approach is heavily indebted to Weber (1909). Aiming to understand and define the 'optimal' behaviour of agents in economic terms, it is based on concepts of rationality and perfect information. The behavioural approach is situation-sensitive and embraces possibility. It does not depart from the concept of perfect information, but its agents usually have to tackle a situation defined by lack of information or asymmetrical information. In this perspective, factors of location are not uniform and differ between locations (Arauzo & Manjón, 2004). However, decisions are based on non-economic factors. This approach gives special importance to the person in charge of the (location) decision—usually the entrepreneur (Ferreira, Fernandes, Raposo, Thurik, & Faria, 2016, p. 988). The neoclassical and the behavioural approach have one view in common: Companies choose actively from a number of alternatives in an environment that is basically static—a surface of location factors, or a 'bed of information' that is processed by the firm (Hayter, 1997). From the 1980s onward, this rather mechanical view of locational behaviour was increasingly being questioned. A variety of strands in research converged on the common belief that economic processes in space are predominantly shaped by society's cultural institutions and value systems. They accentuated the social and cultural context—institutions—in which behaviour is embedded over objective decision-making (Ferreira et al., 2016, p. 988).

Storper and Scott's (2009) work on the causes of urban growth argues for the importance of locally agglomerated systems of production and work. Glaeser (2005) recommends that policymakers focus on education investment, low tax rates, crime reduction, and new housing development. Clark, Lloyd, Wong, and Jain (2002) stress the importance of facilities that provide distraction and amusement, while Florida (2004) advocates building "diverse, tolerant communities." Schmenner (1982) derives corporate location decisions from microdata. Bartik (2019) analyses the competition between local and regional governments in the USA with regard to incentives and offers propositions for policymakers on how to deal with this situation. Important works based on Hayter's clustering include Arauzo-Carod, Liviano-Solis, and Manjón-Antolín (2010), Brouwer, Mariotti, and van Ommeren (2004) or Ferreira et al. (2016). Our analysis follows Ferreira et al. (2016), who attribute 29 location factors to Hayter's three approaches (Table 1).

3. Amazon's Quest: A Project Set to Become the 'Gold Standard' in Investment Location Decision

3.1. From Zero to Hero

Much has been written about a company that has become a household name around the world: Amazon.com, Inc. The venture that started in Seattle in the middle of the 1990s as an online bookstore, diversified over two decades into e-commerce, cloud computing, digital streaming, and artificial intelligence (Noe & Weber, 2019). By the late 2010s, little more than 20 years after its website was launched on July 16, 1995, Amazon was one of the biggest companies worldwide (Figure 1). Total revenues in 2017 were reported as $178 billion and a gross profit of $65,9 billion; its employment rolls have expanded from 33,700 in 2010 to 566,000 in 2017, and all these indicators were predicted to approximately double by 2020 (Macrotrends, 2020). Against this backdrop, in September 2017 the company launched the project that would establish HQ2.

3.2. Request for Proposals

On September 7, 2017, Amazon published an eight-page request for proposals (RFP; Amazon, 2017). It invited cities and states in North America to come up with proposals for a suitable site to host a major investment project:

> The Project is a second corporate headquarters (HQ2), at which Amazon will hire as many as fifty thousand (50,000) new full-time employees with an average annual total compensation exceeding one hundred thou-

Table 1. Approaches to company location.

Behaviour (B)	Neoclassical (N)	Institutional (I)
B1. The founder, managers and employees want to live in this location	N10. Distance between the company and urban centres	I22. Company incubator
B2. Proximity to the founder's residence	N11. Distance to markets and the cluster scale	I23. Access to knowledge generated by universities or research centres
B3. Climate	N12. Road infrastructures	I24. Location close to administrative centres
B4. Good housing standards	N13. Geographic specialisation	I25. Access to science parks
B5. Local community attitude to business	N14. Human resource skills and qualifications	I26. R&D incentives, employment creation or other incentives
B6. Recreational and leisure activities	N15. Industrial real estate costs	I27. Proximity to teaching institutions
B7. The founder was born in the community	N16. Costs of labour	I28. Technological fairs
B8. Good means of access	N17. Population density	I29. Renowned business leaders in the region
B9. Entrepreneur financial capacity	N18. Level of local economic activity in the company location	
	N19. Other physical infrastructures (railroads, airports, telecommunications, etc.)	
	N20. Proximity to raw materials	
	N21. Proximity to services	

Source: Ferreira et al. (2016, p. 989).

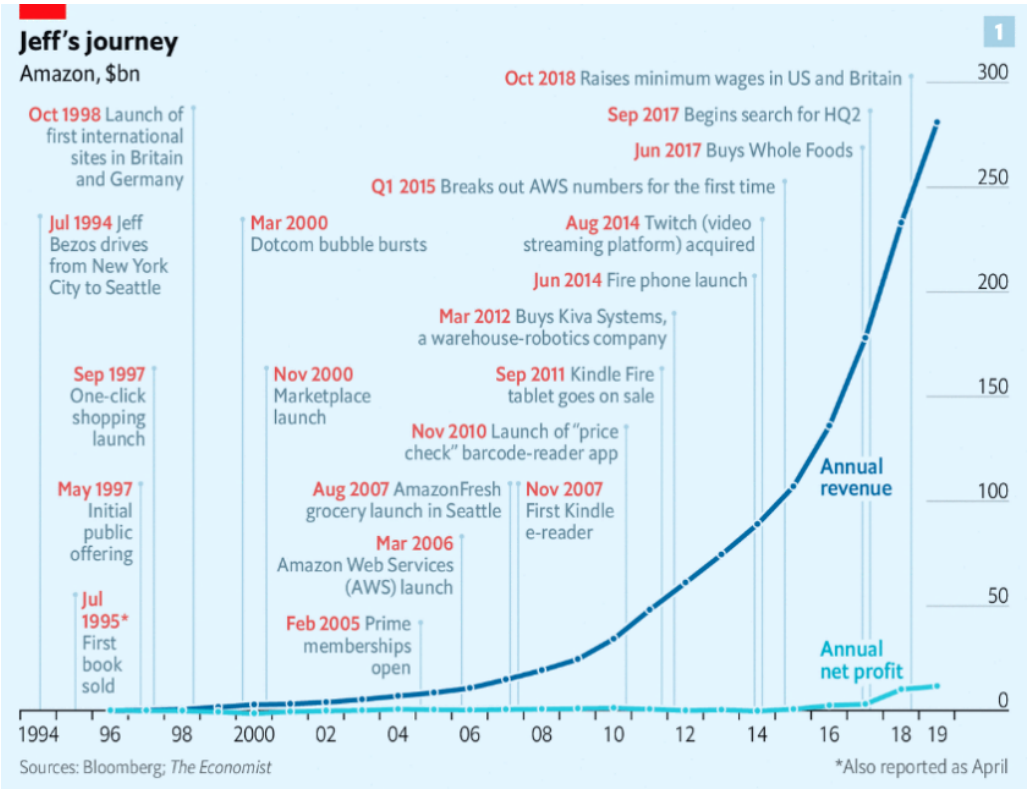

Figure 1. Timeline of Amazon's corporate development 1994/1995–2019. Source: "Can Amazon keep growing like a youthful startup?" (2020, p. 15).

> sand dollars ($100,000) over the next ten to fifteen years, following commencement of operations. The Project is expected to have over $5 billion in capital expenditures. (Amazon, 2017, p. 2)

After providing more technical and financial details on the project, the RFP finished with the following appeal to US cities:

> As this is a competitive Project, Amazon welcomes the opportunity to engage with you in the creation of an incentive package, real estate opportunities, and cost structure to encourage the company's location of the Project in your state/province. (Amazon, 2017, p. 7)

So the game was on. Complying with the tight six-week-deadline set for October 19, 2017, the request resulted in responses from 238 locations. Most proposals were of the type "glossy marketing pitches, with slick graphics and broad proposals for why Amazon should come to their regions" (Weise, 2018a). A dedicated open-source project collects and presents these proposals, accessible for those who are interested to dig deeper into the enormous efforts that competing governments poured into replying to this short invitation (reflect.io, 2020). Figure 2 shows three renderings of the proposed sites. New York's proposal for a Long Island site would gain special notoriety later in the process.

3.3. A Shortlist of 20 Cities

On January 8, 2018, Amazon sent out a press release (shown in Figure 3) communicating a shortlist of the 20 cities it intended to continue the selection process with:

> Amazon evaluated each of the proposals based on the criteria outlined in the RFP to create the list of 20 HQ2 candidates that will continue in the selection process. In the coming months, Amazon will work with each of the candidate locations to dive deeper into their proposals, request additional information, and evaluate the feasibility of a future partnership that can accommodate the company's hiring plans as well as benefit its employees and the local community. Amazon expects to make a decision in 2018. (Amazon, 2018a)

The shortlist reveals two broad clusters of places: larger, more expensive coastal tech hubs and smaller, more affordable regional business centres in the middle of the country (Parilla, 2018a). What exactly led the company to select these 20 cities is not known, thus en-

Figure 2. Examples of renderings of proposed sites. From left to right: Toronto (Toronto Global, 2017, p. 11), New York (New York Metro Area, 2018, p. 72), Boston (City of Boston, 2017, pp. 63–64).

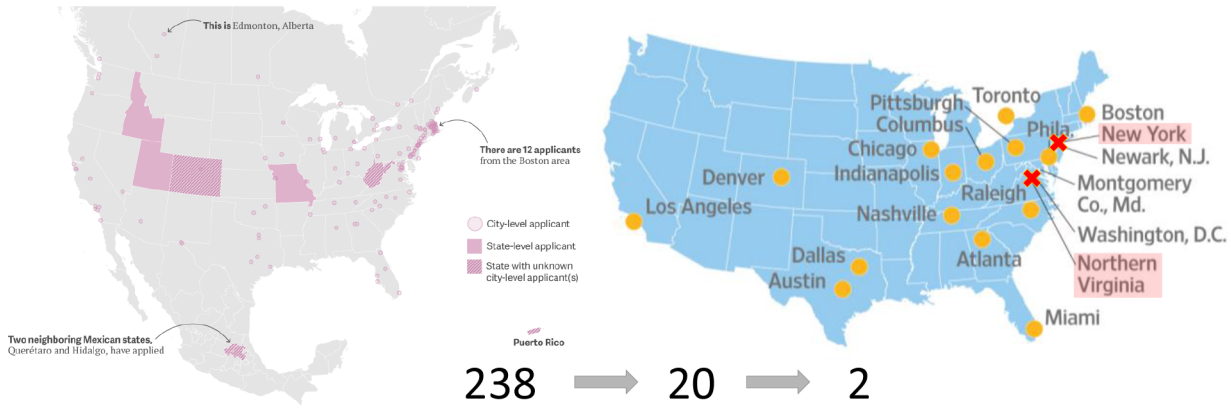

Figure 3. From left to right: Map of the 238 places that bid in the first round for Amazon's next headquarters and Amazon's selection of 20 places for further negotiations with New York and Arlington, Virginia highlighted. Source: Authors' own processing based on Griswold (2017) and Stevens (2018).

gendering speculation. No regulation obliged the company to make its reasons for any decision transparent to the public.

3.4. Request for Information

After announcing the shortlist in January 2018, Amazon presented the 20 candidate cities with a 29-page Request for Information (RFI) that was kept confidential by all sides. Answering it "required far more precision and was more about practicalities than flash. It asked cities to respond by early March with a huge text document punctuated only with a few maps" (Weise, 2018b). The details of most proposals were therefore kept secret—as was any information about the various incentives that were offered to Amazon. Probably by accident, New York's 253-page response to the RFI, code-named *Project Clancy*, was made public. Although the city administration was quick to delete the document, it is still available online (City of New York, 2018). We reconstructed the original 29-page RFI from this proposal. It is available online as supplementary material to this article and constitutes, together with the original RFP, the basis of our analysis of Amazon's location decision criteria.

3.5. Deciding on Two Cities

In November 2018, after concluding negotiations with the 20 cities on its shortlist, Amazon announced it would open not one, but two new headquarters:

> Amazon (NASDAQ: AMZN) today announced that it has selected New York City and Arlington, Virginia, as the locations for the company's new headquarters. Amazon will invest $5 billion and create more than 50,000 jobs across the two new headquarters locations, with more than 25,000 employees each in New York City and Arlington. The new locations will join Seattle as the company's three headquarters in North America. (Amazon, 2018b)

3.6. Leaving New York

An intense debate took off when the agreement between New York and Amazon was made public. After three months of public discussions focussing on the use of public subsidies, gentrification, and the rising cost of living, Amazon cancelled its plans for HQ2 in New York. This decision was interpreted as a blow to the efforts of diversifying the city's economy by making it an inviting location for the technology industry (Goodman, 2019). However, Amazon did not completely turn away from the city: In December 2019, less than a year after cancelling its HQ2 investment there, the company announced the opening of a new, 1,500-employee office in Manhattan (Eugene, 2019).

The proposed investment in Arlington, Virginia went ahead as planned: Arlington County unanimously approved Amazon's proposal for the construction of two HQ2 towers in December 2019. Construction subsequently started in early 2020 and is expected to be completed in 2023 (Graf & Salazar, 2019).

3.7. Critical Discussion of the HQ2 Process

Much scholarly attention has been attributed to the shifting power balance between location and investor: Brenner and Theodore (2002) put an early focus on the interplay between regulation and market-oriented projects from a spatio-political perspective. Carr and Hesse (2020) analyse urban governance in the context of the 'smart-city' concept. Ioannou, Nicolaou, Serraos, and Spiliopoulou (2019) highlight the interconnectedness of large urban developments, foreign direct investment, and a shifting power balance in urban development.

Othengrafen and Levin-Keitel (2019, p. 120) cluster the different roles of planners, and Cleave, Arku, and Chatwin (2019) analyse the work of private sector consultants in place-based economic development strategies: City representatives take on reactive or moderating roles. When those actors are confronted with a 'taskable' inquiry of the type Amazon presented, they tend to show a tendency to comply which results in public institutions ceding the driving seat in urban planning to private companies.

Throughout the whole process of HQ2, Amazon submitted its counterparts to extremely tight deadlines (Figure 4). Parilla (2018b) interprets the six-week deadline as a stress test for local communities that would:

> Test which places could activate their institutional networks to respond with speed and comprehensiveness.…The quick turnaround has limited the time and space for public reflection and vetting of the bid. Public transparency has been severely lacking in the process, and the 20 shortlisted cities have all signed non-disclosure agreements.

This view corresponds with Cleave et al.'s (2019) analysis of how city representatives react to 'taskable' inquiries. Others such as Florida (2018) and Gupta (2019) interpret HQ2 primarily as an exercise in setting up a comprehensive database on investment opportunities and frameworks in American cities.

Public subsidies represent another specific arena for the power play between cities and private companies. Depending on the estimate, annual expenditure from US local and state governments on incentives ranges between $45 and $80 billion, depending on the estimate (Parilla, 2018b). The Website Citylab published a report on what cities actually offered Amazon, with incentive packages from local and state governments in Maryland and New Jersey reaching up to $7 billion (Holder, 2018). This sum is even more impressive when compared to the 'merely' $5 billion that the company was offering to invest over 15 to 17 years. Bartik (2019) advises policymak-

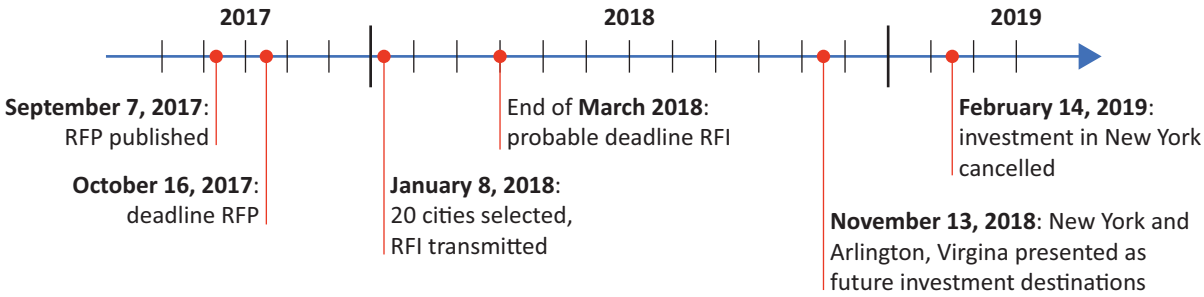

Figure 4. Timeline of the HQ2 decision process.

ers on how to deal with competition among local and regional governments when offering incentives.

4. Decision Criteria Laid Out by Amazon

In this section, we briefly present documents and decision criteria that potential investment locations were confronted with by Amazon in the course of the HQ2 process. Our hypothesis is that these criteria will, due to Amazon's global status as an example to follow, become standard among investment projects over the coming years. This view is supported by a blog post for the Harvard Business Review by Amy Liu and Mark Muro from Brookings Institution:

> Amazon's selection criteria, as described in the company's request for proposal, sets out a compelling list of the attributes cities must have if they aspire to be a serious part of the America's growing digital economy.…Amazon is also signalling very clearly and publicly what the market demands for modern, state-of-the-urban economic development going forward. (Liu & Muro, 2017)

4.1. Methodology

We will base our analysis on two documents prepared by Amazon in the course of the HQ2 location decision: the widely shared RFP (Amazon, 2017) and the confidential RFI (see supplementary material). The RFP is a relatively short document of eight pages that still exhibits a strong focus on the description of the planned project. We reconstructed the originally 29-page long RFI from a confidential document titled *Project Clancy* (City of New York, 2018).

We use a mixed-method qualitative content analysis approach proposed by Mayring (2014) for the analysis of the two documents. This method is based on the assignment of categories to the text as a qualitative step, working through many text passages and the analysis of frequencies of categories as a quantitative step (Mayring, 2014, p. 10). For the execution of these tasks, we referred to QCAmap developed by Letz (2020), an open-access web application for systematic text analysis in scientific projects based on the techniques of qualitative content analysis. Fenzl and Mayring (2017) present the application in detail. Using QCAmap, we extracted a numbered total of 794 items from the two documents. Items that are of topic-setting quality (e.g., #219: Describe the largest social challenges your community is facing) are defined as 'question,' while items that refer to content that depends on those questions are defined as 'sub-question' (e.g., #220: Describe success measures for current and proposed programs). The complete dataset is available online as supplementary material to this publication. Table 2 provides an overview of the two documents.

4.2. Request for Proposals

This is the principal document published on September 7, 2017 (Amazon, 2017). Over eight pages it describes the

Table 2. Quantitative dimensions of documents RFP and RFI.

Document/Section	Items Extracted			Page Count	
	Total #	# Questions	# Sub-Questions	Original document	RFP/RFI/section of RFI
RFI total	607	236	371	29	253
1 Talent	139	65	74	n.n.	74
2 Growth	102	46	56	n.n.	36
3 Real Estate	255	103	152	n.n.	105
4 Taxes and Tax Policy	43	11	32	n.n.	14
5 Incentives	68	11	57	n.n.	24
RFP total	187	91	96	8	29
Total RFP+RFI	794	327	467	37	n.n.

company and provides basic details on its HQ2 project. A special focus is dedicated to the requirements for the future site, to specific characteristics of the metropolitan area where it shall be located, as well as the specific conditions of the labour market for tech workers. Questions and comments are mostly general in nature (#723: The Project requires an expeditious timetable for the location decision and the commencement of construction; or #738: We want to invest in a community where our employees will enjoy living, recreational opportunities, educational opportunities, and an overall high quality of life), although some ask for detailed information (#736: We encourage testimonials from other large companies).

4.3. Request for Information

The RFI (see supplementary material) was sent out by Amazon to the 20 locations selected in the first round. It collected data and preliminary commitments from those locations, which would later serve as a basis for negotiations. Locations were expected to reply to this document within approximately ten weeks (Weise, 2018b). The RFI was organized in five sections. We extracted a total of 607 items (236 questions, 371 sub-questions) from the document. Figure 5 gives a visual impression of the keywords used in the different sections.

4.3.1. Talent

The first section of the RFI is dedicated to the labour market, education (with a focus on STEM), population composition and development (with a focus on migration and integration), as well as an ample field of policies. Questions are very detailed (#93: A comparison between annual objectives and actual performance for each student group) and frequently ask for both historical data (#6: Changes in education level in your community over the last five years) as well as information on or plans for future policies (#82: Describe how education programs are funded). It covers 74 of *Project Clancy*'s 253 pages (29%), its second-largest section.

4.3.2. Growth

The second section is dedicated to general development issues, with a strong focus on housing and quality of life. It approaches the topic from both a rather individual perspective (#156–16: Current Housing Stock [availability, mix of rental versus owned, granular details on a few example neighbourhoods if available, focus on [i] 3 bedroom, 2 bath, single-family homes and [ii] 1 and 2 bedroom apartments]) as well as from a macro-perspective (#191: Data on hate crimes). Approaches to policymaking (#241: Describe what your community has done to encourage STEM professional development in your immigrating and minority populations) are also important.

4.3.3. Real Estate

The section on real estate is the central piece of the RFI. A total of 255 items were identified (103 questions, 152 sub-questions), representing 42% of all 607 items. Furthermore, these questions are expected to be answered independently for every site proposed—in the case of New York for two sites (Long Island and Midtown West), covering a total page-count of 105 pages. The questions cover a wide range of topics associated with the proposed sites—location, infrastructure, availability, neighbourhood, accessibility, usability, topography, utilities, as well as the costs associated with all of these. The company openly addresses incentives (#277: Will a government agency make Site available to the Project at no cost?). A special focus is put on practicalities such as data on the reliability of existing infrastructure, ways to define commitment of public institutions, possibilities of future extensions and several questions on the timeline of expected interventions. The questions even become personal, asking for names, contact details, and term limits of officials and personnel in charge of individual tasks (#359: The person assigned to work with the Project; and #360: The relevant contact information for that person).

4.3.4. Taxes and Tax Policy

The short section on Taxes (14 pages, 43 items) asks for general information on the location's tax regime. It presents several individual cases, for which the tax burden should be calculated (#538: Describe in detail the typical State/Commonwealth/Province and local tax burden that a company worker might anticipate if HQ2 were built on Site and the worker lived in your community. Assume the worker earns $100,000 annually, excluding benefits). Most questions relate, directly or indirectly, to

Figure 5. Word clouds of RFI's 607 items, by section. From left to right: talent, growth, site, taxes and tax policy, incentives.

the possibility of reducing the existing tax burden. The future development of the tax regime is also targeted (#539: Detail any State/Commonwealth/Province tax legislation that has been proposed).

4.3.5. Incentives

The final section is very forthcoming on the topic of incentives, asking for detailed information (and commitment) on a wide range of possible incentives, even "offered by the State/Commonwealth/Province and Local Community" (#540–541, 547: Detail each incentive by real estate site. If the incentive is uncertain or is not guaranteed, an explanation of the factors that contribute to that uncertainty and an estimate of the level of certainty).

Similar to the section on real estate, some questions become personal (#606: Project manager/ombudsman to coordinate/expedite approvals).

5. Analysis

In order to relate the documents to scholarly discussion, we submitted the 794 items to a further process of coding following the methodology proposed by Mayring (2014). We tried to relate all items to the 29 location factors proposed by Ferreira et al. (2016, p. 989). This resulted in the attribution of one or more factors to a total of 566 items (71,3% 'attribution rate'). No meaningful attribution was possible for 228 items (28,7% 'non-attribution rate'). Figure 6 lists the results by factor,

	RFP+RFI	RFP	RFI	1 Talent	2 Growth	3 Real Estate	4 Taxes and Tax Policy	5 Incentives
Factors \ number of items	794	187	607	139	102	255	43	68
Behaviour	183 (23%)	44 (23,5%)	139 (22,9%)	20 (14,4%)	64 (62,7%)	47 (18,4%)	7 (16,3%)	1 (1,5%)
B1: The founder, managers and employees want to live in this location	46 (5,8%)	16 (8,6%)	30 (4,9%)	3 (2,2%)	23 (22,5%)	-	4 (9,3%)	-
B2: Proximity to the founder's residence	2 (0,3%)	2 (1,1%)	-	-	-	-	-	-
B3: Climate	-	-	-	-	-	-	-	-
B4: Good housing standards	42 (5,3%)	4 (2,1%)	38 (6,3%)	1 (0,7%)	36 (35,3%)	1 (0,4%)	-	-
B5: Local community attitude to business	33 (4,2%)	9 (4,8%)	24 (4,0%)	16 (11,5%)	5 (4,9%)	-	3 (7,0%)	-
B6: Recreational and leisure activities	33 (4,2%)	6 (3,2%)	27 (4,4%)	-	20 (19,6%)	7 (2,7%)	-	-
B7: The founder was born in the community	-	-	-	-	-	-	-	-
B8: Good means of access	50 (6,3%)	10 (5,3%)	40 (6,6%)	-	-	39 (15,3%)	-	1 (1,5%)
B9. Entrepreneur financial capacity	10 (1,3%)	5 (2,7%)	5 (0,8%)	5 (3,6%)	-	-	-	-
Neoclassical	403 (50,8%)	92 (49,2%)	311 (51,2%)	108 (77,7%)	26 (25,5%)	144 (56,5%)	3 (7%)	30 (44,1%)
N10. Distance between the company and urban centres	19 (2,4%)	11 (5,9%)	8 (1,3%)	-	1 (1%)	7 (2,7%)	-	-
N11. Distance to markets and the cluster scale	9 (1,1%)	6 (3,2%)	3 (0,5%)	3 (2,2%)	-	-	-	-
N12. Road infrastructures	20 (2,5%)	14 (7,5%)	6 (1%)	-	-	6 (2,4%)	-	-
N13. Geographic specialisation	48 (6,0%)	4 (2,1%)	44 (7,2%)	41 (29,5%)	1 (1%)	2 (0,8%)	-	-
N14. Human resource skills and qualifications	130 (16,4%)	27 (14,4%)	103 (17%)	87 (62,6%)	6 (5,9%)	4 (1,6%)	-	6 (8,8%)
N15. Industrial real estate costs	108 (13,6%)	29 (15,5%)	79 (13%)	-	1 (1,0%)	51 (20%)	3 (7,0%)	24 (35,3%)
N16. Costs of labour	11 (1,4%)	9 (4,8%)	2 (0,3%)	-	2 (2,0%)	-	-	-
N17. Population density	19 (2,4%)	2 (1,1%)	17 (2,8%)	11 (7,9%)	6 (5,9%)	-	-	-
N18. Level of local economic activity in the company location	25 (3,1%)	5 (2,7%)	20 (3,3%)	19 (13,7%)	-	1 (0,4%)	-	-
N19. Other physical infrastructures (railroads, airports, telecommunications, etc.)	126 (15,9%)	24 (12,8%)	102 (16,8%)	-	1 (1,0%)	96 (37,6%)	-	5 (7,4%)
N20. Proximity to raw materials	-	-	-	-	-	-	-	-
N21. Proximity to services	21 (2,6%)	4 (2,1%)	17 (2,8%)	-	10 (9,8%)	7 (2,7%)	-	-
Institutional	195 (24,6%)	39 (20,9%)	156 (25,7%)	64 (46%)	7 (6,9%)	8 (3,1%)	9 (20,9%)	68 (100%)
I22. Company incubator	5 (0,6%)	-	5 (0,8%)	5 (3,6%)	-	-	-	-
I23. Access to knowledge generated by universities or research centres	47 (5,9%)	10 (5,3%)	37 (6,1%)	34 (24,5%)	-	1 (0,4%)	-	2 (2,9%)
I24. Location close to administrative centres	2 (0,3%)	1 (0,5%)	1 (0,2%)	-	-	1 (0,4%)	-	-
I25. Access to science parks	9 (1,1%)	1 (0,5%)	8 (1,3%)	3 (2,2%)	1 (1,0%)	3 (1,2%)	-	1 (1,5%)
I26. R&D incentives, employment creation or other incentives	110 (13,9%)	26 (13,9%)	84 (13,8%)	2 (1,4%)	2 (2%)	3 (1,2%)	9 (20,9%)	68 (100%)
I27. Proximity to teaching institutions	50 (6,3%)	5 (2,7%)	45 (7,4%)	42 (30,2%)	1 (1%)	2 (0,8%)	-	-
I28. Technological fairs	5 (0,6%)	1 (0,5%)	4 (0,7%)	2 (1,4%)	-	2 (0,8%)	-	-
I29. Renowned business leaders in the region	15 (1,9%)	2 (1,1%)	13 (2,1%)	10 (7,2%)	3 (2,9%)	-	-	-
items without factor attribution	228 (28,7%)	42 (22,5%)	186 (30,6%)	25 (18,0%)	27 (26,5%)	106 (41,6%)	28 (65,1%)	-

Figure 6. Analysis of location factors attributed to Amazon's HQ2 location decision process.

approach, and document. The first column shows the 29 criteria, grouped by the three respective approaches: behavioural, neoclassical and institutional. The second columns exhibit the results of our analysis, grouped by document(s) or sub-documents. Each cell shows the sum of items in the respective document that could be attributed to the respective factor or approach, followed by the percentage of total items in the respective document in brackets. Cells with a percentage of over 10% are shaded green, cells with a percentage under 2% red.

These results provide us with ample material to discuss the practical relevance of those individual factors developed by location decision theory. In our analysis, we will concentrate on three specific findings: factors that were (1) widely applied in the course of HQ2; (2) factors that were not or were only sporadically used; we also use it as a basis to (3) contribute to the discussion about the competing approaches in theory (behavioural, neoclassical, institutional). Furthermore, we base two propositions on these results: (1) We put forward a new group of factors that should be integrated into location decision theory as a fourth approach and (2) we provide policymakers with a simple tool to evaluate and discuss their investment promotion strategies.

5.1. Finding I: Location Factors that Stood the HQ2-Test

Figure 7 ranks the 29 factors by attribution rate. Four factors (N14. Human resource; N19. Infrastructure; I26. Incentives; and N15. Real Estate costs) are visibly set apart. Of these four, three stem from the neoclassical approach of location decision theory, one from the behavioural approach.

An interesting opposition can be seen when it comes to the labour market. Whilst availability and qualification (N14) rank first among factors, their cost (N16) is ranked low with markedly reduced attribution rate (16,4% vs. 1,4%). This points to the fact that, in the dense labour market for tech talent, availability trumps cost.

5.2. Finding II: Some Location Factors Have Been Widely Ignored

Three factors (B3. Climate; B7. Place where founder was born; and N20. Raw Materials) are missing completely from Amazon's set of questions. The non-attribution of N20 can be explained by the sector the company is operating in—raw materials are not relevant to its headquarters' business processes. Also, the absence of B7

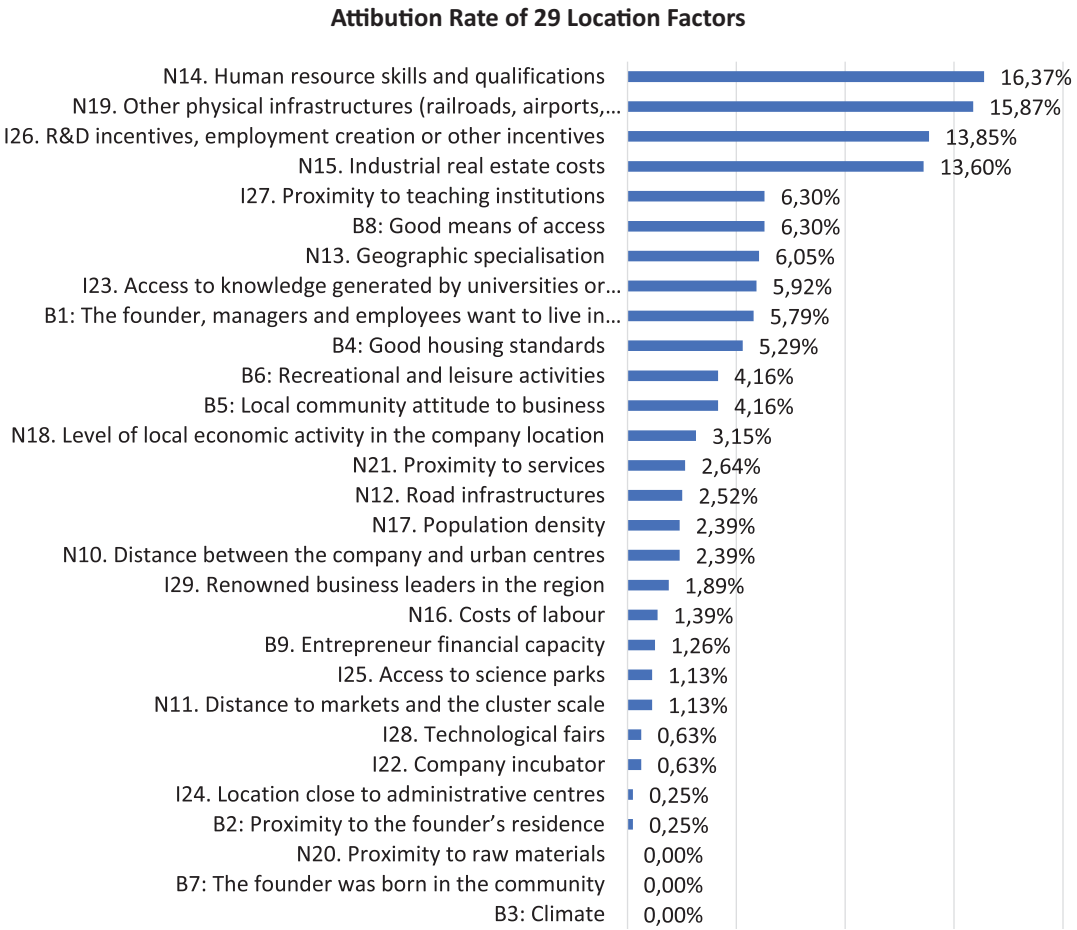

Figure 7. Location factors ranked by attribution rate.

seems to have an obvious explanation: A company with a staff count slowly edging up to reach one million can be expected to be too big to base important decisions on where its founder was born. However, there has been ample speculation about the implicit relevance of this factor throughout the HQ2 process (Dement, 2018; Nickelsburg, 2018). Less obvious is the absence of the third factor, B3 Climate. Recent discussions, especially under the headline topic of sunbelt city development (especially Glaeser, 2005) attribute high importance to this factor. Future research around the importance of climatic factors on business location decisions thus might put more emphasis on the integration of empirical evidence from individual decision processes.

5.3. Finding III: Neoclassical Wins the Approaches' Contest

We presented the historical development of location decision theory over the last two centuries that led to the currently dominant framework of combining the three competing approaches: behavioural, institutional, and neoclassical. In our analysis, the neoclassical approach is by far the most frequently employed by Amazon: More than 50% of all items can be attributed to at least one of this approach's eleven factors (Figure 8). The other two approaches, behavioural and institutional, trail far behind with an attribution rate of less than 25%. The attribution rate does not vary significantly among the two documents, RFP and RFI.

This result is noteworthy, especially for practitioners in investment attraction. Although the criteria employed in the context of HQ2 do include 'soft' factors such as quality of life, environmental quality, culture, or career opportunities, it is still the rationalist, objective neoclassical approach which has been applied most extensively.

5.4. Finding IV: Detecting the Blind Spots

Table 3 looks at factor attribution from a different angle: it shows in how far items from different documents and their sections could *not* be attributed to any one of the 29 location factors proposed by Ferreira et al. (2016). This is the case for a total of 228 out of 794 items, or 28,7%. The non-attribution rate is slightly lower for RFP (22,5%), while the longer and more detailed RFI exhibits a non-attribution rate of 30,6%. Among the document's parts, section 5 (Incentives) stands out with all items attributed. On the other side of the spectrum, sections 3 (Real Estate) and 4 (Taxes and Tax Policy) also stand out with almost every second item not attributed (41,6% and 65,1%, respectively). These findings give us a basis to derive location decision factors that are missing in Ferreira et al. (2016).

As a next step, we ran an additional coding exercise for the 228 items not attributed to any single location

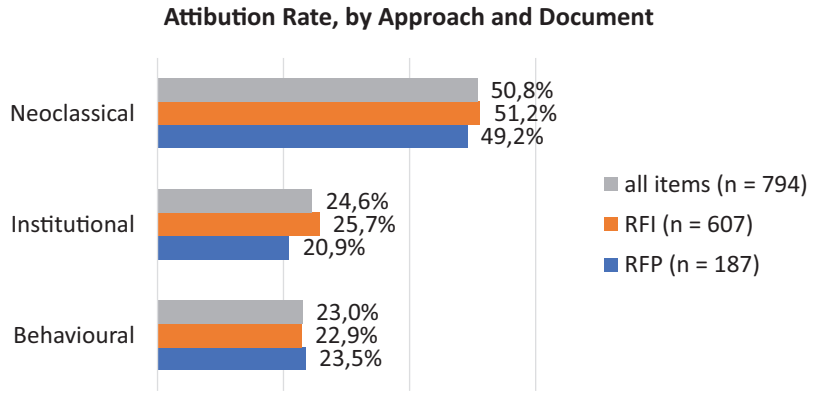

Figure 8. Attribution rate of different approaches.

Table 3. Non-attribution rates by document and section.

Document/Section	Total #	# Items Not Attributed	Non-attribution Rate
RFI total	607	186	30,6%
of which			
1 Talent	139	25	18,0%
2 Growth	102	27	26,5%
3 Real Estate	255	106	41,6%
4 Taxes and Tax Policy	43	28	65,1%
5 Incentives	68	0	0,0%
RFP total	187	42	22,5%
Total RFP+RFI	794	228	28,7%

factor: they were tested for several additional criteria as shown in the left column of Figure 9. These ten additional criteria were derived from (1) a clustering exercise of selected items (colour-coded items in the column 'marked text' in our dataset, available online as supplementary material to this publication) and (2) factors inspired by literature (Clark et al., 2002; Florida, 2004; Glaeser, 2005; Schmenner, 1982; Storper & Scott, 2009). The aim was to establish factors that would explain as many of the non-attributed questions as possible. Figure 9 shows the attributions that we obtained through this additional coding exercise. Cells with an attribution rate of 25% or higher are shaded in green, cells with a rate below 10% are shaded in red. We will use these results to propose an extension to theory.

5.5. Proposition I: Extend Location Decision Theory by Integrating a Fourth, Project-Oriented Approach

Based on our results, we propose an extension of the existing, three-dimensional paradigm: The three approaches (behavioural, neoclassical, and institutional) should be broadened by a fourth approach in order to be able to include the gaps we detected. We term this approach 'Project-Oriented.' Individual factors that constitute this novel approach are described below.

5.5.1. Site-Related Criteria

Every communication during the HQ2 process put a focus on the desired characteristics of available investment sites. The 29 factors from Ferreira et al. (2016) are not able to adequately account for this importance. When testing the 228 non-attributed items, the new criteria C: characteristics of proposed site, was able to account for 42% of all items, including questions related to terrain, neighbourhood, infrastructure, etc. Based on these results, we propose formalizing it as an individual factor.

As to the difficulty of applying a common theoretical framework onto heterogeneous site conditions, we suggest following the approach developed by Serra, Psarra, and O'Brien (2018), who developed an interesting method to quantify defining aspects of development sites.

5.5.2. Project-Management Related Criteria

Our analysis showed that basic concepts of project management cannot be adequately attributed by Hayter's three-pronged approach. This resulted in the non-attribution of items related with aspects of project management such as the project's timeline, the attribution of responsibilities, the actual availability of resources in a given moment, and the potential of a phased development approach including the possibility of future extensions. Testing for these concepts (in the form of two additional criteria, T and R, see Figure 9) resulted in positive attributions (25.0% and 18.4%, respectively). Building on Schmenner (1982) and Mesly (2017), we, therefore, propose the integration of the following additional decision factors:

- Possibility of phased development and future extensions of the project
- Availability and accessibility of existing resources for the execution of the project
- Ability to comply with project timeline
- Actors carrying responsibility (individual, institutional) and their commitment to the project

Table 4 sums up our proposal for an extended system of location decision approaches and related factors.

	RFP+RFI	RFP	RFI	1 Talent	2 Growth	3 Real Estate	4 Taxes and Tax Policy	5 Incentives
proposed new factors \ items not attributed	228	42	186	25	27	106	28	0
C: Characteristics of proposed site	95 (41,7%)	24 (57,1%)	71 (38,2%)	-	-	71 (67%)	-	-
T: Timeline; actual availability of resources and future extensions	57 (25%)	17 (40,5%)	40 (21,5%)	1 (4%)	-	39 (36,8%)	-	-
P: Policies and Programs	43 (18,9%)	2 (4,8%)	41 (22%)	10 (40%)	15 (55,6%)	15 (14,2%)	1 (3,6%)	-
R: Responsible actors (institutional, personal); ownership structure and their commitment for the investment project	42 (18,4%)	3 (7,1%)	39 (21%)	-	-	34 (32,1%)	5 (17,9%)	-
S: Sustainability / Environment and environmental commitment of government	31 (13,6%)	6 (14,3%)	25 (13,4%)	-	3 (11,1%)	22 (20,8%)	-	-
X: Taxes	29 (12,7%)	1 (2,4%)	28 (15,1%)	-	-	-	28 (100%)	-
E: Evaluations, Studies; (international) rankings	25 (11%)	-	25 (13,4%)	8 (32%)	10 (37%)	7 (6,6%)	-	-
G: Grand challenges, big ideas	20 (8,8%)	6 (14,3%)	14 (7,5%)	5 (20%)	7 (25,9%)	2 (1,9%)	-	-
M: Migration and integration	13 (5,7%)	2 (4,8%)	11 (5,9%)	1 (4%)	10 (37%)	-	-	-
F: Funding structures of public system	10 (4,4%)	-	10 (5,4%)	4 (16%)	1 (3,7%)	5 (4,7%)	-	-

Figure 9. Attribution of ten additional criteria to 228 items previously not attributed.

Table 4. Proposed extension.

Behaviour (B)	Neoclassical (N)	Institutional (I)	Project-Oriented (P)
B1. The founder, managers and employees want to live in this location	N10. Distance between the company and urban centres	I22. Company incubator	P30. Characteristics of proposed site
B2. Proximity to the founder's residence	N11. Distance to markets and the cluster scale	I23. Access to knowledge generated by universities or research centres	P31. Possibility of phased development and future extensions of the project
B3. Climate	N12. Road infrastructures	I24. Location close to administrative centres	P32. Availability and accessibility of existing resources for the execution of the project
B4. Good housing standards	N13. Geographic specialisation	I25. Access to science parks	P33. Ability to comply with project timeline
B5. Local community attitude to business	N14. Human resource skills and qualifications	I26. R&D incentives, employment creation or other incentives	P34. Actors carrying responsibility (individual, institutional) and their commitment to the project
B6. Recreational and leisure activities	N15. Industrial real estate costs	I27. Proximity to teaching institutions	
B7. The founder was born in the community	N16. Costs of labour	I28. Technological fairs	
B8. Good means of access	N17. Population density	I29. Renowned business leaders in the region	
B9. Entrepreneur financial capacity	N18. Level of local economic activity in the company location		
	N19. Other physical infrastructures (railroads, airports, telecommunications, etc.)		
	N20. Proximity to raw materials		
	N21. Proximity to services		

5.6. Proposition II: Tool for Evaluation of Individual Locations

As a support to policymakers, we developed our dataset into a simple tool to evaluate a location's investment attraction position. Based on self-assessment, it computes the position of the location vis-à-vis the factors and approaches analysed in this article. Two output tables (Figure 10) list the ten factors that the individual location complies with most and least. This input can provide practitioners with a quick route to an evidence-based discussion of how to interpret and further develop their location's investment attraction policies. The complete dataset, including underlying formulas and a short

High level of compliance with HQ2 topics

Relative Position	Approach / Factor	Attribution rate of institution
1	B2: Proximity to the founder's residence	100%
2	I24. Location close to administrative centres	100%
3	B1: The foucer, managers and employees want to live in this location	83%
4	N16. Costs of labour	82%
5	N12. Road infrastructures	80%
6	I28. Technological fairs	80%
7	N11. Distance to markets and the cluster scale	78%
8	I25. Access to science parks	78%
9	N15. Industrial real estate costs	77%
10	T: Timeline; actual availability of resources and future extensions	74%

Low level of compliance with HQ2 topics

Relative Position	Approach / Factor	Attribution rate of institution
40	I22. Company incubator	20%
39	I29. Renowned business leaders in the region	33%
38	E: Evaluations, Studies; (international) rankings	36%
37	P: Policies and Programs	37%
36	N13. Geographic specialisation	38%
35	I27. Proximity to teaching institutions	40%
34	N10. Distance between the company and urban centres	42%
33	R: Responsible actors (institutional, personal); ownership structure and their commitment for the investment project	43%
32	N18. Level of local economic activity in the company location	44%
31	N14. Human resource skills and qualifications	49%

Figure 10. Evaluation output of fictional location.

description, is available online as supplementary material to this publication.

6. Conclusion

The overall goal of this work on Amazon's HQ2 location decision process was to develop recommendations for both research in location theory and practice in local economic development. We argued that the formal criteria applied by this highly visible investment project will become a new 'gold standard' for business location decision-making. Policymakers will be confronted with potential investors applying similar decision criteria. For location theory, it is an opportunity to calibrate its dominant assumptions.

Applying a mixed-method qualitative content analysis approach, we extracted Amazon's requirements to potential investment locations and set up a dataset of 794 items. Those were attributed to formalized factors from location decision theory following Ferreira et al. (2016). The result led to four findings: First, our analysis shows that criteria related to human resources, infrastructure, incentives, and real estate costs dominate the HQ2 process. Second, criteria related to a location's climate were not present in the decision process. The higher attractiveness of locations in warmer climates, as captured by discussions around 'sun belt' attractiveness, is thus not supported by our analysis. Third, in the contest of Hayter's (1997) three approaches (behavioural, neoclassical, institutional), Amazon clearly took the side of the neoclassical approach. This is most visible in its list of questions dedicated to talent and real estate. Fourth, we were able to detect gaps in contemporary location decision theory: 29% of items could not be attributed to any of Ferreira et al.'s (2016) criteria. Most of these items target questions around real estate and taxes.

This gap led us to our first proposition. By introducing, testing and clustering, we developed a proposition for an addition to Hayter's (1997) three approaches, called the 'Project-Oriented Approach.' It clusters two groups that our analysis proved were missing in the current three approaches: the site-related criterion (P30. Characteristics of proposed site) and the project-related criteria (P31. Possibility of phased development and future extensions of the project; P32. Availability and accessibility of existing resources for the execution of the project; P33. Ability to comply with project timeline; P34. Actors carrying responsibility (individual, institutional) and their commitment to the project). Those criteria are inherently unique to each potential investment location, yet they proved decisive for the HQ2 decision process. Further research is needed to examine ways to integrate those criteria into quantitative models covering a heterogeneous set of locations.

Our second proposition is directed at policymakers. We developed a simple tool based on our dataset of 794 items derived from the HQ2 process. As a result, it shows an individual location's position vis-à-vis the criteria applied by Amazon, highlighting areas of strength and weakness. It provides policymakers with evidence for the evaluation of existing investment promotion strategies and the formulation of economic policy. The tool is available online as supplementary material to this publication.

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Conflict of Interests

The author declares no conflict of interest.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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