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Balancing gentrification in the knowledge economy: the case of Chattanooga's innovation district

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ABSTRACT

Innovation districts are emerging as place-based, knowledge-based urban development strategies in diverse cities around the world. They have, however, been criticized for being non-participative top-down initiatives that encourage gentrification and income, social, and racial polarization. In 2015, Mayor Berke launched Chattanooga's Innovation District in the city's downtown to accelerate the transformation of Chattanooga into a knowledge city. This paper investigates the programs that are being implemented in order to mitigate the negative externalities that such a strategy can generate. Using Chattanooga as an exploratory case, the authors argue that gentrification in innovation districts can increase knowledge spillovers.

KEYWORDS

Urban redevelopment; urban renewal; urban regeneration; local economic development; social inclusion

1. Introduction

Innovation districts are being adopted in cities around the world as local economic development strategies. Barcelona (Spain), Boston (Massachusetts), Chattanooga (Tennessee), Detroit (Michigan), Medellín (Colombia), Montréal (Canada), Philadelphia (Pennsylvania), Rotterdam (the Netherlands), and San Diego (California), and Sydney (Australia) are some of the cities that are building their own version of an innovation district. The concept of an innovation district is the policy response to the increasingly spatial and urban dimensions of the knowledge economy (Carrillo et al. 2014; Yigitcanlar and Velibeyoglu 2008). An innovation district is a place-based urban development strategy that aims to regenerate an under-performing downtown neighborhood into a desirable location for knowledge and creative companies and workers (Pancholi, Yigitcanlar, and Guaralda 2015; Yigitcanlar, Baum, and Horton 2007). The main objective of innovation districts is to accelerate the technological innovation process by clustering knowledge companies and workers (Katz and Wagner 2014; Morisson 2014). In 2015, Mayor Berke announced the creation of an innovation district in downtown Chattanooga. The innovation district aims to leverage opportunities from the 'Gig' economy that was initiated in 2010 when the Electric Power Board (EPB), a public utility company owned by the City of Chattanooga, launched the fastest fiber-optic Internet network in the United States, providing clients with one gigabit speed Internet (Motoyama et al. 2016).

Because of a neoliberal agenda, the knowledge economy is criticized for contributing to gentrification and economic, social, and racial polarization (Edlund, Machado, and

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Sviatschi 2015; Florida 2017; Glaeser, Resseger, and Tobio 2009; Stehlin 2016). The development of innovation districts is also criticized for being non-participative and undemocratic in which local governments are pushing a neoliberal agenda favoring the middle and upper classes (Moulaert 2000; Shin and Stevens 2013; Swyngedouw, Moulaert, and Rodriguez 2002). This paper contributes to the literature on gentrification studies, innovation districts, and knowledge-based urban development (KBUD) by providing policy responses and strategies to better distribute the benefits when pursuing place-based, knowledge-based urban redevelopments. Indeed, the academic literature has widely assessed the negative impacts of the knowledge economy on the urban fabrics but has not provided it with policy responses to build more inclusive innovation districts (see Florida 2017; Glaeser, Resseger, and Tobio 2009; Stehlin 2016).

This paper asks the following question: what are the policy responses to mitigate the negative externalities of adopting a place-based, knowledge-based urban development strategy, such as that of an innovation district? The innovation district of Chattanooga is selected as a single exploratory case study. The research conducted for this paper is based on three sources of data: semi-structured interviews, secondary data, and direct observation. The paper is highly relevant for urban policymakers who wish to mitigate the negative externalities from the creation of an innovation district in their cities and for academics who wish to investigate the impact of such policies. The paper finds that the programs that are being implemented in Chattanooga can be regrouped into three categories: socio-economic, urban, and housing.

2. Literature review

2.1. *The knowledge economy and innovation districts*

In the 1990s, capitalist countries started to undergo an economic transition toward post-Fordism, or knowledge-based economies (Amin 1994; Drucker 1998). In the knowledge economy, technological innovation is a precondition for higher standards of living and economic prosperity (OECD 1996, 2015). The knowledge economy is, however, criticized for polarizing the workforce and hollowing out the middle class (Acemoglu and Autor 2011; Autor, Levy, and Murnane 2003; Goos and Manning 2007). Technological innovations are concentrated in large urban centers, favoring the emergence of ‘superstar cities’ (Edlund, Machado, and Sviatschi 2015; Gyourko, Mayer, and Sinai 2013). Superstar cities concentrate economic wealth and are also highly unequal (Glaeser, Resseger, and Tobio 2009). In superstar cities, the middle and upper-middle classes are being priced out due to rising rents and costs of living (Kuper 2013). Superstar cities are thus becoming cities that only multi-millionaires and billionaires can afford to live in (Florida 2017). The innovation economy has fostered this type of economic polarization in some cities, such as San Francisco, leading to demonstrations against knowledge companies and knowledge workers (Carroll 2014).

The concept of an innovation district has emerged as cities harness the transformative power of technological innovations in order to become knowledge cities. Indeed, cities are increasingly seen as the key administrative units to spur technological innovations (Florida, Adler, and Mellander 2017). The concept of an innovation district is the policy response to the increasingly spatial and urban dimensions of the

knowledge economy (Bevilacqua, Pizzimenti, 2016; Carrillo et al. 2014),), combining innovation theories with socioeconomic trends that have emerged in the knowledge economy (Morisson 2014). Innovation districts are using placemaking to lure and retain knowledge workers, who are seen as the most important element in building a successful knowledge economy (Esmaeilpoorarabi, Yigitcanlar, and Guaralda 2016; Florida 2002; Pancholi, Yigitcanlar, and Guaralda 2015). Using conceptual elements from knowledge-based urban development (KBUD), innovation districts can be created through market forces or through public interventions (Morisson 2014; Pancholi, Yigitcanlar, and Guaralda 2015). Market-driven innovation districts, however, have proven to greatly contribute to gentrification (Mirabal 2009).

2.2. Innovation districts and gentrification

Among the criticisms of innovation districts, one of the most recurrent is the issue of gentrification leading the Bookings Institution to write an article around the question ‘Do innovation (districts) equal gentrification?’ (Vey 2017). As a place-based strategy to foster the knowledge economy, innovation districts also, as a result, emphasize the significant role of real estate development companies in satisfying the strong demand for urban transformations (Bevilacqua, Pizzimenti, and Maione 2017), thus deviating from the original aim of building an inclusive and community-led knowledge economy toward more exclusion and polarization resulting from market forces.

Innovation districts are criticized for being no less than gentrification programs (Moulaert 2000; Smith 2002; Swyngedouw, Moulaert, and Rodriguez 2002). The term gentrification was coined by Ruth Glass (1964) to describe changes in London neighborhoods in the late 1950s and the 1960s. Lees, Slater, and Wyly (2013) define gentrification as ‘the transformation of a working-class or vacant area of the central city into middle-class residential and/or commercial use’ (xv). Gentrification is a process that involves ‘the transition of inner-city neighbourhoods from a status of relative poverty and limited property investment to a state of commodification and reinvestment’ (Ley 2003, 2527). In gentrified neighborhoods, the population structure changes from being working-class to upper-middle-class and most often from being black to white (Ehrenhalt 2012; Harvey 2012). In San Francisco, the knowledge economy also implied a political-economic restructuring in order to accommodate the urban milieu to the new demands of the knowledge economy (Stehlin 2016).

For many, the concept of an innovation district is a strategy that echoes renewal programs, which were implemented in the 1950s and 1960s to redevelop downtown areas in cities in the United States (Hartman 1964). Renewal programs were extremely controversial because they involved displacement, that is, the ‘forced involuntary displacement’ of disadvantaged households (Palen and London 1984, 12). Forms of displacement include: direct displacement, indirect displacement, exclusionary displacement, displacement pressure, or social exclusion (Lees, Shin, and López-Morales 2015). The fear of displacement is the primary concern behind community activism against gentrification (Freeman 2005). Jane Jacobs, the leading figure against urban renewal programs, was fiercely opposed to the Robert Moses’ urban renewal plans, which replaced well-functioning neighborhoods with isolated towers (Jacobs 1961). In the 1980s, local and regional governments in the United States stepped out from

implementing urban renewal programs, leaving gentrification as the outcome of market forces solely (Harvey 2012). The academic literature on gentrification provides us both with its positive and negative aspects (Atkinson 2004). The negative effects of gentrification are numerous, the most severe ones range from displacement to the ‘destruction of community, the increased squeeze on housing availability, and higher rents’ (Smith and LeFavre 1984, 58). For the municipal government, however, gentrification increases the property values, and ultimately, the expected property tax revenues (DeGiovanni, 1984). Some authors have hypothesized that the process of gentrification could trickle down to the poorest residents of the neighborhoods (Lowry 1960; Smith 1964). There is, however, poor evidence of such positive gentrification that would increase social mix, social capital, and social cohesion (Lees 2008).

In the academic literature, gentrification is seen as the outcome of urban reinvasion, which is a global phenomenon (see Atkinson and Bridge 2005; Palen and London 1984). Urban reinvasion has been mostly explained in the literature as ‘demographic-ecological’, ‘sociocultural’, and ‘political-economic’ consequences (Palen and London 1984). The ‘demographic-ecological’ explanation refers to the changes in both the population composition and basic demographic processes (Palen and London 1984). Indeed, relatively affluent, young, child-free couples are more likely to choose to live in the city, close to places of work and leisure (Palen and London 1984). The ‘sociocultural’ explanation refers to the values, attitudes, ideas, choices, and beliefs as factors determining human behaviors (Palen and London 1984). The ‘young affluent white residents’ perceived themselves as pioneers, rediscovering downtowns, bringing with them liberal utopian ideals while also looking for safe diversity (Allen 1984). Florida (2002) notes that the creative class seeks to live in downtown areas in search of tolerant, diverse, and urban amenities. The ‘political-economic’ explanation refers to the disagreement between the traditional neo-classical and Marxist approaches. The traditional neo-classical view emphasizes competition, supply and demand, market efficiency, and the impersonality of the liberal state, while the Marxist view focuses on ‘intergroup power relationships and uneven costs and benefits of neighbourhood change’ (Palen and London 1984, 17).

3. Methodology

The research methodology is based on a single exploratory case study using primary and secondary data. The authors use the case study approach ‘out of the desire to understand complex social phenomena’ over which the researcher has no control (Eisenhardt 1989; Yin 1994, 4). The purpose of the case study is to uncover the policy responses that are being implemented in order to mitigate the negative externalities of place-based, knowledge-based urban development strategies, such as those associated with innovation districts. Chattanooga’s innovation district was purposefully sampled to provide an ‘information-rich case’ (Patton 2015, 230) because in contrast with many innovation districts that have heavily relied on public interventions or real estate companies for their development (see Pancholi, Yigitcanlar, and Guaralda 2015), Chattanooga’s innovation district has involved the participation of a wide range of actors, such as foundations, 501(c)3 organizations, the local government, real estate companies, the local university, the municipally owned utility company, startups, and private companies, thus allowing for more inclusive considerations.

As a result, the case was selected for the purpose of generating findings to inform changes in practices, programs, and policies (Patton 2015). Moreover, the investigation of programs to mitigate the negative externalities of innovation districts has not been fully examined. Thus, a qualitative approach is the most appropriate method (Creswell 2013; Eisenhardt 1989).

The research conducted for this paper is based on three sources of data: semi-structured interviews, secondary data, and direct observation. The in-depth semi-structured interviews were conducted in Chattanooga with key informants who have extensive knowledge on their innovation districts and the programs that are being implemented to mitigate some negative externalities of such strategy. In total, 17 in-depth interviews were conducted in Chattanooga. The actors interviewed in Chattanooga were: the Mayor's Office Chief of Staff, The Enterprise Center, Lyndhurst and Benwood Foundations, the power company EPB, the River City Company, Urban League of Greater Chattanooga, Green Spaces, Chattanooga Design Studio, CO.LAB, Launch Chattanooga, TechTown, and the Chattanooga-Hamilton County Regional Planning Agency. The stakeholders were selected according to their strong knowledge and diverse perspectives on the phenomena studied (Eisenhardt and Graebner 2007). The research used but was not limited to the following secondary data: the different actors' Websites, planning documents, articles in academic journals, news Websites, newspapers, and magazines, such as *Chattanooga Times Free Press*, Nooga.com, *The Guardian*, *The New York Times*; and annual reports. The direct observations involved non-participatory observations in Chattanooga's innovation district. The researcher traveled to Chattanooga for 10 days to conduct field work in November 2017, during which he conducted approximately 22 hours of formal and informal observations in Chattanooga's innovation district and its immediate surroundings. The observations refer to situations in which the researcher 'gathered field notes by spending more time as an observer than as a participant' and recorded 'experiences for scientific purposes' (Creswell 2013, 160). The observations were conducted during the event, 1TABLE, a Thanksgiving potluck on Martin Luther King Boulevard, at the Edney Innovation Center, and at different public and social spaces in the Chattanooga's innovation district to uncover the extent to which the district is diverse and inclusive. Informal field notes and informal conversations with residents and during interviews were conducted to reduce the observer's own biases. This case study aims to categorize the strategies that have been adopted in Chattanooga to build a more inclusive innovation district. The data are analyzed in an inductive manner to uncover patterns in the programs implemented and to create 'categories that divide some aspect of the world into parts along a continuum' (Patton 2015, 457). Reliability, that is, the stability of the categories developed following the same procedures, is achieved through convergence across multiple data sources and through congruence between the research question and the research design phase (Creswell 2013; Patton 2015; Yin 1994). The categories are internally homogenous and externally heterogeneous in that they 'hold together in a meaningful way' and have clear boundaries (Patton 2015, 467). Validation is achieved through prolonged engagement, persistent observation, and triangulation to 'assure that the right information and interpretations have been obtained' encouraging convergent lines of inquiry (Eisenhardt 1989; Stake 2013; 36). The rich descriptions and the categories presented allow the readers to make decisions regarding transferability of the policy strategies and specific programs to build more inclusive innovation districts (Patton 2015).

3.1. Chattanooga's innovation district – case study

3.1.1. Background

Chattanooga is a mid-sized city located in Hamilton county, southeastern Tennessee, between Nashville and Atlanta ([Figure 1](#)). The Tennessee river goes through the city, which lies topographically between the Appalachian Mountains and the Cumberland Plateau. As of 2016, the city has a population of 177,571 inhabitants and a metropolitan population of 551,632 making it the fourth largest most populous city in Tennessee after Nashville, Memphis, and Knoxville (U.S. Census [2017](#)). As of 2015, the median household income in Chattanooga is \$40,177 and the unemployment rate is 6.2% compared with \$53,889 and 5.2%, respectively, in the United States (U.S. Census [2017](#)).

In first half of the 20th century, Chattanooga experienced an industrial boom and was dubbed the ‘Dynamo of Dixie’, a nickname principally derived from the city’s iron foundries and machine works (Eichenthal and Windeknech [2008](#), 8). In 1899, Benjamin F. Thomas, Joseph B. Whitehead, and later John T. Lupton obtained exclusive rights to bottle Coca-Cola in the United States, bringing prosperity to the city (Eichenthal and Windeknech [2008](#)). The negative externalities of this industrial success were the deterioration of air quality and urban white flight (Eichenthal and Windeknech [2008](#)). In 1967, the Chattanooga Chamber of Commerce formed a task force to combat air pollution, which recommended the imposition of stricter regulations. The industrialists in Chattanooga first resisted changes to clean up the air. There was a sense that Chattanooga was doing well when heavy smoke was coming out of the smokestacks (Roberts [2010](#)). In 1968, however, the Federal government withdrew Federal funding until the city came up with ‘stronger regulations and better enforcement plans’ (Roberts [2010](#), 30). In 1969, the Department of Health, Education, and Welfare released a report

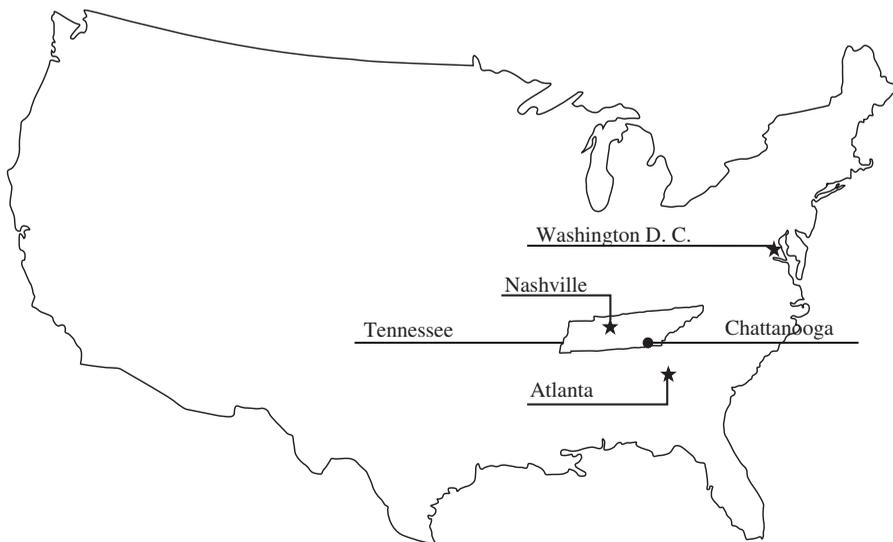


Figure 1. Map of the United States and location of Chattanooga.

Source: Authors' design.

that ranked Chattanooga as having the worst air quality in the United States and urged the city to take up immediate actions to combat air pollution (Roberts 2010, 31).

In the 1970s, Chattanooga cleaned up its air partly due to more stringent environmental regulations and partly due to deindustrialization (Roberts 2010). With the manufacturing leaving the city to go overseas, unemployment and underemployment increased. The suburbanization and the deindustrialization transformed downtown Chattanooga into a district of abandoned factories and empty warehouses (Youtie 1999). From 1950 to 1990, the population in downtown Chattanooga underwent a 10-fold reduction, from approximately 10,000 to 1000 inhabitants (U.S. Census 2017). In the late 1970s and 1980s, the city experienced racial tensions, which culminated when, in 1980, members of the Ku Klux Klan shot five African American women on 9th Street, later renamed Martin Luther King Jr. Boulevard (Roberts 2010). The industrialists encouraged the status quo, hindering the emergence of genuine civic movements, which led the local population to compare the Mountain City Club, an invitation-only private club, as the real Mayor of Chattanooga (Roberts 2010).

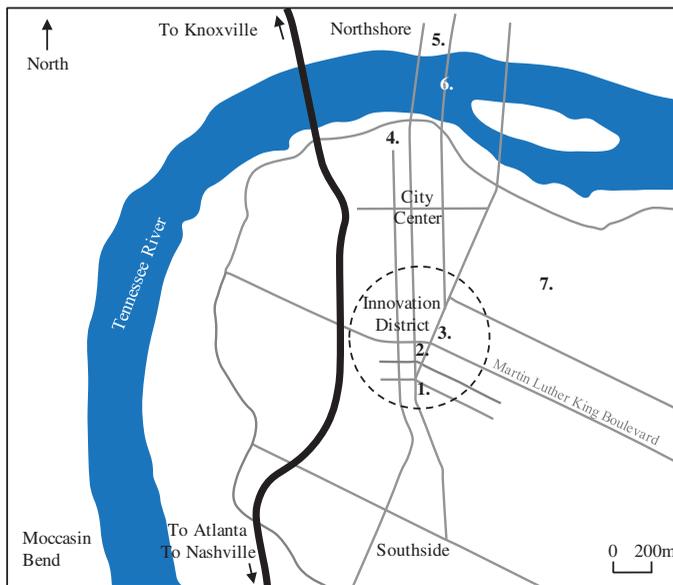
The transformation of Chattanooga and its downtown began when Jack Lupton took over the family foundation, the Lyndhurst Foundation, a legacy endowed from bottling Coca-Cola in Chattanooga. The city of Chattanooga has many foundations thanks to its rich industrial past and the Coca-Cola legacy, such as the Lyndhurst Foundation, the Benwood Foundation, the Footprint Foundation, the Maclellan Foundation, the Tonya Foundation, and the Tucker Foundation. Jack Lupton remarked ‘no city this size in the world has the kind of foundation dollars that this city has’ (as cited in Dedman 1986, 8). In the early 1980s, the mission of the Lyndhurst Foundation shifted when Jack Lupton took over the foundation to support the transformation of downtown Chattanooga and promote local economic development. In 1981, the Lyndhurst Foundation funded ‘Chattanooga in Motion’, an initiative where local leaders visited other cities that had transformed their downtown areas (Eichenthal and Windeknech 2008). In 1982, the Moccasin Bend Task Force was formed to investigate riverfront development alternatives on the Tennessee River and across from downtown Chattanooga (Eichenthal and Windeknech 2008; Youtie 1999). The Lyndhurst Foundation provided more than \$1 million a year for Chattanooga Venture, a not-for-profit organization that was created in 1983 to help the community shape a new vision for the city, Vision 2000 (Times Free Press 2011). The community-based goal-setting process, Vision 2000, involved over 1700 people and resulted in more than 40 goals to improve the quality of life in Chattanooga, leading, for instance, not only to the creation of not-for-profit organizations, such as Chattanooga Neighborhood Enterprise (CNE) in 1986, Public Education Foundation in 1988, and River City Company in 1986, but also to the creation of public spaces, such as the Tennessee Aquarium in 1992, the Walnut Street Bridge in 1993, and the 21st Century Waterfront in 2005 (Eichenthal and Windeknech 2008; Times Free Press 2009; Youtie 1999).

3.1.2. The knowledge turn and the launch of the innovation district

In 2010, the municipal utility company, the Electric Power Board of Chattanooga (EPB), launched the ‘Gig’, thus becoming the first company to offer a 1 gigabit-per-second fibre-optic Internet network in the United States (Lobo 2015; Rushe 2014). The Gig provided

considerable media exposure. For *The Guardian*, the Gig ‘is driving a tech boom’ (Rushe 2014). For *The New York Times*, the Gig is ‘Chattanooga’s new locomotive’ (Wyatt 2014). In late 2013, the newly elected Mayor Andy Berke formed the Technology, Gig, and Entrepreneurship Task Force in order to leverage opportunities from the Gig (Technology, Gig, and Entrepreneurship Task Force 2014). The Task Force recommended the creation of an innovation district in downtown Chattanooga. In 2015, Mayor Berke officially launched Chattanooga’s Innovation District in order to build on the momentum from the Gig and newly established startups and venture capital companies in the downtown, thus becoming the first mid-sized city in the United States to have an innovation district (Morton 2015). The innovation district spans a circular 140 acres (around 56 hectares) in downtown Chattanooga (Malek 2015). The actors located in the innovation district include, but are not limited to: EPB; the Lamp Post Group, a venture capital company; Chattanooga Chamber of Commerce; Causeway, a not-for-profit organization; the Public Library; the Public Education Foundation; the Benwood Foundation; City Hall; the River City Company; ArtsBuild; and the Edney Innovation Center, in which there are located some important anchors, including The Enterprise Center, TechTown, CO.LAB, and Launch Chattanooga (Figure 2).

The Enterprise Center, a not-for-profit organization, was chosen to pilot the transformation of the district into an innovation district (Malek 2015). The Enterprise Center’s mission is ‘to establish Chattanooga as a hub of innovation, improving people’s lives by leveraging the city’s digital technology to create, demonstrate, test, and apply solutions for the 21st century’ (The Enterprise Center 2016, 3). The Enterprise Center is a public-private partnership financed by the City of Chattanooga, Federal Grants, and



1. Edney Innovation Center, 2. Miller Park, 3. Patten Parkway, 4. Tennessee Aquarium, 5. Renaissance Park, 6. Walnut Street Bridge, 7. University of Tennessee at Chattanooga.

Figure 2. Stylized map of downtown Chattanooga and innovation district.

Source: Authors’ design.

Foundations (The Enterprise Center 2015). The Enterprise Center works on three strategic areas: the innovation district; research and application development; and digital equity. In 2015, the Enterprise Center piloted the creation of the Edney Innovation Center, a 90,000-square-foot building that has diverse functions and tenants, within the innovation district, serving as an anchor for the district. Indeed, not-for-profit organizations such as The Enterprise Center, Tech Goes Home, CO.LAB, and TechTown, co-working spaces, start-ups, and private companies are located in the Edney Innovation Center, which serves as a collision space with public and private events. In digital equity, the Enterprise Center operates the program Tech Goes Home.

The City of Chattanooga has actively branded itself to external investors, and the Gig, the innovation district, the city's electric buses, and the transformation of its downtown are all part of this marketing strategy (Lambe and de Zeeuw 2016). The transformation of the downtown began in the 1990s thanks to the Chattanooga Venture and its brainchild not-for-profit organizations such as the River City Company and also to diverse actors from the private and public sectors coming together to form public-private partnerships. With the launch of the innovation district, the downtown experienced large project redevelopments, which amounted to almost \$1 billion in private investment (River City Company 2017). The downtown will receive 2649 new apartment units, 274 new town homes, 1461 student beds, and 698,035 square feet of commercial spaces (River City Company 2017). Since the 1990s, the redevelopment of downtown Chattanooga has contributed to its gentrification. Indeed, the Southside district and the district around the University of Tennessee at Chattanooga have been ranked in the list of the 25 fastest-gentrifying neighborhoods between 2000 and 2010 in the United States, along with neighborhoods in cities such as Portland, Oregon, or Brooklyn, New York (Petrilli 2012).

In the downtown area, Census Tract 31 Hamilton County, home to the innovation district, the population has increased from 1346 in 2000 to 1658 in 2015. The number of households with an income above \$75,000 have increased rapidly from 28 in 2000 to 200 in 2015, representing 4.9% and 24.5% of the total number of households, respectively (Table 1). In contrast, households with an income inferior to \$20,000 have decreased from 357 in 2000 to 300 in 2015, representing 61.9% and 36.8% of the total number of households, respectively. However, the number of households with an income less than \$10,000 has remained stable thanks to the presence of Patten Towers. Located in front of the Edney Innovation Center and as part of the section 8 subsidized housing program, Patten Towers houses 241 residents (Smith 2013). The number of households with an income between \$20,000 and \$40,000 has increased quite substantially thanks to payment-in-lieu-of-taxes (PILOT) agreements to attract middle-class families to the downtown area (Leach 2016). The racial makeup of the district has shifted from 63.3% White and 34.2% African American in 2000 to 71.1% White and 25.6% African American in 2015. The median household income has increased from \$14,271 in 2000 to \$29,837 in 2015, or 109.1% compared to 23.9% for the City of Chattanooga. Downtown Chattanooga is, as a result, a neighborhood undergoing what can be described as light gentrification. Indeed, households living in the neighborhood have shifted from lower class to lower-middle class and upper-middle class.

Table 1. Household income in census tract 31 Hamilton County in 2000, 2010, and 2015.

Household Income	2000		2010		2015		Gain or Loss from 2000 to 2015	Gain or Loss from 2000 to 2015 (%)
	Number of Households	%	Number of Households	%	Number of Households	%		
Less than \$10,000	210	36.40	239	32.65	207	25.40	-3	-1.43
\$10,000-20,000	147	25.48	107	14.62	93	11.41	-54	-36.73
\$20,000-30,000	64	11.09	115	15.71	109	13.37	45	70.31
\$30,000-40,000	49	8.49	15	2.05	94	11.53	45	91.84
\$40,000-50,000	21	3.64	71	9.70	22	2.70	1	4.76
\$50,000-75,000	58	10.05	32	4.37	90	11.04	32	55.17
\$75,000-100,000	17	2.95	51	6.97	43	5.28	26	152.94
\$100,000-150,000	11	1.91	89	12.16	80	9.82	69	627.27
More than 150,000	0	0.00	13	1.78	77	9.45	77	N/A
Total Households	577	100.00	732	100.00	815	100.00	238	41.25

Source: U.S. Census.

3.1.3. *The strategies adopted to limit the negative externalities of the knowledge economy*

Since the mid-1980s, Chattanooga's leaders have transformed their city and their downtown through 'public-private partnerships, strong planning, bold implementation, and constant input from the public', an approach dubbed as the 'Chattanooga Way' (Eichenthal and Windeknecht 2008, 23). In 2013, Mayor Berke launched Chattanooga Forward, a collective goal-setting and recommendation process, involving six different Task Forces – Sports & Outdoors; Entertainment & Attractions; Housing; Downtown; Technology, Gig & Entrepreneurship; and Arts. The goal was to 'write the next chapter in Chattanooga's story' by leveraging the city's 'long history forging public and private partnerships and engaging citizens to help us reach our common goals' (City of Chattanooga 2014). The \$14 million redevelopment of Miller Park that is scheduled for July 2018 in the heart of the innovation district is an example of a public-private partnership in the city. The redevelopment of Miller Park came from a community-led plan – the 2014 City Center Plan – promoted by the River City Company. Working closely with the City of Chattanooga, the River City Company was in charge of collecting \$7.5 million in donations for the overall project (Leach 2017). Foundations, namely the Benwood and Lyndhurst Foundations, private companies, EPB, and the city contributed to the redevelopment of the Miller Park. EPB has offered \$2 million through a mix of in-kind and financial support (Leach 2017).

Foundations, most notably two place-based foundations, the Benwood and the Lyndhurst Foundations, have fostered many of the public-private partnerships that have emerged in Chattanooga. Since the 1990s, Benwood, Tonya, Lyndhurst and other foundations, and individual donors have pumped more than \$200 million into the redevelopment of downtown Chattanooga (Times Free Press 2009). Since the mid-2000s, the Benwood and the Lyndhurst Foundations have adopted a proactive entrepreneurial mindset in promoting local economic development and the knowledge economy in Chattanooga. The Benwood Foundation has focused on supporting public education and the creation of places in the city's downtown, such as Patten Parkway, Miller Park, and the Tomorrow Building, the first co-living space in Chattanooga, through funding not-for-profit organizations such as the River City Company and Chattanooga Neighborhood Enterprise (CNE). The Lyndhurst Foundation has been a catalyst in innovative local economic development strategies focusing on entrepreneurship, planning with the Chattanooga Design Studio, and civic engagement. The foundation was the catalyst in the creation of the not-for-profit organization CreateHere in 2007, a five-year initiative that helped entrepreneurs to establish more than 110 local businesses and facilitated the relocation of artists in the Southside district (Smith 2012). Following the idea of the creative class, the goal of CreateHere was to revitalize Main Street and MLK Boulevard to attract and retain talents in Chattanooga, which suffered from brain drain (Smith 2012).

Chattanooga's leaders have recognized the potential negative externalities – such as income, social, and racial polarizations, and gentrification – that would come from adopting a place-based, knowledge-based urban development strategy. The Technology, Gig, and Entrepreneurship Task Force emphasizes that 'equity and inclusion must be hallmarks of our work' (Technology, Gig, and Entrepreneurship Task Force 2014, 3). The Task Force stresses the importance for *Digital Inclusion* by claiming 'Chattanooga will

only be successful in this new economy if we focus effective efforts on increasing digital inclusion among all citizens and offering everyone the benefits of an increasingly computer and web based world' (Technology, Gig, and Entrepreneurship Task Force 2014, 3). Chattanooga's leaders have adopted three types of strategies to limit the negative externalities of the knowledge economy in the downtown area: first, promoting digital equity and fostering entrepreneurial opportunities for underrepresented groups; second, programming the downtown area as a place for everyone; and third, building affordable housings. The strategies are implemented by a wide range of actors, such as the City of Chattanooga, the Electric Power Board (EPB), and not-for-profit organizations, and are funded by place-based foundations, grants, and corporate sponsors. The actors are intrinsically intertwined, a specificity characterizing the Chattanooga Way, building public-private partnerships to reach positive outcomes in the strategies adopted.

Digital equity is promoted by organizations, such as Tech Goes Home, TechTown, and the Urban League of Greater Chattanooga. Tech Goes Home, which is part of the Enterprise Center, was established in 2015 in order to offer 15-hour courses on basic computer and Internet skills to low-income residents, namely, early childhood, school children, and the workforce. Upon completion, participants have the possibility to purchase a new computer for \$50 and have low-cost Internet options. Tech Goes Home has also partnered with the coding school Covalence to offer scholarships for low-income Chattanooga residents with the Industrial Development Board of the City of Chattanooga. TechTown was established in 2014 as a technology learning center focusing on Science, Technology, Engineering, Art, and Math (STEAM) education for 7- to 17-year-old children. TechTown provides financial help, such as transportation and scholarships, to low-income children and schoolchildren from Title-1 schools. TechTown also created the Tech Workforce program that provides coding skills for unemployed and underemployed adults with income under \$35,000 a year. The Tech Workforce program received various grants from corporate sponsors and one from the City of Chattanooga. The Urban League of Greater Chattanooga was founded in 1982 as an affiliate of the National Urban League focusing on the empowerment of the African American community in Chattanooga. The organization launched the STEM academy, an after-school program, serving minorities and low-income population. Hamilton County aims to reach 75% postsecondary educational attainment by 2025 under the umbrella program Chattanooga 2.0 led by the Benwood Foundation, the Chattanooga Area Chamber of Commerce, the Hamilton County Department of Education, and the Public Education Foundation (PEF).

The promotion of entrepreneurship to underrepresented groups is led by organizations such as Launch Chattanooga, the Company Lab (CO.LAB), the Urban League of Greater Chattanooga, and the Jump Fund. Launch Chattanooga is a not-for-profit organization that was created in 2011 as a micro-business training and coaching center. The organization promotes entrepreneurial skills to underrepresented groups in the entrepreneurial sector, such as minorities, low-income, women, and persons 50 and older. CO.LAB is a not-for-profit start-up accelerator that was created in 2010 as a spinoff from the not-for-profit CreateHere. CO.LAB serves as Chattanooga's 'front door' for entrepreneurs with its acceleration programs for start-ups and high-growth start-ups. CO.LAB aims to attract underrepresented groups in the entrepreneurial community through reaching out to the entire Chattanooga community. In 2016,

30% of the participants were from minority groups, and 64% of the participants were female (The Company Lab 2017). Causeway promotes Co.Starters for Causes, an acceleration program to train the community leaders to become social and civic entrepreneurs. The Urban League of Greater Chattanooga is promoting the program Next Level, dedicated for small business owners who want to scale up their operations. The Jump Fund is a private organization that was launched in 2013 in order to provide women entrepreneurs with seed capital.

The promotion of the downtown and its innovation district as a place for everyone is a collective effort, involving not-for-profit organizations, such as the organizations working toward digital equity and entrepreneurship, the River City Company, Chattanooga Design Studio, CO.LAB, Causeway, the Enterprise Center, the City of Chattanooga, and the Chattanooga-Hamilton County Regional Planning Agency. The strategies to transform the innovation district into a place for everyone are done through organizing events and placemaking. The 5th floor of the Edney Innovation Center hosts many public events organized by CO.LAB, such as Will This Float, 48Hour Launch, Talk Shop Tuesday, Chadev, or 1 Million Cups; by Tech Goes Home with Tech Tune-up Tuesday; by Launch Chattanooga with seminars and the creative mornings; and by The Enterprise Center. There are approximately 150 events organized on the 5th floor of the Edney Innovation Center every month; these events are programmed to be welcoming and interesting to everyone. Launch Chattanooga and Tech Goes Home organize their graduation ceremonies on the 5th floor of the Edney Innovation Center to give a sense of ownership to the participants. The River City Company has promoted events, such as Startup Week Chattanooga and concerts, that are open to the public at Miller Plaza, a space located in the innovation district. Causeway organizes every year in the innovation district, Spark, an event to celebrate Chattanooga's change makers, and ITABLE.

The River City Company has actively promoted placemaking in downtown Chattanooga and its innovation district with the passageways, a program to transform alleyways into art installations. For instance, the River City Company and Chattanooga Design Studio have recommended through community-led planning process the 2014 City Center Plan, the creation of high-quality places, parks, and parkways as to enhance the experience of being in the innovation district. The redevelopment of Miller Park and Patten Parkways developed from these recommendations. In 2016, the Chattanooga-Hamilton County Regional Planning Agency adopted a form-based code for downtown Chattanooga and its immediate surroundings to promote housing stock diversity, density, mixed-use developments, and walkability. In 2017, the Enterprise Center, Causeway, PK Management, and the YMCA have collaborated to open a healthy and affordable grocery store in Patten Towers, Bingo's Market, to alleviate a downtown food desert for its most deprived residents. Finally, the City of Chattanooga aims to further connect the innovation district to the Martin Luther King Boulevard, the historical African American neighborhood, and the University of Tennessee at Chattanooga.

The River City Company has been an advocate of payment-in-lieu-of-taxes program, or PILOT, in order to build affordable housing in downtown Chattanooga. PILOT programs are property tax breaks that were traditionally used to attract large companies such as Amazon, Coca-Cola, and Volkswagen, among others, to Chattanooga. The housing PILOT program was first introduced in 2002 and ended in 2012, in order to



Table 2. Summary of strategies adopted in Chattanooga to distribute the benefits of the knowledge economy.

Category	Strategy	Actors	Targets	Interviews Quote
Socio-economic	Digital Equity	Tech Goes Home, TechTown, Urban League of Greater Chattanooga, Public Education Foundation	Low-income residents, schoolchildren, minorities, African American community, unemployed adults	"TechTown saw the need that every kid should be exposed to coding, when we say every kid, we mean from every zip code, every neighborhood. We make sure that we have programs for the kids living in the mountains and for the kids living in the city." (Chris Ramsey, TechTown, personal communication, 16 November 2017).
	The Promotion of Entrepreneurship	Launch Chattanooga, CO.LAB, Urban League of Greater Chattanooga, Jump Fund	Underrepresented groups in entrepreneurship, such as minorities, low-income residents, women, older adults (50+)	"We look at who is not in the room and our job is to help them launch a dream and get it off the ground and bring them into the room so they are welcome in the conversation about entrepreneurship." (Marco Pérez, Launch Chattanooga, personal communication, 17 November 2017).
Urban	Events	Causeway, The Enterprise Center, Launch Chattanooga, Tech Goes Home, CO.LAB, River City Company	Everyone	"We are consciously and deliberately programming events and places so they are welcoming and inclusive levels" (Ann Coulter, The Enterprise Center, personal communication, 16 November 2017).
				"We bring the participants into the innovation district. First, to give them some ownership, this building (Edney Innovation Center) is a resource they can utilize." (Sammy Lowdermilk, Tech Goes Home, personal communication, November 16, 2017).
	Placemaking	River City Company, Chattanooga Design Studio, Chattanooga-Hamilton County Regional Planning Agency	Everyone	"We know that innovation districts need great public spaces so that people can congregate. That is what we are trying to create with the redevelopment of Miller Park and Patten Parkway." (Amy Donahue, River City Company, 17 November 2017).
Housing	Affordable Housing	River City Company, Mayor's Office, Chattanooga Neighborhood Enterprise (CNE)	Renters earning less than 80 percent of the area median income	"The things that we fund are designed to make it more equitable. We try not to play in the same lane as the private market so a lot of the things that we put our support behind would not have happened without us" (Stacy Richardson, Mayor's Office, 20 November 2017).

provide real-estate developers with an incentive to build apartments in downtown Chattanooga (Brogdon 2015). In 2014, the City of Chattanooga introduced a PILOT program that offers a 10-year tax break for real-estate developers at the condition of renting 20 percent of the units to renters who earn less than 80 percent of the area median income (Smith and Smith 2014). In 2016, the Chattanooga City Council approved a new tax break plan to encourage private developers to create more affordable housing (Leach 2016). The tax incentive plan, a payment-in-lieu-of-taxes program, targets private developers, encouraging them to offer 50 percent of their rental units at below market rate to renters who earn less than 80 percent of the area median income (Chattanooga City Council 2016). In return, real-estate developers receive property tax freezes for up to 10 years for new construction or 14 years for rehabilitation of existing sites (Chattanooga City Council 2016). Chattanooga Neighborhood Enterprise (CNE), a not-for-profit organization that is partially funded by the City of Chattanooga and foundations, has built affordable housing in downtown Chattanooga, such as the Grand Hotel. The organization also provides financial assistances, such as loans and mortgages, as well as assistance in case of foreclosure.

4. Discussion

The fear of displacement, which is dominating the debate about gentrification, is hindering the discussion about genuine progressive approaches to distribute the benefits of urban redevelopment strategies. Freeman (2005) argues that ‘neighborhoods are dynamic entities, and who moves in can be just as important as who moves out in determining neighborhood change’. Indeed, displacement often plays a minor role in the process of gentrification (Freeman 2005; Freeman and Braconi 2004). Place-based, knowledge-based urban development strategies, such as of an innovation district, can, in contrast to traditional capital-led urban renewal programs, bring additional benefits, such as enhanced innovation capacities and branding, to local stakeholders that can be more progressively distributed. It requires, as in the case of Chattanooga, a variety of public and private actors to join efforts to pursue a common vision.

The strategies that have been implemented in Chattanooga to limit the negative externalities of the knowledge economy can be regrouped into three main categories: socio-economic, urban, and housing (see Table 2). The socio-economic strategy refers to the promotion of entrepreneurship to underrepresented groups in the entrepreneurial community through programs, such as mentoring, coaching, seed capital access, and entrepreneurial assistance. The socio-economic strategy also involves digital training and STEAM education as to bridge the digital and technological divides within the city’s residents, through programs targeting young children, low-income communities, unemployed and underemployed persons. The urban strategy refers to a plan of action to make the downtown as a place interesting and welcoming to everyone, through placemaking, the creation of park and parkways, and events. More importantly, it aims to consciously shape programs to give to the most underrepresented groups a sense of ownership of the innovation district. The housing strategy refers to the creation of affordable housing. In the case of Chattanooga, it is pursued through property tax breaks to real-estate developers and through a not-for-profit organization, Chattanooga Neighborhood Enterprise (CNE).

If the strategies adopted in Chattanooga are successfully implemented, especially the urban dimension, then the ongoing gentrification of the downtown area can be seen as an evolution of the district. In the 1980s and 1990s, downtown Chattanooga, like many other downtowns in the United States, was predominantly a low-income residential area and an area where more affluent persons worked. In the knowledge economy, the transformation of downtown Chattanooga can be seen as a case showing how the controversial aspects of gentrification can find a synthesis in combining a higher social mix with increased knowledge spillovers under the condition of successfully implementing the strategies discussed in this article. The ongoing gentrification shifting the share of low-income households toward middle- and high-income households in the district can reduce the ‘cognitive distance’ among groups of residents while at the same time fostering the needed diversity of information between different social groups, thus fostering knowledge spillovers that can be absorbed. The continuous process of information diversity that is offered and demanded in a mixed community can be seen as a sort of knowledge spillover life cycle. Nootboom (1999) shows that knowledge diffusion is constrained by the ‘cognitive distance’ between actors. This cognitive distance should not be too wide nor too similar. Indeed, knowledge that is already known is just as useless as it is for knowledge that cannot be understood (Boschma 2005). By contrast, the effects of gentrification in downtown Chattanooga, combined with the implementation of the discussed strategies, may reduce the cognitive distance between residents while simultaneously fostering novelty and diversity of information through an increased social mix.

5. Conclusions

Place-based knowledge-based urban development strategies, such as of an innovation district, can contribute to some of the negative externalities of the knowledge economy, such as gentrification, and income, social, and racial polarization. At the urban level, gentrification is one of the most visible outcomes of building a successful knowledge economy (Florida 2017; Mirabal 2009; Stehlin 2016). The strategies that have been implemented in Chattanooga in order to limit the negative externalities of the knowledge economy have socio-economic, urban, and housing components. The strategies are especially relevant for mid-sized cities in developed countries that are adopting place-based, knowledge-based development strategies. For policy makers, the case of Chattanooga invites them to draft mitigation policies while planning knowledge-based development strategies. For academics, the case of Chattanooga invites them to rethink the issue of gentrification as an evolution of downtown in the United States, especially in the context of the knowledge economy in which gentrification can facilitate knowledge spillovers, as long as gentrification encourages an optimal cognitive distance between different socioeconomic groups in the district.

The strategies adopted to limit the negative externalities, such as those adopted in Chattanooga’s innovation district, highlight the role of local governments and place-based actors in designing and implementing policies to ensure that the benefits from innovation districts are distributed to as many people as possible while limiting displacement and other negative externalities arising from such urban redevelopment. In Chattanooga, many progressive projects would not have happened without the

innovation district strategy, such as the Bingo's Market in the section 8 subsidized housing, Patten Towers, and the renegotiation of the PILOT program to include more affordable housing. The strategies must, however, be constantly revisited to provide as many benefits as possible to an audience as wide as possible. The socioeconomic strategy should involve formative and summative evaluations of the programs to measure their impacts on residents and the city. The urban strategy should involve low-cost transportation options to come in and out of the downtown area, especially for low-income residents, as well as places, events, bars, restaurants, and shops that are affordable and interesting for diverse ethnic and socioeconomic groups. The housing strategy should involve the creation of a relatively high percentage of affordable housing in order for it to be relevant.

The Benwood and Lyndhurst Foundations have been the catalysts in the early transformation of the City of Chattanooga through placemaking and innovative local development strategies. Moreover, thanks to the presence of the place-based foundations, a strong ecosystem of not-for-profits working toward local economic development and social inclusion has been created. The launches of the 'Gig' in 2010 by EPB and of the innovation district in 2015 by Mayor Berke marked a strong knowledge-based urban development strategy. The common strategy and vision between a wide range of public, private, and not-for-profits actors that is the hallmark of the 'Chattanooga Way' has adopted innovation mitigation strategies to limit income, social, and racial polarization. The future will tell us if these strategies were successful in making the city more inclusive or just in transforming the downtown and its innovation district into a playground for the affluent, innovative, and creative.

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