

# Using entrepreneurial social infrastructure to understand smart shrinkage in small towns

David J. Peters<sup>a,\*</sup>, Sara Hamideh<sup>b</sup>, Kimberly Elman Zarecor<sup>c</sup>, Marwan Ghandour<sup>d</sup>

<sup>a</sup> Department of Sociology, Iowa State University, Ames, IA, USA

<sup>b</sup> Department of Community and Regional Planning, Iowa State University, Ames, IA, USA

<sup>c</sup> Department of Architecture, Iowa State University, Ames, IA, USA

<sup>d</sup> School of Architecture, Louisiana State University, Baton Rouge, LA, USA

**ABSTRACT** Population decline in North America is often viewed as a problem best addressed through economic development efforts promoting growth. In Europe, an alternative view sees depopulation as a process needing to be managed properly, by scaling down community services and infrastructure while maintaining social equity. Called smart shrinkage, this approach argues places can lose population yet still possess a high quality of life. We first clarify the concept by distinguishing the outputs of smartness from its inputs using the entrepreneurial social infrastructure framework. Second, we apply the smart shrinkage concept to n=98 small towns in the Midwestern state of Iowa using longitudinal data collected in 1994 and 2014. Shrinkage is measured by faster than average population loss; and smart outcomes by faster than average quality of life gains. We then examine correlates of smart shrinkage using demographic, economic, social capital, and civic engagement indicators. Demographic and geographic factors have little impact on smart shrinkage. Smart towns have stronger local labor markets, lower poverty and inequality, and job opportunities in goods-producing sectors. Lastly, smart shrinking towns exhibit higher social infrastructure by possessing more bridging social capital across diverse groups, greater quantities of linking social capital such as memberships in local organizations, and frequent civic engagement by participation in local projects. These activities are supported by a community culture of openness, tolerance, and support.

\*Corresponding author. Department of Sociology, 304 East Hall, 510 Farm House Lane, Ames, IA, 50011-1054, USA.

E-mail address: [dpeters@iastate.edu](mailto:dpeters@iastate.edu)

## 1. Introduction

### 1.1. Overview and objectives

Rural population decline, along with corresponding economic decline, is a regional problem in most high-income OECD countries. Rural depopulation in North America has been an ongoing trend since the early 20<sup>th</sup> century, save for places near natural amenities or experiencing economic booms (Johnson, 2014). Rural shrinkage is most severe in the Great Plains and Midwest (Kusmin, 2017). In Europe, rural depopulation has stabilized since the 1990s after waves of out-migration in the decades following the Second World War. However, in certain E.U. countries over 70 percent of rural regions continue to experience depopulation, particularly in eastern Europe and the Baltics (E.U. ESPON, 2017). Recent research suggests the greatest challenges facing shrinking places is first maintaining essential community services; and second retaining investments in businesses and infrastructure (Davoudi and Madanipour, 2015; Meijer and Syssner, 2017; Theide et al., 2017). Depopulation erodes quality of life by curtailing community services and investment, which contributes to further out-migration as residents decide to leave rural communities (Besser, 2013; Jacquet et al., 2017; Molloy et al., 2011).

Most North American social science views rural population loss as a *problem* that needs to be addressed, typically through economic development and neighborhood revitalization efforts to retain current and recruit new residents to grow populations (Rhodes and Russo, 2013). By contrast, some European social science sees depopulation as a *process* that needs to be managed properly, by scaling down local government, community services, and infrastructure to match a smaller population base while still maintaining social equity – collectively termed the smart shrinkage framework (Hospers and Syssner, 2018; Wiechmann and Pallagst, 2012). Although there is no clear definition, smart shrinkage is often described as a process where it is possible

1 for a place to lose population while still offering high quality of life (Hollander, 2011). This  
2 paper applies the smart shrinkage concept from Europe to depopulating small towns in the  
3 Midwestern United States to answer three research questions. First, is smart shrinkage adequate  
4 conceptually for understanding how small towns effectively adapt and respond to population  
5 decline? Second, is the phenomenon of smart shrinkage simply a function of favorable structural  
6 conditions like demography, economy, and the providence of location? Third, do smart shrinking  
7 towns exhibit greater entrepreneurial social infrastructure?

8 Our analysis is exploratory and descriptive in nature, thus we make no claims of  
9 innovation in theory or method. However, by addressing these questions we can better  
10 understand the correlates of smart shrinkage to provide insights on local impacts and responses  
11 in rural communities. The idea that shrinking places can also be thriving ones in terms of QoL is  
12 novel in the United States, where growth is often equated with development (Hollander, 2011;  
13 Shaffer et al., 2004). Most smart research has been done in larger cities, principally in  
14 post-industrial Europe but also in a handful of cities in the American Rust Belt (Rhodes and  
15 Russo, 2013). There is a paucity of research applying this concept to rural areas in both Europe  
16 and the United States (Weaver et al., 2016). This is a particularly troubling gap in the literature  
17 given that some of the most severe population losses have been occurring in rural communities  
18 and regions on both continents. For many small towns, a strategy of smart shrinkage may be their  
19 best option to deal with long-term population decline.

## 20 *1.2 Conceptual approach*

21 We argue that the current smart shrinkage frameworks in Europe and the United States  
22 lack conceptual clarity, which limits their usefulness in understanding how places respond to  
23 population change. There is no agreed upon definition of “smart” outcomes, nor of the inputs or

1 causes of “smartness” that lead to such outcomes. This problem originates with the same  
2 tautological errors that hamper the concept of resiliency by confusing the inputs and activities of  
3 smartness/resiliency with its outputs and outcomes (Kulig et al., 2013). Put another way, most  
4 work fails to distinguish between the causes of smart shrinkage and its effects.

5         We address this issue by defining *smart outcomes* using subjective quality of life (QoL)  
6 assessments. Drawing upon the social indicators literature (Sirgy, 2011), we posit that improved  
7 QoL is ultimately the end goal of any project aimed at addressing physical, economic, or social  
8 conditions in the community. This is true in both growing and shrinking places. In our work,  
9 shrinkage itself is not taken as a problem to be solved, but rather is the given context in which  
10 people live that is unlikely to change. Using the entrepreneurial social infrastructure (ESI)  
11 framework from sociology, we conceptualize *smart inputs* or activities as purposeful collective  
12 actions to achieve community goals that drive smart shrinkage (Flora and Flora, 1993). In  
13 defining smartness as purposeful, we exclude economic and geographic factors that may help or  
14 hinder smartness, but which are generally beyond the community’s control in the near term. Our  
15 conceptual model of smart shrinkage is presented in figure 1.

16         To illustrate, consider the example of fundraising for community improvement projects.  
17 In our model, private investment is a smart activity because people must chose to give  
18 (purposeful) and the degree of individual giving depends on local norms nurtured or not by the  
19 community (local agency). However, private investment is only considered a smart activity if it  
20 leads to greater satisfaction with local amenities that contributes to greater community QoL, our  
21 smart outcome. If private giving and fundraising only enhances amenities and not QoL, we do  
22 not consider it be a smart activity. Activities that do not lead to improved QoL are hypothesized  
23 to benefit only a small subset of the community, usually local elites. Further, we do not define

explicitly how smart activities are organized or who implements them. ESI posits that effective community development is the result of many organizations (e.g. private, non-profit, and public) and any single actor.

Figure 1 about here

## 2. Literature review

### 2.1. Smart shrinkage

The definition and utilization of shrinkage, decline, and smart shrinkage have seen a shift in the literature since the latter half of the 20th century. Two concepts are often used to describe communities that are on a downward trajectory: shrinkage and decline. Sometimes the two are used interchangeably, yet the urban studies literature supports a conceptual difference between them. Urban shrinkage is understood as a neutral, meaning value-free, and "empirical phenomenon resulting from the specific interplay of different macro-processes at the local scale" resulting in population loss (Haase et al., 2014). Population loss is considered the most significant measure of urban shrinkage (Pallagst et al., 2014; Reckien and Martinez-Fernandez, 2011; Vujičić and Đukić, 2015), followed by housing abandonment and vacant residential lots (Hollander, 2011), and shrinking household size (Beauregard, 2009). On the other hand, urban decline is a more multidimensional phenomenon which implies a downward trajectory of several indicators including economic performance, labor force numbers, and demographic changes with negative consequences for the affected city or urban region (Hospers and Syssner, 2018; Lang, 2005). Decline can also be viewed as a failure to act. For example, in the European Union, some declining rural regions deny that they are shrinking and therefore do little to ameliorate its negative effects (E.U. ESPON, 2017). Decline has also been conceptualized through the lens of

1 neighborhood life cycle theory, where decline has occurred through disinvestment in  
2 overwhelmingly African American communities. Typical outcomes linked with decline in this  
3 context include demographic change, aging of infrastructure and housing, and conversion of  
4 property from single family owner-occupied to rental housing (Metzger, 2000).

5         In our research, we conceptualize population shrinkage as one symptom of decline that  
6 neither disparages nor compliments a community as a metric on its own. Our project shows that  
7 not all shrinkage is decline, nor are all efforts to manage shrinkage necessarily smart. Rightsizing  
8 or planned shrinkage is one way that smart shrinkage is referred to in the literature (Ryan, 2012).  
9 In this framework, communities have opportunities to make smart decisions in the midst of the  
10 population loss, which may mitigate its negative effects on quality of life. Implementation is  
11 challenging, because population loss inevitably limits the provision of health, social, and public  
12 services (Hospers, 2013). Despite this, Hollander (2011) finds that people in shrinking  
13 communities can still experience high quality of life when it is measured by residents'  
14 perceptions. Hence, smart shrinkage is proposed as a paradigm shift in responding to  
15 depopulation by re-configuring the community to be smaller and more sustainable, rather than  
16 responding with typical economic growth strategies (E.U. ESPON, 2017).

17         Despite a plethora of empirical and case studies on the topic, smart shrinkage is still not  
18 well conceptualized. Our review of the literature finds only one paper that provides a theoretical  
19 grounding for smart shrinkage. Hollander and Németh (2011) develop a normative theory of  
20 smart decline that views shrink-smart strategies through a social justice lens. They propose a  
21 theoretical framework to define smart shrink processes for local stakeholders to ensure  
22 government planning strategies adhere to the principles of social justice. First, shrink-smart  
23 strategies should accommodate and acknowledge diverse voices. Second, those processes should

1 have capacities for democratic public participation and effective negotiation in order to reach  
2 consensus-based strategies. Third, planners should utilize a variety of communication techniques  
3 to best understand the needs of the whole community. Fourth, shrink-smart planning processes  
4 should be open, honest, and transparent to residents. Additionally, planning efforts should be  
5 regional in scope, yet local in their control and flexible in their implementation.

6       Research on shrinkage and decline has focused primarily on larger post-industrial cities  
7 that have experienced population loss concurrent with losses of jobs and investment in the  
8 industrial economy. Cities such as Detroit, St. Louis, and Youngstown, Ohio feature prominently  
9 in the American case study literature (Dewar and Thomas, 2012; Gordon, 2009; Safford, 2009).  
10 A continent away the cities of Glasgow, Leipzig, Liverpool, and the Czech city of Ostrava play  
11 similar roles in the research literature on European cities (Bernt et al., 2012; Hospers, 2014;  
12 Zarecor, 2012). While there is a wide array of research on the causes and responses to rural  
13 depopulation in general, very few studies have specifically used the concept of smart shrinkage  
14 to understand how some communities have successfully adapted to smaller populations. Our  
15 review of the literature finds only one peer-reviewed paper on smart shrinkage in small towns.  
16 Bowns (2013) argues that smart shrinkage ought to be applied to towns as well as cities, since  
17 towns serve as “urban centers” for the surrounding countryside. She also argues the underlying  
18 processes driving urban and rural smart shrinkage are the same. Using a case study of three small  
19 towns in Pennsylvania, Bowns finds common threads in how these places have responded to  
20 shrinkage. First, they have strong narratives about their community and region that provide both  
21 a shared vision for residents and permits an on-going dialogue about the future. Such narratives  
22 are built around intertwined local history, culture, and landscapes. Second, towns are using their  
23 cultural and natural assets to imagine smaller local economies. The goal is not growth, but a

1 sustainable economic model both environmentally and demographically. Lastly, she finds that  
2 inter-regional collaboration is essential to establish long-term plans that have a high probability  
3 of being implemented.

## 4 2.2. *Quality of life*

5       The smart shrinkage framework is not explicit in how to measure smartness. To address  
6 this gap, we use subjective ratings of community quality of life (QoL) as indicators of smart  
7 outcomes that have been used in other smart shrink research (Hollander, 2011). Improved QoL is  
8 often used as a benchmark to judge whether community projects have been successful in the  
9 opinion of residents (Grzeskowiak et al., 2003). Whether creating jobs, improving education, or  
10 building health facilities, the major purpose is to improve the lives of residents in both an  
11 absolute and relative sense. Subjective QoL indicators measure attitudes, feelings, and  
12 satisfaction with the assets in a place. We choose subjective indicators because we are interested  
13 in relative QoL assessments that differ across people and places. By contrast, objective indicators  
14 measure the actual properties of a place, and typically require a single external criterion to judge  
15 quality (Sirgy et al., 2000). It is our contention that subjective assessments by residents in the  
16 community matter more in understanding the quality of peoples' lives in a place than  
17 assessments done by outsiders. Subjective and objective indicators may contradict each other.  
18 For example, local schools may outperform other schools on statewide tests, but residents may  
19 feel their schools could do better at educating their children.

20       This study uses the personal utility model of community QoL outlined by Sirgy (2011),  
21 which posits QoL in a place is derived from subjective ratings about the person and the place  
22 along three community services dimensions measuring personal utility. The *business dimension*  
23 rates the employment, commercial, entertainment, and telecommunications aspects of the



community. The *non-profit dimension* assesses healthcare, social services, recreation, religious, and civic venues. Lastly, the *government dimension* is how people view public safety, public utilities, transportation infrastructure, public schools, and other government services. Previous research has established that satisfaction with community services is a robust measure of overall community QoL (Boncinelli et al., 2015; Potter et al., 2012).

### 2.3. Entrepreneurial social infrastructure

Since quality of life is used to measure the outcomes of smartness, we also need a conceptual model to understand the causes or inputs of smartness that are distinct from the outcomes. Again, the smart shrinkage concept is not clear on what drives smartness. We use the entrepreneurial social infrastructure (ESI) framework to address this conceptual weakness. ESI describes the characteristics of a community's social structure that facilitates or impedes collective actions to achieve some goal, which ultimately leads to improved QoL (Flora and Flora, 1993). The term entrepreneurial implies that actions to achieve common goals are purposeful and innovative in the community. Over the past 20 years, ESI has been widely used to understand why some rural communities have been effective at locally led economic development efforts and why others have failed (see Flora et al., 1997; Sharp et al., 2002; Sharp and Flora, 1999).

Flora and Flora (1993) outline the three main dimensions of ESI: legitimacy of alternatives, resource mobilization, and network quality. Legitimacy of alternatives encompasses shared symbols and norms of behavior that promote collective action, which are created and reinforced by social interactions. It is measured using four indicators. *Low density of acquaintance* enhances ESI by promoting interactions among residents who are dissimilar from each other that prevent social and physical segregation in the community; and is similar to low

1 bonding social capital. Bonding ties are relationships between people who are similar in some  
2 manner, typically based on strong affective ties that make them emotionally close (Ferlander,  
3 2007). *Acceptance of controversy* is the ability of the community to accept differences of opinion  
4 and alternative courses of action, so all options are considered. *Depersonalization of politics* is  
5 where public positions on issues are decoupled from moral judgements, allowing open  
6 discussion of controversial issues. *Focus on process* helps collective action by viewing the  
7 means of addressing community issues as more important than whether the project was a success  
8 or failure.

9       The first indicator of resource mobilization is *equal distribution of resources*, typically  
10 viewed as low income inequality. Inequality hinders ESI since the wealthy typically participate  
11 in community projects to maintain their privileged positions, while the poor see no personal  
12 benefit to their participation. *Private individual investment* is the ability of residents to contribute  
13 private resources (their money, time, and social connections) to community projects in which  
14 they will not directly benefit, or that the benefits will be shared among all residents. *Public*  
15 *collective investment* is the degree to which the community contributes public resources to  
16 projects, typically through local government. This includes raising sufficient taxes for  
17 government operations, passing of infrastructure bonds, serving on local boards and  
18 commissions, and volunteering in non-profit or quasi-public organizations (e.g. fire protection).

19       Lastly, network quality promotes ESI through building diverse and robust social  
20 networks that facilitate identification of relevant community needs, raising of resources to  
21 implement projects, and commitments to support projects long-term. *Diverse and inclusive*  
22 *networks* cut across major divides in the community such as race and ethnicity, gender and age,  
23 social class, and new versus long-time residents. This broadens the community's resource base

1 and promotes greater civic engagement from all residents. This is similar to bridging social  
2 capital or ties between dissimilar people that is outward looking and seeks to connect different  
3 groups (Ferlander, 2007). *Strong horizontal networks* are linkages between residents in the  
4 community that occur through local organizations and clubs, which is analogous to internal  
5 linking social capital (Dahl and Malmberg-Heimonen, 2010). *Strong vertical networks* are  
6 linkages between the community and state, regional, and national organizations; and this concept  
7 is similar to external linking social capital (Rubin, 2016).

### 8 **3. Data and Methods**

9 Data for this analysis is drawn from the U.S. Census and the Iowa Small Towns Project  
10 (ISTP). The ISTP is a longitudinal survey of residents in 98 small towns in Iowa conducted in  
11 1994 and 2014. Small towns are defined as municipalities not adjacent to a metropolitan city  
12 (50,000 or more) that had populations between 500 and 10,000 people in 1990. This follows U.S.  
13 Census Bureau definitions of urban centers with metropolitans having 50,000 or more people,  
14 micropolitans between 10,000 and under 50,000, and finally non-core or rural places  
15 representing small cities and towns below 10,000 people. A two-stage sampling design is  
16 employed, first randomly selecting one small town for each of Iowa's counties; and second  
17 randomly selecting 150 housing units within each selected town.<sup>1</sup> The response rate (*RR3*) is  
18 72.7 percent ( $n=10,796$  respondents) in 1994 and 41.5 percent ( $n=6,163$ ) in 2014, with the latter  
19 being similar to U.S. Census Bureau's (2014) mailed response rate of 48 percent to the American  
20 Community Survey. In each wave the sampled communities are representative of all Iowa towns  
21 meeting our criteria, based on decennial Census data (Besser et al., 2015). Secondary data for  
22 sampled small towns are place estimates obtained from the 1990 Decennial Census and the 2008-  
23 2012 American Community Survey (ACS). The 2008-2012 ACS (hereafter 2010) is chosen

1 because its mid-point of 2010 provides some comparability with 1990 figures. ACS response  
 2 rates are about 97 percent using mailed surveys plus telephone and in-person interviews.

3 We operationalize the smart shrinkage concept by using percent change in population  
 4 between 1990 and 2010 to measure shrinkage; and change in community quality of life (QoL)  
 5 between 1994 and 2014 to measure smartness. We construct the smart shrinkage typology by  
 6 assigning the  $n=98$  towns into four discrete categories based on  $z$ -scores of the two indicators,  
 7 excluding towns within 1.0 standard deviation around the mean. Higher thresholds of 1.5 and 2.0  
 8 deviations around the mean results in too few cases for analysis. *Smart shrinking* towns are those  
 9 with above average declines in population, yet above average gains in community QoL.  
 10 *Declining* towns are those with above average losses in both population and QoL. For  
 11 comparison, *thriving* towns have growth in both population and QoL, while *adverse growing*  
 12 places saw worsening QoL despite population gains. To address our research questions that seek  
 13 to describe smart shrinking towns across socioeconomic dimensions and entrepreneurial social  
 14 infrastructure, a multivariate general linear model (traditionally MANCOVA) is used to explore  
 15 mean differences across categories of the smart shrinkage typology. Differences between  
 16 estimated marginal means holding 2010 population constant is assessed using the Games-Howell  
 17 test, which is robust to unequal group sizes and variances (Cohen et al., 2003).

18 *Community QoL* is an index averaging the ratings of seven items: the quality of jobs,  
 19 medical services, public schools, housing, local government services, child care services, and  
 20 senior services. The 2014 index has a Guttman reliability lower bound of  $\lambda_2=0.820$  (0.779 in  
 21 1994) that accounts for covariance heterogeneity; and an internal consistency of  $\lambda_3/\alpha=0.841$   
 22 (0.777 in 1994) that is equivalent to Cronbach's measure (Tabachnick and Fidell, 2012). The  
 23 QoL index is calculated using simple averaging instead of a formal measurement model like

exploratory factor analysis (EFA) for consistency across indices and time. EFA results verify that the seven components of QoL belong to a common factor.<sup>2</sup> *Entrepreneurial social infrastructure* is operationalized using indicators of bonding and bridging social capital, memberships in groups for linking social capital, measures of civic engagement, and perceptions about the community. All items are on Likert scales ranging from five to seven points, which are converted to a 100-point scale for comparability. *Structural factors* including demographics, employment, income, and housing are from Census and ACS. Refer to the on-line appendix for detailed variable definitions.

## 4. Results and Discussion

### 4.1. Identifying smart shrinkage towns

The scatterplot of small towns along population and quality of life (QoL) change is presented in figure 2, from which we identify towns that are shrinking smartly or declining in terms of population and QoL. In the smart shrinkage literature, population loss is the standard measure of shrinkage (Haase et al., 2014); and quality of life has been used to measure smartness in a handful of urban settings (Hollander, 2011). We find  $n=11$  smart shrinking towns who experienced on average a -10.9 percent drop in population, yet gained an average of 11.3 points on QoL ratings (on a 100 point scale) over the past 20 years. By contrast, the  $n=9$  declining towns saw worsening QoL (-3.5 point drop) despite having a similar statistical rate of depopulation (-12.9% loss). Smart shrinking towns have higher and improving scores on almost all dimensions of QoL compared to declining and adverse growing towns, especially with regard to jobs, medical care, and child and senior services. However, thriving towns (growing population and QoL) score higher than smart ones on most QoL metrics, save for medical care. Inspection of the maps in figure 3 reveal no clear geographic clustering of smart or declining

towns across the state. Smart shrinkage places are not proximate to one another, suggesting spatial and regional factors play a minimal role.

Figure 2 about here

Figure 3 about here

#### 4.2. Smart shrinkage and economic and physical infrastructure

Although demographic and economic conditions are not considered to be part of entrepreneurial social infrastructure (ESI), such structural factors provide important context on the conditions that may help or hinder development of ESI and quality of life, which we argue leads to improved QoL. Although table 1 shows few demographic differences, we find that smart shrinking towns are much smaller in terms of population and municipal area compared to declining and both sets of growing towns (700 vs. around 1,000 people per square mile). Smart towns also have fewer and slower growing numbers of single-headed families with children, which typically correlates with lower child poverty and better child well-being outcomes (Pender et al., 2014). Although there are no statistical differences in base age structure, we do observe an aging population over time in smart shrinking towns with growing shares of elders over 65 years of age (1.7 vs. -1.3 points). This suggests growing numbers of elders may enhance QoL as this group has the time, financial resources, and experience to support improvement projects (Peters et al., 2017). Growing towns, both adverse and thriving, have better educated populations than both sets of shrinking ones.

Reinforcing the lack of spatial clustering found on the maps in figure 2, we find minimal geographic differences. Smart shrinking and declining towns have the same access to primary

roads and the same lack of natural amenities. By contrast, adverse growing and thriving places are more connected to transport networks and have some natural amenities. The only difference is that smart towns tend to be located in counties that are more rural with smaller urban centers (scoring a 6.9 of 9 indicating location in a county with an urban population between 2,500 and 19,999). However, declining places are in counties that became more rural and less urban since the 1990s. Overall, both sets of shrinking towns are becoming more geographically isolated from urban centers. This indicates smart shrinkage is less influenced by metropolitan proximity, meaning QoL gains are unlikely to be driven by greater access to urban amenities (Grzeskowiak et al., 2003).

---

Table 1 about here

---

In terms of economics, we find that smart shrinking towns have a number features that distinguish them from declining and even adverse growing places (see table 2). Smart shrinking towns have a strong job market as evidenced by higher labor force participation rates (45.6 vs. 42.9%), more workers employed in full-time and full-year jobs (55.2 vs. 50.1%), and shorter commuting times (19.6 vs. 25.4 minutes) than declining places. In addition, employment participation rates grew faster while commuting times barely changed since 1990, indicating more local job creation. Smart towns outperform adverse growing places on these measures, but lag behind thriving towns. Median incomes are statistically identical for all groups except for thriving towns, where incomes are higher and growing. However, poverty in smart shrinking towns is low (12.6 vs. 16.6%) and rates have not ticked upward over the past two decades (-0.3 drop vs. 3.8 gain) compared to declining and even adverse growing places.

For the most part, residents in all shrinking towns work in the same types of jobs except for two marked differences. Smart towns have much larger shares of residents employed in goods-producing industries like manufacturing and construction (32.4 vs. 26.3%); and counter to state and national trends the share of these jobs actually increased since the 1990s (6.5 vs. no gain). Rates in smart towns even outpaced those in adverse and thriving growth towns. On the other hand, smart shrinking towns have fewer jobs in retail trade and leisure services like entertainment, accommodation, food, and personal services (21.9 vs. 25.1%). These services jobs grew in declining and adverse growing places, but fell in smart ones. It is clear that blue-collar jobs in local goods-producing firms helps quality of life in shrinking towns, while lower-end services jobs hinders it.

-----  
Table 2 about here  
-----

#### 4.3. Smart shrinkage and entrepreneurial social infrastructure

The focus of our paper is to understand whether smart shrinking towns possess higher levels of entrepreneurial social infrastructure. We hypothesize that growing quality of life (smart outcomes) is driven by purposeful collective actions facilitated by ESI norms of openness and inclusion, mobilization of resources, and strong social networks (all smart inputs). We test this hypothesis using social capital and civic engagement indicators from the ISTP, presented in table 3. It is important to keep in mind we are examining the correlates of smartness on average, and not individual towns or specific strategies. The first dimension of ESI is legitimacy of alternatives, defined as community symbols and norms that promote collective action. We find smart shrinking towns score higher on *accepting controversy and depersonalizing politics*, as measured by bonding social capital indicators of trust and support in the community. Residents



1 in smart places see their towns as more trusting versus not trusting (71.0 vs. 64.8); and more  
2 supportive versus indifferent of others (72.3 vs. 66.9) compared to declining towns. In addition,  
3 smart towns became more trusting and supportive since 1994, while declining places became less  
4 so. A *focus on process* is also a feature of smart shrinkage with such towns being more open to  
5 new ideas rather than rejecting them (60.6 vs. 53.4); and this openness to ideas became stronger  
6 over time (3.7 point gain vs. -3.8 point drop). Residents in smart towns also feel they are more  
7 involved in local decision-making (64.2 vs. 60.9); and although the rate declined over time it was  
8 slower than in declining towns (-8.1 vs. -11.1 point fall). By contrast, thriving towns score higher  
9 on these indicators while adverse growing towns generally score lower.

10 Counter to ESI, we find that smart shrinking towns do not have a *low density of*  
11 *acquaintance*. People in both shrinking and growing towns have the same number of relatives  
12 and in-laws living in their communities; and smart shrinking places tend to have more close  
13 friends in the community compared to declining ones (49.8 vs. 47.1 in 2014, with a slower drop  
14 of -4.2 vs. -7.2 points). According to ESI, we expect to find much lower scores on these  
15 measures of bonding social capital in smart shrinking and thriving towns. Stronger bonding ties  
16 have previously been found to promote localism, bullying, mistrust of outsiders, and resistance to  
17 new ideas that suppresses collection actions and results in lower quality of life (Poortinga, 2012).  
18 However, our finding do not confirm previous research.

19 Improving quality of life is also contingent on the community's ability to mobilize  
20 resources (such as fundraising, volunteers, social connections, or specialized skills) for  
21 improvement projects, the second dimension of ESI. Flora and Flora (1993) make the case that  
22 *equal distribution of resources* is a precondition for effective mobilization, drawing in the poor  
23 as well as the wealthy. In table 1, we see the poorest 20 percent of households in smart shrinking

places own a slightly larger share of community income than in declining ones (5.0% vs. 4.6%). While income shares fell for both groups over time, the poor become much poorer in declining (-16.8% drop) than in smart (-6.6% drop) places. Further, poverty rates in smart towns have been low and stable since the 1990s, while in declining places poverty is high and growing. For comparison, inequality and poverty is low in thriving places, while adverse growing places have higher inequality far above what we see in smart shrinking towns. This is consistent with the inequality literature that finds lower income polarization linked to better socioeconomic and quality of life outcomes (Gornick and Jäntti, 2013).

Smart shrinking places engage in greater *private individual investment*. Over half (50.1%) of residents in smart shrinking places gave money or volunteered in a community improvement project, compared to just over two-fifths in declining, adverse growing, and thriving places. Greater private investment in housing is indicated by higher valued owner-occupied homes in smart versus declining towns (\$77,560 vs. \$65,880). Indirectly, private investment in the community is also indicated by residents viewing their town as much better kept-up (71.5), scoring higher than declining (58.8 with a -9.1 point drop) and even adverse growing (65.5 with a -4.7 point drop) towns. On the other hand, thriving towns score higher on this measure.

*Public collective investment* can be indirectly measured through community perceptions. Safety is an indicator of adequate law enforcement, courts, fire protection, and building code enforcement provided by local government through taxes and staffing. Residents in smart shrinking places feel safer in their towns, while those in declining ones feel slightly less safe (82.1 vs. 76.8). Another indicator of public collective investment is whether residents feel the entire town gets behind and supports community projects. We find more support for community

1 projects in smart versus declines places (58.6 vs. 50.1). The ESI literature also argues that  
2 collective investment is a function of confidence in the future (Sharp et al., 2002). Residents will  
3 invest in the community if they think its prospects look good in the future, and conversely will  
4 disinvest if they think the town will only continue to shrink and wither. We find that people in  
5 smart shrinking places think their town has much more going for it than other similar towns  
6 (66.8), and this confidence has increased over the past 20 years (1.8 point gain). Smart towns are  
7 even more confident that adverse growing places. By contrast, declining towns have less  
8 confidence in their communities that has eroded over time (48.9 with a -8.7 point drop). This is a  
9 nearly 18 point gap in confidence between smart and declining towns, the largest in our set of  
10 social indicators.

11       The last dimension of ESI is quality networks that are diverse, inclusive, and extensive. It  
12 is clear from our data that smart shrinking towns have more *diverse and inclusive networks*.  
13 People in smart places agree more than those in declining towns that organizations in the  
14 community work for the best interests of all residents (62.6 vs. 57.2); and that the community is  
15 open to new residents taking leadership positions (51.5 vs. 46.7). Although ratings have fallen in  
16 smart shrinking towns since 1994, the declines are slower than in declining places. Smart towns  
17 are also more tolerant versus prejudiced of others in the community compared to declining places  
18 (66.8 vs. 63.0). However, smart shrinking communities are no more accepting of racial and  
19 ethnic minorities, contrary to what the ESI framework predicts. This suggests tolerance of non-  
20 minority residents across non-racial lines (e.g. class or gender), but less tolerance of minorities  
21 themselves. Overall, thriving towns score higher on measures of diverse and inclusive networks;  
22 and both sets of growing towns are more accepting of different races, likely due to increased  
23 minority populations.

The extensiveness of networks is also important for network quality, measured here by memberships in formal clubs and organizations. *Strong horizontal networks* are those within the community and is similar to internal linking social capital. On average, each resident in a smart shrinking town is a member of 1.2 local organizations, while in declining towns the number is 1.1 per person – a small yet statistically significant difference. Specifically, we find smart towns have higher memberships in recreational clubs (1.7 vs. 1.4 per person), job-related groups like unions and professional associations (1.3 vs. 1.1 per person), and political and civic groups including school associations, historical societies, local development organizations, and community improvement clubs (1.4 vs. 1.3 per person). There is no statistical difference in memberships in service or fraternal organizations. Job-related groups are probably linked to the relatively large goods-producing sector in smart towns, likely advocating for better employment options for their members and the community at-large. Civic groups are key organizers of projects to address a wide range of issues in the community. However, horizontal networks have declined in both sets of shrinking places and in small towns overall, as younger and middle age residents eschew formal organizations (Sunblad and Sapp, 2011). *Strong vertical networks* are those connecting the community to state and national organizations that have formal power, again analogous to external linking social capital. We find residents in smart towns have slightly more memberships in outside organizations compared to declining places (0.80 vs. 0.70 per person). In short, strong intra-community linkages are a critical piece of social infrastructure that helps shrinking towns improve quality of life.

-----  
Table 3 about here  
-----

## 5. Conclusion

1           In this paper, we use a modified version of the smart shrinkage framework to understand  
2 why some small towns in the American Midwest have improved perceptions of quality of life in  
3 their community despite population losses. In response to our first research question, we find the  
4 smart shrinkage framework to be wanting in terms of conceptual clarity on the outcomes of  
5 smartness as well as the activities and inputs that are theorized to drive smartness. The literature  
6 tends to treat the causes and effects of smartness as one in the same. To address this issue, we  
7 advocate smart outcomes be measured using subjective quality of life assessments along three  
8 dimensions of the personal utility model, where community services and amenities are provided  
9 by the business, non-profit, and government sectors. We also advocate that the activities and  
10 inputs that cause smart outcomes be measured separately from QoL using the entrepreneurial  
11 social infrastructure (ESI) framework. ESI assumes that collective actions to achieve community  
12 goals are purposeful and innovative. We view our clarifications as a starting point in a larger  
13 conceptual discussion of the smart shrinkage framework. We acknowledge there may be  
14 competing models to operationalize smart shrinkage, notably the resiliency framework. We also  
15 recognize the many variations in how to think about and measure ESI and social capital more  
16 broadly. However, our paper is unique in proposing a more defined conceptual model that is  
17 tested using longitudinal data from a sample of small towns in the Midwestern United States.

18           Concerning the second research question, we find smart shrinkage is not solely  
19 attributable to demographic and geographic factors that are generally fixed in the near term. For  
20 the most part, smart shrinking and declining towns are nearly identical in terms of demographics,  
21 infrastructure, and natural amenities. Counter to what we expected, smart shrinking towns are  
22 located in more rural counties distant from population and employment centers. This suggests  
23 isolation from larger cities strengthens local ESI, while proximity to such cities creates

1 dependence that inhibits local action. For example, towns must provide for their own medical  
2 care as these services cannot be easily obtained in a nearby city. The same for economics, where  
3 isolated towns must create local job opportunities because commutes to employment centers are  
4 too long and costly. This isolation is both cause and consequence of poor connectivity to  
5 transportation networks.

6       On the other hand, we find a number of economic factors correlating with smart  
7 shrinkage. Smart towns have strong local labor markets, lower poverty, and an expanding goods-  
8 producing sector despite contractions at the state and national level. By contrast, there is a  
9 noticeable lack of such jobs in declining towns, which instead specialize in retail and leisure  
10 services jobs. According to regulation theory (Kumar, 2005), goods-producing jobs characteristic  
11 of the Fordist industrial economy are thought to enhance quality of life by typically providing  
12 middle-wage jobs, full-time and full-year work, health and retirement benefits, and require some  
13 education beyond high school (U.S. BLS, 2017). Such jobs provide economic opportunities to  
14 low and moderate income people, resulting in lower poverty and better socioeconomic outcomes  
15 (Peters, 2013). Conversely, retail and leisure services jobs linked to the post-Fordist services  
16 economy require minimal skills, pay lower wages with few if any benefits, and the work is  
17 contingent and part-time (Peters, 2012). We find no difference in professional services jobs  
18 across all towns whether shrinking or growing, indicating the new post-Fordist economy has  
19 created many low-end services jobs in small towns but none of the high-skill and high-wage ones  
20 often associated with the 21<sup>st</sup> century economy. Although the Fordist period has largely passed,  
21 vestiges of it still exist in some communities, as it appears to be in smart shrinking small towns  
22 in Iowa.

1           For the last question, we find evidence that smart shrinking places have greater  
2 community agency by exhibiting more civic engagement and stronger social networks, which is  
3 posited to drive quality of life according to the ESI framework. Our analysis finds residents in  
4 smart places tend to rate their towns as more trusting, supportive, and tolerant (versus  
5 mistrusting, indifferent, and prejudiced), indicating they are more likely to accept controversy  
6 and depersonalize politics on divisive issues. More focus on process is evidenced by more people  
7 saying their town is more open to new ideas and more open to residents being involved in  
8 decision-making. There is greater private investment with half the population participating in  
9 community projects, higher home values, and more residents viewing their town as well kept up.  
10 Public investment is also higher with residents in smart towns saying their community is very  
11 safe, that the whole town gets behind community projects, and that their town has more going for  
12 it than other places. All of these indicate a willingness of the community to invest in itself. Smart  
13 shrinking towns also have fairly inclusive and diverse networks, with strong bridging social  
14 capital indicated by the view that local organizations work on behalf of all residents, and that  
15 new residents are accepted as leaders. Horizontal or within community networks are also  
16 stronger with residents being members of more local clubs and organizations, especially those  
17 related to employment or civic groups. However, smart and declining towns are similar in terms  
18 of vertical networks; and are not inclined to accept people from different races and ethnicities.  
19 Counter to ESI, we find that smart towns have strong bonding social ties, which typically results  
20 in traditional and insular communities that have low ESI and poorer QoL. In conclusion, we find  
21 that smart shrinkage is primarily driven by social infrastructure, and less by economic and  
22 physical infrastructure. If we were to summarize the key difference between smart and declining  
23 places, it would be confidence in the future.

There are several limitations of our work that should be addressed in future research on smart shrinkage. First, there may be selection bias in our quality of life data between 1994 and 2014, as dissatisfied residents leave and satisfied ones stay that may artificially increase QoL ratings over time. However, not all shrinking towns have growing QoL, as one would expect if this bias were present. Many towns have drops in both population and QoL, indicating selection bias may not be a major issue. Second, our findings are based on a sample of towns in a single Midwestern state. More research is needed in other regions of the United States and in other developed nations to determine whether findings are consistent across various economic, cultural, and political contexts. Third, we present the correlates of smart shrinkage and not its potential causes. Future research should more rigorously examine causal linkages between smart inputs and outcomes in depopulating rural regions. Fourth, future work should also seek to develop a more comprehensive conceptual model of smart shrinkage that expands ESI to include spatial, physical, and historical factors. Lastly, this paper does not discuss specific strategies of smart shrinkage that can be used to guide local actions. An important next step is to identify and describe common activities and projects undertaken by shrinking places to improve quality of life, which can be replicated by designers, planners, and community developers in other shrinking small towns.

## Acknowledgements

See cover letter.

## Endnotes

1 Housing unit addresses were selected by telephone exchanges in 1994 and ZIP codes in 2014. Only 98 communities are used for analysis since one town selected in 1994 was



1 replaced in 2014 due to a sampling error by the research team. Design weights are used in some  
2 communities to correct for over-sampling of key sub-populations to ensure representativeness.

3       2 The QoL index is calculated using simple averaging instead of a formal measurement  
4 model for several reasons. First, we wanted to create a robust index of QoL where each indicator  
5 contributes equally. Measurement models estimate differential weights that amplify scores on a  
6 few indicators while diminishing other scores. Second, it is difficult to compare factor scores  
7 across time as the loadings and means differ in each year. Factor scores are essentially  $z$ -scores  
8 making them relative measures within a wave rather than absolute measures across waves.

9       To verify the QoL index, exploratory factor analysis (EFA) using principal components  
10 extraction finds two factors accounting for 81.4% of the variance in 2014 and 74.3% in 1994.  
11 The first factor includes jobs, medical, child care, and senior services; and the second public  
12 schools, housing, and local government. However, the second factor accounts for a small share  
13 of the variance as the three indicators have sizable cross-loadings on the first factor. Forcing a  
14 single factor reduces explained variance down to 66.7% in 2014 and 58.9% in 1994. We decided  
15 to sacrifice about 15% of variance by combining all seven items into a single QoL index to be  
16 consistent with previous research.

## 17 **References**

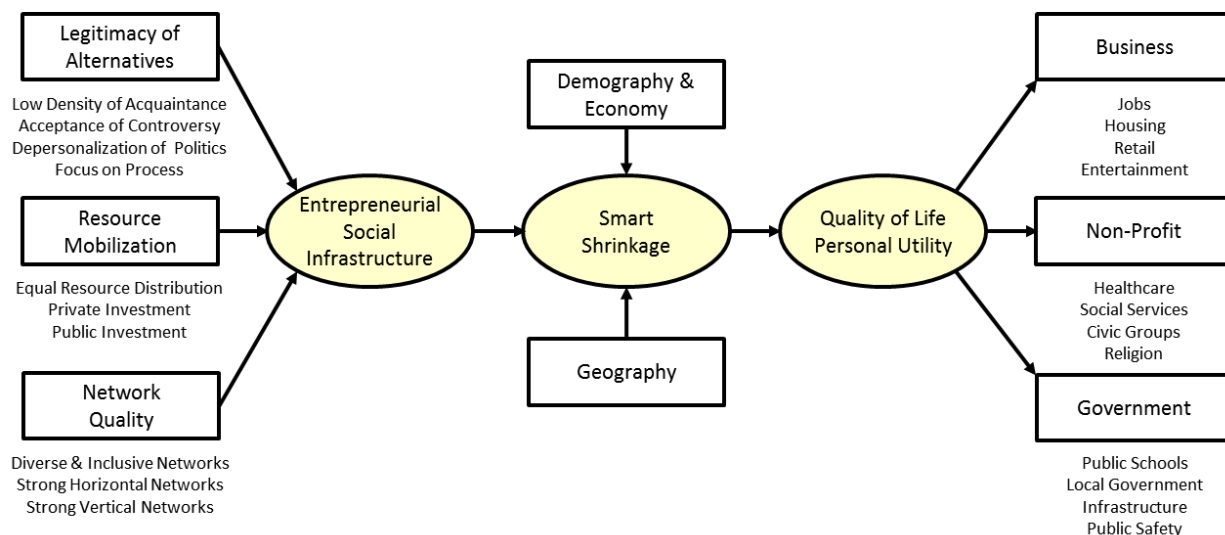
- 18 Beauregard, R., 2009. Urban loss in historical perspective: United States 1820-2000. *Environ.*  
19 *Plann. A* 41, pp. 514-528.  
20  
21 Bernt, M., Cocks, M., Couch, C., Grossmann, K., Haase, A., and Rink, D., 2012. Policy  
22 response, governance and future directions. Shrink Smart Research Brief No. 2, Helmholtz  
23 Centre for Environmental Research, Leipzig, Germany.  
24  
25 Besser, T., 2013. Resilient small rural towns and community shocks. *J. Rural Commn. Dev.* 8,  
26 pp. 117-134.  
27  
28 Besser, T., Harcey, S., and Peoples, C., 2015. Sigma: A Profile of Iowa Small Towns 1994 to  
29 2014. Sigma Project, Iowa State University, Ames, IA.  
30

- 1 Boncinelli, F., Pagnotta, G., Riccioli, F., and Casini, L., 2015. The determinants of quality of life  
2 in rural areas from a geographic perspective. *Rev. Urban Reg. Dev. Stud.* 27, pp. 104-117.  
3
- 4 Bowns, C., 2013. Shrinkage happens ... in small towns too! Responding to de-population and  
5 loss of place in Susquehanna River towns. *Urban Des. Int.* 18, pp. 61-77.  
6
- 7 Cohen, J, Cohen, P., West, S., and Aiken, L., 2003. *Applied Multivariate Regression/Correlation*  
8 *Analysis for the Behavioral Sciences* (3th ed.). Lawrence Earlbaum Associates, Manwah, NJ.  
9
- 10 Davoudi, S. and Madanipour, A., 2015. *Reconsidering Localism*. Routledge, New York.  
11
- 12 Dahl, E. and Malmberg-Heimonen, I., 2010. Social inequality and health: The role of social  
13 capital. *Sociol. Health Fit.* 32, pp. 1102-1119.  
14
- 15 Dewar, M. and Thomas, J., 2012. *The City After Abandonment*. University of Pennsylvania  
16 Press, Philadelphia.  
17
- 18 E.U. ESPON, 2017. Shrinking rural regions in Europe: Towards smart and innovative  
19 approaches to regional development challenges in depopulating rural regions. Policy Brief  
20 October 2017, ESPON EGTC, Luxembourg.  
21
- 22 Ferlander, S., 2007. The importance of different forms of social capital for health. *Acta Sociol.*  
23 50, pp. 115-128.  
24
- 25 Flora, C. and Flora, J., 1993. Entrepreneurial social infrastructure: A necessary ingredient. *Ann.*  
26 *Am. Acad. Polit. S.S.* 529, pp. 48-58.  
27
- 28 Flora, J., Sharp, J., Flora, C., and Newton, B., 1997. Entrepreneurial social infrastructure and  
29 locally initiated economic development in the nonmetropolitan United States. *Sociol. Quart.* 38,  
30 pp.623-645.  
31
- 32 Gordon, C., 2009. *Mapping Decline: St. Louis and the Fate of the American City*. University of  
33 Pennsylvania Press, Philadelphia.  
34
- 35 Gornick, J., and Jäntti, M., 2013. *Income Inequality: Economic Disparities and the Middle Class*  
36 *in Affluent Countries*. Stanford University Press, Stanford, CA.  
37
- 38 Grzeskowiak, S., Sirgy, M.J., and Widgery, R., 2003. Residents' satisfaction with community  
39 services: Predictors and outcomes. *J. Reg. Anal. Pol.* 33, pp. 1-36.  
40
- 41 Haase, A., Rink, D., Grossmann, K., Bernt, M., and Mykhnenko, V., 2014. Conceptualizing  
42 urban shrinkage. *Environ. Plann. A* 46, pp. 1519-1534.  
43
- 44 Hollander, J., 2011. Can a city successfully shrink? Evidence from survey data on neighborhood  
45 quality. *Urban Aff. Rev.* 47, pp. 129-141.  
46

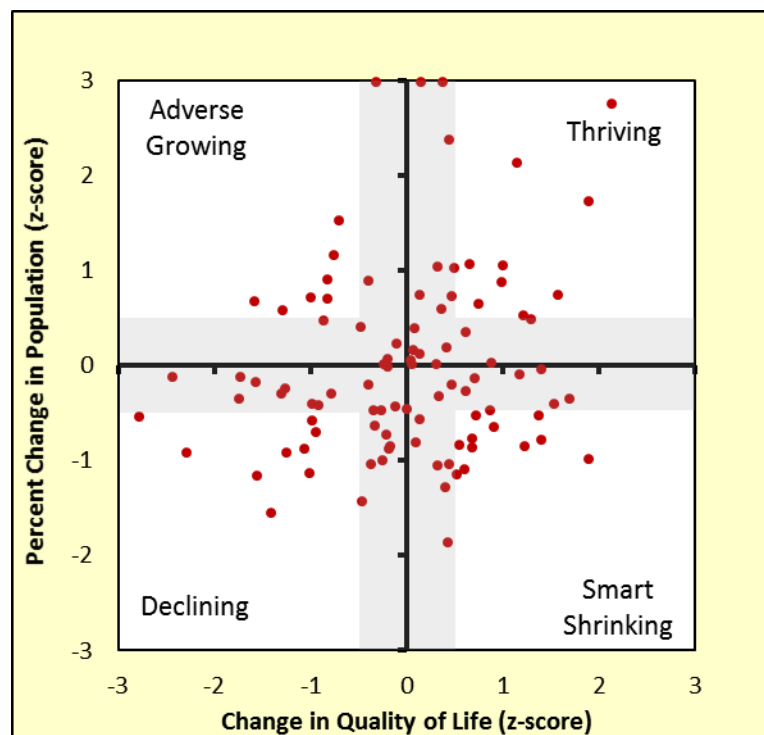
- 1 Hollander, J. and Németh, J., 2011. The bounds of smart decline: A foundational theory for  
2 planning shrinking cities. *Hous. Policy Debate* 21, pp. 349-367.  
3
- 4 Hospers, G., 2013. Coping with shrinkage in Europe's cities and towns. *Urban Des. Int.* 18, pp.  
5 78-89.  
6
- 7 Hospers, G., 2014. Policy responses to urban shrinkage: From growth thinking to civic  
8 engagement. *Eur. Plann. Stud.* 22, pp. 1507-1523.  
9
- 10 Hospers, G. and Syssner, J., 2018. Dealing with Urban and Rural Shrinkage: Formal and  
11 Informal Strategies. Lit Verlag, Zurich.  
12
- 13 Jacquet, J., Guthrie, E., and Jackson, H., 2017. Swept Out: Measuring Rurality and Migration  
14 Intentions on the Upper Great Plains. *Rural Sociol.* 82, pp. 601-627.  
15
- 16 Johnson, K., 2014. Rural demographic trends in the new century. In: Bailey, C., Jensen, L., and  
17 Ransom, E., Editors, 2014. *Rural America in a Globalizing World*, West Virginia University  
18 Press, Morgantown, WV.  
19
- 20 Kulig, J., Edge, D., Townshend, I., Lightfoot, N., and Reimer, W., 2013. Community resiliency:  
21 Emerging theoretical insights. *J. Community Psychol.* 41, pp. 758-775.  
22
- 23 Kumar, K., 2005. From Post-Industrial to Post-Modern Society: New Theories of the  
24 Contemporary World. Blackwell, Malden, MA.  
25
- 26 Kusmin, L., 2017. Rural America At A Glance, 2017 Edition. Bulletin 182, U.S. Department of  
27 Agriculture, Washington, DC.  
28
- 29 Lang, T., 2005. Insights in the British debate about urban decline and urban regeneration. IRS  
30 Working Paper, Leibniz-Institute for Regional Development and Structural Planning, Erkner,  
31 Germany.  
32
- 33 Meijer, M. and Syssner, J., 2017. Getting ahead in depopulating areas: How linking social capital  
34 is used for informal planning practices in Sweden and the Netherlands. *J. Rural Stud.* 55, pp. 59-  
35 70.  
36
- 37 Metzger, J., 2000. Planned abandonment: The neighborhood life-cycle theory and national urban  
38 policy. *Hous. Policy Debate* 11, pp. 7-40.  
39
- 40 Molloy, R., Smith, C., and Wozniak, A., 2011. Internal migration in the United States. *J. Econ.*  
41 *Perspect.* 25, pp. 173-196.  
42
- 43 Pallagst, K., Wiechmann, T., and Martinez-Fernandez, C., 2014. *Shrinking Cities: International*  
44 *Perspectives and Policy Implications*, Routledge, New York.  
45

- 1 Pender, J., Weber, B., Johnson, T., and Fannin, M., 2014. Rural Wealth Creation. Routledge,  
2 New York.
- 3
- 4 Peters, D., 2012. Understanding micro and meso scale income inequality in the Midwestern  
5 United States, 1979-2009. *Rural Sociol.* 77, pp. 171-202.
- 6
- 7 Peters, D., 2013. American income inequality across economic and geographic space, 1970-  
8 2010. *Soc. Sci. Res.* 42, pp. 1490-1504.
- 9
- 10 Peters, D., Fisher, H., and Zarecor, K., 2017. Shrink-smart small towns: Communities can still  
11 thrive as they lose population. SOC 3083, Iowa State University Extension, Ames, IA.
- 12
- 13 Poortinga, W., 2012. Community resilience and health: The role of bonding, bridging, and  
14 linking aspects of social capital. *Health Place* 18, pp. 286-295.
- 15
- 16 Potter, J., Cantarero, R., and Wood, H., 2012. The multi-dimensional nature of predicting quality  
17 of life. *Procedia Soc. Behav. Sci.* 50, pp. 781-790.
- 18
- 19 Reckien, D. and Martinez-Fernandez, C., 2011. Why do cities shrink? *Eur. Plann. Stud.* 19, pp.  
20 1375–1397.
- 21
- 22 Rhodes, J., and Russo, J., 2013. Shrinking ‘smart’?: Urban redevelopment and shrinkage in  
23 Youngstown, Ohio. *Urban Geogr.* 34, pp.305-326.
- 24
- 25 Rubin, O., 2016. The political dimension of ‘linking social capital’: Current analytical practices  
26 and the case for recalibration. *Theor. Soc.* 45, pp. 429-449.
- 27
- 28 Ryan B., 2012. *Design After Decline: How America Rebuilds Shrinking Cities*. University of  
29 Pennsylvania Press, Philadelphia.
- 30
- 31 Safford, S., 2009. *Why the Garden Club Couldn't Save Youngstown: The Transformation of the*  
32 *Rust Belt*. Harvard University Press, Cambridge, MA.
- 33
- 34 Shaffer, R., Deller, S., and Marcouiller, D., 2004. *Community Economics: Linking Theory with*  
35 *Practice*. Wiley-Blackwell, New York.
- 36
- 37 Sharp, J., Agnitsch, K., Ryan, V., and Flora, J., 2002. Social infrastructure and community  
38 economic development strategies: The case of self-development and industrial recruitment in  
39 rural Iowa. *J. Rural Stud.* 18, pp. 405-417.
- 40
- 41 Sharp, J. and Flora, J., 1999. Entrepreneurial social infrastructure and growth machine  
42 characteristics associated with industrial-recruitment and self-development strategies in  
43 nonmetropolitan communities. *Community Dev.* 30, pp. 131-153.
- 44
- 45 Sirgy, M.J., 2011. Theoretical perspectives guiding QOL indicator projects. *Soc. Indic. Res.* 103,  
46 pp. 1-22.

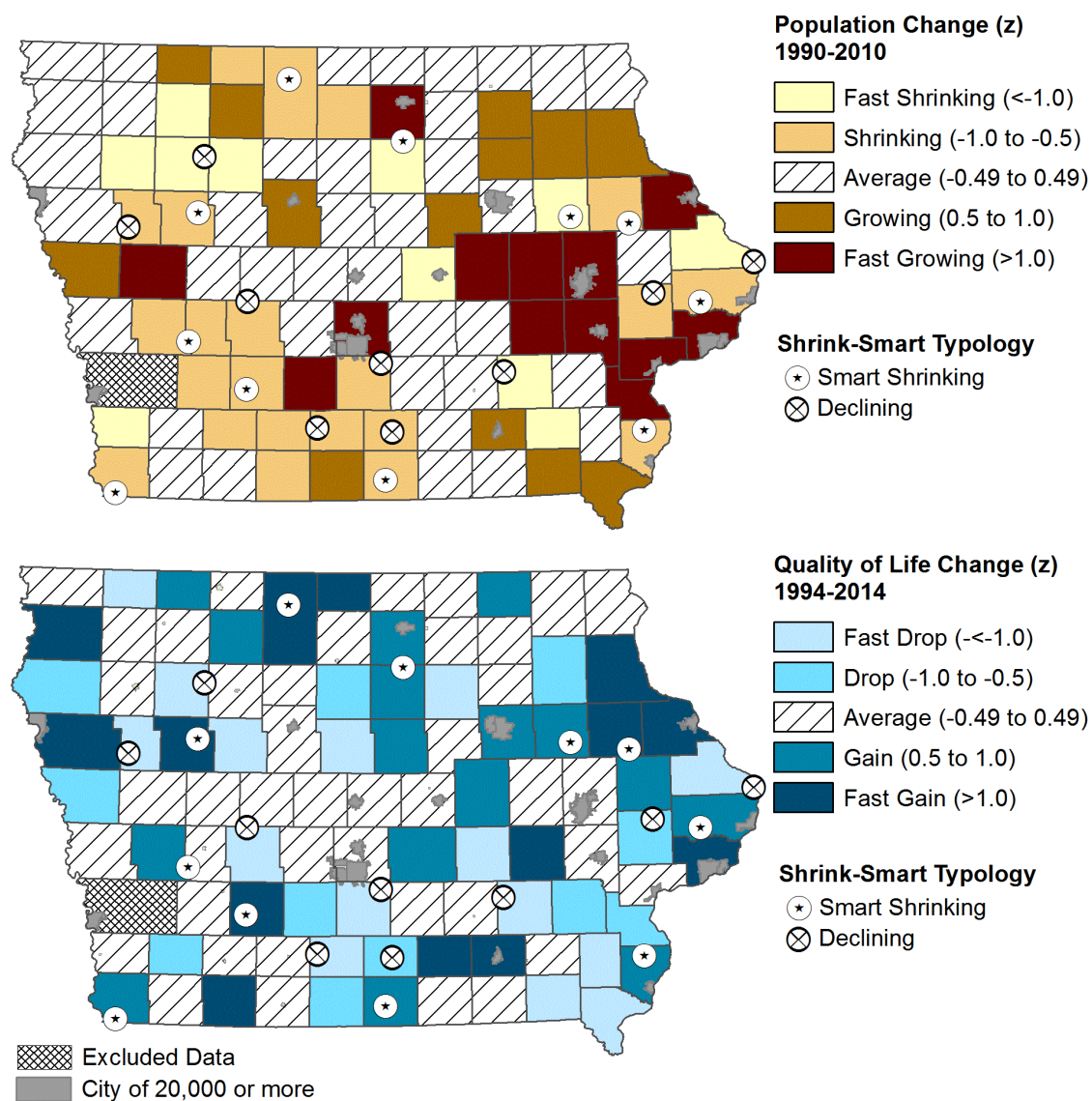
- 1  
2 Sirgy, M.J., Rahtz, D., Cici, M., and Underwood, R., 2000. A method for assessing residents'  
3 satisfaction with community-based services: A quality-of-life perspective. Soc. Indic. Res. 49,  
4 pp. 279-316.  
5  
6 Sunblad, D. and Sapp, S., 2011. The persistence of neighboring as a determinant of community  
7 attachment: A community field perspective. Rural Sociol. 76, pp. 511-534.  
8  
9 Tabachnick, B. and Fidell, L., 2012. Using Multivariate Statistics (6<sup>th</sup> ed.). Allyn and Bacon /  
10 Pearson, Boston.  
11  
12 Theide, B., Brown, D., Sanders, S., Glasgow, N., and Kulcsar, L., 2017. A demographic deficit?  
13 Local population aging and access to services in rural America, 1990-2010. Rural Sociol. 82, pp.  
14 44-74.  
15  
16 [dataset] U.S. Bureau of Labor Statistics, 2017. Employee Benefits Survey.  
17 <http://www.bls.gov/ncs/ebs>.  
18  
19 U.S. Census Bureau, 2014. American Community Survey design and methodology report. U.S.  
20 Department of Commerce, Washington DC. [https://www.census.gov/programs-](https://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html)  
21 [surveys/acs/methodology/design-and-methodology.html](https://www.census.gov/programs-surveys/acs/methodology/design-and-methodology.html)  
22  
23 Vujičić, T. and Đukić, A., 2015. Methodological framework for shrinking cities case study  
24 research: Northwest region of Bosnia and Herzegovina. Geod. Vestn. 59, pp. 520-536.  
25  
26 Weaver, R., Bagchi-Sen, S., Knight, J., and Frazier, A., 2016. Shrinking Cities: Understanding  
27 Urban Decline in the United States. Routledge, New York.  
28  
29 Wiechmann, T. and Pallagst, K., 2012. Urban shrinkage in Germany and the USA: A comparison  
30 of transformation patterns and local strategies. Int. J. Urban Regional 36, pp.261-280.  
31  
32 Zarecor, K., 2012. Socialist cities after socialism: The past, present, and future of postwar  
33 housing in the Czech Republic. E. Eur. Polit. Soc. 26, pp. 486-509.  
34  
35  
36  
37  
38  
39  
40



**Fig. 1.** Conceptual model of smart shrinkage using entrepreneurial social infrastructure and the personal utility model of quality of life. Ellipses represent latent concepts and rectangles observed indicators.



**Fig. 2.** Plot of standardized change in population (1990 and 2010) and quality of life (1994 and 2014) for  $n=98$  small towns in Iowa. Gray bars represent 1 standard deviation around the mean.



**Fig. 3.** Map of standardized change in population (1990-2010) and quality of life (1994-2014) for  $n=98$  small towns in Iowa. Symbols represent towns in the smart shrinkage typology.



**Table 1.**Mean difference tests of demographic and spatial indicators by the smart shrinkage typology for  $n=98$  small towns in Iowa.

	Base in 2010				Change from 1990			
	<i>Smart Shrinking (n=11)</i>	<i>Declining (n=9)</i>	<i>Adverse Growing (n=7)</i>	<i>Thriving (n=10)</i>	<i>Smart Shrinking (n=11)</i>	<i>Declining (n=9)</i>	<i>Adverse Growing (n=7)</i>	<i>Thriving (n=10)</i>
<b>Demographics</b>								
Population (#) <sup>ab</sup>	917	1,062	1,361	2,337***	-10.85	-12.89	21.15***	27.88***
Population Density (sq.mi.) <sup>a</sup>	725	1,052***	1,082***	1,006***	-87.63	-161.44***	186.41***	213.48***
Minorities	6.36	3.99	12.30*	5.00	5.20	3.00	9.43 <sup>†</sup>	4.37
Age 17 & Under	23.01	23.65	24.74	23.30	-3.28	-1.18	0.48**	-1.65
Age 65 & Older	24.17	21.69	17.68***	18.97***	1.73	-1.28**	-4.28***	-2.69***
Single-Headed Families with Children	28.54	37.03**	30.89	25.52	11.34	17.30 <sup>†</sup>	17.43 <sup>†</sup>	6.76
High School Non-Completers	12.98	13.70	14.31	7.48***	-11.16	-11.98	-9.43	-16.65***
4-Year College Graduates	13.64	10.91	19.45**	22.15***	3.89	1.66	7.38*	10.81***
<b>Geographic (county)</b>								
Urban to Rural Continuum Code (1-9)	6.90	5.72*	6.44	5.46**	0.05	0.75*	0.57	0.27
Highway Density 5 mi Radius (sq.mi.*10)	1.68	1.99	2.40***	2.36**	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
Topographic Variation (1-21)	7.96	9.15	9.15	7.71	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
Water Area (%)	0.69	0.55	1.44*	1.54**	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

Notes: Values reported as percentages except where noted. Different from Smart Shrinking places at <sup>†</sup> $p<0.10$ , \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$  using Games-Howell Test. *a* actual mean. *b* percent change. Population constant 1,420.

**Table 2.**Mean difference tests of economic and housing indicators by the smart shrinkage typology for  $n=98$  small towns in Iowa.

	Base in 2010				Change from 1990			
	<i>Smart Shrinking (n=11)</i>	<i>Declining (n=9)</i>	<i>Adverse Growing (n=7)</i>	<i>Thriving (n=10)</i>	<i>Smart Shrinking (n=11)</i>	<i>Declining (n=9)</i>	<i>Adverse Growing (n=7)</i>	<i>Thriving (n=10)</i>
<b>Employment</b>								
Employment Participation	45.76	42.89**	45.71	52.89***	2.56	0.44	0.55	7.17***
Full-Time & Full-Year Jobs	55.15	50.12**	48.40***	60.12**	4.16	-3.44***	-3.76***	6.79
Average Travel Time to Work (mins)	19.63	25.44***	22.43**	20.79	0.99	4.67***	3.41*	1.63
Agriculture & Natural Resources	4.56	4.96	4.07	3.13	-4.26	-3.60	-4.47	-5.79
Manuf., Const. & Mining	32.43	26.26*	21.53***	27.17*	6.51	0.04**	-3.19***	2.03†
Transport, Telecomm & Utilities	8.57	7.43	7.56	6.24**	1.31	1.58	2.08	0.79
Prof. Svcs., Finance & Real Estate	5.67	5.41	7.81†	6.62	-3.45	-4.68	-2.93	-4.26
Health, Social & Education Svcs.	21.10	23.31	26.19*	25.93*	2.28	6.11**	5.42*	7.78***
Retail Trade & Leisure Svcs.	21.85	25.05*	27.68***	23.76	-0.38	2.49*	5.31***	0.35
<b>Income</b>								
Median Household Income (2010\$) <sup>a</sup>	\$40,729	\$39,890	\$42,066	\$52,664***	20.28	15.56	21.68	40.89***
Poverty	12.62	16.57**	15.53†	7.00***	-0.34	3.83**	2.79*	-2.69
Income Owned by Bottom 20% <sup>a</sup>	5.02	4.58†	4.24**	5.95***	-6.55	-16.84†	-26.02***	9.75**
Income Owned by Top 20% <sup>a</sup>	42.60	43.34	43.94	41.13	1.15	4.91	4.74	-3.29
<b>Housing</b>								
Occupied Housing Units	89.44	89.73	90.28	90.37	-3.24	-2.89	-0.95	-2.42
Median Home Value (2010\$) <sup>a</sup>	\$77,559	\$65,875*	\$82,694	112,683***	55.07	47.44	42.03	90.69***

Notes: Values reported as percentages except where noted. Different from Smart Shrinking places at † $p<0.10$ , \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$  using Games-Howell Test. <sup>a</sup> percent change. Population constant 1,420.

**Table 3.**

Mean difference tests of quality of life, social capital, and community perception indicators by the smart shrinkage typology for  $n=98$  small towns in Iowa.

	Base in 2014				Change from 1994			
	<i>Smart Shrinking</i> ( $n=11$ )	<i>Declining</i> ( $n=9$ )	<i>Adverse Growing</i> ( $n=7$ )	<i>Thriving</i> ( $n=10$ )	<i>Smart Shrinking</i> ( $n=11$ )	<i>Declining</i> ( $n=9$ )	<i>Adverse Growing</i> ( $n=7$ )	<i>Thriving</i> ( $n=10$ )
<b>Quality of Life</b>								
Quality of Life Index <sup>a</sup>	57.71	41.61 <sup>***</sup>	46.80 <sup>***</sup>	60.20	11.32	-3.54 <sup>***</sup>	-0.63 <sup>***</sup>	12.67
<b>Social Capital</b>								
Bonding – Close Friends in Town	49.83	47.06 <sup>†</sup>	47.19	46.00 <sup>*</sup>	-4.24	-7.21 <sup>***</sup>	-6.33 <sup>*</sup>	-3.79
Bonding – Relatives/In-Laws in Town	36.33	37.68	34.94	34.13	-5.02	-2.91 <sup>*</sup>	-3.50	-2.94 <sup>*</sup>
Bonding – Not Trusting v. Trusting	70.97	64.77 <sup>***</sup>	68.49	75.60 <sup>**</sup>	2.34	-4.08 <sup>***</sup>	1.16	3.07
Bonding – Indifferent v. Supportive	72.26	66.88 <sup>***</sup>	68.45 <sup>**</sup>	75.37 <sup>*</sup>	6.81	1.46 <sup>***</sup>	3.36 <sup>**</sup>	6.38
Bridging – Organizations Work for All	62.61	57.23 <sup>***</sup>	58.84 <sup>**</sup>	64.75	-6.08	-11.06 <sup>***</sup>	-8.31	-5.37
Bridging – New Residents as Leaders	51.50	46.66 <sup>***</sup>	49.68	57.66 <sup>***</sup>	-6.08	-9.02 <sup>*</sup>	-6.38	0.13 <sup>***</sup>
Bridging – Prejudiced v. Tolerant	66.75	63.03 <sup>***</sup>	65.02	72.01 <sup>***</sup>	12.19	7.42 <sup>***</sup>	8.01 <sup>**</sup>	14.62
Bridging – Reject v. Open to New Ideas	60.64	53.35 <sup>***</sup>	57.60	65.86 <sup>***</sup>	3.73	-3.83 <sup>***</sup>	1.43	8.59 <sup>***</sup>
Linking – External Organizations (#)	0.80	0.70 <sup>*</sup>	0.82	0.86	0.02	-0.06	-0.08	-0.03
Linking – Internal Organizations (#)	1.21	1.05 <sup>*</sup>	1.14	1.08	-0.53	-0.55	-0.55	-0.52
<b>Civic Engagement</b>								
Participated in a Project Last Year (%)	50.13	43.14 <sup>*</sup>	40.92 <sup>**</sup>	40.65 <sup>**</sup>	-0.34	-2.64	-7.65 <sup>*</sup>	-5.49
Community Support for Projects	58.61	50.06 <sup>***</sup>	53.77 <sup>**</sup>	60.89	-4.75	-12.15 <sup>***</sup>	-7.78 <sup>*</sup>	-3.92
Residents Involved in Decisions	64.22	60.93 <sup>**</sup>	60.13 <sup>***</sup>	66.48 <sup>*</sup>	-8.12	-11.07 <sup>**</sup>	-10.42 <sup>*</sup>	-6.63
<b>Community Perceptions</b>								
Dangerous v. Safe	82.10	76.81 <sup>***</sup>	79.43	85.83 <sup>**</sup>	4.96	0.02 <sup>***</sup>	2.48 <sup>*</sup>	3.98
Run-Down v. Well-Kept	71.45	58.83 <sup>***</sup>	65.45 <sup>*</sup>	79.07 <sup>**</sup>	0.44	-9.11 <sup>***</sup>	-4.69 <sup>**</sup>	1.50
Town Has More Going for It	66.77	48.91 <sup>***</sup>	59.90 <sup>*</sup>	71.22	1.84	-8.68 <sup>***</sup>	-4.37 <sup>***</sup>	0.28
Accepting of Different Races/Ethnicities	56.56	55.58	60.59 <sup>**</sup>	63.30 <sup>***</sup>	2.41	1.53	3.68	6.22 <sup>**</sup>

1 *Notes:* Values reported as percentages except where noted. Different from Smart Shrinking places at † $p<0.10$ , \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$   
2 using Games-Howell Test. *a* actual mean. Population constant 1,420.  
3

## Appendix. Variation definitions

Population. Scale: Number. Unit: Place. Source: ACS and Decennial Census.

Population Density (People per square mile). Scale: Number. Unit: Place. Source: ACS and Decennial Census.

Minorities (Non-white race or Hispanic). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Age 17 & Under. Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Age 65 & Older. Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Single-Headed Families with Children (Families with children that are headed by a female or male). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

High School Non-Completers (Population over 25 years without a high school diploma or equivalent). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

4-Year College Graduates (Population over 25 years with a Bachelor's degree or higher). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Urban to Rural Continuum Code. Scale: 1 (urban) to 9 (rural). Unit: County. Source: ERS, USDA.

Highway Density 5 mi. Radius (Miles of primary and secondary roads within a 5 mile radius. Linear miles divided by area in square miles, multiplied by 10 for interpretation). Scale: Number. Unit: Place. Source: Iowa Department of Transportation and ESRI.

Topographic Variation. Scale: 1-4 (plains), 5-8 (tablelands), 9-12 (plains with hills & mountains), 13-17 (open hills & mountains), 18-21 (hills & mountains). Unit: County. Source: ERS, USDA.

Water Area (Percent of county area covered in water). Scale: Percent. Unit: County. Source: ERS, USDA.

Employment Participation (Employment by residence divided by population). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Full-Time & Full-Year Jobs (Employment for 35 hours or more per week for 50 or more weeks per year). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Average Travel Time to Work (For employed persons). Scale: Minutes. Unit: Place. Source: ACS and Decennial Census.

Agriculture & Natural Resources (Employment by residence in agriculture, forestry, fishing, and hunting). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Manuf., Const. & Mining (Employment by residence in manufacturing, construction, and mining). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Transport, Telecomm & Utilities (Employment by residence in transportation and warehousing, utilities, and information). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Prof. Svcs., Finance & Real Estate (Employment by residence in professional, scientific, technical services; and finance, insurance, and real estate). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Health, Social & Education Svcs. (Employment by residence in health care and social assistance; and education. Includes public and private.). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Retail Trade & Leisure Svcs. (Employment by residence in retail trade; and arts, entertainment, recreation, accommodation, and food services). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Median Household Income (2010 real dollars). Scale: Dollars. Unit: Place. Source: ACS and Decennial Census.

Poverty (Person rate). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Income Owned by Bottom 20% (Percent income owned by households in bottom quintile. Income distribution estimated from grouped income categories. See Peters 2013 for method). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Income Owned by Top 20% (Percent income owned by households in top quintile. Income distribution estimated from grouped income categories. See Peters 2013 for method). Scale: Percent. Unit: Place. Source: ACS and Decennial Census.

Occupied Housing Units. Scale: Percent. Unit: Place. Source: ACS and Decennial Census

Median Home Value (2010 real dollars). Scale: Dollars. Unit: Place. Source: ACS and Decennial Census.

Quality of Life Measures (How do you rate the quality of \_\_\_\_ in your community?). Scale: 1 (poor) to 5 (very good) Likert scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

Close Friends in Community (About what proportion of your close personal adults friends live in the community?). Scale: 1 (none) to 6 (all) Likert scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

1 Relatives & In-Laws in Community (About what proportion of your adult relatives and in-laws  
2 live in the community?). Scale: 1 (none) to 6 (all) Likert scale converted to 0-100 scale. Unit:  
3 ZIP Code. Source: ISTP.

4  
5 Not Trusting v. Trusting (What best describes your community?). Scale: 1 (not trusting) to 7  
6 (trusting) semantic differential scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

7  
8 Indifferent v. Supportive (What best describes your community?). Scale: 1 (indifferent) to 7  
9 (supportive) semantic differential scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

10  
11 Organizations Work for All (Clubs and organizations in the community are interested in what is  
12 best for all residents). Scale: 1 (strongly disagree) to 5 (strongly agree) Likert scale converted to  
13 0-100 scale. Unit: ZIP Code. Source: ISTP.

14  
15 New Residents as Leaders (Residents in the community are receptive to new residents taking  
16 leadership positions). Scale: 1 (strongly disagree) to 5 (strongly agree) Likert scale converted to  
17 0-100 scale. Unit: ZIP Code. Source: ISTP.

18  
19 Prejudiced v. Tolerant (What best describes your community?). Scale: 1 (prejudiced) to 7  
20 (tolerant) semantic differential scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

21  
22 Rejecting v. Open to New Ideas (What best describes your community?). Scale: 1 (rejecting of  
23 new ideas) to 7 (open to new ideas) semantic differential scale converted to 0-100 scale. Unit:  
24 ZIP Code. Source: ISTP.

25  
26 External Linking Social Capital (How many organizations do you belong to that hold meetings  
27 outside of the community?). Scale: Number. Unit: ZIP Code. Source: ISTP.

28  
29 Internal Linking Social Capital (Considering all types of groups and organizations, about how  
30 many local groups do you belong to in the community?). Scale: Number. Unit: ZIP Code.  
31 Source: ISTP.

32  
33 Participated in a Project Last Year (How many times in the past 12 month have you participated  
34 in a community improvement project, such as a volunteer project or fund-raising effort?). Scale:  
35 Percent once to 10 or more times. Unit: ZIP Code. Source: ISTP.

36  
37 Community Support for Projects (When something needs to get done, the whole community gets  
38 behind it). Scale: 1 (strongly disagree) to 5 (strongly agree) Likert scale converted to 0-100 scale.  
39 Unit: ZIP Code. Source: ISTP.

40  
41 Residents Involved in Decisions (Most everyone in the community is allowed to contribute to  
42 local governmental affairs if they want to). Scale: 1 (strongly disagree) to 5 (strongly agree)  
43 Likert scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

44  
45 Dangerous v. Safe (What best describes your community?). Scale: 1 (dangerous) to 7 (safe)  
46 semantic differential scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

Run-Down v. Well-Kept (What best describes your community?). Scale: 1 (run-down) to 7 (well-kept) semantic differential scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

Town Has More Going for It (Overall, this community has a lot going for it compared with other communities of similar size). Scale: 1 (strongly disagree) to 5 (strongly agree) Likert scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.

Accepting of Different Races/Ethnicities (People living in the community are willing to accept people from different racial and ethnic groups). Scale: 1 (strongly disagree) to 5 (strongly agree) Likert scale converted to 0-100 scale. Unit: ZIP Code. Source: ISTP.