EXPLORING REGIONAL DEVELOPMENT
A Geographic Perspective

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Preface
Professional Paper No. 22 is organized around the theme of regional development. While the uniting theme is regional development, the scope and scale of analysis in the papers varies. Similarly, the degree to which the papers represent applied versus conceptual contributions to the paper series ranges from prescriptive to wholly conceptual. Despite the internal diversity, this installment does provide an accounting of the range of research conducted within the Department's Regional Development-Urban Geography cluster.

It is within the context of providing a sketch of departmental research and activity that the Professional Papers Series was initiated by Ben Moulten (Professor and Chair Emeritus) in the late-1960s. As a result, early papers included a range of papers from across the department and programs. While Exploring Regional Development: A Geographic Perspective (like Papers 20 and 21) departs from earlier more eclectic collections of papers, it correctly highlights the work of ISU geographers (students and faculty alike) and colleagues with whom they regularly collaborate. Moreover, this issue does represent a return to an all but forgotten traditions established by the early papers. That is, a facsimile of the original cover returns and so does the series’ secondary mission to provide an accounting of the intellectual climate at ISU by listing recent M.A., M.S., and Ph.D. thesis/dissertation titles.

In conclusion, this paper—like future papers—will continue to highlight the accomplishments of ISU’s Department of Geography, Geology, and Anthropology. In future issues, it is fully anticipated that other research clusters will be highlighted as well as developing special issues dedicated to intra-departmental and multi-disciplinary collaborations.

Jay D. Gatrell, Editor
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The regional concept and regional development:  
Policy networks in action and in place

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Abstract

This paper considers the policy implications of contemporary conceptualizations of the region. In doing so, the paper reviews the emergence of a reconstructed regional geography in geography and the resurgence of a new regionalism within the policy community. Conceptually, the new regionalism and reconstructed regional geography are considered within the context of Lefebvre’s Triad. The paper concludes by presenting a typology of regional policy networks and examples of each.

...reconstructed regional geography is not all talk.  
Mary Beth Pudup (2000, p. 404)

The re-constitution of the areal tradition within geography has long been a work in progress. For the past 25 years, the discipline’s great leaders have reacted to the expansion of systematic geography, increased specialization, and the marginalization of the areal tradition by encouraging geographers to ‘get back to the basics’ (such as Hart 1980; Lewis 1985; Pudup 1988; Gaile and Wilmott 1989). For classic regional geographers, the basic task of geography was to document the uniqueness of place and develop meaningful accounts of these locations. Unfortunately, the regional concept’s idiographic approach and philosophical and methodological commitments to individualism prevented—and in some cases explicitly rejected (i.e., Hart 1982)—the assertion that people, regions, or places could be explained. Because of this, the work of regional geographers—and the trajectory of the wider discipline they were once at the forefront of—were decreasingly representative of the social sciences and emerging debates within the discipline.

In this paper, the regional concept—and its re-emergence—is considered within the context of regional development policy. In this paper, we: (1) review the development of a new reconstructed regional geography; (2) consider politics of local economic development; (3) examine the development of a New Regionalism and the issues of regional governance that are responses to the local politics of economic development, and (4) present several examples of the development of new regional policy networks that aid regions as they compete for vital economic development dollars.

Reconstructed Regional Geography

By the 1980s, traditional regional geography had been eclipsed by the methodological developments (i.e., quantitative geography) and epistemological debates (such as, logical-
positivism, Marxism, and behaviouralism) of the 1960s and 1970s. By the late-1970s, regional geographers were no longer the discipline’s dominant research thrust and their regions—as objects—were limited ‘conceptual conveniences rather than real geographical entities’ (Smith and Dennis 1986, p. 16). That is, the meanings of the many rich individualized accounts of areas were unconnected to wider social processes, systems or spaces.

Despite an interest in uniqueness, traditional regional geographers were unable able to ask or answer the basic questions ‘why place’ or ‘why here’. For this reason, systematic geographers were interested in uncovering the processes that drove the development of distinct human geographies. Driven by a need to understand socio-spatial processes and establish a theoretical regional geography, quantitative and radical geographers actively undertook a new regional research program, Reconstructed Regional Geography. This new regional geography developed to understand and explain the processes that produce similar and different spaces and that these spaces have meaning (Agnew 1988; 1999). This new theoretical regional geography posited that regions developed as: (1) responses to economic structures (i.e., the manufacturing belt and industrial restructuring), (2) shared identities (i.e., Appalachia and Appalachian); and (3) platforms for social interactions that were co-determined by macro- and micro-scale structures, processes, and decision making (Gilbert 1988).

While none of these region types were mutually exclusive, the region was no longer an artifice defined by researchers—but spaces consumed and produced by wider social processes. The reconstructed regional concept was also an entity defined by shared social systems—not the singular perspective of researchers. By acknowledging that regions are embedded within a variety of macro and micro social processes, the sameness, not the uniqueness of regions enables geographers to develop and contribute to a literature on local and regional economic development.

While the development of these ideas is itself an interesting narrative, the recognition that social processes were inherently regional processes was an essential step towards understanding and appreciating the complex interactions that shape local politics and economic development. Specifically, the development of a reconstructed regional geography empowered social theorists to explore the inter-relationships and contradictions that are often situated at the meso- or regional scale. The place-space dichotomy—as it has come to be known (see Merrifield (1993))—has become a major point of departure for geographers and policy makers as they try to leverage the power of local agency and mediate the negative externalities attributed to more macro-level or global forces. In the next section, the politics of scale are considered and the development of coping strategies discussed.

Politics of Local Economic Development
The politics of scale has recently become an important issue not only in geography but the broader social sciences in general. The work of Smith (1984, 1992) and Swyngedouw (1997a, 1997b) address ways in which space and scale are socially constructed which, in turn, provides important background for subsequent work in the politics of scale and the realities of ‘glocalization’. It is Cox

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1 Swyngedouw posits that globalization is an imprecise term to understand the contemporary interactions and interdependencies that develop within and between scales and spaces of dependences. That is, the dynamics of globalization are not situated at a single
(1998), however, who provides us with a conceptual framework from which we can begin to work. In his notion of the politics of scale, Cox (1998) identifies three structures that are of primary importance: spaces of dependence, spaces of engagement, and networks of association.

As the appellation implies, a “space of dependence” is essentially the limited space within which one or more entities are dependent upon key interactions, or socio-spatial relationships (such as firm and employee), to reproduce essential infrastructures within a given locality. Hence, local actors are dependent upon each other and the elimination or loss of actors and related investment can have significant consequences for the entire locality and all locally dependant structures. While the substitution or mobility of a particular socio-spatial relationship within a space of dependence is possible, the socio-spatial relationships that constitute spaces of dependence are necessary to reproduce the material conditions of everyday life. The aforementioned entities may be as diverse as homeowner’s associations, councils of governments, or corporations. As such, the spatial extent of such an entity may be very limited or quite expansive. For example, local homeowners and homeowner’s association may be limited to the boundaries of a given subdivision while that of the utility company may cover substantial portions of several states. In either case, however, the interests and activities of the group are generally focused on maintaining or improving the conditions in their particular space of dependence vis-à-vis local policy initiatives (such as land use, taxation, and worker retraining) and shared infrastructures (i.e., roads, utilities, and institutions).

In an effort to ensure the continuation and viability of local and regional spaces of dependence, local actors (individuals, firms, governments, and business coalitions) create local growth coalitions and seek to establish mutually beneficial relationships with other organizations beyond the local milieu. These so-called “networks of association” allow local groups to leverage the combined social and political powers of one another to bring about some change (or, to prevent said change as the case may be). These groups, working together in networks of association create new “spaces of engagement” (Cox 1998). It is by means of these spaces of engagement that, “the politics of securing a space of dependence unfolds” through sustained and expanded capital investment (Cox, 1998,2). Often the space of engagement involves the jumping of scales to a ‘more global’ than the space of dependence, but this is not always the case. In this context, a local government, for example, may wish to form an alliance with a state or federal agency in an attempt to maintain or improve its position vis-à-vis nearby localities.

In a regional development context, it is easy to conceptualize a space of engagement that involves jumping scales to a ‘more global’ level. For example, many high growth regions have aggressively developed and implemented regional governing strategies and planning authorities. In the case of the Triangle J Council of Governments (TJCOG) in Durham, NC, TJCOG coordinates regional development activities for a seven county area of central North Carolina. In order to perform its duties, TJCOG must form a network of alliances with, among others, municipal and county governments in each of
the counties covered by the TJCOG. In this instance, the TJCOG is creating a space of engagement that involves moving from a more global (the seven county area) to a more local (individual city and county governments in these counties) space of dependence. Admittedly, this is only a single component of much more complex and integrated socio-spatial processes that include a wide range of actors (developers, utility companies, state and federal government agencies, etc.) tied together through a complex network of association and each having a separate, but to varying degrees, overlapping space of dependence – some ‘more local’, some ‘more global’.

The ability of locally dependent organizations, structures, and firms to engage in more global policy arrangements demonstrates that the politics of scale and the politics of public policy—particularly regional development policy—are analogous and complementary. Indeed, the competition for capital investment requires local and regional actors design and implement alternate governing strategies to maintain and expand investment. For this reason, the global politics of economic development require all local and regional systems, even in thriving ‘high tech’ corridors like NC’s Research Triangle, develop new—regional—strategies to lure and maintain investment.

New Regionalism and Regional Policy Networks: Legitimacy, Stability & the Realities of New Federalism

The region is an important policy unit (Danson et al. 2000). Whether cloaked in the language of “New Urban Politics”, “New Localism”, or “New Regionalism”, policymakers are very much interested in engineering stable geographies to implement policy and promote sustainable economic development (DeFilippis 1999; Cox 1998, 1995; Deas and Ward 2000; Keating 1997). Hence, new regionalism represents a strategic effort by individual communities to escape the atomistic characteristics of home rule and obtain a critical, and complementary, mass of resources that separately they do not have (Bluechel 1993). Or in other words, new regionalism allow policy makers, interest groups, and implementing agents to create a policy network (Heclo 1978) or advocacy coalition (Sabatier and Jenkins-Smith 1993) focused on shared spatial interests and resources.

In addition to globalization, other ‘drivers’ have promoted the development of new regionalism. Specifically, new regionalism has also been a response to New Federalism in America (Eisinger 1999), Thatcherism and its subsequent neo-liberal articulations in England (Deas and Ward 2000; Peck and Tickell 1995) and variations that have evolved around the world. New Federalism, the devolution of federal services to localities, has placed a variety of new responsibilities and fiscal stresses on communities (Eisinger 1999). The new federalism has forced localities to seek shared approaches towards service provision as government’s face uncertain revenue streams, the constant threat of uneven development, and the zero-sum game of industrial recruitment (Loveridge 1995). Concomitantly, an array of parallel national movements also contributed to the development of new regional strategies. For example, California’s proposition 13 and other taxpayer revolts have also contributed to fiscal uncertainties at the local level (Erie et al 1998; Fulton et al. 1998).

In practical terms, new regionalism is a neo-liberal response to the uncertainties of capital investment. Hence, the implementation of region-wide service delivery plans, governing strategies, or economic development
initiatives require local officials clearly articulate regional spaces. The construction of regional policy spaces—or spatial niches—reflects the shared realities of residents, business, and communities alike (Gatrell and Fintor 1997; Gatrell and Worsham nd; Crotty 2000; Gatrell and Reid fc).

The success of failure of new regionalism and related economic development efforts is fully dependant upon the legitimacy of a shared policy agenda (Worsham 1998, 1997; Eisner, Worsham, & Ringquist 2000) and regional identity (Gatrell and Fintor 1997; Tomaney and Ward 2000). Because the question of legitimacy is an essential component of any regional policy effort including the legitimacy of the regional construct, government involvement, implementing agency, and clients as beneficiaries (see Hargrove and Glidewell 1990), policy makers must clearly understand and appreciate the regional concept. If questions of legitimacy are at the forefront of early regional and policy discussions, policy spaces and networks will more closely reflect the values and beliefs of policy makers, bureaucrats, constituents, and clients (see Figure 1) (Gatrell 2000).

**Regional Policy Units**
Four general types of regional policy networks have emerged. These types are: (1) Governance; (2) Area-wide Infrastructure Districts; (3) Collaborative Partnerships; and (4) Local associations. In addition to these ‘more local’ regions, ‘more global’ policy regions also exist, like the Appalachian Regional Commission and the Tennessee Valley Authority. However, the ‘more local’ regions are unique, as they must strike a delicate balance between the principles of home rule and local sovereignty and implementing collaborative entrepreneurial efforts to compete for capital investment. Moreover, the politics of local policy networks are inherently different than more global arrangements like the ARC or TVA. Unlike the entirely distributive politics of the ARC and the benefits of congressional earmarking associated with many TVA projects, membership in each of the four types of regional policy networks described below requires actors participate in a range of semi-redistributive politics (i.e., transfers of capital between actors, constituencies, and clients) and regulatory actions (i.e., zoning, historic preservation ordinances or incentives). While certainly local policy networks enjoy some benefits of distributive politics (i.e., new infrastructures), the balance of regional policy networks is re-distributive or regulatory as governments and organizations seek to navigate the costly landscape of New Federalism and uncertain terrain of globalization. Because of these combined challenges, local policy networks should be more fully understood and the structure of policy regions examined.

**Figure 1. Regional Policy Networks**

(1) Governance: Indianapolis’ Unigov
The transition from city to metropolitan region that has characterized North American urbanization can be attributed to a range of economic, technological, and political factors. These forces mandate metropolitan regions develop collaborative and effective strategies
that reposition as effective competitors or place entrepreneurs. Emphasizing collaborative and cooperative development programmes, new regional governance strategies have enabled communities to avoid traditional industrial recruitment and retention strategies that inherently degrade into a zero-sum game of smoke stack chasing between ‘cities’ (Loveridge 1995). In this context, the metropolitan era has developed as a response to the unsustainable economic environment that accompanied rapid suburbanization and erosion of local revenue streams. In concert, these drivers encourage communities to develop new governing arrangements that were practical and effective responses to economic development. For example, the city of Indianapolis and Marion County formed an inter-governmental alliance in 1970 based on the basic principles of the federal government’s three branches of government. Known as Unigov, the Indianapolis experiment was one of the first urban centers in America to adopt this model. Like Nashville’s MetroGov to the south, the unified model of government proved to be an especially effective model for simplifying the intra-metropolitan competition for investment—as well as an effective means of constructing and conveying a unified public image.

Indeed, the efforts of leaders to establish clear and unified spatial niche within the place-market continues to be an important economic development tool. The unique governing arrangement is an important asset as the city and the Indianapolis Regional Development Partnership market the community and suburban counties to potential investors. However, the success of Indianapolis’ Unigov is an exception in terms of contemporary urban governance. While many communities attempt to establish regional planning organization and to move towards regional or metropolitan government, the ability to create a solid and shared regional image that is accepted by citizens, leaders, and business is difficult. This is particularly true in a post-suburban era and in multi-nodal metropolitan regions with diffuse economic, political, and cultural identifiers. For example, efforts to establish a MetroGov in Tucson have been met with strong suburban sovereignty movements (Nintzel 1997). Despite the challenges facing regional governance, the changing urban landscape—particularly center city and central county job loss in large metropolitan areas—mandates more and more metropolitan regions to think regionally (Erie et al 1998). In this sense, the regionalization process is legitimized by local conditions and hopefully reinforced by a shared sense of civic identity. However, the success of the regional concept is not inevitable as existence of suburban sovereignty movements demonstrate the very real and hard task of defining not only shared spatial interests—but also a shared identity.

(2) Area-wide Infrastructure Districts: Regional Transit Authority, Chicagoland, IL

The first type of regional governing arrangement to emerge were policy implementation zones known as area-wide infrastructure districts. Special districts allowed local governments to cost share expensive regional infrastructures and maintain delivery of crucial services and infrastructures. In the process, special districts provide a shared platform for economic development and create a unified set of policy goals. As such, special districts have proven to be an effective tool for coordinating, planning, and implementing a range of policies including sewer and water resources, air quality control authorities, and transportation networks.
In large regions with shifting employment centers and ever sprawling suburban landscapes, transit authorities have contributed a sense of a shared regional identity. In fact, one of the most tangible differences that can be observed between urban and non-urban areas has long been the scale, scope, and regional integration of metropolitan public transportation resources. For example, the image of metropolitan Chicago—or Chicagoland—is closely linked to the public—both locally and nationally—to not the materiality of its downtown skyline; but also the region’s integrated 6-county transportation system. With a merge collection of bus, radial rail networks, and elevated trains, the nearly seamless public transportation network is an important and essential component of the region’s economic success. Like New York City’s subways, the elevated train is has become an urban icon. However, the costs of maintaining these resources are enormous. For this reason, the efforts of three individual service boards—Pace, Metra, and the Chicago Transit Authority—are coordinated to ensure access to shared infrastructures (for example, ‘transfer’ policies between suburban Metra and Chicago buses) and stable revenue streams.

The stability and authority of the regional transit authority is closely linked to the region ‘region-wide’ identity and the understood inter-dependencies that have development within and between suburban communities and the city center. Lacking a shared identity, the mission of individual service boards and issues of local ‘sovereignty’ with respect to the scale and scope of service provision would most likely limit the success of regional efforts. Indeed, efforts at establishing regional networks in other larger cities have been unsuccessful. For example, commute times in southeast Michigan (Metropolitan Detroit) can easily exceed 3 hours as suburban networks are not coordinated within and between communities and the city of Detroit’s system is inefficient (Shepardson 2001; Detroit News 2001; Brooks 2000). Indeed, the Chicago network is often used as an example of a successfully integrated and efficient shared system (Brooks 2000; Detroit News 2001).

(3) Collaborative Partnerships: Advantage Valley: Charleston WV-Huntington, WV

Unlike the regional efforts of successful high tech regions, declining regions have also embraced the regional approach. In particular regions with eroding manufacturing bases have sought to engineer new policy regions to make their region more attractive than a single community. Such is the case with Advantage Valley (AV). Functionally, AV is a regional industrial agglomeration that includes two MSAs: Charleston, WV and the Huntington, WV-Ashland, KY-Ironton, OH. The organization is a collaborative effort between counties, chambers of commerce, and three state governments to preserve the existing manufacturing base. The economic foundation of these counties has long been a complimentarity combination of petro-chemicals, mining, natural gas, and metals (Gatrell 1999). In addition to the shared production systems and inter-related industrial complexes that unite the region, the region physiography and hydrography serve to define the collective region and its spatial extent. Created in late-1997, the creation of a wide-area network of economic development opportunities, the region collectively builds on and draws on the skills, institutions, and quality of life benefits of the region. The role of Advantage Valley has continued to grow as the network the counties, chambers of commerce, and three state’s coordinate their response to increase job loss within the petro-chemical industry and seek to establish the
corridor as new type of industrial center focus more closely on value-added petro-chemistry and a range of unrelated manufacturing activities, such as the relatively new and expanding Toyota plant in Putnam county.

As a policy region, Advantage Valley enables communities to more effectively compete for economic development dollars. By expanding the spatial extent of the locality, a broader collection of assets can be used to attract new capital investment and maintain existing assets.

(4) Local Associations: Farrington’s Grove Historical District
Like those networks describe above, organizations are created to empower individuals, groups and communities to compete in the marketplace and give voice to their specific policy concerns. Over the past 30 years, growing collections of urban neighborhoods have mobilized to protect capital investment. In many cases, the organizations have grown as individuals organize traditional neighborhood associations that often accompany contemporary housing development and/or seek special designation as ‘historical districts’ to aid and preserve capital investment through the process of gentrification. While neighborhood associations are increasingly controversial and the gentrification process has mobilized citizens both for and against capital investment (see Merrifield 1993), the underlying foundation of these organizations has been to preserve the investment of local homeowners by maintaining shared local infrastructures. In extreme cases, these associations mandate the performance of certain activities (such as re-painting structures at-least every 7 years) as well as prohibit specific behaviors, like on street parking, or the construction of additional structures (such as detached storage units or clothes lines).

In the 1970s, a gentrification and historical preservation movement in Terre Haute, Indiana resulted in the creation of the Farrington’s Grove Historic District (FGHD). In addition to preserving historical icons of Terre Haute industrial past and the aging homes of the region’s industrial and political elite the FGHD was created to encourage capital investment in an ageing—but important neighborhood in the city. According to the organization’s mission statement, the FGHD: (1) protects the neighborhood’s cultural and architectural integrity; (b) seeks to limit incompatible uses within the boundaries of the district; (c) encourages community fellowship and neighborhood awareness; and (d) endeavors to prevents increased population density. As each of the statement demonstrates, FGDH is clearly an example of an effective policy region albeit at a very localized scale. In addition to engaging in policy discussions, the FGDH is also an effective mobilization tool that engages the community and encourages residents of the district—whether members or not—to participate in a range of community outreach programs. For example, FGDH initiatives in the summer and fall of 2001 included neighborhood clean-up days, anti-graffiti efforts, and garden tours that effectively mobilized renters, homeowners, community organizations, and others to promote the district’s combined social, economic, and political agenda.

Like other policy networks, the successes of the FGHD are very much linked to the identity of the “Grove” and the socio-spatial process that produced the neighborhoods shared architecture, historic (and shifting) land-use patterns and the formal boundaries. Named for a prominent resident and former
state senator, James Farrington, who once owned the many of the parcels of the present day district, the Grove is closely linked to the nostalgic connection to the mid-1800s. Yet, its identity is also linked to the geography structure of the local economy and the city’s prominence throughout the region and nation between 1915-1930. Indeed, many of the district’s most recognizable homes date between 1915-1929. Additionally, the manner in which the region’s land use has changed over the past 50 years and the realistic threats of rapid disinvestments associated with the neighborhood life cycle required residents mobilize and create the FGHD to preserve history and capital investment. In the process, the FGHD also serves to preserve and protect the community’s industrial culture and collective memory by preserving the material landscape.

Concluding Comments

As the examples above demonstrate, the resurgence of regional geography in the academy has been accompanied by its increased utility in the real world. The relevance of regional geography and the potential for localities to collectively engage in a new—more competitive—politics of scale that empowers researchers, politicians, and residents to construct a regional comparative advantage effectively charts a new research agenda for geographers. This new agenda or policy geography will emphasize the mechanics of regional governance and other ‘more global’ policy devices and examine questions of authority and legitimacy as policy makers seek to define stable policy regions.

Unfortunately, the adoption of regional frames has been less than critical. That is, spaces of engagement and networks of association have been conceptualized as sterile devices disconnected to the very real and personal issue of shared identity. Without cultivating collective identities, the success rate of mechanical policy or scalar devices will be inherently uneven.

Works Cited


Heritage Tourism and Economic Development: 
The case of re-created Heritage Villages of the Midwest.

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Abstract
This study examines the purpose and motivation for the development of re-created heritage villages in the Midwestern United States. Since 1950 the Midwestern United States experienced an emergence of a multitude of re-created heritage villages. Existing literature indicates a high emphasis on economic development as a motivation for the creation or development of these potential heritage tourism destinations. A survey was conducted of 76 recognized re-created heritage villages within a ten-state region of the Upper Midwest. This study determined that the prime motivation for the development of re-created heritage villages was not economic development but rather the preservation of heritage and historic structures. Supportive factors indicated a limited focus on economic development in the current operations of the majority of these sites.

There has been much discussion regarding economic development for rural communities in the United States (Edgell and Staiger 1992), especially those with declining populations and declining farm numbers. Utilizing re-created heritage villages as a supply side component of heritage tourism (Mitchell 1994), this research evaluates the characteristics of purpose (intention and motivation) and distribution (site and situation) of re-created heritage villages as means in assessing the relationship between economic development and heritage tourism. One hypothesis was that these entities were created for economic development purposes. From other studies it is known that the spatial and aspatial aspects of purpose and distribution provide valuable insights into tourism (Lovingood and Mitchell 1978).

For some heritage tourism destinations efforts have been made to preserve the cultural landscape of earlier settlement days. Evidence of this trend can be found in the form of re-created heritage villages. Re-created heritage villages consist of structures from the early settlement landscape that have been gathered in from a surrounding community in modern times to form an artificial village. They are not historic sites but may include historic structures. The structures are not on their original foundations and may consist of buildings from different areas and from different periods of time. Authentic historic structures have been preserved and assembled
in a manner as to replicate the village style and atmosphere of an earlier period in history. The urban reflection of a village or town indicates an inclusion of those structures which represent the institutions of community; i.e., churches, schools, general stores, blacksmith shops, railroad stations and residential dwellings. This study focuses on re-created villages as the supply-side tourism component (Mitchell 1994) as they may relate to economic development.

**Study Area**

Many of these sites use the term "pioneer" in their description, though they may represent a period of time other than the pioneer era. The historic period, which is represented in the re-created heritage village, will vary from site to site and from structure to structure. The main era represented by the sites in this study ranges from the late nineteenth century to the early twentieth century. A core area for the location of these phenomena can be found in the northern region of the Midwest in the states of Illinois, Iowa, Wisconsin, and Minnesota, with additional numbers in the peripheral states of Indiana, North Dakota, South Dakota, Nebraska, Kansas, and Missouri. Some villages are in their early reconstruction stages while others are well developed with an extensive activity agenda. The Midwestern United States or the Middle West (Zelinsky 1980; Shortridge 1989) was selected because of the large number of re-created heritage village located within its loosely-defined boundaries. Though there may be re-created heritage villages outside the area of study and throughout the United States, this region provided a central area of focus (see Figure 1).

*Figure 1. Map of Study Area*

Each + represents one re-created heritage village
Heritage Tourism and Economic Development

Heritage tourism is a growing segment of the tourism industry, which is the world's largest industry (Sokolove 1997). It would appear that the post-industrial world has an increased opportunity and availability for travel. Concurrent with this trend is an increase in attention paid to heritage tourism (Urry 1990). Though it can be understood that heritage tourism is increasing in popularity, geographic data and information on heritage tourism are limited (Dickinson 1996).

Tourism and economic development are continually linked as worldwide tourism activity continues to grow (Williams and Shaw 1988). The percent of that growth which is in the form of heritage tourism is not clear. Although research does indicate that heritage tourism has also been on the rise (Capalbo 1996). If developed properly, heritage tourism can be a substantial revenue source for a community. Drawing on resources available in virtually every community, heritage tourism provides opportunities for economic development without significant infrastructure outlays (Sokolove 1997). While not a panacea, heritage tourism is an attractive form of economic development. Heritage tourism enables small towns and entire regions not only to generate new prosperity by putting their inherited assets to work, but also to attract other forms of economic development (Green 1993). People traveling to experience heritage and history spend money on food, lodging, locally-made products, crafts and any other goods or services necessary or desired.

The push to revive rural and urban communities has people talking about the use of tourism as an economic development solution. Rural communities are seeking more sustainable resources as alternatives to economic development to replace the once-dominant industries of farming, ranching, and mining. Tourism opportunities are a highly valuable option and are being viewed as opportunities for keeping rural communities economically viable (Edgell and Harbaugh 1993). How these communities convert to tourism for economic development remains uncertain. There has been much discussion regarding tourism as an economic development tool for rural areas but there is little data available to substantiate success or to establish realistic patterns for small towns or rural communities to follow.

The Growth and Decline of Farms

The Midwest has experienced major changes in the number of farms over the last 150 years (see Figure 2). In the later part of the 1800s there was a major influx of immigrants to the region. According to the U.S. census, there were 1,716,587 farms listed for the Midwest (states identified in the region of study) in 1900. In the 1950 census, 1,518,630 farms were counted in the same region. The next thirty years witnessed a major decline in farm numbers. In the 1992 farm census, there were only 664,432 farms listed for the entire Midwest. Over 50% of the farms had been lost. The decades immediately following 1950 witnessed the largest decline in farm numbers. There was an inverse proportion relationship between the decline in farm numbers and the size of existing farms. The number of farms sharply declined and the farms continuing to operate grew larger in size. Though this trend may have occurred throughout the United States, it is clear that the agricultural heartland of the Midwest was strongly influenced by this trend.

Basic Conclusions

In the region of study, 76 re-created heritage villages were identified and targeted with a
survey instrument that would gather data and be utilized to create a database of information. In each state, agencies regarding travel and tourism and/or heritage sites were contacted regarding the identity and description of re-created heritage villages. Official offices in each state in the study area responded with information regarding heritage tourism sites located within their state. Only village sites that were described as being re-created as opposed to historic were included in the study. Each site manager, owner or operator was contacted and asked direct questions about site history and dynamics. The basic questions were who, when, where and why. Data was collected from the 76 sites with a response rate of over 80 percent. Various sites, 14 to be exact, were visited by the author for a direct understanding of their operations. A common village profile was created and conclusions regarding economic development were outlined.

Re-Created Village Profile
Each re-created village site has unique qualities that may not be found in any other village; unique qualities may not be easy to quantify. Sites vary enormously in atmosphere and scope. This study queried what attributes re-created village sites have in common. First, it was necessary to develop an overall model that portrayed the typical village. This was represented by reviewing the quantitative data and creating a data table, which illustrated the median traits or attributes, which would assist in providing an overall structure for comparison evaluation. Data from the initial survey results were quantified and the median values were portrayed in a data table (see Table 1). The median values are suggested instead of the mean/average due to the high loading affect a few large sites would have on the overall results. Median values represented more accurately the middle ground of dynamics of a typical re-created heritage village.

<table>
<thead>
<tr>
<th>Village Attribute</th>
<th>Median</th>
<th>*(Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Site Opened to Public</td>
<td>1969</td>
<td>1968</td>
</tr>
<tr>
<td>Management Entity Type</td>
<td>Non-</td>
<td>Same</td>
</tr>
<tr>
<td>Reason for Re-creation</td>
<td>Preservati</td>
<td>Same</td>
</tr>
<tr>
<td>When Site is Open to Public</td>
<td>Seasonal</td>
<td>Same</td>
</tr>
<tr>
<td>Cost to Visit Village</td>
<td>$3.00</td>
<td>$3.05</td>
</tr>
<tr>
<td>Number of Annual Visitors</td>
<td>7,550</td>
<td>53,288</td>
</tr>
<tr>
<td>Full-time Employees</td>
<td>1</td>
<td>4.6</td>
</tr>
<tr>
<td>Part-time Employees</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>Annual Volunteers</td>
<td>40</td>
<td>125</td>
</tr>
<tr>
<td>Total Number of Buildings</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Main Source of Buildings</td>
<td>Within 25</td>
<td>Same</td>
</tr>
<tr>
<td>Reason for Site Location</td>
<td>Available</td>
<td>Same</td>
</tr>
<tr>
<td>Likelihood of a Gift Shop</td>
<td>50%</td>
<td>58% Possibility</td>
</tr>
</tbody>
</table>

Economic Development - vs - Preservation
The cultural phenomenon of re-creating heritage villages appeared to develop rapidly after 1950. It was not clear if there was a direct correlation between the sudden appearance of re-created heritage villages and the sharp decline in the number of farms in the region. The two may be related. Site personnel were asked when their site was re-created. The majority of sites were re-created during the decade of the 1960s and 1970s (see Figure 3). There were four sites created in the 1980s and only two sites in the 1990s. According to the data in this study, only five sites (8.1%) were re-created before 1950, with the remaining 91.9% of the sites constructed after 1950. Though a few sites were developed before 1950, the phenomenon of their spontaneous emergence over such a wide area happened after the mid-century mark.
Figure 2. Growth and decline in farms for central area of study.

Growth and Decline of Farms
(U.S. Census and U.S. Census of Agriculture Data)

Number of Farms
Thousands

Decade


Illinois
Indiana
Iowa
Minnesota
Wisconsin

Figure 3. Decade villages opened to the public.

Date Sites Opened to the Public
62 Sites Reporting

Number of Sites

Decade of Opening

Pre 1950 1950s 1960s 1970s 1980s 1990s
The weight of the evidence collected in this study indicates that re-created heritage villages were not created for economic development purposes but were developed for preservation of historic buildings and local heritage. Though these sites are targeted as tourist destinations and mentioned in economic development discussions, they were created and are operated for preservation purposes. The re-creation of heritage villages was a direct result of the preservation movement to retain a connection with the history and culture of an earlier period of time.

When village managers/owners were asked why their village was re-created, 74% responded with preservation as the primary motivation (see Table 2). About 10% suggested education or recreation as the reason. The next highest category, at about 6.5%, was that of history or historic values. It is clear that the preservation of historic structures, cultural traditions or an agrarian way of life was the primary motivation for people to undertake enormous efforts to re-create a village representing the cultural history of a community. When the historic motivations were coupled with the push for preservation, the resulting percentage reached well over 80%. Approximately 8% of the respondents also indicated that the reason their village was re-created was either the celebration of the past or to re-create the historical atmosphere for present and future generations to enjoy. Add this to the 80% tallied and the result is about 88%. With a surprisingly low rate of 1.6%, only one site indicated that the main objective in re-creating a heritage village was economic.

Some may argue that there may have been underlying forces in the creation of these sites which pushed for economic development from the beginning and that these forces may not have materialized in this study. Though that may be true in some cases, there was
additional peripheral evidence in this study to support otherwise. Setting aside the evidence of the push for preservation versus economics as the motivation for the creation of these sites, there were at least four other supply-side indicators to support a current non-economic position: (1) the non-profit organization structure; (2) the use of volunteer labor; (3) the low entrance fee and the low number of gift shops; and, (4) the choice of location for the village site.

Table 2. Main Reasons Villages Were Re-Created

<table>
<thead>
<tr>
<th>Reason for Re-Creation</th>
<th>Number</th>
<th>Percent of Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown (NA)</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>Economic</td>
<td>1</td>
<td>1.60%</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>2</td>
<td>3.20%</td>
</tr>
<tr>
<td>Celebration</td>
<td>3</td>
<td>4.80%</td>
</tr>
<tr>
<td>History</td>
<td>4</td>
<td>6.50%</td>
</tr>
<tr>
<td>Education/Recreation</td>
<td>6</td>
<td>9.70%</td>
</tr>
<tr>
<td>Preservation</td>
<td>46</td>
<td>74.20%</td>
</tr>
<tr>
<td>Sites Reporting</td>
<td>63</td>
<td>100%</td>
</tr>
</tbody>
</table>

Non-Profit Organizational Structure

Not only was it necessary to understand when the sites were re-created, it was also important to know who was re-creating these sites. This push for preservation was also evident in the responses to the question of what individual or group was involved in re-creating heritage villages. Historical Societies were the number one entity that was involved with the creation and/or current management of heritage villages. According to the findings, about half (47%) of the sites were controlled by a historical society, with approximately 71% of all re-created villages controlled by some type of non-profit organization; eg., historical society, museum, civic organization, etc. (see Figure 4, listed as Non-Profit). Aside from historical societies, most of the non-profit organizations were also interested in preservation as a main priority. Museums and other non-profit organizations (other than historical societies) made up 25% of controlling entities, with 12.5% allocated to each respectively. Another 17.5% of sites were owned and operated by public entities such as city, county, state or federal governments (listed in Figure 4 as Public).

Only one site, 1.6% of those included in the study, operates under the status of a for-profit business (listed in Figure 4 as Business). This site, however, does not even charge an admission fee. Survey results indicate that almost all the private sites were organized or operated for non-economic reasons. There was clear indication that the main focus of the publicly owned sites was community heritage preservation or for staging community events coinciding with such activities as the county fair or other social occasions.

Understanding the people who re-created heritage villages aids in understanding why they were formed. Historical societies and museums traditionally are the vanguard of preservation, whether it be artifacts or cultural traditions. Individuals involved in the formation of many of the heritage villages started as a drive for preservation of a structure or building. At times this was accomplished by a single individual or by a group of like-minded people. At least six sites were once owned by private individuals who later turned the sites over to public entities or other non-profit organizations. Almost all the current private sites were owned or had been initiated by a person or persons who wanted to preserve similar heritage structures or historical items for future generations. These now-senior individuals were of the generation before 1950 or much earlier.

Volunteer Labor Base

Another major indicator that the heritage villages may not be a primary medium for economic development was that of the volunteer labor base. For-profit businesses
usually do not attract a high volume of volunteer labor. With the heavy dependency on volunteer workers within this type of entity, it became difficult to conclude that economic development was a priority issue. The one for-profit business did not indicate any volunteer assistance. Of the nine sites in this study that indicated they had no volunteer assistance, five sites were privately owned and two were non-profit entities (see Table 3). There was little difference between non-profit and public sites. The reasons most of the private sites did not have volunteers was because the sites were either a retirement project or the sites were not open on a regular basis but by appointment only.

In the case of re-created heritage villages, volunteers are working for the public good or for a non-profit cause they want to support. Some sites rely entirely on volunteer workers and have no paid employees. According to the survey results, 13 of the 45 non-profit sites relied entirely on volunteer labor with no paid employees. All of the public sites had at least one paid employee. The for-profit business site indicated one full-time employee; this may or may not have been the owner. If these entities were driven by economic profits it is very likely there would be a change in the volunteer component. It would appear difficult to have an economic development entity with no paid employees. The community may benefit economically but the entity would most likely be managed or operated for non-economic reasons.

The conclusion was drawn that the majority of volunteers were from the senior generation who had lived a large portion of their lives before the phenomenon of re-creating heritage villages developed. They have witnessed the rapid change in the cultural landscape of the region and hold the closest attachment to the earlier way of life (Cronon 1991). They are also the ones who appear to be most active in the preservation movement. This may be changing, as baby boomers grow older. According to David Listokin, a professor at the Center for Urban Policy Research at Rutgers University in New Jersey, aging baby boomers are interested in their cultural roots and have greater interest than their parents in things historic and in preservation (Dickinson 1996). Though the baby boomer market may be increasing rapidly, many people managing historic sites still look to adults who are 65 and older as their largest market. A general rule was that as the number of volunteers increased, age became more diverse. As the number of volunteers decreased the average age increased. Sites with living history actors had volunteers from various age groups. Those sites with fewer volunteers appeared to have more senior volunteers.

Low Entrance Fees and the Lack of Gift Shops
A further indicator that these entities are not motivated by economic profits was the low entrance fee charged to village visitors. A large number of the sites, approximately 30% of sites involved with this study, required no entrance fee to visit the site (see Figure 5). An additional 30% charged $3.00 or less and only 12.7% of the sites charged $6.50 or more. The highest entrance fee was approximately $11.00.
Entrance fees may not be the only economic factor of a tourist site, but entrance fees can indicate the level of expectations of the establishment. This study found entrance fees to be a prime indicator of overall site structure, management, and magnitude. The 30% of these, entities, which have no admittance fee, could not be classified as profitable economic enterprises unless there are other benefits that balance out the operating costs. Publicly operated entities may offer free admittance by providing a service to the people served by the tax base of the community. It is the 12.7% of the sites that charged an admittance fee of $6.50 or over that may be looked at as possibly fitting into the economic development equation. Further study would be needed to evaluate the amount of money generated by those sites, the cost of their operations and any other sources of funding; e.g., public tax funding, federal programs, endowments or private donations. The fact that all of them are operating as non-profit organizations or publicly-owned entities suggests that any economic gains would be from indirect economic development factors. There appeared to be a fine gray line between non-profit and for-profit status.
In addition to entrance fees there was the consideration of whether or not there was a gift shop located at the site. Gift shops can provide revenue for the operating entity. A standard component of the tourist business is a site gift shop, novelty shop or convenience shop. The availability of a gift shop was also revealed to be an important indicator of variance between village sites. In this study, 42% of the sites did not offer any type of gift shop on the premises. A few of the larger villages had onsite craft or artisan shops as a part of the village environment.

It could be concluded by the varying amounts of the entrance fees and the availability or non-availability of gift shops that a few of the larger sites were involved in substantial economic activities while the majority of the sites provided few such opportunities for economic gain. The question of how each site complemented the community in regard to economic development was not addressed by this study. This study only focused on the supply-side component these sites provide heritage tourism.

**Economic Factors of Village Location**

After reviewing the results of the survey regarding site selection for re-created heritage villages, it became clear that location for the villages was determined primarily by land considerations and not economic development (see Table 4). The majority of sites needed to locate some building or structure at some location in the community and those in charge looked for available land at an affordable price. Approximately 50% of sites responding brought up land as the number one consideration. The sites for which inexpensive land was a primary consideration were further broken down into four more detailed categories: immediately available land (20%), donated land (14%), land in location (9%), and already-owned land (7%). The majority of operators were looking for a location for a preserved structure and considered the availability of inexpensive land to be a high priority.

**Table 4. Primary Location Considerations**

<table>
<thead>
<tr>
<th>Reason for Location</th>
<th>Number</th>
<th>Known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Considerations</td>
<td>28</td>
<td>50%</td>
</tr>
<tr>
<td>Existing Buildings on Site</td>
<td>5</td>
<td>8.90%</td>
</tr>
<tr>
<td>Or Site of Historic Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Located Next to/or Inside</td>
<td>13</td>
<td>23.20%</td>
</tr>
<tr>
<td>Existing Park or Fairgrounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy Access to Highway or Highway Intersection</td>
<td>5</td>
<td>8.90%</td>
</tr>
<tr>
<td>Economic</td>
<td>2</td>
<td>3.60%</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>5.40%</td>
</tr>
<tr>
<td>Unknown (NA)</td>
<td>7</td>
<td>---</td>
</tr>
<tr>
<td>Sites Responding</td>
<td>63</td>
<td>100%</td>
</tr>
</tbody>
</table>

Though location reasons could be factors in an economic equation, that relationship was not mentioned or indicated by respondents. Access to a highway or highway intersection may also have been a strong component in an economic equation; however, again, economics was not mentioned but rather only the issue of access; i.e., for the convenience of visitors, or moving buildings. When the numbers were broken down further only a few alternatives were considered. Only two sites specifically indicated that the primary location factor was directly based upon economic considerations.

The privately owned sites regarded location as a matter of availability rather than commercial development. One owner remarked that if his site had been located next to a major transportation route his site would have become a major tourist attraction. As it was, the site was located in a rather remote location and was only open by appointment.

Location was more ad hoc and spontaneous than strategically determined.
There did not appear to be clear or structured planning involved with the majority of these sites. In many cases buildings were added as they were preserved without a clear master plan. As a result, each site now has its own unique idiosyncratic history of development. Ironically enough, the dynamics of how many villages were re-created may have been similar to the actual historic villages they attempt to replicate in that there was likewise no real long term planning in how the historic villages would have developed. Lack of knowledge about strategic location planning is probably the cause of a large number of business failures in the tourism industry (Mitchell, 1991). Thus, it was concluded that economic opportunity was not a high priority in the choice of the majority of site locations. Further study is necessary to determine how each site’s location factors into their role in the local community.

It is interesting to note that the nature of this phenomenon is that of a re-creation. With this in mind, site and location was not set but was open and fluid, to be determined by present day choices. Had the people who instigated the re-creation of these villages been focused more on tourism and economic development, location would most likely have been given much higher priority in the decision-making process and many of the sites would not have been located where they are.

Summary
The basic research conducted in this study has established that the primary reason re-created villages were created and currently operate is for the preservation of historic structures or cultural heritage and not economic development. Many of them struggle economically to maintain upkeep and rely heavily on volunteer labor. It is true that the element of experience and the attraction of preserved structures make these re-created villages heritage tourism destinations. It would appear that many of these sites face the challenge of the heritage tourism market without the benefit of a sound economic business plan. They have a difficult task in finding the balance between preservation and economic development. At the present time these entities do not represent a strong economic development tool, though they endure to preserve heritage and draw a number of visitors. Only a few fortunate sites have made the transition into a major tourist attraction and may be considered an economic development success. The role they will play in the heritage or economic development of the Midwest will continue to raise interesting questions.

Works Cited


University-Led Regional Economic Development: Challenges to Emerging Research Universities

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Abstract

A university that is not an active participant in regional economic development efforts is now an exception to the national norm. The successes of major research universities in this regard are legend, but emerging research universities, particularly those in rural or in small urban areas, are also moving quickly into this arena. The rising expectations that university-led development at smaller research universities will transform regional economies must be tempered by a clearer understanding of the context of the university and its surrounding region. This topic is discussed in light of Ohio’s effort to use its universities to spark statewide economic development and to diversify its economy away from traditional primary and secondary industries.

“There must be a stream of new scientific knowledge to turn the wheels of private and public enterprise. There must be plenty of men and women trained in science and technology for upon them depend both the creation of new knowledge and its application to practical purposes.” Vannevar Bush (1945, p.6)

As the United States was winning the Second World War, the involvement of the federal government in the science and technology enterprise was taking shape. Impressed with the ability of university research laboratories, and university scientists, to develop systems from radar to the nuclear bomb, visionaries anticipated great benefits to the nation if universities were provided the funding opportunities to turn attention to non-defense related projects. The federal government responded to this call by creating the National Science Foundation, by increasing its investment in academic research and development over the years, and by providing incentives for universities to develop and exploit intellectual property.

The investment in academic research has been highly concentrated into a few states, and within a few regions within those states. Not surprisingly, those areas with strong technology-driven economies are closely associated with those research universities that have been the major recipients of federal R&D funds.

Over the past decade, rural states, and smaller urban areas without nationally ranking research universities, have turned to their universities as a source of ideas, talent, and technology to revitalize their economies. The “triple helix” of government, industry, and university relationships in the knowledge production business appears to have gained widespread acceptance as a vehicle for regional economic development (Leydesdorff and Etzkowitz, 1996). In some cases, the expectation that such universities will reshape an economy is fed not only by government officials and development leaders, but also by the university leadership who have accepted economic development as the third mission of
the university (teaching, research and economic development).

This paper shows that such thinking is not wrong, but that the university’s ability to contribute to local economic change must take into consideration the size of its research enterprise, the nature of its academic programs, and the reward structure of the institution. Also, the partnership between emerging research universities, government entities, and local business provides tremendous funding opportunities such as through congressional earmarks and additional state appropriations. However, this pressure may be transforming the nature of faculty research as university administrators, and those external to the university who support universities, expect faculty research to produce technology that will translate into profit for the university and economic growth to the region.

Changing Role of the Emerging Research University

Academic research is generally traced to the reformation of the American university in the late 1880s in which faculty investigation and graduate studies of specialized topics directed toward the Ph.D. moved the university from the earlier instruction-based model that taught a standard curriculum of courses “to be covered” to win a degree. Johns Hopkins University, founded in 1876, is credited as being the first American university dedicated toward the advancement of knowledge using this German research and graduate education model (Geiger, 1986, p. 7-9). The twenty or so leading universities adopted the Hopkins model, but most of the nation’s state and urban universities continued to emphasize the curriculum-based instructional model until after the second half of the twentieth century.

The Second World War brought federal funds to a few universities and demonstrated the power that universities could bring in advancing technology and solving problems. By the close of the war, MIT received defense contracts of $117 million, with Caltech at $83 million and Harvard at $31 million (Leslie, 1993, p. 14). This defense-led funding helped support the establishment of leading laboratories such as Caltech’s Jet Propulsion Laboratory, Johns Hopkins Applied Physics Laboratory, MIT’s Research Laboratory of Electronics and the Laboratory for Nuclear Science and Engineering, and later the Lincoln Laboratory. These labs produced such technologies as radar, radar interference systems, missile guidance systems, microwave systems, the proximity fuse, etc.

Research expenditures remained highly concentrated in the fifties and sixties even as federal funds to support research grew. From 1954 to 1958 research expenditures in universities grew by 60 percent, but then in the 1958 to 1968 period, federal funds for university basic research grew from $178 million to $1.3 billion (Geiger, 1992, p. 8-9). The federal government continues to invest in research and development in a way that will surely benefit universities. In FY2002, federal R&D exceeds $103 billion, which represents a $12.3 billion increase (the largest in history) over the previous year. Given the huge increases in the budget for the National Institutes of Health (its budget now stands at $23.6 billion), universities with strong life science programs are in a position to expand their funded research programs.

Federal R&D funds have been concentrated in a handful of universities. In 1952, the top ten universities accounted for 43.4 percent of the total federal R&D obligations. Even as late as 1968, the top ten universities accounted for 27.7 percent of the total federal

The ambitions of emerging universities led them to various ways to increase federal R&D funding. One avenue was through the use of academic “earmarks” and the other through protected competitions. “Earmarks” are special provisions placed into federal funding legislation to direct an agency to support specific projects (Savage, 1999, p. 6). It is estimated that earmarks to academic institutions stood at $16 million in 1980. The process expanded greatly and by 1990 was at $245 million (Savage, 1999). In 2001, academic earmarks were at $1.7 billion (Brainard and Southwick, 2001). The distribution of earmarks more closely aligns to congressional power rather than academic contributions. In 2001, the University of Alaska Fairbanks led the pack with $35 million in earmarks, second was Loma Linda University with $35 million, and third was Marshall University with $27.5 million.

Another alternative is available to those states that do not have a strong record of winning federal R&D funds. The Experimental Program to Stimulate Competitive Research (EPSCoR) began modestly in 1979 as a protected competition in which five states (Arkansas, Mississippi, Maine, South Carolina, and West Virginia) received NSF funds to develop competitive research projects. Through the program, agency funds are distributed after the review of proposals that compete against those from other EPSCoR states. The program now is funded in excess of $240 million with programs in the National Science Foundation, the National Institutes of Health, the Department of Energy, the Department of Defense, NASA, and the Environmental Protection Agency.

As federal investment in academic research grew, and as other mechanisms helped to more broadly distribute federal R&D funds, the federal government provided the means for universities to capitalize on its intellectual property. The 1980 Bayh-Dole Act (Patent and Trademark Act of 1980) gave ownership of intellectual property arising from federally funded research to the performing university with the expectation that the university would patent its technology and license it to industry for the public good (Business-Higher Education Forum, 2001, p. 19). Partly as a result of this, many universities became more aggressive in developing and marketing their technology. There has been a great increase in both the number of universities receiving patents as well as the total number of patents assigned to universities. According to the National Science Foundation, about 75 academic institutions received patents in the early 1980 compared to 175 institutions in 1997 (National Science Foundation, 2001, p. 6-56). More impressively, the number of academic patents has increased from about 250 per year in the early 1970s to over 3,100 in 1998 (National Science Foundation, 2001, p. 6-56).

The success of a few regions and associated universities demonstrated the value that universities may play in the creation of local wealth (Jaffe, 1989; Castells and Hall, 1994; Saxenian, 1994; Audretsch and Feldman, 1996). Government entities (local, regional and state), local businesses and development organizations, and congressional representatives increasingly embraced regional development by looking to local universities to drive economic development and help to diversity regional economies. The creation of “learning regions,” where knowledge and innovation is the prime resource driving knowledge workers in the creation of wealth, has been embraced by economic
development specialists who ten years ago were seeking the next manufacturing branch plant (Cohen, 2001; Florida, 1995).

Although the evidence that technocapitalism is real (Suarez-Villa, 2000), and that the growth of scientific creativity does lead to regional advantage, it is less well understood how and if universities should change their culture to increase their economic development contributions. The lessons learned in Boston, Silicon Valley, or Research Triangle Park are difficult to replicate in rural regions with a primary industry focus, or in declining manufacturing regions where the economy was centered on the mass production of goods (Baschma and Lambooy, 2000; Asheim and Isaksen, 2002). Rural areas lack the diversity of firms, people and organizations found in metropolitan areas, and old industrial districts may have difficulties in breaking from traditional thinking that cost competitiveness or transportation advantages were their key to success.

For universities in rural or smaller industrial areas, the expectations that universities can lead in the transformation of a region are often unrealistic. According to the Association of University Technology Transfer Managers, it takes about $7.3 million in research to generate one patent, and over $20 million in research to produce one income-generating license (AUTM, 1999). First, it takes time for basic research to be translated into economic development outcomes—from five to fifteen years (Fogarty, 1997, p. 16). Second, the likelihood that the patent will lead to growth in the local region is not assured. In fact, if the region is unable to absorb the new knowledge created by the universities, much of this new intellectual property will transfer to other areas.

According to NSF data, over 40 percent of academic patents are related to biotechnology, and the concentration of university patenting in the life science area has been growing. However, there is evidence that technology transfer in the area of biotechnology does not necessarily go to the local region. According to Audretsch and Stephan (1996), there are a few dominant biotechnology areas (San Francisco, San Diego, Boston, Philadelphia, and New York City), but about 70 percent of the linkages between scientists and firms are non-local. The ability of a region to “absorb” the local knowledge generated by its universities is important in using university technology from moving to other regions. A critical element is the existence of nearby technology firms that actively interact with local universities in the technology area.

Concentration of Academic Research and Regional Development Expectations
As noted above, the investment in academic research has been highly concentrated into a few states, and within a few regions within those states. Not surprisingly, those areas with strong technology-driven economies are closely associated with those research universities that have been the major recipients of federal R&D funds.

According to the National Science Foundation, about one-half of the nation’s total research and development activity is concentrated in six states (California, New York, Michigan, Massachusetts, New Jersey, and Texas). Within these states the concentration of academic research is in those few areas with research universities. For example, about 80 percent of California’s academic R&D is performed in the San Francisco Bay area, the Los Angeles area, and the San Diego area. While most residents in those metropolitan areas enjoy the benefits of
participating in a robust regional economy, many Californians in peripheral areas have standards of living not unlike those in the rural south or Appalachia. This is one reason why the University of California is developing a new university in the foothills of the Sierra Nevadas.

The concentration of academic R&D in metropolitan areas is also significant. Table 1 summarizes total federal science and engineering (S&E) obligations for major U.S. metropolitan areas. Science and engineering activity is expected to be correlated with technology development. The dominance of a few areas is clear. Most have a number of leading universities, but there are important exceptions. Seattle has one very strong university, the University of Washington. Other major metropolitan areas do not score high on local academic S&E research. Phoenix has less than $50 million, and Dallas is insignificant with most academic R&D in the state concentrated in Austin, College Station, and Houston. In addition to academic research, the educational contributions of the universities are also important. According to Gottlieb (1999, p. 28-29), per-capita income growth over 1985-90 in the 75 largest metropolitan areas was 1.8 percent for those with the highest number of college graduates in 1980 compared to only 1 percent for those metropolitan areas with the least number of college graduates.

Ohio is ranked 10th in the nation in total academic research and development performance (Bennof, 2001, p. 1). The state does have an impressive number of universities. There are 15 in the state system, and Ohio ranks as one of the leaders in

\begin{table}[h]
\centering
\begin{tabular}{|l|c|}
\hline
Metropolitan Area & Federal S&E \\
\hline
Washington & $1,290 \\
San Francisco Bay & 908 \\
Boston & 844 \\
Metro New York & 828 \\
Los Angeles & 819 \\
Research Triangle & 636 \\
San Diego & 478 \\
Philadelphia & 460 \\
Chicago & 459 \\
Houston & 438 \\
Seattle/Tacoma & 438 \\
Detroit/Ann Arbor & 421 \\
Denver/Boulder & 406 \\
Pittsburgh & 345 \\
St. Louis & 302 \\
Atlanta & 279 \\
Minneapolis & 262 \\
Cleveland/Akron & 198 \\
Salt Lake City & 181 \\
Columbus & 137 \\
Miami & 128 \\
Cincinnati & 73 \\
Phoenix & 49 \\
Toledo & 18 \\
\hline
\end{tabular}
\caption{Federal Obligations for Science and Engineering to Academic Institutions –FY1999 (in millions)}
\end{table}

private education led by Case Western Reserve University. Three universities rank in the top 100 in total R&D. These are Ohio State University (#19), Case Western Reserve University (#50), and the University of Cincinnati (#59). These universities are also located in the three largest cities—Columbus, Cleveland, and Cincinnati. Other universities are also located in or near these metropolitan areas, such as the University of Akron (#197) Kent State University (#229), and Cleveland State University (#235), all located near Cleveland. Wright State University (#169) is located in Dayton, Ohio University (#185) is located in rural southeastern Ohio, and Miami University (#231) is in rural southwestern Ohio. The Toledo metropolitan area has
three research universities, the Medical College of Ohio (#218), The University of Toledo (#220), and Bowling Green State University (#312). About 84 percent of Ohio's academic R&D occurs in the top three universities, and 89 percent in the “Three C” cities of Columbus, Cleveland and Cincinnati. Ohio's number four city, Toledo, brings in about 3.5 percent of the state’s total academic R&D.

Ohio’s Plan for Science and Technology Development
Not unlike other states, Ohio has ambitious plans to stimulate technology-based development through an investment program that brings together elements of the private sector, academia, and government. The state first proposed The Ohio Plan to pump $150 million per year into research programs in the areas of biotechnologies, information technologies, and nanotechnologies. Despite a two-year planning process involving the Governor’s Science Advisory, the Board of Regents, and the Department of Development, the program did not receive state funding and was officially declared dead in February 2002.

In his February 5, 2002 State of the State address, Governor Bob Taft announced the “Third Frontier Project.” The project will commit funds to the Technology Action Fund and the Biomedical Research and Technology Transfer Fund at $50 million per year. New programs include the $50 million per year Wright Brothers Capital Fund, the $100 million Innovation Ohio Fund, and a new $500 million Bond issue. The emphasis of this investment strategy is to develop internationally competitive programs in Ohio that are research based and lead to commercial activities. The existing Technology Action Fund and Biomedical Research and Technology Transfer programs require proposers to show how the funding will lead to commercial application—with an emphasis on the creation of high value jobs.

Although the leadership of the state’s three major research universities (Case Western Reserve, Ohio State University, and The University of Cincinnati) have concerns about the overemphasis on applied research and perhaps the fact that the Ohio Office of Development has perhaps taken more of a leadership role in the program than the Ohio Board of Regents, the emerging research universities are fearful that the funds will be almost entirely directed toward the “Three C” cities of Cincinnati, Cleveland, and Columbus. In Toledo, the three local universities are forming a research collaboration partly to position themselves to better compete for state technology funds.

Conclusions
University administrators and local development champions should promote the role of universities in strengthening the local economy and serving as a force for positive change within the region. But emerging institutions should be careful not to sacrifice the primary two missions of the university must by setting high standards for developing commercially marketable technology, spin-off firms, or license revenue. The fundamental tasks are in the promotion and development of academic research and the attraction and development of new talent through high quality academic programs. According to Florida (1999) the primary resource of the knowledge economy is knowledge creation and talent, and universities should do their best in attracting and creating talent and in developing innovations.

The downside of promoting technology transfer activities must also be understood. A
university with an eye toward protecting its technology will instruct its professors to be careful about disclosures of information so as not to jeopardize patenting opportunities. Faculty may be reluctant to share information, or even to invite students to participate knowing that a published thesis or dissertation may disclose a promising invention.

Leaders in rural areas, or in those urban areas with only emerging research universities must stay focused on the development of their faculty and their academic programs so the university becomes an increasingly important contributor as the local development quilt of venture capitalists, business incubators, small technology firms, development organizations, urban amenities, and government support takes form. Emerging universities must participate in transforming the economy, but be aware that moving headlong into technology transfer and commercialization activities may reduce the ability for the institution to compete for basic federal research funds or have undesirable consequences on student development.

End Note

1. Obligations are the amounts for orders placed, contracts awarded, services rendered, and other transactions regardless of when expenditures occur (National Science Foundation, 2000, p. 5).

Works Cited


Evansville’s Post-Rail Industrial Development

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Abstract
The arrival of the first Evansville railroad initiated a transition from the southern river trade to that based on the rail system. In the large cities, accelerated growth in the number of manufacturing establishments, greater manufacturing diversity, and an increase in manufacturing specializations were among the impacts of that transition. It was hypothesized that each of these impacts characterized post-rail manufacturing in Evansville. The hypotheses were tested using data from a detailed survey of pre-1920 Evansville industry.

Introduction
Before the arrival of the railroads, industrial development in the Ohio Basin was based on the river trade. In the Ohio Basin, pioneers settlers produced surplus agricultural and forest products, and local merchants shipped the surplus by flatboat to the New Orleans market (Hunter 1915). Profits from the sale of the goods enabled the merchants to buy needed merchandise in the East. This triangular trade, from the Ohio Valley settlements to New Orleans, then to the East, and back to the Ohio Valley characterized the region’s pioneer economy. Typically, a commercial economy was established soon after the start of settlement wherever there was ready access to the river trade (Carmony 1964; Scheiber 1969).

To reduce the bulk and perishability of the products shipped, some of the merchants developed processing facilities. Typically, either flour milling or pork packing was the leading industry around which a local complex of related industries commonly developed (McGregor 1992).

The dominance of this pioneer river based economy in the Ohio River Basin was ended by a combination of factors. Certainly, the closing of the Mississippi River traffic during the Civil War stopped the river trade. The emergence of an integrated rail system by about 1860 provided alternative transport links to the north and east which ended dependence on the southern markets (Abbott 1981; Conzen 1977). And, the resulting access to new materials and markets, as well as rail-based competition (Abbott, 1987), changed the industrial cost structure in the region and created the opportunity to develop new types of post-rail industries.

Three impacts of the “water to rail” transition are hypothesized in this analysis of Evansville’s industrial development. They include accelerated post-rail growth in the number of manufacturing establishments, increased manufacturing diversity, and an increase in manufacturing specializations. The 1812-1919 period was selected for analysis, which extends from the establishment of Evansville through the pioneer (pre-1850) and post-rail (1850-1919) periods.
Related industrial studies have been developed of communities in the Wabash Valley (McGregor 1992, 1999, 2002). In particular, the analysis of Terre Haute, the regional center of west central Indiana, provides a comparative basis for the present research. And, the research on Vincennes and four towns near Terre Haute (Brazil, Clinton, Eugene-Cayuga, and Middlebury-Clay City) make possible consideration of the post-rail impacts at different points of the town-small city hierarchy. The dual names for two of the towns reflect their relocation to nearby sites when they were bypassed by the railroads.

Post-rail industrial development in some larger Midwestern cities has been considered descriptively (Mayer and Wade 1969; Still 1948; Wade 1959). The earlier research on smaller cities and towns in western Indiana, as well as this analysis of Evansville, were developed because analysis of development in the more numerous smaller centers has been neglected (Mayer 1965; Muller 1976; Ogle 1992; Page and Walker 1991).

The Hypotheses
The post-rail industrial transition was complex in its characteristics, as it involved diverse economic, technological, and cultural change (Meyer 1990; Page and Walker 1991; Teaford 1993). In this research, the focus was limited to three hypotheses about Evansville’s post-rail development which could be effectively tested with the available data base.

The resulting population growth, the larger local market, and the increased potential for local linkages would have created opportunities for still other industries. Thus, the process of circular and cumulative causation (Meyer 1990; Myrdahl 1957; Pred 1966; Taaffe and Gauthier 1973), in combination with the initial post-rail growth, should have led to greater industrial diversification (Hypothesis 2).

The shift from merchant to industrial operations in the post-rail period (Davis and North 1971; Meyer 1983; Miller 1979; Taaffe and Gauthier 1973; Walsh 1972) facilitated the development of large, post-rail factories, and the greater access to the expanding resources and markets in the northeast created opportunities for new types of large, specialized establishments (Taaffe 1967).
Thus, diversification in Evansville should have led to a new set of large local industrial establishments in Evansville and an increase in local manufacturing specializations (Hypothesis 3).

The Industrial Database
An intensive survey of pre-1920 industry in Evansville was developed to support the analysis. Establishments operating in the city between 1812 and 1857 were identified from a combination of the available local histories, early maps, and the surviving public documents (in particular, the tax records). A long series of Evansville city directories was published irregularly from 1858 to 1871, and annually afterwards. They each included a “business directory.”

In the business directory, local manufacturing establishments were identified by name and type of industry, as well as either their address or a description of their location. Plat maps from the historic county atlases (Griffing 1880; Tillman and Fuller 1889) and the available pre-1920 Sanborn insurance maps (1884, 1895, 1906, and 1910) were used to map the identified sites. Each site was then inspected in the field to collect data on the surviving early industrial structures.

The survey resulted in the identification of 1375 pre-1920 industrial sites and the industrial establishments which operated on them. Most critically, the results provide a detailed record of Evansville industry over nearly all of the post rail period.

Pre-Rail Industry
Prior to the 1853 arrival of the first railroad in Evansville, the populations of both the town and the surrounding county were small, and relatively few manufacturing establishments operated there. The available documentation was most complete for the 1830s, when a combination of 20 establishments operated in Evansville (Elliott 1897).

The city’s pre-rail industry (Table 1) was similar to that identified in the Wabash Valley pioneer industrial complexes (McGregor 1992). Flour and grist mill, pork packing, tannery, sawmill, and foundry establishments characterized both Evansville and the Wabash Valley centers. In addition, two large Evansville furniture makers (not artisan shops) and a stoneware pottery apparently also represented local industrial specializations. The other pre-rail industries were types which typically operated at a small scale and were oriented to the local economy rather than the river trade.

Hypothesis 1: Accelerated Post-Rail Growth
Substantial post-rail growth in the number of Evansville manufacturing establishments certainly occurred (Figure 2). From a small base which totaled no more than 20-30 establishments in each of the decades before 1850, the number grew from 65 in the 1850 decade to 621 in the 1890s. Evansville’s post-rail growth over those five decades was clearly much greater than the city’s limited pre-rail development. The 1900-1919 decline in number of establishment occurred concurrently with the growth of large factories in the city, and did not represent a sharp decline in local manufacturing.

Hypothesis 2: Greater Post-Rail Diversification
Greater post-rail industrial diversification would involve attraction of establishments in an increasing number of the major industry groups as well as development of a more equal number of establishments in the groups.
Table 1. Pre-Rail Evansville Industrial Establishments.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of Establishments</th>
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<tr>
<td>Major Industries, Related to the River Trade (a):</td>
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<tr>
<td>Flour, grist mill</td>
<td>3</td>
</tr>
<tr>
<td>Pork Packing</td>
<td>2</td>
</tr>
<tr>
<td>Sawmill</td>
<td>2</td>
</tr>
<tr>
<td>Tannery</td>
<td>2</td>
</tr>
<tr>
<td>Foundry</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Other Major Industries:</td>
<td></td>
</tr>
<tr>
<td>Furniture Manufacture</td>
<td>2</td>
</tr>
<tr>
<td>Pottery</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Industries Oriented to the Local Economy:</td>
<td></td>
</tr>
<tr>
<td>Bakery</td>
<td>1</td>
</tr>
<tr>
<td>Cabinetmaker</td>
<td>4</td>
</tr>
<tr>
<td>Cobbler</td>
<td>1</td>
</tr>
<tr>
<td>Saddle and Harness Maker</td>
<td>2</td>
</tr>
<tr>
<td>Brickyard</td>
<td>2</td>
</tr>
<tr>
<td>Blacksmith</td>
<td>6</td>
</tr>
<tr>
<td>Wagon Maker</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
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</table>

Table 2. GINI Coefficients for Two-Digit Evansville Manufacturing Industries, 1812-1919

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<tr>
<th>Period</th>
<th>GINI Coefficient</th>
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<td>1812-1849</td>
<td>.696</td>
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<td>1850-1859</td>
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<td>1860-1869</td>
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<td>1870-1879</td>
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<td>1880-1889</td>
<td>.501</td>
</tr>
<tr>
<td>1890-1899</td>
<td>.456</td>
</tr>
<tr>
<td>1900-1909</td>
<td>.508</td>
</tr>
<tr>
<td>1910-1919</td>
<td>.510</td>
</tr>
</tbody>
</table>
Figure 2. Evansville Manufacturing Establishments by decade, 1850-1919.

In post-rail Evansville (the decades from 1850 to 1919) establishments operated in 18 of the 20 major industry groups. Using the establishment percentages for each group, Lorenz curves were developed for the establishments of the pre-rail period as well as for each decade from 1850 to 1919. Lorenz curves are simply cumulative curves, initiated with the smallest value and adding each higher value in turn (Holloway and Wheeler 1991). Those for the 1850-1859 and 1890-1899 decades are illustrated (Figure 3). The reduced distance of the curve from the diagonal in the later period suggests both a more even distribution of the establishments among a greater number of the groups, and a correspondingly greater local industrial diversification.

The GINI coefficient was calculated to provide a measure of diversification for the pre-rail period and each post-rail decade. To do so, the area between the Lorenz curve and the diagonal was divided by the entire area below the diagonal. In perfect diversification, the number of establishments in each group would be the same and no area would occur between the Lorenz curve and the diagonal. The two curves would be identical and the coefficient zero. More generally, the coefficient would become smaller as the degree of diversification increased. In Evansville, the pre-rail coefficient was 0.696 (Table 2). The value declined in each decade from 1850 to 1899 when it reached a low of 0.456. Increasing industrial diversification clearly occurred in those post-rail decades. The subsequent increases in the 1900-1919 period indicate a modest decline in local industrial diversification.

Figure 3. Lorenz Curves and GINI coefficients for Evansville Industry, 1850-1859 and 1890-1899.

Hypothesis 3: Post-Rail Industrial Specialization
The analysis of local industrial specializations is necessarily based on specific industries rather than the major industry groups. Unfortunately, Census employment and output data were not uniformly available for local industries over the post-rail period, and no other historical source provided such data. The analysis was based on the size of the industrial sites as determined from the site addresses and the historic Evansville city maps.

The sites proved to vary widely in size. Most (87.1 percent) were small, involving only a single or double urban lot. Another 6.2 percent of the establishment sites were somewhat larger, but involved less than a fourth of their respective blocks. The largest sites (6.7 percent of the total), ranged from a quarter block area to multiple blocks in extent. They were individually large enough for establishments operating on them to represent a local industrial specialization.

The adopted large site criterion for identifying local industrial specializations could have included a few industries which were not large enough to represent a local specialization. However, the historic industrial structures which did survive on the large sites indicate that would have been the exception. On the 27 such sites in Evansville where the historic industrial structures did survive, they underfit the site in only two instances.

A few sizeable sites on large blocks in the urban fringe were excluded by the adopted definition. They were, however, occupied by establishments of industries in which other sites met the quarter block criteria. The quarter block site threshold for Evansville eliminated no industries which occupied extensive sites in any of the decades of analysis.

The industries identified as local specializations in each decade are indicated in Table 3. From a total of 4 in the 1850s, the number grew to a high of 37 in the 1900 decade. The number then declined slightly to 31 in the subsequent decade.

Most of the identified post-rail specializations persisted over several decades. Through 1909, just nine of the 54 specializations identified were limited to a single decade. Those first established in the 1910 decade could be documented only for that period, since in was the last decade analyzed. It is apparent that local industrial specializations did, indeed, increase over the post-rail period in Evansville, and most continued in operation over a substantial time.

Post-Industrial Complexes

The industrial specializations in Evansville suggest both a pattern of local linkages between large area establishments, and a set of post-rail industrial complexes (Figure 4). While the available literature did not support documentation of the inferred linkages, the local development of service and component specializations related to the large fabricated metal product, automotive product, and furniture industries do suggest the local development of post-rail industrial complexes. It seems improbable that local industrial linkages failed to develop between those industries and the area establishments which produced goods and services they required.

The fabricated metal product and machinery producers (1860-1919) and automotive product establishments (1900-1919) represented substantial markets for local metal industry services. The Evansville foundry, machinist, forging, plating, and sheet iron work establishments would have been able to provide the metal industry industries with a variety of needed services.
### Table 3. Evansville Industrial Specializations by Decade.

<table>
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<tr>
<th>Specialization</th>
<th>1850</th>
<th>1860</th>
<th>1870</th>
<th>1880</th>
<th>1890</th>
<th>1900</th>
<th>1910</th>
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</thead>
<tbody>
<tr>
<td>Brewery</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planing mill</td>
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<td>x</td>
<td>x</td>
<td>o</td>
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</tr>
<tr>
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<td>o</td>
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<td>x</td>
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<td>Tannery</td>
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<td></td>
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<tr>
<td>Mop and broom</td>
<td></td>
<td></td>
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<tr>
<td>Medicine</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Structural steel</td>
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<tr>
<td>Tool</td>
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<td></td>
</tr>
<tr>
<td>Hot water apparatus</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Elevator</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Car wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car and truck body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>10</td>
<td>17</td>
<td>20</td>
<td>26</td>
<td>37</td>
<td>31</td>
</tr>
</tbody>
</table>

Subtotal:

- x = largest site less than one block
- o = largest site one block or more

| Subtotal: | 4 | 9 | 13 | 15 | 19 | 25 | 10 |

39
These complexes are indicative of the maturing of post-rail industrial areas. Industrial centers began to develop distinctive local specializations and complexes of related industries among the new specializations (Meyer, 1983, 1990; Page and Walker, 1991). Evansville exemplifies the complex role that the local areas began to play in the increasingly integrated post-rail economy of the northeast, as does Terre Haute. The development of the Vincennes metal industry complex was similar, but was so delayed it cannot be considered characteristic of the smaller city’s post-rail development.

**Post-Rail Increases in Site Size**
The number of large (quarter block or more) industrial sites also increased over most of the post-rail period (Table 4), as would be expected from the increase of specialized industries which required large sites. That increase, however, did not fully suggest the extent of the large establishment growth which occurred in the city. Among them, the percentage of sites extending over a block or more also increased over the period. This increase in the largest of the local manufacturing facilities, greatest between 1900 and 1919, is the apparent reason for the late declines in the total number of Evansville manufacturing establishments, diversification, and number of specializations. In that time frame, a demonstrable shift occurred in the community to larger scale factories.

**Comparative Analysis**
The hypothesized post-rail impacts were also considered in analyses of development of Terre Haute (McGregor 2002) and Vincennes (McGregor 1999), as well as four towns near Terre Haute (McGregor 2002). The magnitude of the pre-1920 industrial development in each community is suggested by the number of early sites identified in the industrial surveys (Table 5). Clearly, industrial
development was concentrated in the three cities, and comparatively limited in the towns.

As in Evansville, the validity of all three hypotheses over the post-rail period was demonstrated in Terre Haute. However, in Vincennes, the increase in specializations was delayed until the 1900-1919, long after the 1854 arrival of the railroad. It would seem that before 1900, Vincennes was too small a community to attract the new specializations which characterized the development of larger centers in the post-rail period.

### Table 4. Large Evansville Industrial Sites by Decade, 1850-1919

<table>
<thead>
<tr>
<th>Decade</th>
<th>At least 1/4 block, Less than 1 block</th>
<th>Site Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>1850-1859</td>
<td>6</td>
<td>100.0</td>
</tr>
<tr>
<td>1860-1869</td>
<td>19</td>
<td>95.0</td>
</tr>
<tr>
<td>1870-1879</td>
<td>26</td>
<td>86.7</td>
</tr>
<tr>
<td>1880-1879</td>
<td>28</td>
<td>84.9</td>
</tr>
<tr>
<td>1890-1899</td>
<td>37</td>
<td>78.7</td>
</tr>
<tr>
<td>1900-1909</td>
<td>45</td>
<td>63.4</td>
</tr>
<tr>
<td>1910-1919</td>
<td>26</td>
<td>46.5</td>
</tr>
</tbody>
</table>

### Table 5. The Number of Pre-1920 Industrial Sites Identified by Community.

<table>
<thead>
<tr>
<th>Community</th>
<th>Number of Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evansville</td>
<td>1,375</td>
</tr>
<tr>
<td>Terre Haute</td>
<td>729</td>
</tr>
<tr>
<td>Vincennes</td>
<td>413</td>
</tr>
<tr>
<td>Brazil</td>
<td>81</td>
</tr>
<tr>
<td>Clinton</td>
<td>67</td>
</tr>
<tr>
<td>Middlebury-Clay City</td>
<td>40</td>
</tr>
<tr>
<td>Eugene-Cayuga</td>
<td>33</td>
</tr>
</tbody>
</table>

Among the four towns, only the diversification hypothesis was applicable over the post rail period. In one, Brazil, Indiana, accelerated growth and new specializations did develop after the 1882 location there of an iron and steel works. However, this was long after the 1850 arrival of the railroad, and Brazil’s overall industrial development was only slightly greater than that of the other towns considered.

Given the results of the community case studies, it would tentatively appear that regional centers at the scale of Evansville and Terre Haute did experience the type of post-rail development identified in the larger cities (all three hypotheses applicable). In smaller cities, such as Vincennes, accelerated growth in the number of establishments and increased diversification apparently occurred, but prompt development of new manufacturing specializations characteristic of the post-rail period did not. And, in the towns, only industrial diversification among the hypothesized impacts seems to have characterized their post-rail development. If so, the characteristics of post-rail industrial
development varied substantially at the regional center, small city, and town levels of the urban hierarchy.

**Conclusions**

As hypothesized, an accelerated increase in the number of establishments, greater diversification, and an increase in new specializations characterized the post-rail industrial development of Evansville. In addition, the development of local manufacturing complexes based on the post-rail industrial specializations, and a substantial size increase in the largest sites occurred in Evansville.

In a broader context, Evansville’s post-rail development appears to be characteristic of post-rail development at the regional center level of the urban hierarchy. The differing results for the small city (Vincennes) and the four towns analyzed, suggest that post-rail development may have differed substantially at different levels of the smaller communities in the urban hierarchy.

**Works Cited**


Development in Place: The neighborhood life-cycle and land-use in Farrington’s Grove

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Abstract
This paper investigates land-use within Terre Haute’s Farrington’s Grove Historical District between 1850 and 2000. The study charts observed land-use change by type of activity and site size. In doing so, this paper investigates the socio-spatial implications of public and private sector practices on land-use. The paper concludes by mapping the basic geography of the neighborhood life-cycle in place and how the cycle has been experienced in the “Grove”.

The paper has three primary objectives. First, the paper reconstructs the historical geographies of Farrington’s Grove land-use. Second, the study charts the life-cycle of the historic district, noting the influence of the local Terre Haute economy on the neighborhood’s landscape. Third, the project maps and assesses changing land-use based on type and intensity.

The Study Area: Farrington’s Grove
Farrington’s Grove has been at the center Terre Haute’s historical development since the 1850s. Because of this, the district testifies to the various eras of economic development, as well as serving as the home to a diverse collection of institutions, historical actors, and architectural styles. As the city’s oldest surviving neighborhood, Farrington’s Grove can be used to illustrate the many forces that have shaped the historical trajectory of the city and the Wabash Valley.

Architecture
The architecture in Farrington’s Grove is diverse and distinguished. The district contains more than 800 buildings exhibiting examples of thirty (30) architectural styles within its sixty (60) square blocks (Table 1 and Map 1). The diversity and density of multiple styles marks Farrington’s Grove as one of Terre Haute’s more unique cultural and material landscapes. The styles range from the simple Carpenter-Builder homes of workers to the elaborate multi-storied Queen Anne houses of their managers. The Historic district includes two structures listed on the National Register of Historic Places, the Williams-Warren-Zimmerman house, an 1840 Greek Revival and the Sage-Robison-Nagel house, an Italianate built in 1868.

Residents
Farrington’s Grove was the home of many significant individuals. In the 1840s, James
Farrington’s farm comprised a large portion of what would later be designated as Farrington’s Grove Historical District. Farrington was an attorney, state senator, bank president, and businessman. Other former residents include Virginia Jenekes, the first woman from Indiana elected to Congress, Max Ehrmann, a noted poet and author, and John Cox, an artist of national renown. The glass manufacturer and designer of the Coca-Cola bottle, Chapman Root was also a resident of the district. Perhaps the most influential past residents was Anton Hulman Jr., a diverse industrialist and builder of the Indianapolis Speedway. His leadership and philanthropic effort have had lasting effect on the community and region.

**Institutions**

The district has been the home to a range of key community institutions. Farrington's Grove is notable in women’s education as having been the site of the Terre Haute Female College (1858) and Coates College (1885). Since 1911, the neighborhood has also included Terre Haute’s only remaining synagogue. Farrington’s Grove also contained St. Anthony’s hospital (demolished, now Anthony Square) a regional leader in health care in the early 20th century and former home of the nursing college. Similarly, the district is home to a variety of other institutional actors including schools and historically significant places of worship, such as the Washington Street Church.

**Table 1. Farrington’s Grove Architectural Styles**

<table>
<thead>
<tr>
<th>American Four Square</th>
<th>Modern Functional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Crafts</td>
<td>Dutch Colonial Revival</td>
</tr>
<tr>
<td>Queen Anne</td>
<td>Nineteenth Century Revival</td>
</tr>
<tr>
<td>Carpenter – Builder</td>
<td>Prairie</td>
</tr>
<tr>
<td>Jacobethan</td>
<td>English Cottage</td>
</tr>
<tr>
<td>Italianate</td>
<td>Spanish Colonial Revival</td>
</tr>
<tr>
<td>Twentieth – Century Functional</td>
<td>Second Empire</td>
</tr>
<tr>
<td>Free Classic</td>
<td>Shingle</td>
</tr>
<tr>
<td>Victorian Gothic</td>
<td>Jacobethan Revival</td>
</tr>
<tr>
<td>Bungalow</td>
<td>Renaissance Revival</td>
</tr>
<tr>
<td>Colonial Revival</td>
<td>Classical Revival</td>
</tr>
<tr>
<td>Romanesque Revival</td>
<td>French Cottage</td>
</tr>
<tr>
<td>Ranch</td>
<td>Mediterranean Revival</td>
</tr>
<tr>
<td>Split Ranch</td>
<td>Queen Anne Cottage</td>
</tr>
</tbody>
</table>

**Table 2. Land-Use By Type, 1850-2000**

<table>
<thead>
<tr>
<th>Year</th>
<th>Undeveloped</th>
<th>Single-Family</th>
<th>Multiple-Family</th>
<th>Institutional</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>24</td>
<td>18</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>1885</td>
<td>25</td>
<td>45</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>1925</td>
<td>0</td>
<td>59</td>
<td>15</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>1950</td>
<td>0</td>
<td>58</td>
<td>15</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>1975</td>
<td>3</td>
<td>58</td>
<td>50</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td>2000</td>
<td>3</td>
<td>53</td>
<td>55</td>
<td>14</td>
<td>24</td>
</tr>
</tbody>
</table>

**Life-Cycle: Uneven Development in Place**

Capital investment and the absence of capital investment are the key determinants of the life-cycle of a neighborhood (Figure 1.). Specifically, the ebb-and-flow of capital investment at the household-level as well as the investment of private entrepreneurs shape
the overall trajectory of growth, sustainability, and decline in urban areas. The neighborhood life cycle—like all of the literature on uneven development (see Smith 1984, 1996; Smith and Williams 1986)—posits that capital investment is inevitably uneven across space and time. Indeed, sustained capital investment is highly unlikely (if at all possible) as individuals and firms seek to maximize profits (Smith 1984).

Building on the principles of uneven development, the neighborhood life cycle charts the multi-stage investment and disinvestments sequence that often characterize urban space economies. The first stage—suburbanization—refers to the initial phase of capital investment and is characterized by low density and low diversity development. During the in-fill stage (Stage 2), increases in both density and land-use type are observed. In both phases, overall capital investment increases. In contrast, the final phases are marked by a decline in investment and the potential for renewal, rehabilitation, and gentrification.

Figure 1. Capital Investment and the Life-Cycle. Based on Knox (2000).

The third and longest stage, downgrade, can be attributed to the combined impact of reduced capital investment, technological change, and cultural obsolescence. In the fourth stage, thinning out, demolition and abandonment create derelict landscapes that are symbolic of economic decline and urban decay (Jakle and Wilson 1992). Ironically, this phase is essential for neighborhood renewal, or new investment, as it often results in the most significant “Rent-Gap” (Smith 1996). Rent-Gap refers to the cost differential between acquisition of real property and the potential for investors to obtain surplus value (i.e., profits) following investment and/or land-use change. This gap makes investment in declining areas attractive and can be a vehicle for renewed development. The fifth stage of any neighborhood cycle is entirely dependent upon the specific outcomes associated with the rent-gap. Depending on the investment environment and range of land-use types, new investment may spur renewal (elimination of current land-use and wholesale re-development of real property), rehabilitation (the updating of structures and the introduction of new use types), or gentrification (the upgrading of structures within the context of a neighborhood’s original architectural integrity, eliminating incompatible uses, emphasizing single family use, and decreasing density).

Research Methods
Data were obtained from a variety of sources. Using a mixed methodological approach, contemporary fieldwork was combined with in-depth archival research and local histories. Archival research included identifying a range of documents such as photos, newspaper accounts, and advertisements that served to complement local economic, transportation, and personal histories. Additionally, over 150 years of Vigo County tax, zoning, plat, and insurance maps were used to create the land-use maps.
Maps were produced in the following manner. Based on collected and observed data, traditional ‘pen and ink’ maps were drawn and then scanned. In order to build topology, the scanned images were digitized in Arcview. To create an effective cartographic product, the digital maps were refined using Adobe Illustrator.

**Land Use: 1850-2000**

The following analysis charts the development of the Farrington’s Grove Historical District and the neighborhood life cycle as it has been experienced in place.

1850
The antebellum period is best characterized as existing in a natural state. The area was densely covered with foliage, with a small knoll of wild strawberries bringing summertime visitors. The majority of the land was undeveloped, with few blocks defined and travel within the district difficult. On the Northern most boundary of the district, closest to downtown Terre Haute, were three cases of institutional land use. The few (n=18) instances of single-family housing were constructed by what can be considered Terre Haute’s early gentry class (Table 2). These country homes sat on vast tracts of land and were in many cases self-supporting.

Farrington’s Grove land-use in 1850 is extensive, with parcel size large relative to future subdivision (Figure 2).

1885
A survey of local records indicate, Farrington's Grove experienced the initial subdivision of land and the introduction of new housing that marks suburbanization. It is in this period—the late-1800s—that the basic street pattern was established. This phase also saw the beginning multiple-family housing and commercial activity in Farrington’s Grove. This new development was linked to Terre Haute’s increasing importance as a regional coal industry hub and as a key Midwest railroad point of exchange. It is in this stage that parcel size is further reduced (Map 1) and land-use begins to intensify.

1925
The most extensive period of construction (1900 – 1925) produced mixed economic and residential use, with all land within Farrington’s Grove now developed. This period of in-fill is marked by a predominance of single-family housing. The resulting structures reflect the economic situation of their inhabitants.
built along South 6th, Center, and South 7th Streets were those of the wealthy local elites. These residents were the owners and managers of local industries, including glass, steel, soup and beer production. The homes of the less affluent middle and working class were located on South 5th and 4th streets. These homes were within easy walking distance of Terre Haute’s industrial corridor (along the Wabash)—where many worked. The early twentieth century economic prosperity was greatly aided by Terre Haute’s location on the Wabash (transportation/industrial water supply) and the intersection of major highways U.S. 40 and U.S. 41. During this era, capital investment intensifies, major land-use classes diversify, and average parcel size is reduced (Map 1. and Table 2.)

1950
Since the 1950s, Farrington’s Grove has experienced the longest phase of the
neighborhood life-cycle, downgrading, as capital investment in the district stagnated. Floods and the potential for floods encouraged many industries along the Wabash River to relocate; thus greatly reorganizing the regional space-economy and geography of real estate markets. In most cases, the new socio-spatial arrangement was anchored by new suburbanization at and beyond the city limits of Terre Haute. This exodus of residents precipitated the deterioration of the built environment. In addition to changing demographics, the district experience significance rates of technological (for example, dishwashers, central air) and cultural (such as, attached garages) obsolescence.

1975
Continued flight to the suburbs and economic uncertainty left many structures abandoned and in a major state of disrepair. This deterioration brought about the demolition of some structures, thinning out, as undeveloped parcels re-entered Farrington’s Grove. This created the potential for increased land-use diversity as the rent gap drove minimal capital investment. The rent gap was expressed in the material landscape as many structures were subdivided into multiple-housing units in order to meet the increased demand for student housing at Indiana State University. Indeed, occurrences of multiple-family housing increased from 15 in 1950 to 50 in 1975. In 1976, neighborhood residents and Terre Haute’s Department of Redevelopment began to investigate ways to reinvigorate and preserve the unique qualities of the district, resulting in the district being placed on the National Register of Historic Places. In 1977, Special Ordinance No. 68 sought to impose zoning restrictions that would help reestablish a predominance of single-family structures in the neighborhood. However, the area covered under this ordinance is roughly only half the size of the designated historic district.

2000
Today, the neighborhood life-cycle continues to be driven by capital investment. New investment in Farrington’s Grove comes in three forms: renewal, rehabilitation, and gentrification. Capital investment in renewed parcels has produced a cluster of high order commercial use (medical services/consulting) as sites were cleared for new construction and re-development. Rehabilitation activities have focused on working class houses located on the edges of the district. Gentrification efforts have been concentrated in the inner core of the “Grove” (Center and 6th Streets).

Generally, gentrified homes tend to be larger and more elaborate. In terms of the character of recent gentrification efforts, the process of gentrification has resulted in the return of some properties to single-family residential uses. Alternately, gentrification has also been characterized by the development of mixed-use properties, such as business-residence. For example, the Farrington Bed and Breakfast located on 7th Street (and others) have combined residential uses with commercial activities.

Conclusion
The historical experience of Farrington’s Grove mirrors that of the neighborhood life cycle and the realities of uneven development. Over the past 150 years, the built environment of “Grove” has changed considerably. In addition to the material landscape, the scale and scope of land-use has changed. The overall trajectory of land-use change has been the transition from extensive to intensive use—as well as from single family use towards more diverse collections of commercial, institutional, and multi-family housing. Similarly, the life cycle can be charted in terms of average parcel size. Over the past 150 years, parcels in the district has
steadily decreased from 5.9 acres in 1850 to less than a third of an acre in 2000.

As this case study demonstrates, the history and development of places and regions can be understood within the context of neighborhoods and neighborhood change. The endogenous and exogenous forces that shaped Terre Haute and the Wabash Valley altered Farrington’s Grove and continue to serve as the foundation for future investment or dis-investment.

Acknowledgements
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Works Cited
Evidence of a New US Economy: Geography, Place and Innovation

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Abstract
The new economy hypothesis identifies the southern and western parts of the United States as important source points for industrial creativity that can rival the northeast. This study shows that this viewpoint, based on invention and innovation, is warranted. Regional technology production in the country is being helped by the presence of professional, skilled labor, rather than manufacturing and related activities as in times past. While the northeast or midwest now operate in a much more competitive inventive spatial system, and are being outperformed technologically by California, Texas, and Florida combined, all regions of the country are patenting inventions more than ever before.

The importance of industrial creativity to regional economic progress is something that has been witnessed for centuries and has become an issue of increasing significance to researchers. Technological advances are necessary for capitalist economies to expand and the engines of economic progress. Bearing this in mind, the purpose of this study is to show the geography of U.S. patented inventions. The net number of patents granted by state from 1978 and 1998 and the percent of inventions developed in US metropolitan areas from 1990 to 1998 are studied. Since invention and innovation play a vital role in the development of economies, understanding their geography is a useful exercise. All regions experience technological growth and decline and consequently there is a need to constantly update our understanding on the matter. For example, Norton (2000) documents the rise of the new U.S. economy and links its to the increasing incidence of entrepreneurs in the western half of the country. Does U.S. patent data also follow this pattern? If it does, it will reaffirm and help geographically define this new entrepreneurial economy.

The importance of new technology to economic growth led Solow (1957) to estimate that three-quarters of the economic growth in the US during the first part of the twentieth century can be linked to industrial inventions. Even at the urban level, it has been shown that waves of technological development initialized by inventive activity will create waves of urban development (Barras, 1987).

Pred (1966) was one of the first to suggest that researchers should concern themselves with the spatial attributes of industrial inventions. Much of the research on the geography of invention and innovation shows patterns of decentralization, agglomeration, and specialization (Antonelli, 1986; Ceh, 1996; Feldman and Florida, 1994; O hUallachain, 1999). For example, the U.S. northeast and midwest are both found to have significant innovation potential. However, the extent of
this regional concentration in innovation needs better calibration since recent changes in the U.S. spatial economic system hint that new evolutionary forces are at hand.

One recent study on the geography of invention shows this phenomena to be concentrated in the traditional industrial belt of the United States (Feldman and Florida, 1994). This concentration is partly due to the Northeast's abundant technical infrastructure, which is supported by research institutions. These researchers suggest that not only does geography play an important role in the invention process, but that invention itself is a geographic process. The capacity of regions to invent is ever more dependent on the agglomeration of specialized skills, knowledge, institutions and resources that mould the technical infrastructure of regions (Feldman and Florida, 1994). Is it possible that those regional factors helpful to invention and innovation building in strength in areas beyond the northeast and midwest?

Beggs and Cameron (1988) found that a technological workforce typically favours certain geographic areas, such as highly urbanized areas, and often avoid locations that predominantly house traditional economic activities. In their study, the bottom 25 producing cities of new technology were in lagging regions and in old industrial and mining towns. Their study also suggests that rural areas are not favourable locations for new technology production. These findings certainly play favourable to the new economy hypothesis that new technology regions are sometimes the antithesis of decaying or traditional ones.

Highly urbanized regions foster inventive activity because of their advantages in economies and superior interaction and information flows (Baitani and Coffey, 1998). In this respect, firms in urbanized locations are at an advantage over their rural counterparts (Ewers et al., 1980; Howells, 1984). In a study of 8,200 small and medium-size firms, it was found that half the firms innovating were located in highly urbanized regions, and in densely populated areas every fifth firm innovated compared to every tenth firm in rural areas (Meyer-Krahmer, 1985).

Firms in urban areas also employ significantly more non-production personnel (i.e., scientists and engineers), use more external sources of information (i.e., journals, suppliers and customers), and tend to have fewer highly qualified employees that can handle sensitive functions and information (Meyer-Krahmer, 1985).

**Methodology**

This study examines the geography of U.S. inventions in 1978 and 1998. The total number of patented inventions developed in U.S. states for each period made the analysis possible. The data came from the U.S. Patent Office (2000). Three maps are shown, the total number of patents claimed by state in 1978, 1998, and the net number of patents granted by state for these two years. Patent data for the top 20 technology centres were also attained from the same source. This data is given for 1990 and 1998.

Since this study uses patent data, this measure of new technology is worthy of some discussion. Though large companies can hold multiple or uncommercialized patents for the purpose of protecting a key invention, a researcher can use that information to their advantage. Arguably, the more pertinent an invention, the more likely a company will acquire additional, supporting patents (which typically are never commercialized) to protect their new technology. As such, unfiltered patent data has a weighted element built into it and researchers can consider it for data analysis rather than treating the information as a drawback.
One way of obtaining filtered patent data is through patent citations. Jaffe (1993) used this approach to successfully show the localization of knowledge. His study is important for another reason. If patents are only a moderately strong spatial measure of new technology, there should be a moderate or weak correlation between the location of cited patents (which are technologically significant) and all patents for a given year. However, this was not shown to be true and Jaffe (1993) found a significant correlation between cited and all patents.

While R&D data is an input measure of new technology, and innovation data is an output measure, patent data is unique because it is both a input and output measure of new technology. Logically, patent information can be used by corporations to measure the success of their R&D employees and spending. Since patenting has come to involve substantial costs and time, simple inventions are becoming more uneconomical to patent. Because modest product or process changes can involve considerable R&D at the firm level, which seems to be happening more often, the lack of patents generated can help reveal this situation.

**Innovation Potential of U.S. Regions**

The innovation potential of U.S. states has changed considerably from 1978 to 1998, making it a spatially dynamic phenomena (Figures 1-2). The data period has captured three important periods of the U.S. economy (i.e., Fordist, transitional, and post-Fordist). It is likely for this reason that the regional innovation potential of the states has changed dramatically over the past few decades. The most obvious has been a decline in the share of technology patented in the traditional manufacturing belt and a rise of such activity in three sunbelt states - California, Texas, and Florida (Figures 1). The finding also complement the notion of a new economy with strong origins beyond the northeast and midwest manufacturing belt.

The notion that the U.S. can be understood as a continent-sized nation of country-sized regions, whereby such regional nations have distinct economic cultures (Norton, 2000) can help decipher the patterns found here. Traditional manufacturing areas in the U.S. are facing increasing technological competition due to increasing provincial innovation. Continual monitoring of the situation will reveal to what extent, and when, the phenomena will show signs of slowing. The possibility that metropolitan centres in the manufacturing belt are immune from this change needs to be re-thought. The manufacturing belt has not only been challenged at the regional-state level, but also metropolitan. Twelve of the top 20 inventive metropolitan centres in the country reside outside the belt (Figure 3). This, coupled with the fact that the northeast and midwest both showed inventive decline from 1978 to 1998, or put another way, had almost 60 percent of the nations patented inventions in 1978, but 45 percent in 1998 (Figure 1), strengthens the notion of a new spatial economy.

At the metropolitan level, 8 of the 20 most inventive cities during the 1990s were in the manufacturing belt (Figure 4). However, the cities of Chicago, Detroit, Philadelphia, and New York all had a smaller share of the inventions by 1998. Thus, any notion that the major cities of the traditional manufacturing zone have maintained their share of invention is misplaced. Boston is the only centre that was comparatively more inventive by 1998. Albeit, even in growing technology regions, such as California, major centres of invention can become less inventive. Los Angeles and Orange County both had a smaller share of the inventions after 1990. Overall, patterns of
Figure 1. Net Innovation Growth by State: 1978-1998

Figure 2. Share of Innovation Growth by State: 1978-1998

Figure 3. Percent of Overall Innovation Among Top 20 US Technology Cities
concentration and decentralization are evidently occurring simultaneously in the U.S. spatial inventive system. The top 20 centres of invention had 37 percent of the nations patented inventions in 1990 and 41.5 percent in 1998.

A national T- or Y-shaped pattern of relative inventive decline best describes the U.S. situation from 1978 to 1998 (Figure 2). States from the far northeast to far midwest and down through to Louisiana form the near T or Y pattern. On the other hand, North Carolina, Georgia, Florida, Texas, Colorado, Arizona, Utah, Idaho, Washington, Oregon, California, Minnesota, and Massachusetts had a greater share of patented technology by 1998 (Figures 1-3). While many of the other states seem to have experienced inventive decline, the situation is not as problematic as initially discussed. The reason for this lies in the fact that the number of inventions patented in all states and the largest 30 cities still increased from 1990 to 1998 (U.S. Patent Office, 2000). Though some regions, such as the northeast and midwest, are accruing less of the national share of new technology, they still developed a larger number of patented inventions (Figures 3). Chicago had almost a thousand more patented inventions from 1990 to 1998 (U.S. Patent Office, 2000) in spite of having a noticeably smaller share of patented inventions compared to other major technology centres from 1990 to 1998 (Figure 4).

With respect to net invention growth from 1978 to 1998, all states showed net invention growth during this time (Figure 1). The fastest growing technology regions are California, Texas, New York, Florida, and Minnesota, respectively (Figure 1). Clearly, the situation for the northeast and midwest is not as problematic as initially discussed, but shows that these regions are having to co-exist in a more competitive “inventive arena”. The dramatic inventive rise of California is downplaying the significance of technological growth elsewhere in the country and shows that this is the country’s “tiger state”.

The technological rise of the sunbelt has been influenced heavily by a few notable factors, according to Suarez-Villa (1993). He argues that a shift to a services based economy and the movement of people to the region have been important to its inventiveness. Key sunbelt states, such as California, Texas, and Florida are thought to be success stories because they have attracted inventors and research-intensive firms from the heartland, have built major technology corporations, and have developed major research poles in selected locations (Suarez-Villa 1993).

**Conclusion**

U.S. inventive activity shows itself to be a dynamic phenomena requiring continual observation. This study confirms that the new economy has strong origins outside the manufacturing belt. The three southern states of Florida, Texas, and California are growing faster technologically than the manufacturing belt. This process has also been continual since the 1970s.

While much of the new inventive growth has been outside the manufacturing belt region, it has by no means immobilized the innovative capacity of the area. The belt continues to dominate on a national level and has been growing technologically in spite of much higher increases elsewhere in the country. As such, it would be unwise to suggest that the longstanding manufacturing region has given way to other areas of the country on an inventive level. If, however, present inventive trends continue, the manufacturing belt will eventually be surpassed by the three growing southern “tigers” - Florida, Texas, and California. This scenario will arguably only happen if these same three states manage to
capitalize on the next wave of new technologies to sweep industrial economies, thereby providing their next major inventive impulse. As is, the three sun-states combined are already more inventive than either the northeast or midwest.

Based on significant technological growth in California, one would expect its largest city to be helping. Yet, the greater Los Angeles area developed a smaller share of the state’s inventions by the late 1990s. Clearly, the primate city is not always the greatest engine of technological growth. New York City was in fact the ninth greatest inventive centre in the country during the 1990s. Surprisingly, many of the country’s most important inventive centres are located in the sunbelt. Further, many of these metropolitan centres, such as San Jose, Dallas, and Austin, had a greater share of patented inventions by 1998, unlike Chicago, Philadelphia, and New York City.

Though manufacturing and related activities played favorably to inventive regions in decades past, today inventive regions need a well educated, professional, and technical labor force. Regional technological growth is essentially being helped by the localized availability of professional, skilled labor. There is sufficient literature that suggests that periphery located and rural regions are at a technological disadvantage. This study finds this situation to be true with respect to many central parts of the country, such as North and South Dakota. On the other hand, the core-periphery disparity is decreasing. Better information and communication technology and more footloose activities have helped reduce the difference in recent years. The push away from manufacturing to more footloose activities, which require a more skilled, technical, and portable labor force, have inevitably shaped recent inventive patterns in the country. Still, it is important to note that the more inventive regions are the most populated. Interestingly, this phenomena is more visible at the state level than for highly urbanized regions. Rochester, for example, has become as inventive as New York. Overall, inventive activity in the United States has shown itself to be a spatially fluid phenomena that appears to not only mirror the economic status of regions, but also those key societal characteristics conducive to industrial creativity.

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