

**Hubs, Nodes, and Bypassed Places:
A Typology of E-commerce Regions in the United States**

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The end of the 20th century was marked by dramatic changes in telecommunications as national monopolies and plain old telephone service (POTS) gave way to increased competition, lower prices, and growing data communications and advanced services. The most visible example of this process is the growth of the packet-switched network of networks, *i.e.*, the Internet. The unlikely progeny of a Cold War defense project, the Internet emerged during the 1990s from the cloistered confines of academia and courtesy of the user-friendly World Wide Web, transformed itself into an increasingly commercial environment (Abbate, 1999; Reid, 1997).

The bursting of the dot-com bubble in April 2000 resulted in a marked decrease in rhetoric on the ability of the Internet and E-commerce to completely transform the economy. Despite this decline in visibility, E-commerce continues to grow and affect the way companies conduct business. While it is no longer the stuff of instant companies and 20 year old billionaires, it has important implications for the development trajectories of cities and regions. This paper assesses U.S. metropolitan regions in terms of the adoption of E-commerce by businesses located within them. This analysis shows that E-commerce is not bringing about the destruction of place and space as some pundits predicted, but is providing the impetus and means to reorganize the economic space in which businesses operate. In addition, spatial divisions in the use of E-commerce in which many cities in the South and Midwest appear to be lagging behind their counterparts in other part of the country. While not every place can become a major hub or global city, some regions appear to be re-making themselves while others are moving more slowly.

I. The spatial implications of E-commerce

One of the great paradoxes of the 21st century is that as telecommunications improve and the economy globalizes, spatial proximity and cities retain their importance in economic development (Malecki, 1999; Porter, 1998; Markusen, 1996; Florida, 1995; Gertler, 1995; Scott, 1995). This builds upon earlier arguments by Pred (1977) and Storper and Walker (1989) and reflects over a century of academic research. Despite this body of research many people, albeit largely non-geographers, predicted that the Internet would loosen the ties of economic activity to localities and heralded the end of cities (Gilder and Peters, 1995; Cairncross, 1997; Negroponete, 1995, 1999).¹

A. To disperse or not to disperse...

While expectations of the Internet “ending geography” have been shown to be grossly exaggerated (Zook, 2000; Moss and Townsend, 2000; Gorman, 2001), there remains considerable uncertainty surrounding the impact of E-commerce on the economy (Leinbach, 2001). While it is tempting to identify a single effect of E-commerce, *e.g.*, dispersal of jobs or industries, the dynamic geography of the economy and production is complicated, messy and defies neat categorization (Storper and Walker, 1989). Moreover, analysis of earlier rounds of related innovations in transportation and communications technologies demonstrate that certain activities such as management might agglomerate while others such as production or distribution may disperse with the two trends constructing a more complex organizational systems (Johnson, 1977; Castells, 1989; Leamer and Storper, 2001).² While it remains an empirical question, it

¹It is enlightening to note that during the 19th century pundits made related predictions about how the introduction of the telephone would effect economic and social life (Fischer, 1992).

² Economic history is repleat with numerous instances in which existing skills, production processes, industries and locations were rendered obsolete by a new innovation and in so doing offering the opportunity for new agglomerations and the reorganization of existing ones. As Walker (1995, p. 196) argues, “The amazing process of industrialization – has repeatedly knocked the props out from under established social arrangements and posed new

seems likely that E-commerce will help create a similar pattern of concentration and dispersal in the organization of businesses and the economy.

For example, new communications and transportation technologies have allowed for the fragmentation of many production process across geographical places (Arndt and Kierzkowski, 2001), but this fragmentation has not reduced the draw of agglomerations nor their ability to generate new firms and industries (Jacobs, 1984). The reasons for this attraction of agglomeration are as complex and vary with the economic activity. Transportation costs remain an important factor for some manufacturers; reliability of access is another, while others are driven by cost-minimizing or regulatory concerns. In the case of innovative and information-based industries, the ability to access uncodifiable knowledge via local networks has proven a powerful theoretical explanation for agglomeration in the current era (Saxenian, 1994; Gertler, 2001; Grote and Lo, 2001). Although the concept of neighborhood or district should not simply be conflated with community ties (Wellman, 1999) and the exchange of uncodified knowledge need not be limited to local exchanges (Amin and Cohendet, 1999; Cowan *et al*, 2000), economic history provides considerable evidence that “handshake” interactions generally require face-to-face interaction (Leamer and Storper, 2001).

B. Continued relevance of localities and agglomerations

Thus, for these theoretical reasons, the Internet and E-commerce are arguably bringing about a revival of cities (or in light of the office park landscape of Silicon Valley, agglomerations) rather than their end. Research on “global” cities such as Friedmann and Wolff (1982) and Sassen (1994) and related research that documents the dominance of a few metropolitan regions in

puzzles for humanity to solve. How this unwinds is very much an open, experimental process, even though the contours of the prevailing social relations channel the movements in certain ways.”

“knowledge” industries (Pollard and Storper, 1996; Audretsch, 1998), provide empirical backing to the argument that agglomerations are far from irrelevant in the current era. Nevertheless, research on the interaction of telecommunications (such as the Internet) and cities has historically been relatively sparse, particularly when compared to research on urban transportation issues. Moreover, analysis of the use of telecommunications and the implications for cities is often colored by technological determinism, utopian and dystopian, rather than concrete analysis (Graham and Marvin, 1996; Thrift, 1996).

In the case of the Internet there has been a growing body of literature that demonstrate that much of the development of the Internet has concentrated within developed countries and/or major urban agglomerations (Hargittai, 1999; Robinson and Crenshaw, 2001; Jordan, 2001; Townsend 2001; Dodge and Shioda, 1998; Brunn and Dodge, 2000; Moss and Townsend, 1997; Kolko, 1999; Zook, 2000; Zook 2001; Malecki, 2000). Equally intriguing are a number of studies have also shown that significant disparities exist between regions’ access and use of the Internet (Wheeler and O’Kelly, 1999; O’Kelly and Grubestic, 2001; Zook, 2001; Moss and Townsend, 2000). This suggests that country and regions are taking multiple paths towards Internet adoption rather than following a single trajectory.

Aoyama’s (2001) research on E-commerce in Japan provides a particularly striking example of this. Rather than following the retail E-commerce model developed in the United States in which consumers make purchases via a web site with a credit card and have it delivered to their home, Japanese retail E-commerce centers around corner convenience stores. A combination of factors including less familiarity and history with mail-order purchases than in the U.S., a low level of credit card use, and concerns with the ability to return purchases, has created a

remarkably different implementation of E-commerce. Although sub-national differences within a country are likely to be less than between countries, this example suggests that the timing and use of E-commerce within regions can vary significantly.

This review argues that the affect of E-commerce on the U.S. economy is not uniform and that it is best not to think of it in static terms. The adoption of E-commerce is a dynamic process and as the numerous bankruptcies of online retailers illustrates, can change very quickly. Even before the bursting of the dot-com bubble there was steady movement away from small entrepreneurial companies to more established “bricks and mortar” companies. This trend, however, does not mark a return to the economic system of the pre-Internet era but the next phase in E-commerce adoptions. Nevertheless, as the following sections show, regions that were the early centers of dot-com companies retain their primacy into the next stage even as more mainstream companies expand their E-commerce activity.

II. Identifying E-commerce Agglomerations

Obtaining accurate and meaningful geographic measures of the Internet and E-commerce is a difficult undertaking. A widely used study by the Center for Research in Electronic Commerce at the University of Texas (2000) as well as Department of Commerce (2000) data on E-commerce is only available at the national level. Although country business pattern data will likely prove useful in the future with its utilization of the North American Industry Classification System (NAICS), currently its most recent data predates most of the expansion in E-commerce.

Therefore, researchers interested in E-commerce, particularly its geographical dimension, must rely upon private sources of data and their own devices to find relevant data sources. This paper

uses a series of databases that provide indications of the level of Internet commercial activity constructed from lists of companies. Because this data comes from private sources rather than government agencies the methodologies and criteria vary and often only capture the largest cases of E-commerce. In order to reduce the bias of any one source this paper uses a combination of databases. These databases are used to construct a typology of regions based on the size and relative specialization of regions' E-commerce activity.

A. Data sources

The primary data source for this paper is a list by *Interactive Week* of the 500 companies with the most sales generated electronically.³ This ranking is conducted in late summer and measures online sales for the previous 12 months, generally July 1st to June 30th. The list includes both private and public companies and although it is likely that some companies eligible for this list are missing, it still represents the most comprehensive collection of companies engaged in E-commerce. The criteria for E-commerce is based on a Department of Commerce definition and includes the sale of all goods and services (B2C and B2B) via any electronic means, *e.g.*, electronic data exchange, Internet, extranet, etc., although payment can be made via any means. The reliance upon this database means that this definition is also the one used by this paper. Because *Interactive Week* provides no data on the location of these companies, this information is based on the registration information for the domain names obtained from Whois queries (Moss and Townsend, 1997; Zook, 2000).⁴

³ To see this list visit, <http://www.interactiveweek.com/>.

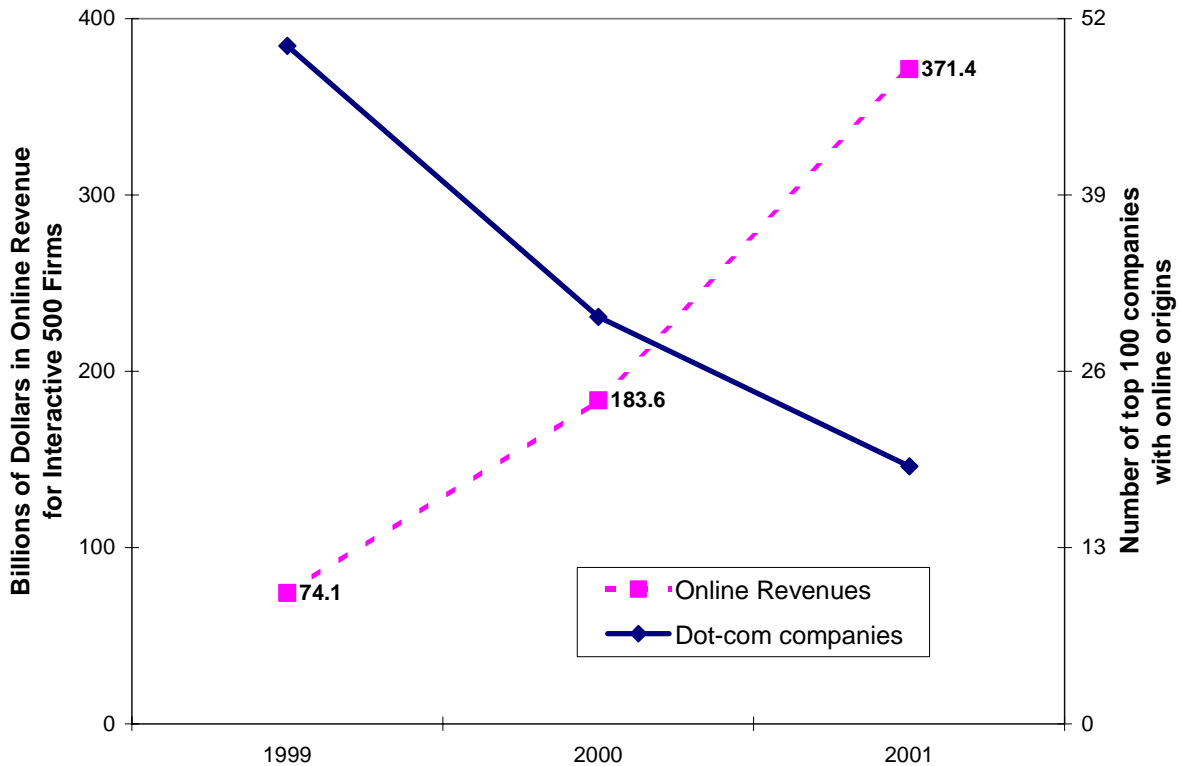
⁴ While this means for determining geographic location is by no means full-proof, Zook (2001) has shown a high correlation between the headquarter locations of companies and the registration information contained within domain names.

The *Interactive Week* ranking has been conducted in 1999, 2000 and 2001, however, concerns with the validity of longitudinal geographic analysis based on this data restricts this paper to a static moment in time. Nevertheless, it is informative to examine the evolution of this data set particularly because it covers the period of time in which many dot-com companies went out of business. As Figure 1 illustrates, there has been considerable growth in the amount of revenue generated by the top 500 E-commerce firms. From approximately \$74 billion in 1999, it grew to 183.6 billion in 2000 and to \$371 billion in 2001.⁵ While the figures for E-commerce are difficult to verify, *Interactive Week's* figures correspond well with other available data. For example, the Center for Research in Electronic Commerce (2000) found that Internet Commerce in the time period that corresponds with *Interactive Week's* 2000 data totaled \$226 billion dollars.⁶

⁵ More than a fourth of the total in 2001 is generated by Enron, which with \$97.5 billion of online sales, far surpasses its closest competitor, IBM with \$26 billion. Of course, as Enron's recent bankruptcy shows, considerable volatility remains among top E-commerce firms regardless of the origins of the company.

⁶ While CREC's figure is an estimate it is relatively close to the figure from *Interactive Week* and the \$42 billion surplus could be accounted for by the the revenue of smaller companies that did not make the list of the top 500.

Figure 1, Online Revenues and Number of “Dot-com” firms in top E-commerce Positions, 1999-2001



Source: Online Revenue's based on Interactive Week's Interactive 500; Firms with online origins determined by author

In addition, Figure 1 highlights a second trend within E-commerce, *i.e.*, the shift from startup companies formed specifically to take advantage of the Internet to established companies who incorporate the Internet as part of their business strategy. During the late 1990s, the prevailing wisdom was that “brick and mortar” companies were in danger of losing significant market share to online startups, *e.g.*, eToys which was ranked 80th in by Interactive Week in 1999 and Toy ‘R’ US that did not even make the top 500. As argued in *Business Week* in 1999,

When old-economy companies have tried to beat their Net rivals at the new game, it has usually been the upstarts that prevailed...Perhaps nowhere will the contest between traditional and cyber-merchants be more intense than in toys...Toy ‘R’ Us Inc...is still struggling to get its cyberfooting...the entrenched E-tailer, eToys, will be hard to beat. It could grab as much as \$100 million in sales this year" (Zellner *et al*, 1999, p. 31)

Ironically, although eToys reached \$167 million in sales in *Interactive Week's* 2000 data it did so by taking an enormous loss. In less than the space of two years the situation changed dramatically with eToys bankrupted and Toy 'R' US moving up the rankings for E-commerce revenues.⁷

The second data source is based on a technique first discussed by Paltridge (1997) that relies upon efforts on the web to rank top web sites. The exact methodology of these rankings systems are often proprietary but they are generally based upon variables such as pageviews – the number of times a site is accessed, unique visitors – counting individuals rather than hits, and other traffic measures. Although not all top visited sites engage in e-commerce, berkeley.edu and mit.edu are regularly among the top 500 most visited sites, there is generally a high correlation between traffic and attempts to turn these visitors into customers. This paper uses the top 1000 sites provide by Alexa research which are based on the aggregated traffic patterns of 500,000 web users worldwide. The location of these websites was again determined by Whois queries on domain names.

The third data source used for an indicator of E-commerce is a specially constructed database of Internet firms. At its heart is Hoover's Online Business Network, which contains information on approximately 14,000 public and private firms worldwide. Firms were selected from this database if they were classified by Hoover's as belonging to the Internet Sector or were otherwise identified by the author. These firms include both those founded explicitly to take

⁷ In general there has been a steady drop in the rankings of top "dot-com" firms in *Interactive Week's* list and a corresponding rise in established corporations. For example from 1999 to 2001, Amazon dropped from 12th to 21st, Travelocity from 17th to 82nd, E*trade from 18th to 26th, Buy.com from 20th to 44th, and Yahoo! from 21st to 40th. In contrast, Enron which was not rated in 1999 was ranked 1st in 2001, General Electric moved from not rated to 8th, and General Motors moved from not rated to 10th.

advantage of the Internet (dot-coms) those which had existed prior to the Internet but were moving towards making the Internet a significant part of their business. While these 815 firms certainly do not include all companies in the Internet industry, they do represent a sample of the most important firms. The location of each firm was based on the information within the Hoover's database.

A common issue with all three data sources (See Table 1 for a summary) is that they provide only one location for a firm or website despite the complex spatial division of labor of the companies represented in the data. As a result these databases are biased toward urban regions that contain a large number of company headquarters since often this is the one location that is possible to determine. Although this issue cannot be completely removed, the analysis corrects for this bias by standardizing the analysis by the number of Fortune 1000 companies headquartered in a region.

Table 1, Data Sources

Data	URL/Source	Location based on...	Number of Observations	Date
Top E-commerce Firms	Interactiveweek.com	Domain Name	500	June 30, 2000 – June 30, 2001*
Most Visited Websites	Alexaresearch.com**	Domain Name	1000	July 2000
Top Internet Companies	Hoovers.com	In database	815	May 2000

** If data is not available for this time period, the four quarters closest to this date is used; ** This ranking is no longer available online*

B. Constructing a typology

The first step in constructing a typology of E-commerce regions in the United States is the creation of indexes that standardized each region's score. The calculation for each index is based on the following formula:

$$\left(\frac{\text{Number of Observation in Region}_i}{\text{Maximum number of observations in any Region}} \right) * 100$$

This creates an index from 0 to 100 in which the region with the largest number of observations scores 100 and a region that had 43.8 percent as many observations Scores 43.8. These three index scores are summed and standardized which form the basis for the typology created in this paper.⁸

The typology is defined along two axes, the overall size of E-commerce in a region and its specialization in E-commerce relative to the number of Fortune 1000 firms headquartered with it. Regions are placed in each category based on standard deviations as outlined in Table 2. The size categories are relatively straightforward measures of the overall amount of E-commerce in a region. The specialization level categories capture regions' level of activity within E-commerce with those scoring well above the median designation as E-commerce regions. Potential and Lagging classification simply represent lower penetration levels within the region. While the criteria for entry in each category are soft they are based on natural breaks within the index and are designed to provide variation to allow for useful delineation between regions.

⁸ Although the algorithm used in this paper is one of many indexing techniques, sensitivity analysis shows that similar classifications result when other formulas based on medians or means rather than the maximum value are used. Moreover, the exclusion of datasets in the summed index produces relatively few changes in the categories in which regions are placed. For example, when only the *Interactive Week* dataset is used, regions that are better known for their role in the dot-com boom such as Seattle and Los Angeles drop from Hubs to Nodes and Chicago moves from a Node to a Hub. However despite this movement, the regions retain their respective specialization classifications, e.g., E-commerce or Lagging.

Table 2, Outline of Typology

	Criteria for Entry in Category
Size	
Hub	Summed Index > 1 Std. Dev. above median
Node	Summed Index > 0.5 Std. Dev. above median
Place	Summed Index > Median
Specialization Level	
E-commerce	Standardized Summed Index > 1 Std. Dev. above median
Potential	Standardized Summed Index > 0.4 Std. Dev. above median
Lagging	Standardized Summed Index < 0.4 Std. Dev. above median
EXAMPLE	
E-commerce Hub	Summed Index > 2 Std. Dev. above median & Standardized Summed Index > 1 Std. Dev. above median

This paper uses Census defined Metropolitan Statistical Areas (MSAs) or Consolidated Metropolitan Statistical Areas (CMSAs) throughout its analysis. Because revenues vary so dramatically and it is not possible to assign revenues of multi-locational companies to each of its sites, this paper use the count of number of companies in a particular region. Because of the relatively small sample sizes of all the data sets, analysis based on it is limited to 106 metropolitan regions with observations in at least one of the three indicators.

III.E-commerce Hubs, Nodes and Places

As Table 3 outlines, there is considerable variation among the 15 regions that score highest in the summed index. The seven hubs that are at the top of this typology are identical to the largest metropolitan areas in the US with the exception of Seattle and the exclusion of Philadelphia. The rankings, however, do not mirror the size of these region as the San Francisco Bay outstrips other regions in all categories and Chicago ranks lower than its size suggest. The result of that is that only four of these seven hubs' emerged as specialized in E-commerce with New York and Washington DC achieving potential status and Chicago emerging as a laggard. This demonstrates that the adoption of E-commerce is not simply a matter of major business centers

adopting its use. Rather the unique dynamics and histories in regions are likely shaping the adoption of E-commerce by business.

This trend is mirrored in the smaller concentrations in Table 3, *i.e.*, nodes and places, which again run the gamut from E-commerce to Lagging classifications. While it is not surprising that Austin, given the presence of Dell Computers (Fields, 2001), or San Diego, given its concentration of many telecommunications companies, achieve an E-commerce specialization, the emergence of Miami as an E-commerce node is less intuitive. Identified by Zook (2000) as containing a large concentration of domain names, and as a location for E-business activity by Gorman (2001), Miami is emerging as an example of how the E-commerce allows some regions to leverage their existing strengths in the Internet era. Although space considerations do not allow this paper to go into more detail on this point, it appears that Miami is increasingly become the Internet hub for Latin America. Telegeography (2002) documents that it is the primarily gateway for Internet traffic from Latin America to the United States and the rest of the world.

Table 3, Summary of 15 Regions with the highest summed indexes

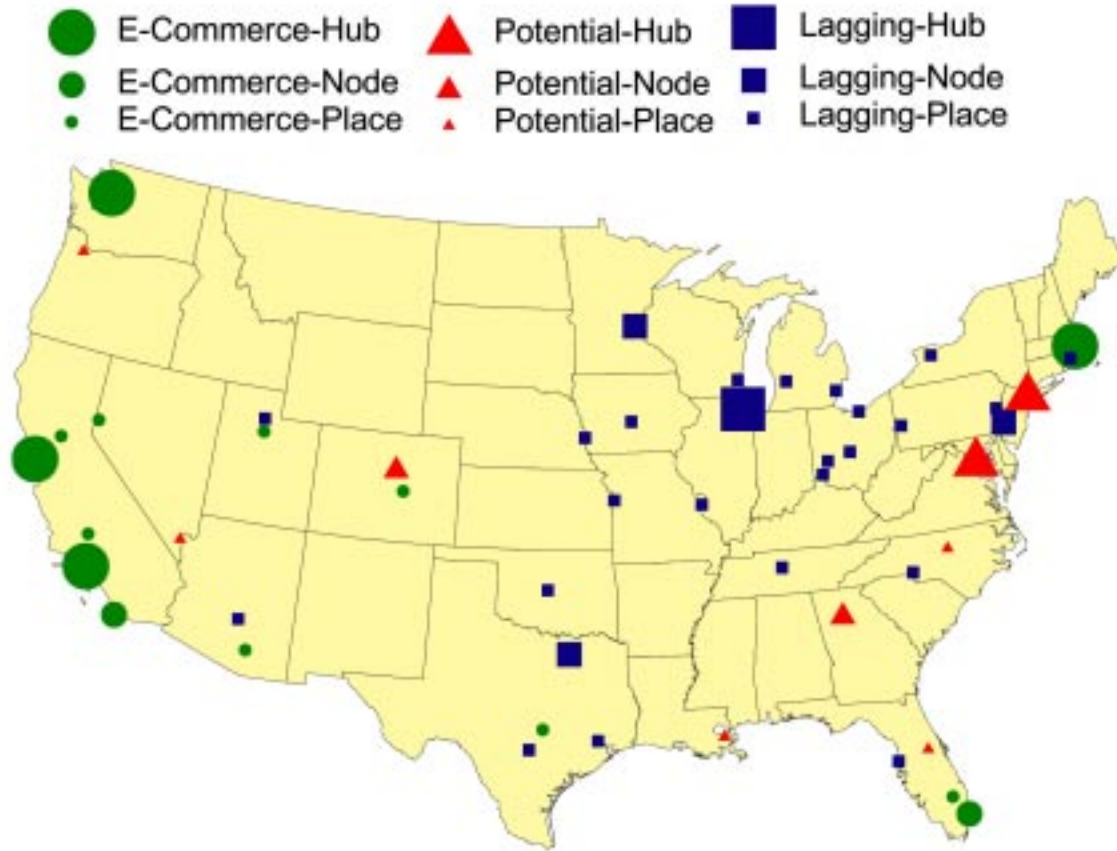
MSA/CMSA Description	Alexa Index	Hoovers Index	Interactive Week Index	Summed Index	Standardized Summed Index*	Category
San Francisco-Oakland-San Jose, CA CMSA	100.0	100.0	100.0	300.0	6.4	E-Commerce-Hub
New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CMSA	64.2	85.8	78.0	228.1	1.6	Potential-Hub
Los Angeles-Riverside-Orange County, CA CMSA	43.8	29.7	45.1	118.6	2.6	E-Commerce-Hub
Boston-Worcester-Lawrence, MA-NH-ME-CT CMSA	20.4	34.5	30.5	85.4	3.3	E-Commerce-Hub
Seattle-Tacoma-Bremerton, WA CMSA	32.8	28.4	23.2	84.4	6.0	E-Commerce-Hub
Washington-Baltimore, DC-MD-VA-WV CMSA	17.5	24.3	28.0	69.9	2.1	Potential-Hub
Chicago-Gary-Kenosha, IL-IN-WI CMSA	12.4	19.6	31.7	63.7	1.0	Lagging-Hub
Atlanta GA	9.5	13.5	15.9	38.9	1.7	Potential-Node
Dallas-Fort Worth, TX CMSA	7.3	10.1	17.1	34.5	1.0	Lagging-Node
San Diego CA	8.8	11.5	8.5	28.8	5.8	E-Commerce-Node
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD CMSA	6.6	7.4	14.6	28.6	0.7	Lagging-Node
Miami-Fort Lauderdale, FL CMSA	8.8	8.8	8.5	26.1	3.3	E-Commerce-Node
Minneapolis-St Paul MN-WI	5.1	10.1	9.8	25.0	0.8	Lagging-Node
Denver-Boulder-Greeley, CO CMSA	3.6	14.2	6.1	23.9	1.6	Potential-Node
Austin-San Marcos TX	3.6	8.1	6.1	17.9	8.9	E-Commerce-Place
Median	0.7	0.7	1.2	2.4	1.0	
Standard Deviation	12.7	13.8	13.8	40.0	1.6	

**Standardization is based on number of Fortune 1000 companies headquartered in region*

The regions that have relatively little E-commerce activity given the size of their existing business community include Chicago, Dallas, Philadelphia and Minneapolis. While there are any number of reasons for this low level of penetration this mirrors the pattern identified for the adoption of commercial Internet use identified by Moss and Townsend (1997), Zook (2000) and Moss and Townsend (2000). This lack of specialization remains even when the analysis is just based on *Interactive Week* data. These differences between regions suggest that important spatial differentiation exist in the adopting and use of E-commerce.

This spatial division is even more evident when mapped. As Map 1 illustrates, the bulk of E-commerce regions are concentrated in the Western and Pacific regions of the United States. In addition to those listed in Table 3, these regions include Santa Barbara, Provo, UT, Reno, NV, Colorado Springs, CO and Tucson, AZ. In contrast, the majority of regions that have low E-commerce use relative to their existing economy, *i.e.*, lagging, are concentrated in the Midwest and Great Plains including Detroit, MI, Cincinnati, OH, Milwaukee, WI, Cleveland, OH, Pittsburgh, PA and Omaha, NE. Although regions placed in the Potential category are more evenly distributed throughout the US, the spatial divide between E-commerce and Lagging regions is striking.

Map 1, Distribution and Level of E-commerce in the United States, 2000



The 51 out of 106 metropolitan regions represented here are those that scored above the median in terms of size of E-commerce activity

This concentration illustrates a continuing spatial divide between region of the United States between regions that were early adopters of the Internet and E-commerce and those that have been slower to take this step. It also suggests a sectoral division between regional economies with larger concentrations in traditional manufacturing and agriculture industries resulting in slower adoption of E-commerce. This spatial divide is resistant to sensitivity testing and remains evident even when the standardization method is based on the total number of firms within a region rather than Fortune 1000 firms.

Although this typology is preliminary, it reiterates the continued relevance of agglomerations during the emergence of E-commerce in the United States. However, it suggests that the way in

which regions adopt and participate in E-commerce is not uniform but based on the history and conditions of a region. While much of this may be unique to particular regions there also appears to be some large and spatially relevant trends influencing the adoption of E-commerce and resulting in a spatial division of E-commerce regions.

IV. Bypassed Places

The nature of the data used in previous analysis, *i.e.*, its small sample size and focus on the largest companies confounds attempts to study smaller regions and cities with lower levels of Internet use and penetration. For example, because all three data sources assign all data to a single headquarters location they miss out on smaller E-commerce activities that are based in the multiple locations by firms. This includes Amazon.com's warehouse in Lexington, Kentucky, the emergence of specialized regional centers for the distribution of products, *e.g.*, Reno, Nevada, and the concentration of Internet infrastructure in colocation facilities (?? And Malecki, 2001). Although this paper is unable to contribute a meaningful analysis of the complexity of these examples, it provides an alternative effort to measure these types of regions.

In order to accomplish this analysis, the number of registered dot-com domain names per establishment in a region during in July 1998 and January 2001 was examined. Regions with less than the median number of com domains per establishment in both time periods (117 MSAs) were identified. MSAs with less than the median number of com names per establishment from this subset in both time periods (37 MSAs) are classified as bypassed places with sustained and significantly lower commercial usage of the Internet than the US as a whole.

As Map 2 illustrates, these bypassed places are scattered throughout the United States although there is a large concentration in the South. Over 70 percent of bypassed regions are located in

the Census defined southern region with 30 percent in the South Atlantic Division, *i.e.*, Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia. Another 27 percent are located in the West South Central division consisting of Arkansas, Louisiana, Oklahoma, and Texas.

Map 2, Bypassed Places



This distribution suggests a further refinement of the spatial division of E-commerce identified in Map 1 in which the Southern part of the United States has a disproportional number of bypassed places. While firms within smaller regions in the U.S. and these “bypassed places” are certainly able to engage in E-commerce it appears that they may be less likely to do so. It is not clear from this analysis what barriers may be preventing firms in these regions from adopting E-commerce and what an appropriate response would be. However, the type of E-commerce

activity in these smaller regions likely differs significantly from what takes place in the E-commerce hubs. Although officials in many regions are eager to cast themselves as the next Silicon Valley or E-commerce center, a more likely scenario would take the form of call centers (Richardson and Gillespie, 2000).

V. Conclusion

The typology of E-commerce regions developed in this paper tells an important story of how a technology that was reputed to “render geography and cities meaningless” has developed a distinct and often urban geography. There are a few key urban agglomerations that have emerged as hubs for E-commerce. While in some ways these cities correspond closely to existing city hierarchies there are also significant discontinuities from previous patterns. For example, Chicago and Philadelphia have a relatively small E-commerce component to their economy and other regions such as Austin, TX and Miami are emerging as important new nodes.

While the telecommunications technologies have increased the ability for isolated businesses or individuals to access (and be accessed by) the rest of the world, it also strengthens the ability of large companies and early movers to extend the scope and reach of their markets. Given the disparate experience of regions shown in this paper, it is clear that the impact of E-commerce is far from uniform. Nevertheless, two conclusions can be made based on this analysis.

A. Shift from dot-coms

The first conclusion is that E-commerce is continuing to shift away from the entrepreneurial startup prevalent at the end of the 1990s to more established or “bricks and mortar” companies. At the height of the dot-com bomb in 1999 big companies and corporations were increasingly concerned with Internet based competition as a seemingly endless supply of venture capital and

IPOs were creating companies and attracting talent. As the “new economy” magazine *Business 2.0* characterized the dilemma facing old-line business:

An increasingly annoying question – *What's your Internet strategy?* – keeps getting asked, but not really answered. You thought the focus group nipped that in the bud when you launched a Website a couple of years ago. (You even had the URL printed on everyone's business cards.) Problem is, your big dot-com is now dismissed as advanced brochureware, and two online startups launched last quarter with the sole mission of bumping you off the face of the earth. More red flags: Resignation letters from key executives in logistics and distribution – who took jobs they couldn't turn down at Net startups – are trickling in. (Davis, 1999, 72)

The souring of the public markets, the subsequent drop in venture capital investing, and the numerous bankruptcies of dot-com business during 2000 and 2001 has reduced this particular worry for companies.⁹ Nevertheless, considerable challenges remain for companies and regions in adopting E-commerce in business and development strategies. While the recent bankruptcy filing by *Interactive Week's* leading E-commerce company, Enron may be a unique case, it highlights that even longer company histories do not ensure success.

B. Variety of Place Experience

This paper's second conclusion is that the adoption of E-commerce by businesses and regions is far from a uniform process. Some sectors, *e.g.*, high technology, financial and business services were quick to adopt the Internet and introduce E-commerce capabilities into their business models. However, the dearth of E-commerce specialized regions in the Midwest and the concentration of bypassed places in the south suggests that there is a significant spatial divide within the adoption of E-commerce.

⁹ Moreover, while dot-com companies received much of the attention during the 1990s and included some major success stories it is questionable how much of the Internet Economy consists of these type of firms. For example, the CREC (2000) argues, “While ‘dot-com’ companies have often been the face of the Internet Economy,

Moreover because of the data sets used by this paper there has been a focus on the largest cities in terms of E-commerce and admittedly provides a superficial analysis of how E-commerce has affected smaller regions and rural areas. One of the most remarkable achievements with in E-commerce is the increased ability for individuals and small business to access large markets of other individuals through web sites such as eBay and Paypal. These agglomeration of these small transactions into a national and international market places enables people to sell and buy products from other individuals on a scale hitherto unknown. The time and monetary costs of contacting all the sellers or buyers in a market would have been prohibitive and served to keep many of these exchanges, local and constrained. Although this will wait on future research it is likely that this type of engagement will provide yet another example of the variety of E-commerce adoption.

Thus, rather than the destruction of place and geography predicted by some, E-commerce is reorganizing the economic space in which businesses operate. This reorganization of economic space is reflected in the fortunes of specific regions and contains significant variation between regions. Although not every place will become a major E-commerce hub all regions will be shaped by the way in which firms adapt to this new commercial medium.

interestingly they make up a very small part of it. Only 9.6 percent of the firms studied can be classified as 'dot coms' with 95 percent or more of their revenue from the Internet. [based on 2000 data]"

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