Supply, demand and ICT-based services: A local level perspective

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Abstract

While much of the economic development literature urges greater emphasis on demand-based strategies, policies designed to create economic development advantage by leveraging telecommunications investment continue to be supply side oriented. The rationale underlying telecommunications investment efforts is that if the technology is low cost, both financially and from a cognitive usability standpoint, then it will be used. This paper examines the use of supply side strategies by one small community, LaGrange, Georgia. LaGrange sought to enhance its competitiveness in the knowledge economy through the deployment of an Internet television like service designed to be free and easy to use called LITV. Based on a survey of 494 households and selected case studies, the study found that a major group of households that took up the service already had an Internet computer at home. They adopted LITV primarily because it was free rather than because it was an upward path toward economic transformation, as was the case for a segment of African-American female-headed households that adopted LITV. In spite of the fact that LITV was free and nominally easy to use, many citizens did not adopt LITV. Nonadopters and those who initially adopted but then dropped the service spanned the socioeconomic spectrum—rich and poor, well educated and dropouts, with Internet computers at home and beyond. This finding suggests that reducing the cost of technology alone is not enough to raise demand. More attention must be paid to tailoring policies to stimulate demand through targeted applications and broader supporting policies.

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Keywords: Municipal telecommunications service; Rural economic development; Technology transfer; Public broadband network; Supply side policies; Information technology utilization

1. Introduction

Telecommunications policy has often been driven by the goals of improving public information access and promoting industrial development. Such a linkage was explicit in programs such as the French Teletel (Minitel) system (Cats-Baril & Jelassi, 1994) and the US National Information Infrastructure (NII) initiative (Information Infrastructure Task Force, 1993). As with these national policies, local policy has focused on increasing the supply of telecommunications in order to achieve larger social and economic goals. Demand for
information and communications technologies (ICTs) has not been much of a consideration. This paper examines how programs focused on increasing the supply of local telecommunications infrastructure and ICT-based services, without consideration of demand-side issues, can miss their policy objectives.

It is useful to begin by noting that economic development policy—especially at the local level—has traditionally been concerned primarily with increasing the supply of infrastructure in order to attract industry. In 1988, Peter Eisinger maintained in the Rise of the Entrepreneurial State (Eisinger, 1988) that state economic development policies were shifting from supply side strategies to attract and recruit mobile businesses to strategies that emphasize demand factors. Porter (1990) makes a parallel argument that local demand conditions such as sophisticated local markets constitute a competitive advantage.

Since that time, federal, state and local governments have made investments to develop their local demand capabilities. Indigenous research, commercialization, support for venture startups, science parks and upgrading of existing industries and existing workforces have been pursued. Various studies have examined the links between economic development indicators and strategies to increase local demand for technology such as university research (Acs, FitzRoy, & Smith, 2002; Audretsch & Feldman, 1996), venture capital (Belke, Fehn, & Foster, 2003), research parks, (Luger & Goldstein 1991) and industrial extension programs (Shapira & Youtie, 1998).

Despite the attention given to these nominally demand-based approaches, most local economic development practice is still focused on business recruitment and other supply-side efforts (Yanarella & Green, 1990, Pennington, 1994). Moreover, it could be argued that even these are supply-side efforts because they are not driven by local demand for technology, let alone work to increase that demand. Also, most of these efforts have dealt with locales that have manifest technological demand: major and mid-sized metropolitan areas with universities and substantial industrial bases.

Nowhere is this more valid than in the case of telecommunications. Economic developers and related organizations have placed much emphasis on the local supply of technology. The progress in information and communication technologies (ICT) over the last half-century has been astounding as the supply of digital computing and telecommunications has increased exponentially in accordance with Moore’s law: the processing power per dollar of ICT has increased nearly 40 percent annually since 1971 (Bond, 1997, p. 4).

Many states and municipalities followed this investment trend by building broadband networks (either themselves or through providers) because it has been seen as important for their economic development strategy. This “build it and they will come” strategy, in which success is equated with deploying broadband infrastructure (i.e., network facilities and hardware), has been particularly popular with smaller, more rural communities as a way to “leapfrog” into a knowledge economy and attract “high tech” firms. The underlying policy logic has been that technology-intensive firms use advanced telecommunications services, which require extensive telecommunications infrastructure, therefore, deploying such infrastructure in small rural communities will result in those communities being able to effectively attract such firms (see Parker, 2000; Malecki, 2003; Ramirez & Richardson, 2005 and for discussion of this rationale and alternatives).

Several studies have identified factors that encouraged municipalities to build broadband infrastructure. Luger, Stewart & Traxler (2002) found that distressed communities were more likely to invest in broadband if the investment was made in combination with improvements in infrastructure supplied to distressed communities with other traditional infrastructure, a larger planning process, financial subsidies and flexibility. Youtie (2000) indicates that experience in the public utilities business, private sector partnerships, supportive public policies and sound investment practices were critical factors in investing in broadband infrastructure. These studies illustrate that, where broadband and other ICT infrastructure is concerned, developing supply is often equated with economic development success. This is borne out by the extensive coverage of broadband deployment in the popular media, which is almost exclusively concerned with communities deploying broadband, rather than whether and why (or why not) consumers demand the service.

Unfortunately, as demonstrated by the bursting of the tech bubble and the telecom crash, ICT demand was far outstripped by supply. Despite the fact that scholars have consistently questioned the productive value of ICT investment, hype about the technology’s benefits drove computing and telecommunications companies to over invest. This was compounded by supply-side policy discussions in the mid 1990s concerned about the disparities in access to ICT, also known as the digital divide. Most consideration of this issue in policy papers, the popular press and scholarly articles typically focused on cost as the primary barrier to ICT utilization.
Technological progress, hype about the benefits of the technology and digital divide-related concerns about universal availability drove investment far in excess of existing demand in the public and private sectors.

The current ICT challenge, both to further investments in the infrastructure and services and, more importantly, to enhance economic development, has been presented as a supply problem. The supply problem has focused policy attention on ICT infrastructure, specifically the high cost of T-1 lines, lack of broadband Internet access and the lack of home computers and home Internet access. But it must be understood that consumers and businesses do not purchase infrastructure and they do not purchase technology for technology’s sake. Instead, they purchase communications capabilities and information processing capacity that they need to conduct their businesses and lead their lives. The supply of such services and the physical infrastructure that enables them, have dramatically increased over the last decade. So, where is the demand for ICT services given that the supply of ICT-based services has been increased?

The underlying assumption of the supply-side policy approach has been that there is inherent demand for ICTs because everyone wants better communications and information. Based on this assumption one would conclude that if costs were very low, everyone would use ICTs. But an extensive body of literature details that demand for ICT products and services is highly complex (c.f., Kim & Yoon, 2004) and involves much more than monetary costs. Studies of organizations, in which the cost of ICTs to employees is effectively zero, provide insights into the factors other than cost that are involved in decisions about whether to use ICTs.

Davis (1989), Cooper and Zmud (1990), applying Rogers’ (1995) diffusion of innovations framework to organizational ICTs, identified perceptions about ease-of-use and usefulness, the “task-technology fit,” as key determinants of ICT use. This model has been applied in a wide variety of settings—hotels (Siguaw, Enz, & Namasiyavam, 2000), physicians’ offices (Hu and Chau, 1999), community-based organizations (Kellogg, 1999), less-developed countries (Montealegre, 1999) and with consumers (LaRose, Mastro, & Eastin, 2001)—with consistent results: adoption occurs when users perceive that the technology fits the task, that they can effectively use the technology and that use of the technology is beneficial to them.

While ease-of-use is the dominant factor in initial adoption of ICT, usefulness is the overwhelming determinant of whether use is sustained (Adams, Nelson, & Todd, 1992; DeLone & McLean, 1992). IT-related experience and knowledge of executives and managers directly impacts usability and usefulness (Attewell, 1992; King & Teo, 1994; Taylor & Todd, 1995; Thong & Yap, 1995; Swanson, 1994) because they control the functional characteristics and context for ICT applications. Social factors shape perceptions and expectations about the technology, but have relatively weak direct impact on adoption and even less effect on use and this effect decreases over time (Karahanhanna & Straub, 1999). And the best predictor of adoption of ICT at home is use of ICT at work (Hollifield & Donnermeyer, 2003).

These studies suggest that monetary “hard” costs are only one factor in adopting ICTs. Nonmonetary “soft” costs and the effective benefits of use appear to be at least as important. A primary constraint on demand might be lack of technology awareness and a life context that makes ICTs useful, particularly in small rural communities or for socially isolated persons. Another constraint might be soft costs associated with technology that does not work well; consumers may lack the patience to put up with failures or other functional limitations common to new technologies and new technology-based services. Demand would be undermined if use of technology does not directly benefit a geographic community but results in purchases from or communications linkages with distant locales. And most significant users may view ICT as a novelty but not a significant improvement on their current modes of communicating or accessing information. Cumulatively, given compromised usability and usefulness, ICTs may not be enough of a transforming mechanism to move traditional industrial blue-collar communities into the knowledge economy.

Gurstein (2003) implicitly addresses these constraints by suggesting that effective use of ICTs must be a central consideration if these technologies are to enable community-level economic transformation. Building on Clement and Shade (2000), Gurstein maintains that physical infrastructure must be supplemented by content, expertise and mechanisms for developing personal and organizational capacity to apply ICTs, as well as means of financing and regulating all of the above. Most significantly, Gurstein insists that the end-users of the technology must be fully and actively involved in designing the entire system. In order to maximize the economic potential of ICT-based services consumers should at least be involved in evaluating those services prior to deployment and ideally they should actually define services’ functions.
2. The LaGrange Internet television initiative

LaGrange, Georgia is located near the Alabama state line approximately 80 miles southeast of Atlanta. It is a “full service municipality,” in that the City provides water and sewerage, electricity, gas and telecommunications service in addition to the essential public service provided by most municipalities. All of the city utilities were originally provided publicly, for a fee, because city leaders felt that supplies were too limited and costs were too high to support economic development. Over the last decade the City of LaGrange began providing telecommunications to large enterprises with multiple locations in the City, partnered with a private cable TV system operator, Charter Communications, to provide broadband service and deployed a very low-cost, easy-to-use high speed Internet service between June 2000 and October 2004. The last service, known as LaGrange Internet TV (LITV, or by its brand name, WorldGate), was provided via an intelligent set-top box with a wireless keyboard, connected to a central terminal server via the cable TV network, using the TV as a monitor. The terminal server communicated with the Internet and hosts the end-user applications, which were limited to e-mail and web browsing. The terminal had no storage capacity and could not download, open attachments, run web browser plug-ins, or print.

LITV was originally planned as a for fee service. According to the City employees who instigated LITV, they were considering several seemingly unrelated issues. There were doubts that LITV would sell well because, it was conjectured, those who wanted Internet had broadband and those who did not want it would not purchase LITV. City leaders were concerned that not enough was being done to increase the technical skills available in the workforce, particularly general computer and information retrieval skills. Also, city leaders were also concerned that too much was being spent on industrial marketing for the city, particularly because their economic development strategy called for attracting technology-intensive firms and lack of workforce skills reduced the efficacy of such marketing efforts (see also Youtie, Shapira, & Laudeman, 2004).

Considering all three of these together, the Mayor suggested providing LITV for free as a way of exposing citizens to Internet technology. Such a project might increase workforce skills and it would almost definitely create positive publicity. City administrators were able to develop a business plan in conjunction with Charter and WorldGate that allowed them to obtain the set-top boxes and terminal service rather inexpensively, and actually receive payment from the company for installing the service. Within a year, after advertising in the media and on utility bill inserts, through the hard work of a gamut of City employees and with a few technical glitches, the City rolled out LITV to over approximately half of all homes in the city. The only conditions for service were that a subscriber had to live in the city, had to request the service and had to subscribe to basic cable (at the cost of $8 a month, which was waived for low income residents).

LITV had characteristics of both computer/Internet and television. It was rather easier to use than an Internet computer because all of the software is integrated together, and there was no need to establish connections or invoke programs. But, it had much more interactive functionality than television, allowing for bi-directional messaging (e-mail) and perusal of hypertext documents (the worldwide web). LITV did not operate at full broadband speed but the link between the terminal and server was both reasonably svelte and over twice as fast as a modem connection. Also the providers made special efforts to orient new users with in home mini-lessons, video lessons running continuously on cable TV and a help line to answer questions and solve problems.

LITV was effectively a public Internet service, set up by the City government not just to provide cheap and easy access for its citizens. The city hoped that LITV would facilitate transition to the knowledge economy. Local economic developers indicated that LaGrange was competing globally for technology firms and needed a workforce with competitive keyboarding and Internet access skills. The very survival of the city was viewed as being connected with its ability to compete for knowledge-based firms.

Based on a series of interviews that the research team conducted with the founders of LITV, it was apparent that City officials believed LaGrange’s public information utility would transform the perspectives and capabilities of citizens. They believed that reducing the hard and soft costs of technology would be sufficient to cause citizens to adopt the service. As a result of such adoption, citizens would improve their skills, be empowered by access to new information and ultimately make the community more competitive in the knowledge economy. These suppositions parallel the underlying assumptions that drove the over investment in ICT nationally, discussed in the previous section. The question guiding this research is whether supply side
initiatives to reduce the hard and soft costs of ICT are adequate to stimulate demand that can impact a region’s economic development strategies.

3. Methodology

As part of a broader research project sponsored by the National Science Foundation (NSF), Georgia Tech researchers conducted a survey to examine the impacts of the city of LaGrange’s decision to offer Internet access free of charge through its cable television system to all residents. The objectives of the survey were to examine the diversification of online population, the adoption of information technology by population segments without previous Internet experience and the development of skills and networks that can assist small city communities in an increasingly information-driven economy. Particular focus was placed on understanding effects among LaGrange Internet TV (LITV) users with no prior Internet experience relative to corresponding changes in skills among LaGrange Internet TV users with prior such experience and nonusers who did not take up the service. The survey was complemented by a series of case study interviews with selected survey participants that demonstrated distinctive use of the service.

Researchers designed a four-page mail-based questionnaire to address these objectives. The questionnaire included items asking about household demographics (e.g., number of people in the household, highest level of education, household income) and characteristics of the person completing the survey form (e.g., age, race). It also asked about existing technologies in the household, household computer usage and computer usage in other environments (e.g., work, school). Adoption of LITV was investigated through items asking about whether the household has LITV, when the household obtained LITV, reasons for taking up the service, frequency of use of LITV, satisfaction with the service, new skills obtained as a result of LITV and impacts on education, communication, computer usage and work.

The household was the primary sampling unit for this survey. Researchers obtained a database of 10,253 utilities customers from the city. The database had 4051 users of LaGrange Internet TV, with the remainder being nonusers. Some of the records in these databases were removed because they were businesses. A systematic sample beginning from a random start and pulling every other record resulted in the drawing of 1967 members of the sample; 40 percent were users and 60 percent were nonusers. The survey was administered from October 2000 to February 2001. After adjusting for duplicates, nonresidential addressees, addressees who were deceased and inability of the post office to locate addressees, the base number was reduced to 1855. In all, researchers received 494 completed surveys for a response rate of 27 percent. Key demographic attributes of the sample and the target population were compared as a check of nonresponse bias. The survey approximates 2000 Census percentages in two of three demographic categories. The male–female and age distributions in the survey are close to that of the 2000 Census. Racial compositions are somewhat different; whites account for 67 percent of the total survey versus 50 percent of the Census; blacks account for 31 percent of the total survey versus 48 percent in the Census. While there is a smaller percentage of nonwhites in the survey than in the Census, there are still more than 150 nonwhite households in the sample.

4. Findings

4.1. LITV penetration

Respondents were asked to indicate whether their household had Internet TV. About 40 percent of the survey sample indicated that their household had Internet TV. This percentage is consistent with city of LaGrange utility records. As of October 2001, the city of LaGrange had 4051 households subscribing to LITV. Of the 10,253 utility customers that the city serves (some of which were businesses, even if most were residential households), roughly 40 percent were using LITV.

But the 40 percent figure does not reflect all LITV users. Another 20 percent of households had LITV at one point in time, but discontinued the service. The survey asked these respondents why they quit LITV. The most common reasons given were: (1) they had another Internet-connected computer (35 percent or 36 respondents), (2) the service went down/did not work well (31 percent or 30 respondents), (3) it was...
awkward to use (29 percent or 29 respondents) and (4) LITV interfered with their TV (18 percent or 18 respondents). In fact, more than four of every 10 quitters did have an Internet-connected computer at home, while the remaining households quit without an alternative home Internet connection. Still, when one adds the quitters to the current LITV users, 60 percent of survey respondents currently have or at one point had LITV.

What about the remaining 40 percent of nonusers? This nonuser figure is an ambiguous measure of information technology “have-nots.” About half of these nonusers (or 19 percent of the total respondents) already had an Internet-connected computer. The other half stayed in the off-line population. Fig. 1 provides a visual representation of the on-line and off-line populations in LaGrange in the context of LITV.

4.2. Characteristics of LITV users and nonusers

Are there differences between LITV users and those who currently do not use or never used LITV? A contingency table has been developed that compares users and nonusers of LITV within income, education, race, home electronic gadgets and prior use of PCs and the Internet. Demographic attributes and LITV usage membership have then been graphed in two-dimensional space using homogeneity analysis in Fig. 2. The distances depict the degree of relationship between the points. Eigenvalues for the chi-square distance matrix indicate that the first (horizontal) dimension accounts for 43 percent of the relationship. This dimension reflects technology-aware household attributes and income and educational differences. The second (vertical) dimension, which accounts for 21 percent of the relationship, best represents age differences.

The right side of the map depicts households that were in a sense LaGrange’s target, both because these households did not have prior Internet connectivity and because of their relatively lower socioeconomic attributes. The top right quadrant shows households with LITV and no other Internet connection. These households were closest to population segments composed of black and other minority households, female-led households and middle-income segments. The association between households adopting LITV with no other Internet connection and black, female-led, middle-income households defines a digital divide “sweet spot” in terms of income, sex and racial characteristics.

![Fig. 1. LITV, Internet PC and off-line population in LaGrange.](image-url)
The bottom right quadrant includes two groups of households that still are not in the online population. One group is households quitting LITV without another home Internet connection. These households are most closely associated with the over 60-age group and households with few home electronics technologies. The second segment is households without prior household connectivity that never took up LITV. These households were nearest to low-income, less-educated and less-technologically aware households. LITV was not able to bridge the digital divide in a manner that reached these socioeconomic groups.

The left side of the map consists of households with an Internet-connected PC. Three different segments of Internet-connected households compose this group: (1) those who quit LITV, (2) those who never took it up and (3) those having both LITV and an Internet-connected PC. These three groups are broadly comparable in that most are white, male, 60 or younger, earn $25,000 or more in annual income, hold college degrees and have five or more home consumer electronics technologies. Still there are some differences among the three online segments. Households that use both LITV and Internet-connected home PCs fall into the top left quadrant. This segment is closest in proximity to households with nine-to-14 home electronic technologies. These households may well have taken up the technology because of their general preference for electronic gadgets.

In the bottom left quadrant is the segment that has an Internet-connected home PC and never took up LITV. This segment is most closely associated with male-led households, whites, those with graduate or professional degrees and households earning more than $50,000. In between the two Internet-connected groups of households lies the segment that quit LITV but already had an Internet-connected home PC. The current lack of LITV adoption of these two segments indicates that households on both sides of the digital divide did not take up, or dropped the technology.

4.3. Reasons for adoption

The questionnaire asked respondents to indicate how important various reasons were in getting Internet TV for their household. Respondents rated these reasons on a scale ranging from very important to moderately
important to not important or not applicable. Table 1 shows that more than three-quarters of respondents said that they obtained LITV because the service was free. As an indication of how important free service was, the next most highly rated reason—wanting to try the Internet—was rated very important by 43 percent of respondents. The next most important reasons were learning a new skill and communicating with others, which were each rated as very important by nearly 40 percent of respondents.

Table 1
Most important reasons for getting LITV by respondent characteristic (% very important)

<table>
<thead>
<tr>
<th>Service was free (%)</th>
<th>Wanted to try the Internet (%)</th>
<th>Learn a new skill (%)</th>
<th>Communicate with others (%)</th>
<th>Help the city (%)</th>
<th>Improve job opportunities (%)</th>
<th>Someone recommended it (%)</th>
<th>Step towards getting a computer (%)</th>
<th>Was afraid of computers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents</td>
<td>77.6</td>
<td>43.1</td>
<td>39.5</td>
<td>38.6</td>
<td>37.6</td>
<td>27.1</td>
<td>25.0</td>
<td>20.5</td>
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<td>Sex</td>
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<tr>
<td>Male</td>
<td>75.0</td>
<td>38.1</td>
<td>35.6</td>
<td>36.5</td>
<td>35.7</td>
<td>25.8</td>
<td>19.6</td>
<td>19.8</td>
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<tr>
<td>Female</td>
<td>81.4</td>
<td>47.2</td>
<td>44.7</td>
<td>41.7</td>
<td>40.6</td>
<td>28.8</td>
<td>35.0</td>
<td>20.4</td>
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<td>Age</td>
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<td>18–60</td>
<td>79.6</td>
<td>41.7</td>
<td>39.7</td>
<td>36.6</td>
<td>38.7</td>
<td>26.7</td>
<td>25.9</td>
<td>18.8</td>
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<td>Over 60</td>
<td>64.5</td>
<td>51.9</td>
<td>48.4</td>
<td>58.6</td>
<td>33.3</td>
<td>23.1</td>
<td>26.9</td>
<td>11.5</td>
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<tr>
<td>Education</td>
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<tr>
<td>High school or less</td>
<td>72.9</td>
<td>69.8</td>
<td>62.3</td>
<td>45.1</td>
<td>46.3</td>
<td>51.9</td>
<td>38.5</td>
<td>36.7</td>
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<tr>
<td>College</td>
<td>78.0</td>
<td>39.8</td>
<td>36.1</td>
<td>41.8</td>
<td>32.3</td>
<td>23.7</td>
<td>22.1</td>
<td>20.8</td>
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<tr>
<td>Graduate/</td>
<td>82.3</td>
<td>24.1</td>
<td>23.3</td>
<td>28.8</td>
<td>39.7</td>
<td>10.7</td>
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<td>Income</td>
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<tr>
<td>Less than $25,000</td>
<td>73.1</td>
<td>67.3</td>
<td>57.9</td>
<td>54.9</td>
<td>46.0</td>
<td>58.8</td>
<td>39.2</td>
<td>33.3</td>
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<td>$25,000–$50,000</td>
<td>80.4</td>
<td>50.9</td>
<td>44.2</td>
<td>50.0</td>
<td>37.3</td>
<td>30.0</td>
<td>30.0</td>
<td>28.8</td>
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<tr>
<td>More than $50,000</td>
<td>78.7</td>
<td>20.9</td>
<td>20.7</td>
<td>19.8</td>
<td>29.1</td>
<td>5.9</td>
<td>14.9</td>
<td>7.0</td>
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<td>Race</td>
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<td>White</td>
<td>80.0</td>
<td>26.6</td>
<td>19.8</td>
<td>25.2</td>
<td>30.7</td>
<td>9.7</td>
<td>16.4</td>
<td>6.3</td>
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<td>Black/other</td>
<td>74.7</td>
<td>68.3</td>
<td>68.2</td>
<td>58.5</td>
<td>47.6</td>
<td>53.7</td>
<td>38.0</td>
<td>42.3</td>
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<td>Other home technologies</td>
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<tr>
<td>0–4</td>
<td>73.3</td>
<td>70.7</td>
<td>63.0</td>
<td>48.7</td>
<td>41.5</td>
<td>56.1</td>
<td>32.5</td>
<td>28.2</td>
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<td>5–8</td>
<td>78.3</td>
<td>45.9</td>
<td>36.6</td>
<td>43.1</td>
<td>37.0</td>
<td>21.5</td>
<td>25.9</td>
<td>20.0</td>
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<tr>
<td>9–14</td>
<td>78.0</td>
<td>17.5</td>
<td>27.6</td>
<td>22.4</td>
<td>35.1</td>
<td>16.1</td>
<td>19.0</td>
<td>14.0</td>
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<td>Has a home PC</td>
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<td></td>
</tr>
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<td>No</td>
<td>77.1</td>
<td>73.4</td>
<td>60.0</td>
<td>59.2</td>
<td>50.0</td>
<td>56.0</td>
<td>36.0</td>
<td>37.8</td>
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<td>Yes</td>
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Source: LaGrange Internet Access Research Project, 2001, based on information from 494 respondents.
It was interesting that social connections and norms were not rated as more important in the adoption of LITV. Less than 40 percent of respondents said they got LITV to help the city. And fewer than 30 percent of respondents indicated that recommendations from another person were important in getting LITV.

Among the least important reasons for getting LITV were job-related and computer-related concerns. Fewer than 30 percent of respondents reasoned that it was very important to get LITV to improve job opportunities. Only 20 percent of respondents rated getting LITV to be a very important step toward getting a computer. Only 9 percent of respondents rated fear of computers as a very important reason for getting LITV.

Table 1 also examines differences in importance of reason by respondent characteristics. For some respondent segments—whites and those earning more than $50,000, with graduate/professional degrees, with many electronic home technologies and with home access to the Internet through the PC—free service was the primary reason for taking up LITV. But for others—blacks and other minorities and those with high school education, earning less than $25,000, with few home electronic technologies and no home PC—the percentage of respondents wanting to try the Internet or learn a new skill was almost as high as the percentage saying they took up LITV because it was free.

To further examine the importance of the free service as a reason for adoption, the survey asked LITV users to indicate whether or not their household would have the service if they had to pay for it. Sixteen percent of all LITV users reported that they would still use LITV even if they had to pay for it. For blacks or other minorities, this potential retention rate was nearly 27 percent versus only 10 percent for whites. One-quarter of households earning less than $25,000 stated that they would keep LITV if they had to pay for it, compared to 13 percent of households earning more than $50,000. While finer gradients of willingness to pay might be insightful, particularly when correlated with demographic characteristics and reasons for taking up LITV, the imperative to keep the survey instrument concise so as to not negatively impact the response rate mitigated against gathering this data.

After offering free Internet access through a television set top box for approximately 3 years, the city of LaGrange discontinued the LITV service in October 2003 when the private sector contract provider cancelled its offering. Follow-up surveying of a sample of 304 former users and nonusers of the discontinued LITV service conducted from May to July 2004 found that about one-quarter of respondents had stopped using the Internet completely and another 20 percent stopped using the Internet at home but continued using it at work, library, or other location. One-quarter of respondents subsequently bought a home computer (not necessarily connected to the Internet) and nearly one-quarter used their existing home computer connected to the Internet. Only 14 percent acquired high-speed broadband Internet service or low-speed broadband Internet service (7 percent) (Youtie et al., 2004). Thus, LITV stimulated some ongoing usage of the Internet through acquisition of other ICT services, although a considerable segment of the former LITV users dropped out of the online population.

5. Conclusions

This research has found that while LITV had significant outputs, in terms of the number of households that tried the service, its core outcomes were mixed. One outcome for the city was that it was featured in press reports for its technological progressiveness. While this was an important policy objective of city representatives, it was beyond the scope of this study to assess such impacts. The other primary objective of the city was to increase citizens’ familiarity with and skills for ICTs, particularly computers and the Internet. In spite of the fact that 60 percent of the LaGrange households took up LITV at some point and that 40 percent of respondents who took up LITV cited skill development as a reason for acquiring the service, there was only marginal progress towards this objective. This marginal progress was further diminished with the discontinuation of the LITV service. As discussed in more detail below, it appears that the drop-off in usage of LITV was due to technical problems, functional limitations and the difference between the capabilities of LITV and personal computers. In addition, the socioeconomic context in which LITV was introduced somewhat undermined the disadvantaged population’s trust in the system and whether it could be useful for them.

One of the main findings of this study is that supply-side policies and initiatives work well for people who are already predisposed to use the technology. Technophile households made up a major proportion of those
who took up LITV. These households were most likely to have other types of technologies such as MP3 players and PDAs. They tended to be better educated and more well off. They adopted LITV not because it would transform their skills but because it was free. These households had readily available and more functional alternatives to LITV (e.g., internet connected computers). And, it is reasonable to conclude, given their use of other technologies, that curiosity about the system rather than unmet practical needs motivated them to subscribe to LITV.

The other demographic group that took up LITV was African-American female-headed households. Most of these households did not have previous technology experience. However, case studies suggest that they had an existing interest in technology as an incremental way to improve their socioeconomic position even before LITV was deployed. For example, one woman who had decided to go back to school to get a better job in the real estate industry used LITV to communicate with a professor and in her courses. She then used LITV to access on-line information about real estate transactions once in her new real estate job. This finding is supported by Kvasny (2003) who found that low-income minority women perceived IT as a first step toward socioeconomic advancement.

But in spite of the fact that LITV was free and nominally easy to use, many citizens did not adopt LITV. The nonadopters spanned the socioeconomic spectrum—rich and poor, well educated and dropouts. This suggests that reducing the cost of technology was not sufficient to raise demand, particularly given that low-income households did not take up the service. Making the service cheap and easy to use was not sufficient. This research suggests that the technical problems and limitations, particularly LITV’s lack of downloading, printing and multimedia capabilities, its interference with television viewing and unreliability, greatly undermined its usability. These limitations, in conjunction with lack of local content and limited demand for technology expertise by local employers, appear to have fundamentally constrained LITV’s usefulness.

The study also found that adoption of LITV was not cumulative, in the sense that rather than increasing their usage in the ensuing months, some households took up the service only to drop it within a relatively short period of time. These households were a socioeconomically diverse group. Some of these “quitters” had prior Internet experience whereas others—mostly low income seniors—did not. They seemed to be motivated to drop the service by technical problems or lack of functionality. Some dropped the service to return to reliance on existing home computers. Others dropped the service because LITV did not connect, interfered with their television viewing, had a slow keyboard and did not allow them to download or print. Case study interviews found that citizens used LITV up to a point, then went to work or to the library to print or download.

It is notable that although a primary policy goal was to increase citizens’ ICT-related skills, there was no formal analysis of demand for such skills among consumers or businesses as part of the decision making process. Nor was utilization of LITV directly linked to increasing such skills. This research suggested that there was no clear and unmet demand for ICT-related skills and that LITV users did not perceive it as contributing significantly to their skills. Ironically, it appears that LITV was made so simple to use that it did not result in skills or concepts that translated to using computers. This suggests that initiatives to increase ICT supply should be more explicitly linked to policy goals by formal pre-program assessment of the validity of those goals and the feasibility of the system contributing to achieving them.

This research observes that LITV allowed its users to increase their communications with others, particularly acquaintances and relatives outside the community. Also, the system was used for making purchases and searching for employment. This appeared to involve persons with reasonably high education and technical skills looking outside the community. While these behaviors would seem to increase external social and economic linkages, they also represent leakage of financial, human and social capital. Data and timeframe limitations of this study do not allow for full analysis of these outcomes or their implications for the community.

The experience of LITV suggests that the supply-based strategy was not sufficient to achieve policy makers’ large-scale goals. It is necessary for policy makers to more fully consider and foster demand. Some households were not interested in the system and were not aware of how it could potentially benefit them. Other households did not feel that the system offered enough functionality. In order to realize substantive economic development outcomes of supply-side investment, there also has to be investment in building demand. At one level, those who do not understand the technology have to be better informed about the technology and how it can benefit them. At another level, supply side strategies have to be better tailored to the needs of various
segments of citizens. Even more broadly, ICTs cannot effect economic transformation if knowledge and innovation are not essential elements for the local economic base. Therefore, ICT initiatives may be most successful when coupled with broader efforts to increase the skills of citizens, improve the operations of organizations and increase the level of knowledge utilization within the community. Overall, more effort should go into understanding the factors that drive demand for ICTs and ICT-based services and the broader policy and support systems that shape and constrain this demand.

6. Limitations and further research

This study was inherently limited by its scope and subject. LITV was a unique and relatively bold experiment that was largely coincidental to other programs and initiatives undertaken by the City of LaGrange. A truly authoritative study would need to span multiple communities in different geographic areas and be structured to control for variation in technical characteristics of the ICTs involved. The study was also limited by social factors that impacted response rates. Specifically, anecdotal evidence suggests that low-income, minority populations were less likely to receive and complete the survey. While the investigators tried to compensate for nonresponse bias in conducting the survey through intensive outreach to disadvantaged populations in the city, this issue does represent a threat to the validity of the data. A further limitation of the study, as discussed in the literature referenced in the introduction to this article, is linked to the importance of organizational adoption of ICT by business, civic and governmental leaders. These issues, beyond the scope of this study, clearly merit further investigation.

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References


