

I. Introduction

OVERVIEW OF THE TELECOMMUNICATIONS AND INFORMATION INFRASTRUCTURE ASSISTANCE PROGRAM

In 1994, the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) initiated the Telecommunications and Information Infrastructure Assistance Program (TIIAP). The program was established at a time when many of the online services we now take for granted, such as using search engines on the World Wide Web, were unavailable or difficult to access. For example, in 1994 the Internet had 30,000 domain-names and 2.2 million hosts. In contrast, by 1998, the Internet had well over 1.3 million domain-names and over 30 million hosts.

Larry Irving, Assistant Secretary of Commerce and Director of the National Telecommunications and Information Administration, stated in late 1997,

The Digital Revolution differs in an important way from the Industrial Revolution. During the Industrial Revolution, different countries moved from agrarian to industrial economies at different times. Today, almost every nation is experiencing the digital revolution. China and India and Botswana are making the transition to an information economy as well as the U.S. and Germany and Australia. Telecom and information infrastructure, services, and products are the key to economic development and success for virtually every nation.

Program Purpose and Structure

The TIIAP program is designed to provide matching grants to a wide range of nonprofit organizations—schools, libraries, hospitals, public safety entities, and state and local governments—to make use of innovative technologies. A primary purpose is to bring these technologies and their benefits to inner-city and rural areas, and other groups that have difficulty accessing the information infrastructure.¹ The program has the following objectives:

- To increase awareness in the public and nonprofit sectors of the National Information Infrastructure (NII) and its benefits.
- To stimulate public and nonprofit organizations to examine the potential benefits of investments in the NII.
- To provide a variety of model NII-related projects for public and nonprofit organizations to follow.
- To educate public and nonprofit organizations about best practices in implementing a variety of NII-related projects.
- To help reduce disparities in access to, and use of, the information infrastructure.

¹ The TIIAP program defines "information infrastructure" as telecommunication networks, computers, other end-user devices, software, standards, and skills that collectively enable people to connect to each other and to a vast array of services and information resources.

Grants are used to fund projects that intend to improve the quality of (and the public's access to) education, health care, public safety, and other community-based services. Grant recipients can use their awards to (1) purchase equipment for connection to networks, including computers, video-conferencing systems, network routers, and telephones; (2) buy software for organizing and processing all kinds of information, including computer graphics and databases; (3) train staff and others in the use of equipment and software; (4) purchase communications services, such as Internet access,² and (5) pay staff salaries.

To create a synergy of funding among public and nonprofit entities, TIIAP requires grant recipients to obtain matching funds from partner organizations. Specifically, TIIAP provides up to 50 percent of the total project cost (in some cases, the program will support up to 75 percent of program costs).

Since its inception, TIIAP has identified a variety of application areas that define the program's funding priorities.³ For the purposes of this report, all of the 1994 and 1995 projects were assigned to one of the following application areas that were in use in the 1998 fiscal year:

- **Community Networking.** This application area focuses on multi-purpose projects that enable a broad range of community residents and organizations to communicate, share information, promote community economic

development, and participate in civic activities. These projects typically involve multiple stakeholder organizations that wish to link services, reduce duplicative record-keeping, simplify and/or expand end-user access to a variety of information resources, engage in initiatives that would not have been possible without networking technologies, or provide information across various application areas within a specific geographic region.

- **Education, Culture, and Lifelong Learning (ECLL).** Projects in this application area seek to improve education and training for learners of all ages. They can also provide cultural enrichment through the use of information infrastructure in both traditional and non-traditional settings. Examples of strategies used by ECLL projects include integrating computer-based learning and network resources in the classroom; forging stronger links between educators, students, parents, and others in the community; linking workplaces and job-training sites to educational institutions; using distance learning networks to provide educational training in remote areas; and enriching communities by delivering online informational, educational, and cultural services at public libraries, museums, and other cultural centers.
- **Health.** Projects in this application area seek to use the information infrastructure to enhance the delivery of health and home health care services and the performance of core public health functions. Examples of strategies used by health projects include improving the care and treatment of patients in their homes; developing telemedicine systems that offer extended medical expertise to rural or underserved urban areas; improving communication between health care providers and patients; improving treatment of patients in emergency situations; and developing networks for disease prevention and health promotion.
- **Public Safety.** Projects in this application area seek to increase the effectiveness of law enforcement agencies, emergency, rescue, and fire departments, and other entities involved in

² TIIAP does not support projects that are designed to (1) construct or augment one-way networks; (2) enhance or expand the internal communication needs of a single organization; or (3) replace or upgrade existing facilities. Nor does TIIAP support projects whose primary purpose is to develop content, hardware, or software, or to provide training on the use of the information infrastructure. TIIAP will, however, support projects that include elements of content development, training, and hardware and software development so long as they are integral to a broader strategy for using the information infrastructure to address community problems.

³ In its first year, for example, the program indicated that "Funding under TIIAP will be awarded to support projects that most effectively enhance economic opportunity, the provision of education, culture, health care, public information, library, public safety, social services, or other efforts to meet public needs; and that support the further development of a nationwide, high-speed, interactive infrastructure, incorporating the widest variety of information technologies."

providing safety and crisis prevention services. Examples of strategies used by public safety projects include facilitating the exchange of information among public safety organizations (in one community or across multiple regions); providing information in a timely manner to “first-response officials” (e.g., police officers, emergency medical technicians, firefighters); helping public safety agencies provide community outreach services; developing innovative ways to share scarce spectrum resources; increasing the safety and security of children; and reducing domestic violence.

- **Public Services.** Projects in this application area aim to improve the delivery of services to people or organizations with a range of social service needs, e.g., housing, child welfare, food assistance, and employment counseling. Examples of strategies used by public services projects include using information technology to promote self-sufficiency among individuals and families; developing networks that facilitate coordination and collaboration among public and/or community-based organizations; using electronic information and referral services to provide information on a variety of community-based or government services; making public agencies more accessible and responsive to community residents; and using geographic information systems to assess demographic trends.

In addition, during the 1994 and 1995 fiscal years, the program had three grant categories: access, demonstration, and planning.

- **Access.** These grants, initiated in 1995, help communities increase their capacity to access the information infrastructure. Special emphasis is placed on increasing the access of traditionally underserved populations and narrowing the gap between the information haves and have-nots.
- **Demonstration.** These grants help projects use telecommunications and the information infrastructure to solve problems within their communities. Special emphasis is placed on

developing successful models that could be replicated by other communities.

- **Planning.** These grants enable communities to develop strategic plans for improving the telecommunications and information infrastructure in a particular area.

Since its inception, TIIAP has generated tremendous interest. Between 1994 and 1998, the program received more than 5,300 applications, requesting \$2.1 billion, from across the country. Over the same period, TIIAP has awarded 378 grants in 50 states, the District of Columbia, and the U.S. Virgin Islands. Across these 378 projects, approximately \$118 million in Federal grant funds have been matched by more than \$180 million in non-Federal funds. In line with project goals, a significant portion of TIIAP funding has gone to rural regions, where telecommunications has the power to create new opportunities for geographically isolated communities and their residents.

Program Changes

One of the unique characteristics of TIIAP is that despite its brief history, the program has evolved considerably since its inception in 1994. The most visible of these changes have been in its funding categories. During its first year, the program funded two types of projects: demonstration and planning. In 1995, the program began funding access projects as well. Over time, however, access and planning projects have been de-emphasized. The distribution of projects among the primary application areas has also changed over time. For example, the number of public safety projects has increased, while the number of ECLL projects has decreased. In addition, as discussed previously, the application areas have been consolidated into five broad areas.

With time, the standards for project acceptance have become more stringent. For example, in fiscal year 1998, successful proposals had to meet the following criteria:

- Make explicit the connections between community problems, solutions, and the outcomes the project is proposing.
- Emphasize the use of the information infrastructure to solve community problems, as opposed to building the infrastructure itself.
- Focus on *involving* underserved communities, rather than simply *servicing* the underserved.
- Explain the project's potential to serve as a model for other communities and organizations to follow.

In addition, successful applicants had to describe the design of the project's evaluation, a plan for implementing the evaluation, and the resources to be allocated to evaluation. This design had to address "the evaluation questions; the methodological approach for answering the evaluation questions; how data will be collected; how the data will be analyzed; and how the evaluation findings will be reported and disseminated" (FY 1998 Notice of Availability of Funds). Moreover, project evaluations had to be linked directly to problems, solutions, and anticipated outcomes identified in the proposal. Finally, documentation plans were required to include methods and procedures for collecting data, such as demographic and background information on the population(s) served, activities, and outreach.

TIIAP has made a variety of policy and procedural changes as well. For example, the average length of grant periods has increased over time—in large measure to allow grant recipients more time to implement their projects. In addition, since 1996 (when agency-wide spending restrictions were lifted), NTIA has used site visits to dramatically increase its level of onsite grants monitoring. The program has increased its dissemination efforts by supporting annual conferences for former, current, and potential grantees. Program materials have taken on a more technical assistance function, and program staff actively assist projects with lessons learned by previous grant recipients. In addition, TIIAP has also developed a series of handbooks to assist grant recipients and TIIAP Program Officers and staff to better understand their responsibilities.

Finally, TIIAP is taking steps to improve the quality of the quarterly data that are collected from projects. An electronic Performance Reporting System is being developed that will enhance the capacity of grant recipients and program officers to collect, analyze, and use data constructively. As part of this effort, the program will conduct evaluation workshops to assist grant recipients with their project evaluations.

STUDY OVERVIEW

In 1997, TIIAP initiated a series of activities intended to produce a broad-based external evaluation of the use and impact of these grants. Although considerable anecdotal information already existed, program managers felt that it was important to conduct an independent assessment of the program's implementation and impact. This report presents findings from a study of the implementation and impact of the 206 projects that were funded in the program's first 2 years of operation, fiscal years 1994 and 1995. These program cycles were considered by NTIA to have been in operation long enough to warrant an evaluation. The purpose of the study is to assess the effects that the funded projects are having at the local level and, over the long term, at the national level. The information obtained from this study is also intended to provide a basis for program improvements and to lay the groundwork for continued and improved collection of program data in future years. The broad evaluation questions addressed by this study are summarized below.

- To what extent are the projects accomplishing their implementation objectives?
- What are the factors at the Federal level and at the local project level that influence the extent of implementation?
- Are the needs of end users being met?
- How are projects changing the way organizations provide services and how individuals work?
- How are the individuals and families served by projects affected?

- Are these changes temporary or likely to be sustained?
- What are some of the important contextual differences in projects that need to be taken into account in tailoring a project within a particular site?
- What difference have Federal grants had in the creation, scale, and scope of projects?
- Where project goals have been surpassed, what factors or unexpected opportunities served to enhance project impacts?
- To what extent are the projects accomplishing their evaluation objectives?
- To what extent are the projects accomplishing their dissemination objectives?
- Are the projects receiving requests for information or technical assistance from organizations planning similar activities?
- What is the nature and extent of any spillover benefits to organizations and communities not directly served by the projects?
- Are demonstration projects, in particular, achieving their objectives as replicable models and strategies for other communities and nonprofit sectors to follow?

Characteristics of 1994 and 1995 TIIAP Projects

The study universe included all projects funded by TIIAP in 1994 and 1995. As shown in Table 1-1, these 206 projects received TIIAP funding during the period covered by this study. Of this number, one-third (34.5 percent) were designated as ECLL. The remaining projects were designated as follows: community networking (25.7 percent); public services (24.8 percent); health (12.1 percent); and public safety (2.9 percent). In addition, half (50.5 percent) of the awards in 1994 and 1995 were made to demonstration projects, while approximately one-quarter were made to

planning (27.2 percent)⁴ and access (22.3 percent) projects.

The average grant award amount for the 1994 and 1995 projects was \$283,837 (see Table 1-2). Demonstration grants were, on average, funded at considerably higher levels than access or planning grants. In addition, the average health project received more TIIAP funding than projects in any of the other application areas.

STUDY METHODOLOGY

The evaluation was conducted by Westat, a Rockville, Maryland, research and consulting firm. The primary data collection strategies used in the development of this report are described below.

- **Document Review.** A comprehensive document review of the applications and quarterly progress reports submitted by the 206 projects funded in 1994 and 1995 was conducted in autumn 1997 to develop a preliminary database that could be used to assess broad program trends. It was also used to inform the development of the mail survey and case study protocols.
- **Mail Survey.** A mail survey was conducted in summer 1998 to assess the implementation and impact of the 206 projects funded in 1994 and 1995. Two different versions of the survey questionnaire were developed and used in the study. Version A (Appendix B) focused on implementation issues and outcomes and was completed by demonstration and access projects. Version B (Appendix C) focused on planning issues and progress toward implementation and was completed by planning projects. Each version of the survey was further customized to reflect the unique settings, populations, and problems of interest to projects in the five different application areas by tailoring the response options for selected items.

⁴The study collected data for projects in all three application areas. However, because the TIIAP program has de-emphasized planning grants, this report primarily focuses on demonstration and access projects.

**Table 1-1
Numbers of TIIAP awards, by application area: 1994 and 1995**

Type	Application area					Total
	Community networking	ECLL	Health	Public safety	Public services	
Demonstration.....	25	39	17	3	20	104
Access.....	14	18	3	1	10	46
Planning.....	14	14	5	2	21	56
Total.....	53	71	25	6	51	206

Source: TIIAP award database.

**Table 1-2
Mean TIIAP award amount, by application area: 1994 and 1995**

Type	Application area					Average across application areas
	Community networking	ECLL	Health	Public safety	Public services	
Demonstration.....	\$414,794	\$361,427	\$474,757	\$179,135	\$418,596	\$398,516
Access.....	188,868	181,493	156,302	221,600	145,812	175,210
Planning.....	133,310	133,111	131,745	78,058	210,490	160,090
Average across project types.....	280,761	270,790	367,940	152,520	279,418	283,837

Source: TIIAP award database.

The survey response rate for the 198 eligible projects was 92.4 percent.⁵ It is important to note that almost all of the projects for which a survey was completed were no longer receiving grant monies at the time of the data collection. As shown in Table 1-3, the response rate was strong for all project types and application areas (although health projects had a slightly lower response rate—76.0

percent—than the other application areas). As shown in Table 1-4, the average grant amount for the 183 survey respondents totaled \$277,168. In addition, the two (of three) public safety demonstration projects that responded to the survey were funded at a substantially lower average amount (\$58,037) than for the entire universe of public safety demonstration projects (\$179,135).

⁵ Eight projects were deemed ineligible for the survey because their funding was terminated prior to completion. One of the eight ineligible cases was an access project that was terminated prior to implementation due to insufficient personnel and resources to carry out the proposed activities. Two of the eight ineligible cases were demonstration projects—one of these was terminated midway through the grant period when the grant recipient organization folded and the other did not accept the award due to insufficient personnel and resources to carry out the proposed activities. The remaining five ineligible cases were planning projects—one of these was terminated and funds withdrawn midway through the grant period when the grant recipient organization failed to institutionalize the proposed initiative, while the remaining four did not accept the award due to a lack of interest among the organizations involved.

- **Case Studies.** Site visits were conducted throughout the first 6 months of 1998 in 25 of the projects funded by TIIAP in 1994 and 1995. The purpose of these visits was to obtain more detailed information about the experiences of a sample of grant recipients. The sites that were visited represented a cross-section of all projects funded in the program's first 2 years. Specific site selection criteria included geographic region, target area, project application area, project category, and size of award (see Appendix A for a more

complete description of the case study methodologies).

STRUCTURE OF THE REPORT

The remainder of this report provides findings from the evaluation study. The results are organized as follows:

- Chapter II—Characteristics of Grant Recipients and Project Partners

- Chapter III—Implementation of Demonstration and Access Projects
- Chapter IV—Accomplishments and Impacts of Demonstration and Access Projects
- Chapter V—Sustainability and Project Expansion
- Chapter VI—Lessons Learned
- Chapter VII—Summary and Conclusions

Table 1-3
Numbers of survey respondents, by application area: 1994 and 1995 grants

Type	Application area					Total
	Community networking	ECLL	Health	Public safety	Public services	
Demonstration.....	23	35	13	2	17	90
Access.....	13	18	3	1	10	45
Planning.....	12	12	3	1	20	48
Total.....	48	65	19	4	47	183

Source: 1998 mail survey of TIAP grantees.

Table 1-4
Mean TIAP award amounts among survey respondents, by application area: 1994 and 1995 grants

Type	Application area					Average across application areas
	Community networking	ECLL	Health	Public safety	Public services	
Demonstration.....	\$411,821	\$370,778	\$403,526	\$58,037	\$407,143	\$385,916
Access.....	186,089	181,493	156,302	221,600	145,812	174,103
Planning.....	118,358	149,545	151,586	114,676	218,514	169,887
Average across project types.....	277,319	277,518	324,711	113,087	271,274	277,168

Source: 1998 mail survey of TIAP grantees.

