

EDAPTS Cost-Benefit Study

The Efficient Deployment of Advanced Public Transportation Systems (EDAPTS) Cost-Benefit Evaluation Study was undertaken to determine the beneficial nature of the San Luis Obispo Transit (SLO Transit) EDAPTS system. This effort examined the impacts of the EDAPTS system on SLO Transit operations. Based on scientific analysis of real-world data, the research successfully determined a favorable benefit-to-cost ratio for this Intelligent Transportation System (ITS) implementation.

Premise: If research can show a favorable benefit-to-cost ratio for the SLO Transit EDAPTS system, then the business case for other small transit ITS solutions being deployed in similar environments will be strengthened, helping small transit providers in California and throughout the United States better justify their proposed deployments.

Background

In early 2001, the first EDAPTS system was installed, tested, and began operation at San Luis Obispo. This research system utilized innovative digital communications links, open source designs, solar powered real-time arrival signs, and innovative data links to improve transit services and safety for passengers and drivers. This original EDAPTS research effort, funded by Caltrans and the Federal Transit Administration, tested the viability of **innovative**, lower-cost implementations of ITS technologies where the concepts, designs and performance expectations were tightly focused and tailored specifically to small transit system usage needs.

When the research was completed in 2003, ownership and operational responsibility for the test system was transferred to SLO Transit and the system continues to be used in day-to-day operations. This extended period of operation has gave researchers access to several years of continuous operations data collected by

the EDAPTS system. The data provided a detailed look into the operational impacts of such things as timetable changes, bus schedule adherence, driver impacts, ridership and customer perceptions. Researchers from California State Polytechnic University at Pomona and California Polytechnic State University at San Luis Obispo used these data to perform a scientific analysis of costs incurred versus benefits received.

What Was Done

An initial literature review on Advanced Public Transportation Systems helped identify benefits and costs and determine appropriate measures of performance. Next, an innovative methodology was developed to quantify the intangible benefits of using the EDAPTS system. The stated preference methodology used the principle of willingness-to-pay to assign dollar values to benefits, thus providing a quantitative measure for comparison purposes.

The study considered two basic types of benefits: (a) conventional benefits and (b) consumer surplus. Conventional benefits were directly measured using the willingness-to-pay principle for passengers, drivers and SLO Transit administrators. Consumer surplus was calculated as the difference between the price consumers were willing to pay and the actual price charged.

Using a passenger survey questionnaire, a boarding time survey and interviews with SLO Transit drivers and administrators, the team estimated the various benefits and costs for the SLO Transit EDAPTS system and performed a B/C ratio analysis along with a sensitivity analysis. The sensitivity analysis considered different discount rates and different assumed service lifetimes.

Results

Using discount rates from five percent to ten percent, the study showed

Research shows a conservative benefit-to-cost ratio of 3.9 for the SLO Transit EDAPTS system

significant support for deploying ITS solutions in a small transit environment. Further, using assumed ser-

vice lifetimes of 5-years, 7-years, and 10-years, and considering both the inclusion and exclusion of consumer surplus in the calculations, the analysis showed a favorable benefit-to-cost ratio.

Benefit/Cost Ratio Summary @ 7% Discount Rate
(\$ x 1000)

Item	5-Year Life	7-Year Life	10-Year Life	Units	Group Benefited
<i>Consumer Surplus Applied</i>					
Total Benefits	\$226	\$226	\$226	\$/yr	All
Annualized Total Costs	\$46	\$38	\$32	\$/yr	Transit agency
B/C Ratio	4.8	5.9	7.0		
<i>Consumer Surplus Not Applied</i>					
Total Benefits	\$183	\$183	\$183	\$/yr	All
Annualized Total Costs	\$46	\$38	\$32	\$/yr	Transit agency
B/C Ratio	3.9	4.8	5.7		

Conclusions :

This research shows strong economic support for the deployment and use of ITS solutions at small transit agencies.

It also confirmed that by using the EDAPTS approach when deploying small transit ITS solutions, ***You Get More Bang For Your Buck!***

Research Factoids :

- ☞ Passengers on SLO Transit buses perceived substantial benefits from the EDAPTS system features.
- ☞ Not all individual EDAPTS system elements were recognized as beneficial by the constituent groups, though the groups might well have deemed the service being enabled by that element as valuable.
- ☞ The survey indicated that passengers were willing to pay more for *alternative* transportation when faced with a service shutdown than for *substitute* transportation when service is simply delayed.
- ☞ Measured data indicate that electronic fare payment saved an average of 3.6 seconds per boarding passenger. For SLO Transit, this means as much as 700 hours of loading time delay could be avoided on a yearly basis — if cash fares were to be replaced by swipe cards.
- ☞ The calculated total annual benefits generated by the SLO Transit EDAPTS system exceeded \$180,000.



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