



**Smart Card
Alliance**

Transit Payment System Cost Model

A Smart Card Alliance Transportation Council Tool

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About the Smart Card Alliance

The Smart Card Alliance is a not-for-profit, multi-industry association working to stimulate the understanding, adoption, use and widespread application of smart card technology. Through specific projects such as education programs, market research, advocacy, industry relations and open forums, the Alliance keeps its members connected to industry leaders and innovative thought. The Alliance is the single industry voice for smart cards, leading industry discussion on the impact and value of smart cards in the U.S. and Latin America. For more information please visit <http://www.smartcardalliance.org>.

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Transit Payment System Cost Model: User Guide

The Smart Card Alliance Transportation Council Merchant has created this Excel model to assist transit agencies in comparing costs of current and new transit payments systems.¹ The model comprises several linked spreadsheets that capture the operating, capital, and maintenance costs of a current payment system and provides a format in which to compare the system with one or more alternative systems. As described below, the model requires the user to enter all cost data and related information, first for an agency's current payment system, and then for alternative systems for evaluation and comparison. The model is designed to provide the flexibility for a transit agency to model any type of alternative system; the model is adapted to different system alternatives by entering revenue and cost factors that are appropriate for that alternative. The model contains sample input data for illustration purposes only.

The model's overall purpose is to provide a tool for transit agencies to examine the near- and long-term cost implications of purchasing new fare payment equipment and of adopting different technology alternatives. The selection of the "right" alternative is in part a capital investment problem. The analyst must calculate the return on an initial investment, inclusive of operating and maintenance costs over time, as well as the revenues or cost savings that result. Accordingly, the model uses net present value (NPV) to determine the value of an alternative by discounting cash inflow and outflow over the life of the project back to its present value. NPV is commonly used in capital investment analysis, since it provides a consistent means of addressing the changing value of money over the life of a project.

The cost model also includes a metric that measures revenue collection efficiency—the per-dollar expense of collected revenue. The model computes a ratio between the total amount of revenue collected and the fully allocated collection costs (such as labor, materials, and contract costs) required to operate and maintain the payment system. Agencies who wish to improve fare collection efficiency by investing in a new system should first establish a benchmark of current collection costs, which allows for evaluation of the performance of a variety of technology alternatives.

1) Download the Model

A beta version of the model is now available for download.

- Download the Excel model from the Smart Card Alliance web site (<http://www.smartcardalliance.org>). The model includes sample data for illustration purposes only.

2) Launch the Model

Open the Excel file ' Transit Pmt System Cost Model - BETA - March 2010.xls.'

3) Model Operation and Description

The payment system model requires data entry through a user interface, in which embedded formulas calculate various aggregations and measures. Model inputs and outputs are described below.

Summary

The Summary page shows the results. (Sample data is included for illustration.) Generally, no data is entered directly into this page. It displays the values that result from the data input into the other sections. In short, this is the model output page and shows the costs of alternative

¹ The Excel model was initially developed by SEPTA, with revisions by Gerald Kane and the Transportation Council, and made available for industry use through the Smart Card Alliance Transportation Council.

payment systems and their performance based on data input by the user. Highlighting a particular cell will display the formula and location where the result is derived.

Baseline

The Baseline page describes the current situation. Generally, the Baseline page includes all equipment maintenance, replacement needs, and operations of the current system, with the assumption that only limited capital investment is required to maintain the system in a state of good repair. To complete this page, the user decides on the future capital and maintenance requirements necessary to continue system operations without significant upgrades to equipment or technology. This data represents a baseline alternative with which to compare alternative options. For the baseline alternative and all other alternatives, costs are entered for each year with an assumption of 15 years of project life. The page includes categories for all major transit modes, but users may choose to delete (or enter zero) for cost items associated with modes that are not applicable for their agencies.

Capital

The Capital pages specify the costs for replacement or significantly upgraded payment alternatives. New bus fare boxes, fare gates, and other capital equipment are identified and cost estimates for the life of the project are entered. Capital input is organized by transit mode, and the user may choose to input some or all of the data as determined by the agency's technology and direction. Major infrastructure categories such as new communication systems (e.g., optical fiber) or facility improvements (such as station overhaul) are not listed but may supplement the capital category.

Fare Media

The Fare Media page allows the user to select the various fare media types being considered for the future options. This page is also organized by transit mode, and the table displays a variety of fare media types common to new payment systems. The user is asked to identify the quantity of fare media and media costs over the project life for each of the alternatives under consideration.

Present Staffing

The Present Staffing page addresses payment system labor costs and identifies job titles and number of positions included in the agency's operating budget. The user must identify the number of all full- and part-time employees who support the payment system (especially the portion of a full-time employee's time spent on fare collection duties) and input the annual costs of the current system. A value for fringe benefits is included in the table. This page is one of the important benchmarks for calculating the cost performance of alternatives.

Staffing

The Baseline and Alternatives Staffing pages adjust the values entered in the Present Staffing page to reflect the labor positions and costs required to support the proposed fare payment systems. The Reference page, described below, shows actual position titles and associated labor costs. Labor expenses are entered for each year of a project's life.

Operating Costs

Most agencies would expect a new system to be introduced over time. Therefore, the baseline system and the new system will be operational during a transition period. Operating costs during the transition period will be a blend of both. Analysts will need to factor this into the proposed alternatives.

Assumptions

The model includes the assumptions used to develop the model and is self-explanatory. The user can modify these assumptions as necessary.

Reference

The Reference page serves as a look-up table for economic assumptions about inflation, increased material costs, and various other assumptions. It also averages salary rates for operating positions added or reduced by a fare payment alternative. Also included is an estimate for the annual amount of revenue collected, an assumption that may change with each alternative.

Graphing Information

The Graphing Information page includes a series of charts illustrating cost comparisons among the alternatives for operating, maintenance, and capital over the life of the project.

4) Send Us your Feedback

We'd like feedback on the beta version of the transit payment system cost model.

- Did you have any problems using the model?
- Does the model include the key decision factors that you would use in analyzing investment alternatives?
- When you entered data, did the model generate a realistic summary?
- Are there other benefits, cost savings or costs that should be included in the model?

Send an email to transit-model@smartcardalliance.org with your feedback.

Disclaimer

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About the Smart Card Alliance Transportation Council

This Excel model was developed by the Smart Card Alliance Transportation Council to provide an interactive tool for transit agencies to use to assess different fare payment system alternatives. Publication of this document by the Smart Card Alliance does not imply the endorsement of any of the member organizations of the Alliance.

The Smart Card Alliance wishes to thank Jerry Kane, SEPTA, for leading the project and for contributing the initial version of the model. The Alliance also would like to thank Transportation Council members for their contributions: ACS, Booz Allen Hamilton, Cubic, Giesecke & Devrient, INSIDE Contactless, JPMorgan Chase, Southeastern Pennsylvania Transportation Authority (SEPTA)

The Transportation Council is one of several Smart Card Alliance Technology and Industry Councils, focused groups within the overall structure of the Alliance. These councils have been created to foster increased industry collaboration within a specified industry or market segment and produce tangible results, speeding smart card adoption and industry growth.

The Transportation Council is focused on promoting the adoption of interoperable contactless smart card payment systems for transit and other transportation services. Formed in association with the American Public Transportation Association (APTA), the Council is engaged in projects that support applications of smart card use. The overall goal of the Transportation Council is to help accelerate the deployment of standards-based smart card payment programs within the transportation industry.

The Transportation Council includes participants from across the smart card and transportation industry and is managed by a steering committee that includes a broad spectrum of industry leaders.

Transportation Council members involved in the development of the model and white paper included: ACS, Booz Allen Hamilton, Cubic, Giesecke & Devrient, INSIDE Contactless, JPMorgan Chase, Southeastern Pennsylvania Transportation Authority (SEPTA).

Special thanks go to SEPTA, who developed the initial Excel model and contributed the model to the Transportation Council for industry use.

Transportation Council participation is open to any Smart Card Alliance member who wishes to contribute to the Council projects. Additional information about the Transportation Council can be found at http://www.smartcardalliance.org/about_alliance/councils_tc.cfm.