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User Manual for Spreadsheet Tool and Implementing Performance Planning for Rural Planning Organizations

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USER MANUAL FOR SPREADSHEET TOOL AND IMPLEMENTING PERFORMANCE PLANNING FOR RURAL PLANNING ORGANIZATIONS

by

John Overman
Research Scientist
Texas A&M Transportation Institute

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TEXAS A&M TRANSPORTATION INSTITUTE
College Station, Texas 77843-3135

INTRODUCTION

The performance-planning tool developed as part of this project is intended for use with the guidebook for establishing and using rural performance based transportation system assessment, monitoring, planning, and programming to support the rural planning organization (RPO), the Texas Department of Transportation's (TxDOT's) districts, and statewide long-range planning effort. The analyst is encouraged to read the following steps before using the tool.

The tool has four tabs: first tab introduces the tool, the second tab is the tab that can assist in quantitative project scoring, the third tab is qualitative project scoring, and the fourth tab has input data that are based on currently available TxDOT performance benchmarks. The users can use either the quantitative project scoring tab or qualitative project scoring tab based on data availability and comfort level with the tool. In future, users are recommended to update the benchmarks (in tab 4) as and when available for the year.

The tool has four colored cells following explanation:

- Blue cells: Input Data (User can modify).
- Orange cells: Default Values or Custom Values (User can modify).
- Dark Blue Cells: TxDOT Performance Benchmark Values Used Calculations.
- Green Cells: Output Results.

The light blue cells comprise input data. Each time the worksheet is used, the values in these cells should be changed based on performance metrics of the project being evaluated. Input data must be provided by the analyst and will impact the outcome or prioritization process.

The orange cells are the default or custom values. The sheet will have default values that the user can change accordingly; these values are weights assigned to each performance metric and the total has to be 100.

The dark blue cells are the intermediate-calculation steps for users to check if calculations are correct and understand the simple math behind the scoring process.

The green cells represent output and the values that are computed after performing calculations. These are the final values of combination of performance metrics or each of the performance metric.

The tool provides two scoring sheets with different input needs, which the user can select depending on data availability and comfort level with tool:

1. Quantitative Scoring (based on performance measures and comparison at the state level).
2. Qualitative Scoring (based on subjective ranking of performance measures).

STEPS FOR USING QUANTITATIVE SCORING WORKSHEET

Step 1: Choose the Performance Measures

Select the necessary performance measure by checking the box and input column(s) for each category of the performance measure. For instance, if a user checks Safety performance measures, there will be two columns displayed. One column for Fatality rate and the second for Serious injury crash rate.

Step 2: Enter the Value of Performance Measure for Each Project

The user will enter the project name and required inputs under each chosen category in Step 1, such as, for safety, the user has to enter fatality rate in crashes/million vehicle-miles and serious injury rate. The guidebook discusses the availability of these datasets. The user needs to enter the value in the necessary units. Similarly, for Pavement, enter the pavement condition score for the road section and so on for all other categories selected in Step 1.

Step 3: Enter the Weights or Use Default Weights

Once the user has selected the performance measures, they can use the current default weight values provided in the sheet. The user can see the default weight values for each measure by checking the box that says "Enter Weight Manually." The user can change the weights for selected categories, but the total of weights should be 100 otherwise a warning will appear. If a user has selected only two categories then the weight should be entered for only those two performance categories; for example, if the user has selected safety and pavement then weight values should only be entered for only these two categories, total of weight should be 100, and the rest of the categories should have zero value then. If the user is planning to use default weights, select all performance measure categories or the default weights need to be changed such that they are zero for the unselected categories and total is 100.

Step 4: Calculate Scores

The user can click on the Calculate Scores button to compute the score for each project based on the selected performance measure and combined overall score based on combination of safety, transit, and freight score. This is computed by multiplying the user-defined weights to each of these performance measures with the score and summing them together.

Step 5: Ranking Projects

The user can rank the projects by clicking on any of the five buttons provided in the Step 5 of the Quantitative Project Scoring sheet. The projects will be ranked in descending score based on the desired performance measures or weighted combination score of safety, transit, and freight score.

The reason pavement score has not been added in this weighted score is because the pavement score is a step function (non-continuous), and cannot be combined in weighted score as the values near each of pavement condition score threshold changes drastically and may result in inaccurate comparison.

CALCULATIONS IN QUANTITATIVE SCORING WORKSHEET

This section explains the intermediate and final calculations performed for each of the performance measures.

Safety

For safety performance measure, the user needs to add the values of fatality rate and serious injury rate. Once the value is added in the field, it is normalized with 5-year moving average for rural Texas; for example, the fatality rate is compared with the 5-year moving average of rural Texas for FY 2014. This is done by calculating the percent difference between the entered performance measure value and benchmark (5-year moving average of rural Texas), which is then multiplied by weight assigned for that performance measure.

Let us say the fatality rate for a project/corridor is 0.99 and serious injury rate is 40. This will be compared with the 5-year benchmark for fatality rate and serious injury rate in rural Texas (i.e., 0.97 and 38). This represents an increase of 2 percent and 5 percent in fatality rate and serious injury rate, respectively, compared to benchmark. The value is then multiplied by the weight assigned for each of these performance measure values to get a combined score.

Pavement

The simplest measure of pavement is pavement condition score and is measured for most of the on-system roads in Texas. The target pavement condition score (CS) for Texas is divided into three categories:

- Percent Lane-Miles Good or Better (CS ≥ 70).
- Percent Lane-Miles Fair (50 < CS < 69).
- Percent Lane-Miles Poor (1 < CS < 49).

According to Texas performance result, 90 percent of the national highway system (NHS) or non NHS roads have a condition score of 70 or more (CS ≥ 70), 7 percent of roads have score in fair condition (50 < CS < 69), and only 3 percent or roads are in poor condition. Hence, the following scoring mechanism has been used:

- CS=70 or more means score = 0.1 (low priority project from a pavement condition standpoint).
- 50<CS<69 means score = 0.93 (high priority project).
- CS<50 means score = 0.97 (desperately needed project).

Freight

The freight performance measure used in this tool is truck travel time reliability index. It is calculated as ratio of 95th percentile truck travel times and normal (50th percentile) truck travel time for each reporting segment to the nearest hundredth. The national threshold for truck travel time reliability index is 1.5; however, in Texas, the truck travel time reliability index for rural location was found to be around 2.0. So the comparison of the performance measure is done with respect to this rural Texas value and percent difference is used to compute the score.

Transit

The condition of transit is normally ranked based on state of good repair that can be compared with Texas performance results of FY 2013 for Transit. Typically, the state of good repair is ranked as 1 for Bad, 2 for Poor, 3 for Fair, 4 for Good, and 5 for Excellent. For rural Texas, the average score for state of good repair was 3.61. The score entered in the project field is compared to this benchmark and the difference is computed to score the projects.

Weighted Average for Safety, Transit, and Freight

User can also get a weighted average score based on combination of safety, transit and freight score. This is computed by multiplying the user defined weights to each of these performance measures with the score and summing them together.

The reason pavement score has not been added in this weighted score is because the pavement score is a step function (non-continuous), (i.e., a good pavement condition score greater than 70 results only in one value of 0.1, whereas fair pavement condition score [50> CS >69] results in only 0.93 and lesser than that results in 0.97). Hence, it cannot be combined in weighted score as the values near each of pavement condition score threshold changes drastically and may result in inaccurate comparison.

STEPS FOR USING QUALITATIVE SCORING WORKSHEET

The qualitative worksheet is simple to use and assists in project ranking when there is a lack of available data for the projects. The steps below describe usage of these worksheets.

Step 1: Enter Unique Project Name

For each project, enter a unique identification name or number.

Step 2: Enter the Qualitative Value of Performance Measure for Each Project

Next, the user clicks on the cell under each performance measure and chooses the qualitative value from dropdown (i.e., high/medium/low). The qualitative worksheet has two more performance measures compared to the quantitative project scoring worksheet namely, connectivity and mobility. The user enters the safety concern under safety performance measure. The energy sector concern under pavement field implies extensive usage of roads by truck traffic for oil, gas, or renewable energy related efforts.

The freight performance measure in this sheet implies the impact of truck traffic on traveling public on the rural roads. The subjective ranking on transit availability can be entered in the column with transit performance measure. The performance measure connectivity and mobility suggest increases in connectivity and mobility due to proposed project. If the user believes the project will increase connectivity, they can rate it high. If a user thinks the project will not add to existing mobility, they can rank it low).

Each subjective value has a weight assigned to it; for example, High value has score of 5 associated with it, Medium has 3, and Low has 1.

Step 3: Enter the Weights or Use Default Weights

The user has the option to weigh each of the subjectively ranked performance measures to determine the overall score. By default, some weights have been provided in the sheet. The user can see the default weight values for each measure by checking the box that says "Enter Weight Manually." The user can also change the weights for selected categorizes, but the total of weights should be 100 or a warning will appear.

Step 4: Calculate Scores

The user can click on the Calculate Scores button to compute the score for each project for a combined overall score.

Step 5: Ranking Projects

The user can rank the projects by clicking on button that says "Sort Based on Overall Score." The projects will be ranked in descending score based on the combined weighted score of all performance measures.