

# TFLEx Guide for Transit Newbies

## Module 3

### Key Performance Indicators

#### Key Performance Indicators

Welcome to the Key Performance Indicators module.

This module will provide you with a basic understanding of the key performance indicators, or KPIs, that help the transit industry tick.

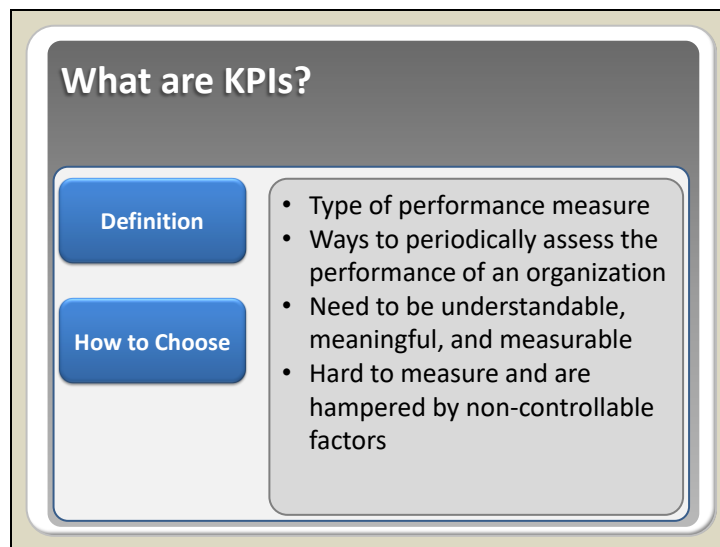
After completing this module, you will be able to:

- Define KPI
- Identify the different categories of transit agency performance measures and their characteristics
- Define the leading and lagging measures
- Determine the persons served by the KPIs

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#### Key Performance Indicators



#### *Definition*

A Key Performance Indicator, KPI, is a term for a type of performance measure. KPIs are used to periodically assess the performance of an organization, including its departments and employees. They need to be defined in a way that is understandable, meaningful, and most importantly, measurable. KPIs can be hard to measure and can be hampered by factors seen as non-controllable by the divisions or individuals responsible for developing and reporting them, frequently leading to the KPIs being ignored.

#### *How to Choose*

In order to successfully choose good KPIs, those who are choosing them must have a clear understanding of what is important to the agency. Different departments within the agency will have different ideas as to what makes a KPI useful – for example, the KPIs useful to finance will be quite different from the KPIs assigned to operations. KPIs are often developed as part of a strategic planning process.

A very common method for choosing KPIs is to apply a management framework such as the Balanced Scoreboard. Google search or use this link for a definition of Balanced Score Card: [www.balancescorecard.org](http://www.balancescorecard.org)

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#### Categories

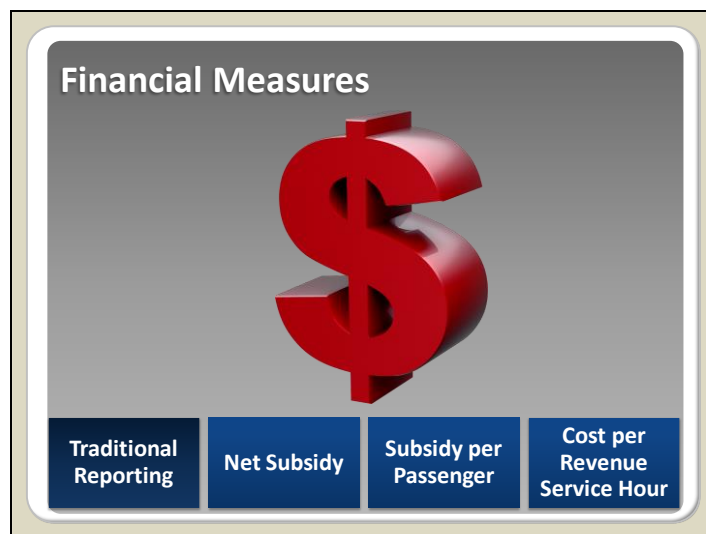
KPIs can be grouped into categories, such as the following.

- Financial Data for Transit: Traditional focus of financial personnel in the transit agency.
- Effectiveness: Traditional focus of operations management for the transit agency. This tells you how much service is provided, and if the agency is “doing the right things.”
- Efficiency: Traditionally more emphasized by external parties, these measures tell how well labor, vehicles, and fuel are used to produce service. “Doing things right.”
- Quality: This focuses on the reliability of the service functions.

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So how do we measure performance? There are four categories that need to be measured. These identify various categories of transit agency performance measures and their characteristics.

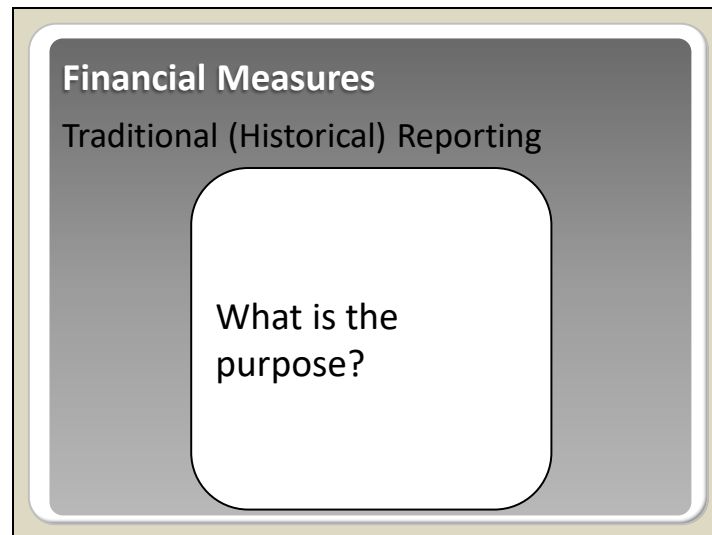
Let's first go into more detail about the financial data for transit, or the financial measures. There are four areas that we need to look at more closely. These are:

- Traditional reporting:
- Net subsidy
- Subsidy per passenger
- Cost per revenue service hour

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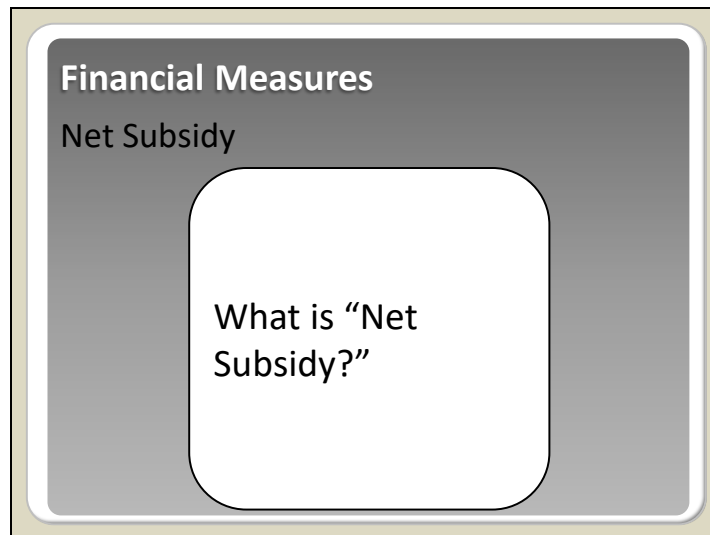


- What is the purpose?
  - To provide information about what the agency has spent and received from what sources, as well as what is still owed.
- Who are the users?
  - Internal management and external accountants, bankers, investors
- What is used?
  - Balance Sheet, Income Statement, and Sources & Uses of Cash
- What are the benefits?
  - This type of reporting helps the agency qualify for external funding and translate agency operations into language common to the business community.
- Is it reliable?
  - Financial data are also reliable, meaning if you measured the same thing many times with the same tool, you would be pretty sure of getting the same result.
- Are there limitations?
  - Yes. It is based on historical facts, for example, it is sometimes referred to by the saying, "like driving by looking in the rear-view mirror." Traditional financial data don't help you identify ways to drive change or improvement. Financial results don't help the agency focus on the end-user of the system.

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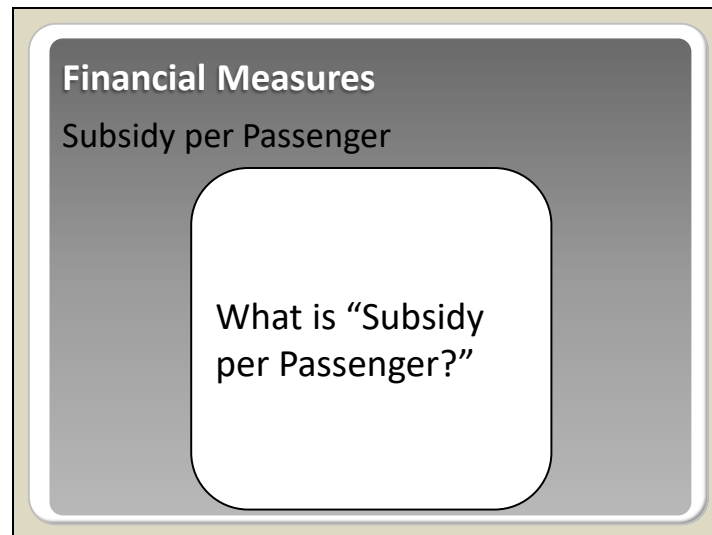


- What is “Net Subsidy?”
  - Cost incurred to produce the amount of service consumed.  
Net Subsidy = Operating Revenues - Operating Expenses  
Net Subsidy is the difference between operating revenues and operating expenses, which must be subsidized for each mode, generally by taxation.
- What is the purpose?
  - Budgeted and reported regularly to show what is needed from taxing authorities to fund transit operations.
- Who are the users?
  - Agency management, financial reviewers, and taxing authorities.
- What are the benefits?
  - Familiar measure to those responsible for overseeing transit operations.
- What are the limitations?
  - It does not tell where there are efficiencies or inefficiencies.

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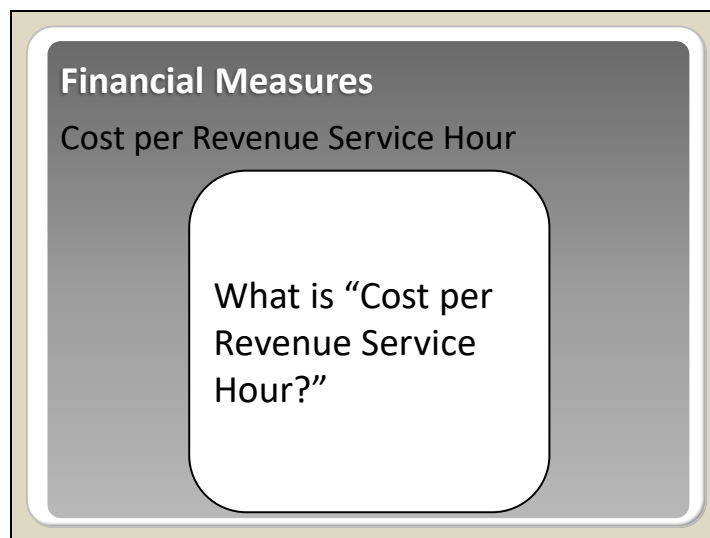


- What is “Subsidy per Passenger?”
  - It is the net subsidy divided by the ridership:  
$$\text{Net Subsidy/Ridership}$$
- What is the purpose?
  - To show how well cost is minimized in relation to service provided. Sometimes viewed as an efficiency measure, but treated as a separate KPI here to emphasize cost incurred relative to cost consumed, versus cost of service produced.
- Who are the users?
  - Agency management and public organizations that monitor transit.
- What are the benefits?
  - It reflects both cost and volume of ridership in one measure.
- What are the limitations?
  - It is not a National Transit Database category, and it is not widely reported. Note that some agencies consider this an efficiency measure, not a cost effectiveness measure.

A link to the National Transit Database website can be found under “Other Resources” on this TFLEx website.

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What is "Cost per Revenue Service Hour?"

- It is the total operating costs divided by the total revenue service hours:  
$$\text{Total operating costs} / \text{Total revenue service hours}$$
- What is the purpose?
  - It shows how operating costs relate to a unit of actual transit service provided.
- Who are the users?
  - Agency management
- What are the benefits?
  - It reflects cost apportioned out by actual service provided; this measure is used by most agencies across the country as a benchmark.
- What are the limitations?
  - Not all agencies agree exactly on what goes into the "Total Operating Cost" number.



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##### Financial Measures

##### Knowledge Check

- During the past month, the operating revenues for your agency were \$175,000, and your operating expenses were \$140,000. What is your agency's net subsidy?
  - A. \$35,000
  - B. \$315,000
  - C. -\$25,000
  - D. \$8,000
- You just determined that your net subsidy is \$35,000. Your ridership level was at 2,000 people. What is your subsidy per passenger?
  - A. \$37,000
  - B. \$0.05
  - C. \$17.5
  - D. \$33,000
- Your total operating costs for the month were \$325,000, and your total revenue service hours were 2500. What is your agency's cost per revenue service hour?
  - A. \$30
  - B. \$130
  - C. \$230
  - D. \$330


Answers: A, C, B

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### Effectiveness Measures



Generally, service is hard to measure, as you can see in each of the KPIs you'll visit here. Also, transit managers have less control over service levels than efficiency measures, which you'll learn more about here as well. This means that looking at service levels doesn't help identify problems that can be easily solved.

Let's look at three KPIs that measure effectiveness.

Generally, service is hard to measure, as you will see in each of the KPIs you'll visit here. Also, transit managers have less control over service levels than efficiency measures, which you'll learn more about here as well. This means that looking at service levels doesn't help identify problems that can be easily solved.

Let's look at three KPIs that measure effectiveness.

#### Typical Effectiveness Measures

- Ridership
- Fare recovery
- Passengers per mile

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##### **Ridership**

- This is the number of passenger boardings.
- Ridership is the basic building block for service or effectiveness measurement. Ridership is the number of passenger boardings based on farebox/turnstile data and calibrated or supplemented through on-board ride check samplings. This generally represents unlinked trips.
- The purpose is to gauge and monitor the number of people reached by the transit agency and then identify trends in amount of service desired and use.
- The users are agency management, including planners
- Where reliable farebox or turnstile systems exist, this KPI provides a timely indicator of system usage.
- It is limited because automated farebox systems are sometimes unreliable and non-automated systems are subject to error.
- Many agencies are developing routes with off-board fare collection, making accurate automatic passenger counters and sampling more of an issue.
- Unlinked trips can make agency-to-agency comparisons difficult, if transfers are managed differently from agency to agency.

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##### **Fare Recovery**

- Fare revenue/Operating expenses
- The purpose is to focus on revenue growth or stabilization.
- The users are agency management, including the board of directors, to determine the extent to which operating costs are covered by fare revenue.
- This is one of the more familiar KPIs.
- Limitations: Best as a general agency-wide measure. Does not provide management with information needed to make decisions like which routes to keep or expand and which ones to cut back-especially because there are other factors to consider, like whether a route is serving a part of the community that has no alternative means of transportation, which is not reflected in fare recovery.
- Operating revenue does not include some revenue that is received from cities to compensate for low-fare or no-fare zones in some urban areas. This would make fare recovery appear lower in cities with those kinds of fare arrangements.

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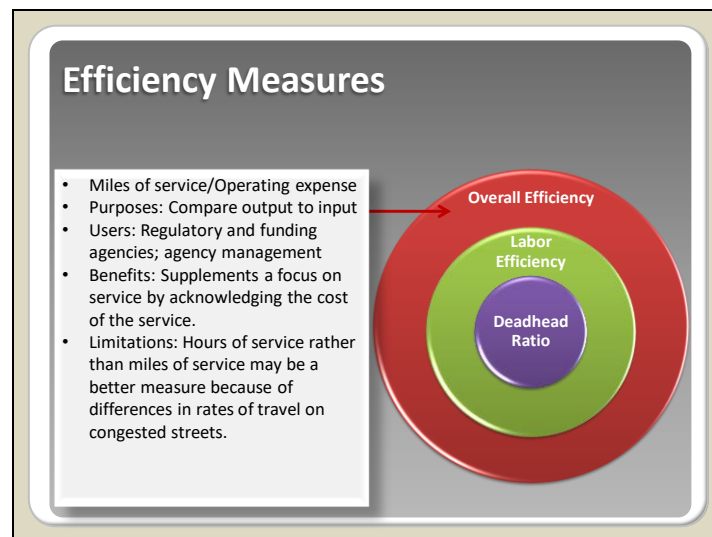
##### **Passengers per Mile**

- Passenger boardings/Revenue miles
- Its purpose is to measure service effectiveness on any route - how much service is provided to how many passengers.
- The user is agency management.
- The benefits to this KPI are that it is a familiar measure, reported by every agency for the National Transit Database. It can generally be calculated for different modes.
- Limitations:
  - Miles don't present the best comparability between agencies, because speed of travel can vary widely from route to route and location to location depending on traffic congestion. Hours might provide better comparability.
  - Passengers boarding buses are generally not counted as accurately as passengers boarding trains.
  - Remember that unlinked trips can make agency comparisons difficult.

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### Efficiency Measures

Traditionally emphasized more by external parties, these KPI measures tell how well labor, vehicles, and fuel are used to produce service. This goes by the mantra, “doing things right.” Let’s learn more about these particular KPIs.

#### *Overall Efficiency*

Overall efficiency = Miles of service/Operating expense

- Purposes: Compare output to input
- Users: Regulatory and funding agencies; agency management
- Benefits: Supplements a focus on service by acknowledging the cost of the service.
- Limitations: Hours of service rather than miles of service may be a better measure because of differences in rates of travel on congested streets.

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##### *Labor Efficiency*

Labor efficiency or Pay-to-platform ratio =  $\text{Pay hours} / \text{Platform hours}$

- Purposes: Monitor output received (hours driven) for input (hours paid). Paid time includes overtime, scheduled and unscheduled absences, unscheduled work, and safety and training classes.
- Users: Agency management, planners
- Benefits: Labor is the single largest category of expense, and most of labor is operator labor. This measure yields an idea of the amount of labor cost driven by non-productive time. This has become a familiar measure in the industry.

##### *Deadhead Ratio*

Deadhead ratio =  $(\text{Schedule miles less revenue miles}) / \text{revenue miles}$

- Purpose: Measures efficient use of vehicles and drivers.
- Users: Agency management, planners
- Benefits: May help to explain low labor efficiency by highlighting where schedules are inefficient.
- Limitations: Not as familiar or readily understood as the other efficiency ratios.

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#### Quality Measures

The last KPI measures we'll talk about today are the Quality Measures. These measures consist of vehicle reliability, safety, on-time performance, and customer service.

##### *Vehicle reliability or Mean Distance between Failures*

Vehicle reliability = Total miles operated/Number of mechanical failures

- Purposes: One indicator of whether maintenance program works. Can be budgeted for comparison of actual and budgeted levels.
- Users: Agency management
- Benefits: Provides some indication of the preventive maintenance program effectiveness.
- Limitations: Doesn't communicate anything about the cost to achieve the quality level. Also, there is no standard definition of failure, so agency-to-agency comparability is difficult.



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##### *Safety*

Vehicle accidents per 100,000 miles = (Vehicle accidents/Actual fixed-route miles) \* 100,000

- Purposes: High-visibility, customer-focused measure used to monitor combined effectiveness of factors affecting safety.
- Users: Agency management
- Benefits: In one measure, provides some information about combined effectiveness of maintenance and driver selection and training.
- Limitations: Doesn't shed light on individual factors behind the accident rates.
- Should be calculated for each mode

##### *On-time Performance*

On-time Performance = (Number of scheduled trips - number of times late)/Number of scheduled trips

- Purpose: Measures the frequency of vehicles picking up at the designated time within an allowed window, such as 0 minutes early and 3 minutes late.
- Users: are the same as other quality metrics.
- Benefits: Serves as a good predictor of customer satisfaction.
- Limitations: Not widely reported externally, for example in the National Transit Database.

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##### *Customer Service*

Complaints per 100,000 trips = (Complaints received/Total Ridership) \* 100,000

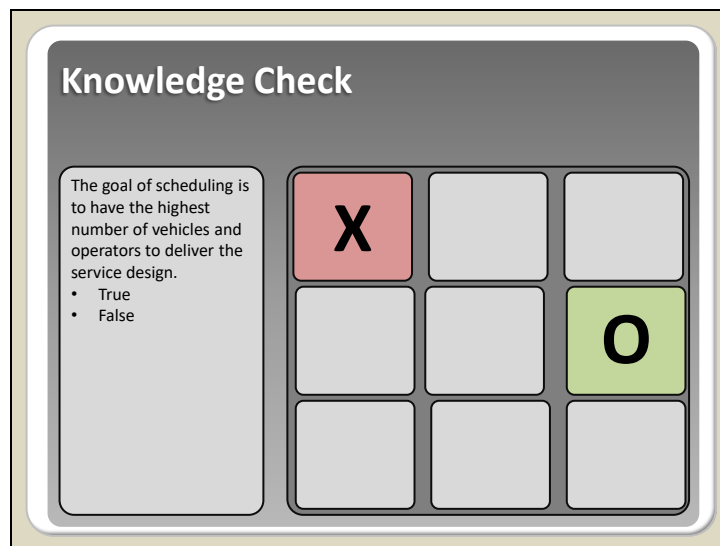
- Purpose: Determine how well the service is perceived by the riding public.
- Users: Agency management, public organizations that monitor transit.
- Benefits: While a single measurement may not provide much information, watching the trend over time will give a good indication of customer satisfaction, particularly when service changes are made.
- Limitations: Major events may generate many complaints from different riders, skewing the measurement.

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##### Knowledge Check



Let's check your knowledge of the Effectiveness, Efficiency, and Quality Measures KPIs.

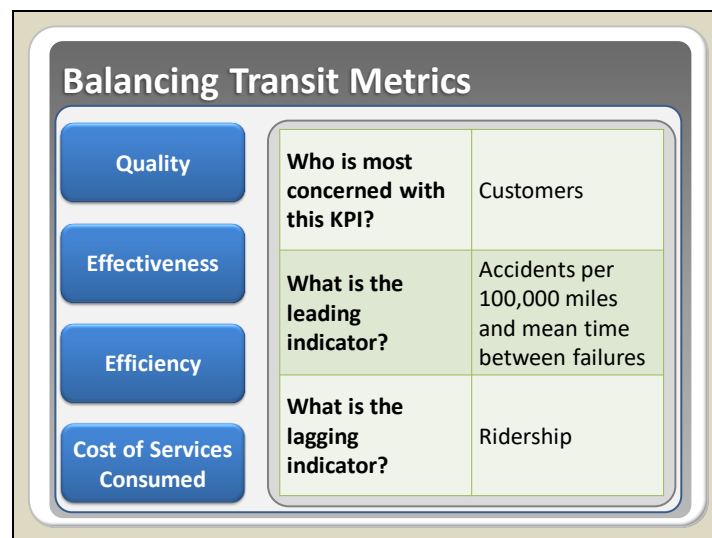
True or false?

1. Ridership is the basic building block for service or effectiveness measurement.
2. The purpose of farebox recovery is to measure service effectiveness on any route.
3. One of the limitations to the passengers per mile KPI is that it is an unfamiliar measure.
4. The calculation to determine overall efficiency is miles of service/operating expense.
5. Planners do not use the labor efficiency KPI.
6. The purpose of the deadhead ratio is to measure efficient use of vehicles and drivers.
7. One of the limitations to vehicle reliability is that it does not communicate anything about the cost to achieve the quality level.
8. The benefit to the safety KPI is that it does not shed light on individual factors behind the accident rates.
9. The purpose of the customer service KPI is to determine how well the service is perceived by the riding public.

Answers: True, False – This is the purpose for passengers per mile, False– It is a familiar measure, and this is a benefit, True, False – Planners do use labor efficiency, True, True, False – this is a limitation, True

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It may be useful to your agency to think in terms of who is served by the various KPIs you use, and whether those KPIs help you predict the agency's performance (leading indicators), or only report on it after the fact (lagging indicators). Keep in mind what leading indicators do: They are data based on events that have occurred but help predict another outcome. For example, today's ridership could have been predicted to an extent by last year's or last quarter's quality metrics (such as accidents or equipment failures). Let's take a look at some information about each of the KPIs.

#### *Quality*

- Who is most concerned with this KPI? Customers
- What is the leading indicator? Accidents per 100,000 miles and mean time between failures
- What is the lagging indicator? Ridership

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##### *Effectiveness*

- Who is most concerned with this KPI? Customers
- What is the leading indicator? Revenue miles
- What is the lagging indicator? Passengers per mile

##### *Efficiency*

- Who is most concerned with this KPI? Customers
- What is the leading indicator? Pay-to-platform ratio, deadhead ratio
- What is the lagging indicator? Net subsidy

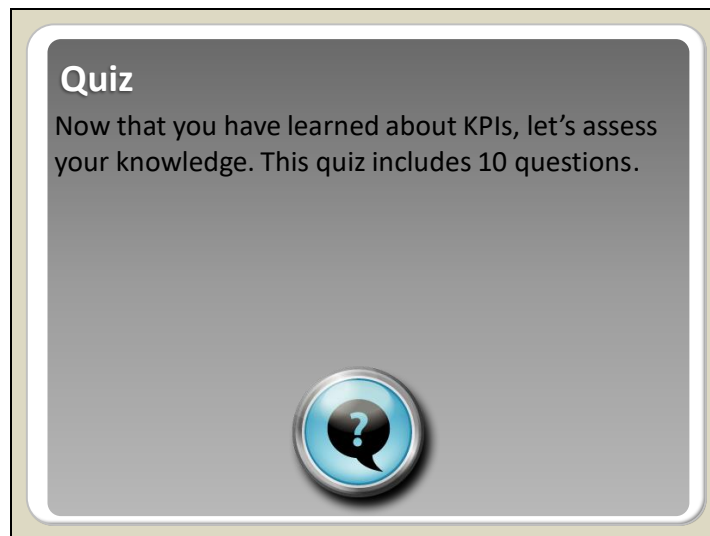
##### *Cost of Services Consumed*

- Who is most concerned with this KPI? Other stakeholders (investors, board members, local officials)
- What is the leading indicator? Process cycle times and benchmark comparisons
- What is the lagging indicator? Net subsidy and subsidy per passenger

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Now that you have learned about KPIs, let's assess your knowledge. This quiz includes 10 questions.

1. Which of the following rely heavily on an agency's historical financial data?:
  - a. Bankers and investors in any debt instruments the agency has issued
  - b. The agency's bus operators
  - c. Supervisors in the agency's maintenance yard
  - d. The agency's riders
2. How is net subsidy calculated?:
  - a. Total revenue less operating expenses
  - b. Assets less liabilities
  - c. Operating revenue less operating expenses
  - d. Current assets less current liabilities
3. Operating revenues at your agency remained about the same this year, but operating expenses increased. Farebox recovery \_\_\_\_\_ during the same period:
  - a. Increased
  - b. Decreased
4. An agency's pay to platform ratio is 1.25. Is it realistic to expect this number to be less than 1?:
  - a. Yes
  - b. No

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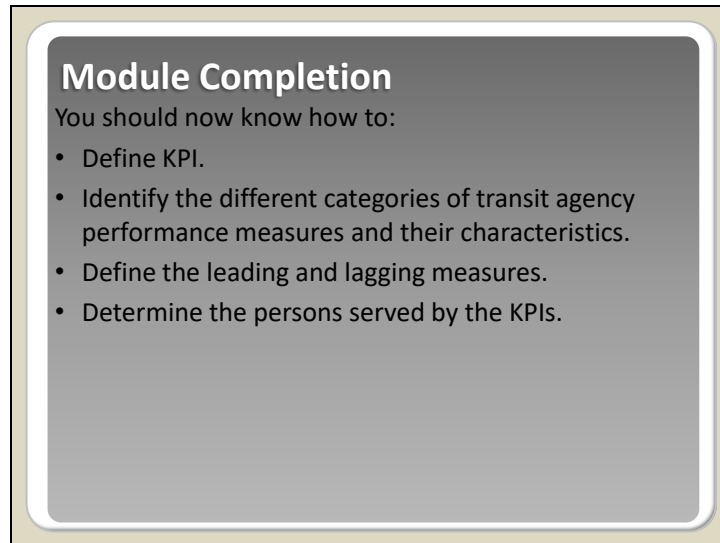
5. An agency relies almost exclusively on Pay to Platform ratio as an efficiency indicator. Which statement best explains dependence on Pay to Platform?
  - a. It is easier to calculate than deadhead ratio or miles of service to operating expense
  - b. Customers care more about Pay to Platform ratio
  - c. It deals with the biggest portion of the agency's spending
  - d. Data for the others are hard to get
6. A decrease in subsidy per passenger is an improvement. One way of improving subsidy per passenger would be to \_\_\_\_\_.:
  - a. Increase expenses
  - b. Increase ridership
7. Which of the following are service (effectiveness) measures? (check all that apply)
  - a. Passengers per mile
  - b. Miles of service
  - c. Fare recovery
  - d. Net subsidy
  - e. Mean time between failures
8. Fixed route ridership is a lagging indicator of service (effectiveness):
  - a. True
  - b. False
9. Mean Time Between Failures is a lagging indicator of quality:
  - a. True
  - b. False
10. Net subsidy is a lagging indicator of efficiency:
  - a. True
  - b. False

Answers: a, c, b, b, c, b, a and b and c, a, b, a

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A rectangular box with a light beige border and a dark grey background. The text is white. The title "Module Completion" is in a bold font. Below it, the text "You should now know how to:" is followed by a bulleted list of four items.

**Module Completion**

You should now know how to:

- Define KPI.
- Identify the different categories of transit agency performance measures and their characteristics.
- Define the leading and lagging measures.
- Determine the persons served by the KPIs.

Congratulations! You have completed the **Key Performance Indicator** module. You should now know how to:

- Define KPI,
- Identify the different categories of transit agency performance measures and their characteristics,
- Define the leading and lagging measures, and
- Determine the persons served by the KPIs.



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*Key Performance Indicator Glossary.*

**Balanced Scorecard:** A strategic planning and management system that is used extensively in business and industry, government, and nonprofit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals.

**Cost per Revenue Service Hour:** Total operating costs divided by total revenue service hours.

**Deadhead Ratio:** Schedule miles less revenue miles, divided by revenue miles.

**Farebox Recovery:** Farebox revenue divided by operating expenses.

**Lagging Indicator:** Reports incidents after they have happened.

**Labor Efficiency:** Also called Pay-to-platform ratio. Pay hours divided by platform hours.

**Leading Indicator:** The KPIs that help the user predict the agency's performance.

**Net Subsidy:** Cost incurred to produce the amount of service consumed. Calculated by taking operating revenues less operating expenses

**Key Performance Indicators:** Ways to periodically assess the performance of an organization and its departments and employees.

**On-time Performance:** Number of scheduled trips less the number of times late, divided by the number of scheduled trips.

**Overall Efficiency:** Miles of service divided by operating expense.

**Passengers per Mile:** Passenger boardings divided by revenue miles.

**Ridership:** Number of passenger boardings.

**Subsidy per Passenger:** Net subsidy divided by ridership.

**Traditional Reporting:** Reporting that provides information about what the agency has spent and received from what sources, and what is still owed.

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##### *Key Performance Indicator Glossary (continued)*

**Vehicle Reliability:** Also known as mean distance between failures. Total mile operated divided by the number of mechanical failures.

#### **Additional terms**

A general transit glossary and list of acronyms can be found under “Other Resources” on this TFLEEx website.