Measurement of Freight Network Performance

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Freight Industry and Network Performance and Effectiveness Measures -

- Must deal with differing physical quantities and configurations of cargo as well as,
- The number and type of physical units to be moved.
- These are the fundamental drivers of network performance.
- Ultimately, understanding network performance relies on a series of output measurements linked to values or quantities of required input factors.

Freight Network Performance Measurement Must Ultimately -

- Be based around measures that will drive capital investment decision making and drive efficient management of network operations toward customer expectations.
- Thus, performance measurements reflect the need to understand the efficiency of capital utilization and the need for capital creation if the network is to be sustained, and,
- The need to maintain some degree of redundancy and network reliability within limitations of network structure and capital availability, and,
- The need to control operating costs while providing service that can successfully compete for customer shipments.

Measurement Objectives

- Describe network fluidity.
- Describe network efficiency.
- Describe productivity - cost and revenue.
- Describe service expectations for network customers.
- Provide physical component for asset utilization and productivity measures.
- Identify opportunities for network management improvements.
- Identify opportunities for capital investment.

Some Existing Network Measures – Most Are Operational

- Seven day (or other time period) vehicle loading rates.
- Network vehicle inventory (totals and components).
- Network velocity (totals and components).
- Terminal dwell (totals and individual terminal performance).
- Terminal throughput versus terminal assets.
- Vehicle or package movement performance versus plan.
- Vehicle productivity (totals and components).
- Network assets unavailable for use.
- Network mileage under constrained use limitations.
- Vehicle delay time (totals and components).
- Assets required to meet demand (totals and components).

Limitations of Traditional Network Measures

- Activity and/or performance measurements only represent part of the measurement equation,

  Financial and economic components are needed.
- They are only useable over time to measure performance of a single carrier, network, facility or operation.
- They are difficult to use to compare carrier, facility or modal performance due to variance in physical or business characteristics.
- They usually cannot be used to compare performance between networks.

Further Measurement Limitations

- They do not reflect the complexity of service and vehicle interchange between networks,

  Either intra-modal or inter-modal.

- They have difficulty reflecting the impact on network performance of factors outside the control of the carriers or network managers,

  Such as customer facility design or customer equipment utilization.

- They typically have difficulty reflecting the impact of common network costs and the management decisions and policy making associated with and derived from the allocation of these costs.

The Measurements of Greatest Importance

- Ultimately – Measurements must have a financial or economic component to be meaningful.
- They must relate to the cash flow production of assets (both network and vehicle).
- Usually a time component is needed since capital costs, and many operating costs, tend to be time related.
- They need to reflect performance issues that drive customer satisfaction, customer costs and customer logistics requirements.
- No single measurement is all-encompassing. They must be used in concert along with management judgment of their relative importance at a particular time or under particular circumstances.

Measurement Examples That Include a Financial Component

- Vehicle revenue or margin productivity over time.
- Operating ratio (ratio of revenue to operating cost either in total or for discrete operating entities).
- Return on assets (either in total or for discrete operating entities).
- Return on equity.
- Revenue or margin productivity over time of terminals, line segments or service offerings.
- Revenue, cost or margin per unit of production over time.
- Performance versus operating and financial plans or versus prior time periods.

A Few Dangers of Measurement

- Simply “getting it wrong”.
- Formulaically weighting a group of measurements without an understanding of the reasonableness of the combination.
- Managing the measurements rather than managing the phenomena causing the measurements.
- Making inappropriate comparisons either of measurements or of the phenomena being measured.
- Failing to properly link the measurements with the management goals or objectives for the network.
- Failure to understand the limitations or “gaming opportunities” of specific measurements

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