LTD Performance Management Strategies

Fall 2019
LTD

Corum Ketchum • Saurabh Lall

PPPM 465/565 Program Evaluation

UNIVERSITY OF OREGON
SCI Sustainable Cities Institute
SCYP Sustainable City Year Program

Fall 2019 LTD

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Acknowledgments

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Andrew Martin, Development Planner, LTD
Corey Newhouse, Founder and Principal, Public Profit

Cover photograph courtesy of Lane Transit District.

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About SCI

The Sustainable Cities Institute (SCI) is an applied think tank focusing on sustainability and cities through applied research, teaching, and community partnerships. We work across disciplines that match the complexity of cities to address sustainability challenges, from regional planning to building design and from enhancing engagement of diverse communities to understanding the impacts on municipal budgets from disruptive technologies and many issues in between.

SCI focuses on sustainability-based research and teaching opportunities through two primary efforts:

1. Our Sustainable City Year Program (SCYP), a massively scaled university-community partnership program that matches the resources of the University with one Oregon community each year to help advance that community's sustainability goals; and

2. Our Urbanism Next Center, which focuses on how autonomous vehicles, e-commerce, and the sharing economy will impact the form and function of cities.

In all cases, we share our expertise and experiences with scholars, policymakers, community leaders, and project partners. We further extend our impact via an annual Expert-in-Residence Program, SCI China visiting scholars program, study abroad course on redesigning cities for people on bicycle, and through our co-leadership of the Educational Partnerships for Innovation in Communities Network (EPIC-N), which is transferring SCYP to universities and communities across the globe. Our work connects student passion, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCYP

The Sustainable City Year Program (SCYP) is a year-long partnership between SCI and a partner in Oregon, in which students and faculty in courses from across the university collaborate with a public entity on sustainability and livability projects. SCYP faculty and students work in collaboration with staff from the partner agency through a variety of studio projects and service-learning courses to provide students with real-world projects to investigate. Students bring energy, enthusiasm, and innovative approaches to difficult, persistent problems. SCYP's primary value derives from collaborations that result in on-the-ground impact and expanded conversations for a community ready to transition to a more sustainable and livable future.

About Lane Transit District

LTD provides more than 10 million trips per year on its buses and EmX Bus Rapid Transit line in Lane County, Oregon. Encompassing the Eugene-Springfield metro area, LTD is a special district of the state of Oregon and led by a seven-member board of directors appointed by Oregon's Governor.

LTD also operates RideSource, a paratransit service for people with disabilities, and numerous transportation options programs to promote sustainable travel county wide, and Point2Point, an initiative that provides community members with the necessary information and resources to assist them in identifying opportunities to drive less by discovering transportation choices that meet their individual lifestyles.

Course Participants

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NETI GUPTA, International Studies Graduate
CORUM KETCHUM, Public Administration Graduate
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Executive Summary

This report contains recommendations on how LTD could evaluate five of their programs: fleet, operations, service planning, risk management, and sustainability. Each section examines one of these five programs, with recommendations from both the graduate and undergraduate student researchers.

Recommendations vary from program to program, but one theme remains constant: managers at LTD could benefit from thinking critically about what program outcomes they want to be held accountable to and use key performance indicators (KPIs) to track their progress in meeting those goals.

Full copies of student reports are available in the appendices, discussing the topics covered in this report in greater detail including logic models and more specific recommendations.

Introduction

LTD approached students in this course with the question of how their managers can reliably measure and articulate success across their widely ranging programs.

To answer this question, students applied performance measurement best practices learned from Alnoor Ebrahim's Measuring Social Change (2019). Additionally, students consulted writings from practitioners in the field.

To provide LTD with usable recommendations, students drew from four different strategies, looking carefully at what each strategy indicates and what outcomes each strategy fosters. The performance measurement strategies students used included niche, emergent, integrated, and ecosystem. Each strategy follows a logic model of inputs, activities, outputs, and outcomes. By analyzing LTD programs using these strategies, students were able to assess what key performance indicators could best work for each LTD program they analyzed. Strategies were selected based on LTD's perceived level of influence and control over its individual programs and those programs' impact on society.

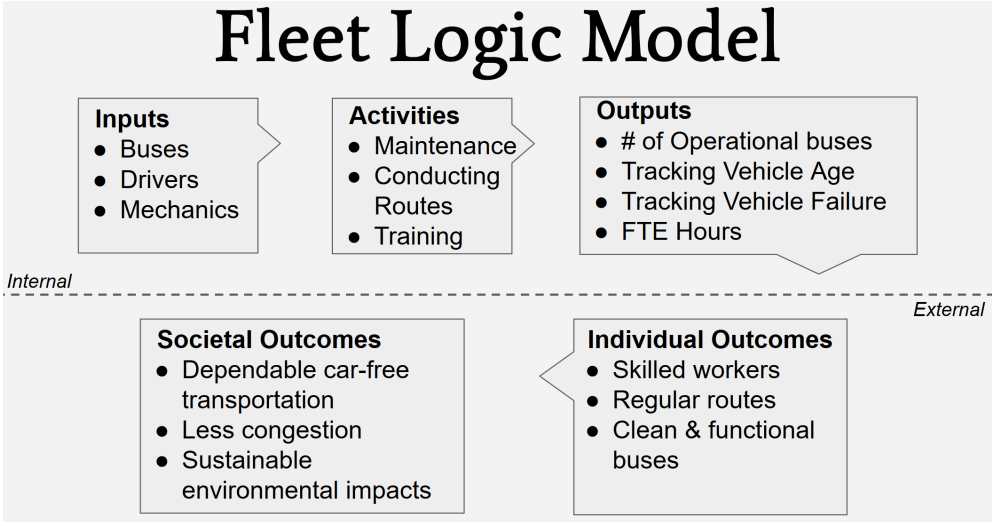


FIG. 1
Example logic model for LTD's Fleet program.

Students applied four the different performance measurement strategies., since each strategy implies a different way to understand the causal mechanisms and goals of the programs. Students assessed which strategy best typified each LTD program and issued corresponding recommendations.

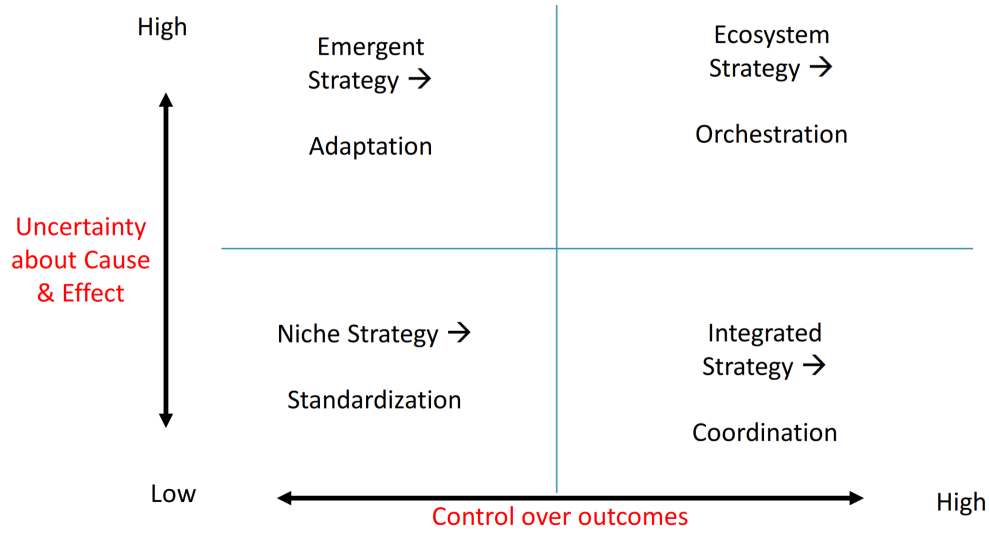


FIG. 2
Summary chart of performance management strategies.

A description of each strategy follows.

EMERGENT STRATEGY

An emergent strategy is used for adapting programs "on the fly". Program managers following this strategy are constantly looking for new opportunities to adjust and adapt how they deliver services to their constituencies.

Emergent strategies work in a space of high uncertainty over cause and effect and low control over outcomes. This means that managers are unsure how their program impacts the world outside of their organization. This strategy lends itself to monitoring intermediate outcomes, with the organization learning and adapting to the environment it is working in.

INTEGRATED STRATEGY

An integrated strategy calls for coordinating a suite of services within an organization. Managers are monitoring how each of their programs interact with one another and what that interaction means for the people they serve.

Integrated strategies are employed where mangers have low uncertainty over cause and effect and high control over outcomes. In other words, the organization knows that its programming is working and understands how program changes will impact its constituents. This strategy calls for monitoring and aligning outputs across multiple programs. Managers track key indicators throughout the program and tie those indicators to discreet outcomes.

ECOSYSTEM STRATEGY

In an ecosystem strategy, program mangers become leaders in their sector. Using an ecosystems approach, managers convene and coordinate other organizations that provide complementary services to their target population.

This strategy is appropriate for situations where a program has high uncertainty over cause and effect but has high control over outcomes by coordinating their services with other organizations. Managers in this setting evaluate program success by monitoring how well their relationships with other organizations are functioning and how the sum of the ecosystem's work is impacting their target population.

NICHE STRATEGY

A niche strategy is designed to evaluate discreet and targeted programming. Managers take careful stock of how their logic model delivers services and outcomes. In a niche strategy, energy should be directed at tracking indicators internal to the program with an assumption that tracking outcomes is beyond a niche program.

A niche strategy is used in situations where program managers have low uncertainty about cause and effect and low control over the outcomes of the population they serve. That is, mangers understand that their program is delivering services, but they also see that they are one piece of a larger puzzle. Managers understand that they alone do not bear full responsibility for outcomes of their target population. Managers here focus on tracking their activities to determine how efficiently they are delivering services.

Fleet

LTD fleet operations include the equipment and staff that enable the organization to serve its public. The fleet metrics provided by LTD include:

- The total number of articulated and nonarticulated buses
- Bus ages
- Bus loss of service due to mechanical failure
- The number of Full Time Equivalent (FTE) hours of bus maintainers and mechanics
- The number of sick leave hours taken by maintainers and mechanics

GRADUATE STUDENT FINDINGS

The graduate team compared each of the four suggested evaluation strategies to find one that best matched the level of control and certainty of LTD's fleet operations. In their analysis, fleet managers have low uncertainty and low control over outcomes, leading students to suggest a niche strategy: managers should focus on delivering reliable results for their supporting role within LTD. Low uncertainty in this case indicates that managers understand how effective their program is at curating a dependable operations fleet. Managers have low control in that having a reliable fleet of buses does not directly influence (but plays a supporting role in) LTD's transit activities.

The team identified key performance indicators within existing metrics. These track how efficiently the fleet was delivering vital services by combining the metrics above with dollar estimates to get an idea of fleet operations' cost-per-unit. By tracking costs for each particular bus, managers can understand which vehicles are taking a disproportionate amount of resources.

UNDERGRADUATE STUDENT FINDINGS

The undergraduate student team suggested an integrated strategy after comparing fleet operations against that of neighboring Cherriots transit in Salem. The undergraduate team suggests that an integrated strategy lends itself to delivering a "pipeline" of results.

Like the graduate team, undergraduates recommended that fleet managers begin logging the operational performance of each individual bus to discover which are most costly to the program. Additionally, the team recommended tracking employee performance to discover which staff members could use more training or guidance in their work. Finally, the team suggested that managers log the kinds of vehicle technical assistance calls so that mangers can understand the outcomes of specific maintenance or purchasing decisions.

SYNTHESIZING RECOMMENDATIONS AND CONCLUSIONS

Student teams recommend that the fleet program mangers focus on producing consistent results. Managers should track which vehicles are most costly and which staff members are most impactful. This means logging activities more closely on a per person and per vehicle basis.

Recommended Strategies:
Niche or integrated

Recommended Key Performance Indicators:
- Maintenance and staff time spent per bus
- Employee performance tracking
- Logging vehicle technical assistance calls

Operations

LTD Operations includes two key areas:

- On-time departure performance, which is measured through several means including the number of scheduled and missed trips.
- FTE and absenteeism hours by full-time and part-time drivers.

Operations managers track the reliability of the staff that make LTD's service useful for its customers.

GRADUATE STUDENT FINDINGS

The graduate student team recommended an integrated measurement strategy for LTD's Operations department. The Operations department has low certainty over cause and effect because it has a strong approximation of causal relationships, empirically observable and quantifiable indicators, and clear indicators for LTD's desired outcomes. These include sustainability, quality, reliability, and accountability. LTD Operations managers have high control over outcomes because LTD provides direct services to the community, lacks area competition, and maintains easily measurable data including ridership demographics.

UNDERGRADUATE STUDENT FINDINGS

The undergraduate team recommended pursuing a niche measurement strategy, reasoning that no matter the quality of the service LTD provides, ridership is still dependent on the choices of would-be riders. That is, Operations managers have low uncertainty: they know roughly how the timing and reliability of their routes impact the success of their program, but they do not have control over whether or not passengers will utilize the service.

Additionally, the undergraduate team recommended managers follow measurement best practices set out by the International Bus Benchmarking Group (IBBG). This includes tracking key performance indicators through surveying excess wait time rates and customer satisfaction.

SYNTHESIZING RECOMMENDATIONS AND CONCLUSIONS

Both student groups recommend LTD Operations managers continue to closely monitor the reliability of their drivers and trips. Managers should be keenly aware of any aberrations in the quality of the service and move to rectify situations quickly. Additionally, managers should be curious, self-reflective, and forward looking: how can LTD continue to deliver the high-quality service to passengers in the face of uncertain ridership?

Recommended Strategies:
Integrated or niche

Recommended Key Performance Indicators:

- On-time departure measures
- Excessive wait time rates
- Customer satisfaction surveys

Service Planning

Service Planning managers are responsible for ensuring trips provide revenue for the organization, are accessible to Americans with Disabilities Act (ADA) populations, and provide a speedy and broad service network. Metrics provided by LTD for evaluation include:

- Passenger boarding
- Passenger miles
- Non-revenue generating trips
- Service area
- Average speed

GRADUATE STUDENT FINDINGS

The graduate team recommend a niche strategy because LTD Service Planning managers work within a market with no other form of competition (other mass transit providers) along with a strict measurement of outputs and systems of standardization (Ebrahim, 2019).

Upon evaluating provided metrics, the graduate team determined that the KPIs for managers are already in place for the niche strategy to maximize efficiency while benchmarking for service planning.

UNDERGRADUATE STUDENT FINDINGS

The undergraduate student team echoed the findings of the graduate team, finding that service planning operators should continue tracking activities using a niche strategy. Additionally, the student team found that service planning managers are well suited to pursue an ecosystem strategy.

In an ecosystem strategy, managers would act as leaders and coordinators for entities across the county with the goal of providing a holistic system of publicly accessible transportation services and infrastructure. Students recommended that managers work with private, nonprofit, and government agencies to ensure complementary services across the sector. Some examples include PeaceHealth Bikeshare, the city of Eugene, and transportation network companies (TNCs) such as Uber or Lyft.

SYNTHESIZING RECOMMENDATIONS AND CONCLUSIONS

Student teams agreed that managers should leverage existing KPIs to continue providing sustainable service to the community. Internally, this can be done through a niche strategy that tracks the performance of different routes and activities. Externally, mangers should take a leadership role by pursuing an ecosystem strategy. This is of vital importance in the face of fluctuating ridership and competing transportation technologies.

Recommended Strategies:

Ecosystem and continued niche

Recommended Key Performance Indicators:

- Relationships with partner transportation-related agencies
- Passenger boarding
- Passenger miles
- Non-revenue generating trips
- Service area
- Average speed

Risk Management

Current Risk Management programming concerns the tracking and evaluating of injury to persons, vehicles, and other property. Provided metrics include:

- The number of preventable and unpreventable collisions with vehicles and property.
- Injuries to passengers, staff, and third parties.
- Quantifying lost staffing capacity due to on-the-job injuries.

There was only one student team assigned to this topic.

GRADUATE STUDENT FINDINGS

The key recommendation of the team was that certain KPIs currently categorized as fleet and operations should be cross integrated into risk management to provide a more holistic, integrated strategy for performance measurement.

The graduate team recommended risk management officers utilize an integrated strategy to evaluate performance in a way that captures a broader scope of the challenges LTD faces. Here, outcomes of factors not strictly within LTD's risk management category would be considered. Under this strategy, outcomes from fleet or operations may be considered interdependent with risk management outcomes. These are outcomes over which LTD has a high degree of control, including the critical safety precautions measured by fleet and operations metrics. The combined outcomes of interventions, such as bus maintenance and staff training, are stronger than any single intervention alone.

CONCLUSIONS AND RECOMMENDATIONS

Implementing an integrated strategy for LTD's Risk Management evaluations will allow officials to think about risk management in a more holistic manner. These changes will allow managers to track performance without the need to collect any new metrics. An annual review of LTD's metrics can help identify where performance management strategies need alteration. Broadening the metrics pertaining to risk evaluation can help LTD better prepare for the future while learning from past mistakes.

Recommended Strategies:
Integrated

Recommended Key Performance Indicators:

- The number of preventable and unpreventable collisions with vehicles and property.
- Injuries of passengers, staff, and third parties.
- Quantifying lost staffing capacity due to on-the-job injuries.
- Maintenance and age of buses
- On-time boarding

Sustainability

The metrics provided to the course by Sustainability program mangers include diesel consumption by the articulated and non-articulated vehicles in terms of total fuel consumption and passenger miles.

There was only one student team assigned to this topic.

GRADUATE STUDENT FINDINGS

The graduate student team found that a niche strategy would best fit the goals of the Sustainability program. The Sustainability program has high certainty (high accuracy and strong awareness) of tracking emissions and low control over how its quality impacts the overall environment. The team recommends broadening the scope of potential KPIs to include other factors that impact LTD's "triple-bottom line" as indicated in the following section.

CONCLUSIONS AND RECOMMENDATIONS

The graduate student team recommends collecting KPIs that reflectw a commitment to the "triple-bottom line" of social, economic, and environmental accountability:

- American Bus Benchmarking Group Metrics: Consider measuring pollution consumption, creating emission inventory profiles, and using infrastructure capacity as a measurement strategy.
- Similar Agency Metrics: Consider using more specific greenhouse gas measures to support environmentally informed decisions around emissions and reductions. Examine select considerations and measurements developed by Chicago Transit Authority (see Appendix A) if interested in an expansion.
- Consider additional tools and measurements to improve evaluation processes and strengthen their sustainability evaluation. This includes tracking pollution consumption (noise and toxic pollution, in addition to greenhouse gas emissions) and quantifying how the current built environment impacts the sustainability of LTD's activities.

Additionally, it is the team's recommendations that managers take a proactive role in developing new sustainability efforts, with special consideration to a fleet procurement plan that meets the organization's environmental goals.

Recommended Strategy:
Niche

Recommended Key Performance Indicators:
- Emissions inventory including
- Noise
- Toxic waste (waste from maintenance and operations)
- Emissions and greenhouse gases
- Infrastructure capacity (in terms of the number of buses or other sustainable transportation options that can use the right-of-way, facilities, etc.) and how that influences sustainability performance
- Chicago Transit Authority indicators (see Appendix A)

Conclusion

While exact results vary program to program, student teams found that LTD should consider closely and thoughtfully monitoring the provided metrics. Teams commonly suggested a niche measurement strategy for each program, indicating that managers may benefit from closely tracking how the inputs of each program impact that program's immediate deliverables.

In the face of fluctuating ridership, LTD can position its programs in such a way that they can be responsive to changes in technology, rider demand, and climate. By carefully tracking identified key performance indicators, managers can identify trends as they begin to take shape and adjust programming appropriately.

PROGRAM	STRATEGIES	KEY PERFORMANCE INDICATORS
Fleet	Niche / Integrated	• Maintenance and staff time spent per bus • Employee performance tracking • Logging vehicle technical assistance calls
Operations	Niche / Integrated	• On-time departure measures • Excessive wait time rates • Customer satisfaction surveys

Service Planning	Ecosystem (and continued Niche)	• Relationships with partner transportation-related agencies • Passenger boarding • Passenger miles • Non-revenue generating trips • Service area • Average speed
Risk Management	Integrated	• The number of preventable and unpreventable collisions with vehicles and property. • Injuries of passengers, staff, and third parties. • Quantifying lost staffing capacity due to on-the-job injuries. • Maintenance and age of buses • On-time boarding
Sustainability	Niche	Emissions inventory including: • Noise • Toxic waste (waste from maintenance and operations) • Emissions and greenhouse gases • Infrastructure capacity and how that influences sustainability performance • Chicago Transit Authority indicators

References

Ebrahim, Alnoor. Measuring Social Change: Performance and Accountability in a Complex World. Stanford, California: Stanford Business Books, an Imprint of Stanford University Press, 2019.

Appendix A

`Fleet`

LTD Project - Fleet Metrics

MEMORANDUM

TO: PROFESSOR LALL

FROM: ALOURA DIGIALLONARDO, NETI GUPTA, CORUM KETCHUM, GENEVIEVE MIDDLETON, LANEY WOOD

SUBJECT: LTD PROJECT- FLEET METRICS

DATE: 11/25/2019

CC: MATT IMLACH, LTD REPRESENTATIVE

EXECUTIVE SUMMARY

We recommend LTD adopt a niche evaluation strategy for its fleet program's indicators. A niche strategy allows the organization to measure short-term outcomes and the immediate outputs of the program. LTD fleet should focus on both standardizing all fleet metrics, tracking indicators on a unit level and develop new indicators to evaluate upcoming green fleet requirements.

Background

Lane Transit District (LTD) is a public transportation provider in the Eugene/Springfield metropolitan area and surrounding community. According to the report put out by LTD in June 2018, LTD's transportation services include a fixed-route transit, such as LTD bus routes, EmX, other metro area routes, and commuter routes to small towns and rural communities. These services are open to the general public. Fixed-route buses are the largest component of LTD's service; they account for t almost 95% of LTD ridership (Walker et al., 2018), making the fleet operations a keystone element of LTD's overall success.

ANALYSIS:

The PPPM team evaluated four evaluation strategies: integrated, ecosystem, emergent and niche. A brief explanation of each of these strategies is provided below. Each strategy was evaluated based on the perceived control LTD has over the outputs of Fleet programming, and the certainty LTD has that is programming is achieving the desired goal. It is our analysis that LTD has low uncertainty (that is, LTD is reasonably certain) about how maintaining a fleet of busses impacts their ability to achieve their overall outcomes. The Fleet itself has little direct control over the outcomes –however, it serves as a key tool that LTD would not be able to be successful without.

- Integrated - *Low Uncertainty / High Control*

A series of discrete interventions are delivered in a coordinated fashion to create an outcome that is more than the sum of its parts (Ebrahim, 2019) - not suitable for the specialized role of the Fleet program because this narrow program does not control the activities nor outputs of the rest of the LTD's operations.

- Emergent - *High Uncertainty / Low Control*

Suitable for organizations that know their end goal, but not how to get there (Ebrahim, 2019). The predictable needs and assets of the Fleet do not lend itself to this strategy. This strategy is best applied to more ambiguous targets.

- Ecosystem - *High Uncertainty / High Control*

An ecosystem approach attempts to coordinate the actions of many different actors across a sector or issue area toward a common cause - it recognizes who the important players are, what their relationships are to each other, and how they can best specialize in delivering their unique services (Ebrahim, 2019). This method would be more appropriate for a branch of LTD that is focused on coordinating mobility services across Lane County.

- Niche Strategy - *Low Uncertainty / Low Control*

This strategy emphasizes building systems that deliver reliable, high-quality outputs. This strategy is well suited to evaluating programs whose outputs (services) are their outcomes (established goals), usually due to a strong causal link between outputs and outcomes but organization having little control over their wider impact (societal outcomes) (Ebrahim, 2019).

The LTD Fleet has “low uncertainty” and “low control” over what the buses are ultimately used for by their passengers - the Fleet is part of a chain of services, and as such, should be focused on delivering the highest quality outputs (functioning buses) for the organization. With a niche approach, LTD’s Fleet can stay focused on tracking the dollars and labor that go into sustaining the operations of its wider transit network. Other strategies imply a scope of operations that is beyond that of the LTD Fleet.

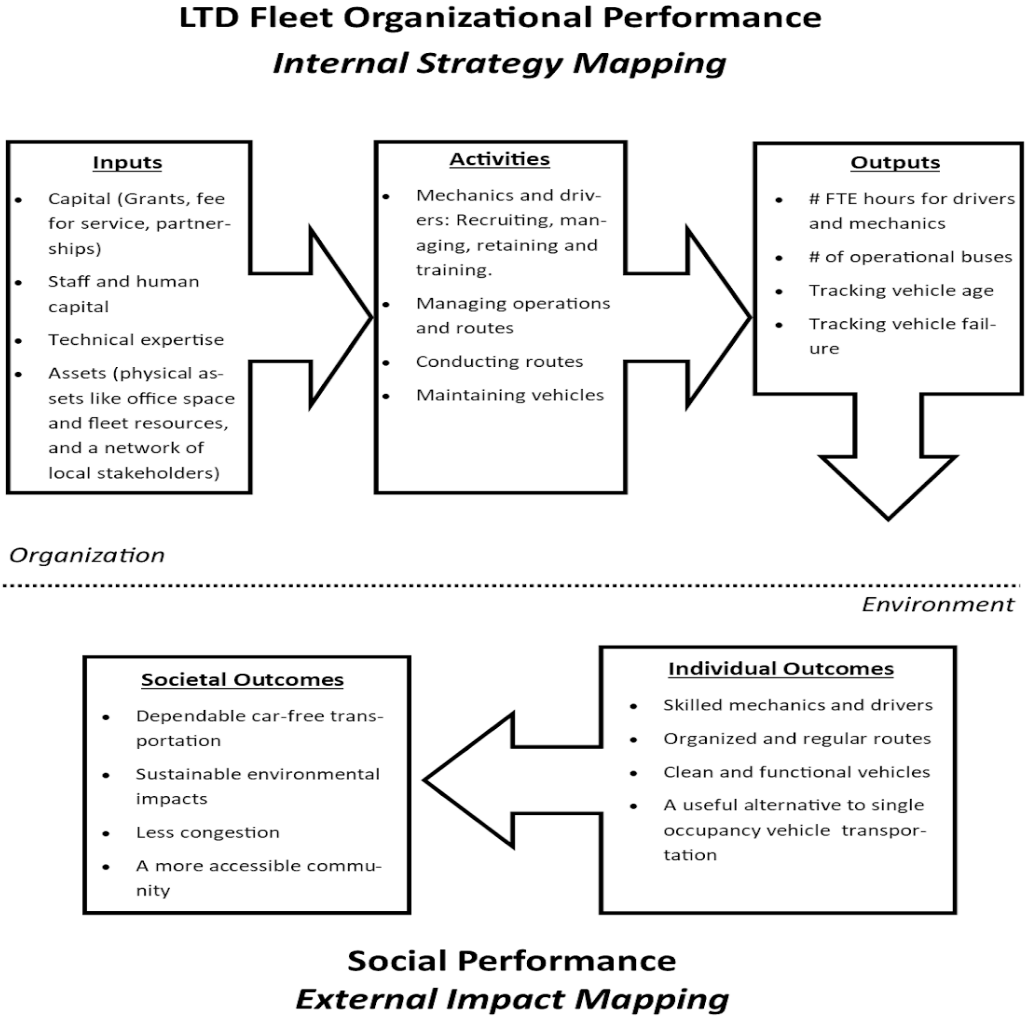
RECOMMENDATIONS

Lane Transit District (LTD) fulfills a well-defined role in the community by providing reliable transit services through high-quality, sustainable, transportation options, programs, and services (Lane Transit District, 2019). Through the lens of LTD’s fleet operations, it is recommended to utilize a niche evaluation strategy in order to measure the organization's performance towards its mission of providing high-quality, reliable transit services in efficient and safe vehicles.

The niche strategy is ideal for interventions where the primarily intended results are outputs rather than outcomes. This is similar to the case study given on Ziqitza Healthcare Limited in Mumbai, India (Ebrahim, 2019). Causal uncertainty and control over outcomes were both low for the ambulance service, making the need for standardization and quality control systems extremely relevant in order to successfully deliver short-term outputs (Ebrahim, 2019). Given LTD’s low control over outcomes, it can work effectively and efficiently by primarily utilizing a performance system that focuses on standardization, consistency, and quality control of outputs, thereby reinforcing the causal link between outputs of their programs and long-term outcomes (Ebrahim, 2019).

In a standardized systems approach, a set of well-defined key performance indicators, or outputs, are important in determining the efficacy and construct validity of the program of interest (Ebrahim, 2019). For LTD fleet indicators, these may include maintenance hours, number of buses, and number of riders accommodated, depending on the activity or program.

Quality control systems also play a crucial role in the niche strategy. In order to ensure not only continual improvement but also compliance against internal and external organizational standards, accountability mechanisms must be built into the value chain at LTD (Ebrahim, 2019). Audits and performance reviews can be done to assess successes and shortfalls, followed by learning mechanisms such as feedback and coaching processes, which can be instrumental in improving service quality. In terms of fleet operations, monthly cluster and surprise audits may be utilized as a measure taken to allow field individuals to review and analyze quality parameters such as the number of road calls due to technical faults or lost vehicle miles (Ebrahim, 2019).



The niche strategy is best recommended for evaluating the fleet operations of LTD primarily because when the bus delivers someone from one location to the next, they are handing that individual to another niche in the ecosystem. This makes them one piece of the longer chain of interventions providing short-term outputs, measured separately from other organizations, but potentially adding up to longer-term outcomes (Ebrahim, 2019).

LTD Fleet: Strategy Mapping

Figure 1.1 is a tool that the managers within the LTD Fleet program can use to evaluate the inputs and outputs of their work.

In a niche strategy, the outcomes and outputs of the Fleet are closely tied, and a direct line can be drawn between maintaining the buses and having a dependable transportation network. The societal outcomes, however, are outside Fleet's control (that is, "low control") and are presumed based on the broader activities of LTD as an organization.

Key Indicators Tracking

LTD already tracks several key indicators related to the efficiency and effectiveness of their fleet, which aligns well with the niche strategy. A few existing indicators the team identified as particularly useful for LTD to use to improve output quality.

- **Maintenance Hours:** Tracking the number of hours needed to maintain and repair the buses is a key performance measure. Knowing how much time is spent on repairs is important for quality control and standardizing vehicle maintenance protocols. It also serves as an early indication system to flag if there is an issue with a particular bus. Increasing the efficiency and quality of maintenance will help LTD stay cost-effective and, therefore better sustain its overall operations.
- **Number of Buses, Drivers & Riders:** Tracking basic statistics about LTD's resources and their clientele is an important tool for standardization and quality control. Tracking these indicators provides LTD with the ability to look at trends and the relationship between some of their outputs and the number of people they can serve.
- **Vehicle age and miles:** Knowing how old and how many miles a bus has traveled allows LTD to forecast expenses for new buses and for expected repairs. It will also help LTD track trends in repair needs and can lead to standardization of bus repair and maintenance approaches.

While LTD already tracks many helpful indicators that align with the niche strategy measurement style, the team has identified a few other indicators that would provide LTD with valuable information to improve standardization, consistency, and quality control of outputs.

- **Cost per Unit:** The fleets indicators are tracked wholesale, lumping all vehicle cost together. We recommend tracking costs per unit. A niche to help identify which buses are the most costly to maintain, based on age and other factors. This could also be compared against the routes buses serve to understand which are the most costly to operate.
- **"Green" Fleet:** The team noted that only articulated and standard busses are currently being tracked. This tracking system based on the size of the bus is useful for

maintenance, but in the light of likely changes from an eventual House Bill 2020, LTD should be developing green fleet metric indicators. While the bill failed in the last session, LTD should take this as a signal and consider and begin tracking sustainability metrics in their Fleet, which will help set targets for future House Bill 2020 compliance.

POTENTIAL LIMITATIONS/OTHER CONSIDERATIONS

Changing trends may affect the causal relationships between outputs and outcomes. Recent Oregon House Bill 2020 is a statewide greenhouse gas emissions policy that is intended to reduce carbon emissions by 45% below 1990 emissions levels by 2035. The operationalization of this policy required by HB2020 states that all determined entities demonstrate compliance with the program beginning in 2021 (HB 2020). This will include mandatory instruments to measure emissions and entity demonstration of emissions reduction avenues; for LTD this will include modified technology on the existing fleet, as well as the continued introduction of electric buses. This may affect maintenance hours due to new types of buses being introduced to the fleet and increased need for specialized knowledge of electric busses and modification technology for current buses.

In response to HB2020, the current logic model will eventually need to include tracking emissions. This change also affects Niche Strategy measurements in terms of standardization, which may force the performance system to have more adaptive qualities - reflecting more in the evaluative approach of Emergent strategies.

With continued response to emerging concepts and policies, future technological innovations, e-transportation (electric and autonomous vehicles) introduced into the LTD fleet, brings change in causal uncertainty from the current low to high. The changes on the fleet may result in “systems of orchestration that fundamentally reorganize the way things are done” and may create a period of time when our recommendations of Niche Strategy may have limitations.

CONCLUSION

LTD is committed to connecting communities, the fleet is the foundation of operationalizing that goal. We recommend the fleet program pursue a niche strategy that reinforces the interwoven causal link between outputs of a program and its intended outcomes. Through standardization and quality control of these outputs, LTD Fleet will be able to both maximize their effectiveness of delivering high-quality outputs, identify issues in performance quickly, and better measure how they are comparing to benchmarks of similar organization. Furthermore, a niche strategy will lend itself to upcoming policy changes LTD will need to adapt to in order to mitigate its impact on climate change.

SOURCES

Ebrahim, Alnoor (2019). Measuring Social Change: Performance and Accountability in a Complex World. *Stanford University Press.*

Lane Transit District (2019). Performance Measures. *Lane Transit District.*

Walker , J. (2018). Transit Tomorrow Existing Conditions and Choices Report. Transit Tomorrow Existing Conditions and Choices Report (pp. 1–63). Eugene, OR: Lane Transit District.

STATEWIDE GREENHOUSE GAS EMISSIONS REDUCTION GOALS, House Bill 2020, Oregon. June 2019.

LTD Fleet Division: Evaluation Recommendations

Memorandum

To: Lane Transit District

From: Kaleigh Jodice, Carlee Dotson, Payton Onesti, Sarahi Ortiz, Briana Parra

Subject: LTD Fleet Division: Evaluation Recommendations

Date: 11/25/2019

CC: Professor Saurabh Lall

Executive Summary

Lane Transit District is a transit agency that strives to provide accessible and efficient transportation to the people of Lane County and surrounding areas. They act as an alternative to automobile transportation creating safer roads while also promoting sustainability. In order to reach their goals to improve the lives of their commuters, LTD may benefit from integrating the following new measurement strategies into their business model.

LTD Performance Measurement Metrics & Strategy: Fleet

Background and Context

Program evaluation is the application of systematic methods, which may include data collection strategies like surveys or interviews, to address questions about program operations and results in an organization[1]. Organizations use performance measurement strategies to ensure that their program strategies are most effectively aligned with their intended goals. A transit agency will use evaluation to ensure their varying program components, like fleet maintenance and network efficiency, are operating at the highest possible degree of efficiency so that they may meet their

[1] Newcomer, K. E., Hatry, H. P., & Wholey, J. S. (2015). *Handbook of Practical Program Evaluation*. Hoboken: Wiley & Sons. Inc.

intended outcomes. These intended outcomes for transit agencies often include accessible and safe travel options for citizens residing in their regions as well as more responsible use of environmental resources through less car ridership and efficient fuel usage. Lane Transit District's intended outcomes are accessible and quality-of-life improving transportation services being efficiently provided for its served populations as well as viable alternatives to automobile ownership being promoted so that the organization can create a more sustainable and equitable community.

Transit agencies may use a variety of performance measurement indicators to evaluate their organizations. A similar-sized transit agency to LTD, Salem Area Mass Transit District or "Cherriots" in Salem, OR focuses most on measuring total revenue miles, total revenue hours, and total boardings in their evaluations[2]. These indicators measure not only how well local citizens are being served but also how efficient their fleet is operating. These measurements align with standards for national transit agency evaluation strategy. According to Trompet et al., the most commonly used performance measurement indicators used in transit evaluation are passenger boardings, passenger kilometers, vehicle kilometers, and vehicle hours[3]. LTD measures similar performance standards in its evaluation strategy as well as more specific metrics relating to maintenance and technical support efficiency for its fleet division.

Recommendations

After evaluating the numerous measurement strategies in Alnoor Ebrahim's *Measuring Social Change*, it became apparent that the integrated strategy would best serve Lane Transit District's

[2] Cherriots. FY19 Q3 Performance Measures: January - March 2019. Retrieved from https://www.cherriots.org/media/doc/FY19_Q4_Performance_Report.pdf.
[3] Trompet, M., Anderson, R. J., & Graham, D. J. (2018). Improved understanding of the relative quality of bus public transit using a balanced approach to performance data normalization. *Transportation Research Part A: Policy and Practice*, *114*, 13–23. doi: 10.1016/j.tra.2017.11.019

(LTD) fleet division. Integrated strategy is generally used to evaluate organizations with high control over outcomes and low uncertainty about the relationship between cause and effect as a result of their program. Integrated strategies of social change utilize a "series of discrete interventions, delivered in a coordinated fashion, to produce outcomes that are greater than the sum of their parts". One way to conceptualize integrated strategy is to think of it as a "coordinated pipeline" where there is a range of outputs delivered in a particular fashion to reach the intended outcome[4].

Broadly, fleet refers to the combination of outputs that maintain a business's vehicles. This happens through tracking vehicle maintenance, age, and overall health in order for a business to safely perform intended services. In addition to vehicle maintenance, LTD's fleet division monitors maintenance staff. For example, LTD tracks staff hours in addition to maintaining and updating mechanic headcounts. Fleet fits into LTD's overall mission through its intention to provide safe and efficient public transportation, for if fleet is maintained well it will improve the quality of life for Lane County commuters.

Fleet fits into integrated strategy due to its low uncertainty between cause and effect for vehicle maintenance resulting in mechanically sound vehicles, as well as its high control over outcomes through coordinated inputs. Fleet creates a "pipeline" between staffing mechanics, maintenance activities, mileage tracking, age counting and roadside assistance tracking, which work together to provide safe and accessible transportation[5]. This pipeline allows fleet to have high control over outcomes. Additionally, fleet has low uncertainty about cause and effect because there is no

[4] Ebrahim, Alnoor. *Measuring Social Change: Performance and Accountability in a Complex World*. Stanford Business Books, 2019.
[5] Ibid.

knowledge gap between routine vehicle maintenance and the outcome of safer vehicles[6]. Therefore, there does not need to be an evaluation on whether these two variables are connected, but on how best to complete and integrate fleet's many interventions into a sound system.

Integrated strategy is built on the idea that systematic, discrete interventions will lead to intended outcomes. Fleet is comprised of two main interventions, which are made up of smaller interventions, known as fleet metrics. The careful combination and oversight of interventions will help LTD achieve its desired outcomes.

1. Intervention one: vehicle maintenance. Vehicle maintenance as a large intervention is made up of numerous smaller interventions, which are listed on LTD's fleet metrics handout. Vehicle maintenance requires tracking the "Number of Road Calls Due to Technical Faults," "Total Lost Vehicle Miles," total vehicle counts, and average "Age of buses," which can range from 0-22 years old and must be tracked for different types of vehicles in the fleet, such as standard vehicles and articulated vehicles. These discrete interventions would not be possible without the existence of the Fleet's second main intervention.
2. Intervention two: staff maintenance. In order to master vehicle maintenance, LTD must hire trained, professional staff who will correctly deliver the metrics that vehicle maintenance requires. Like vehicle maintenance, staff maintenance is comprised of numerous small interventions that add up to outcomes that are greater than the interventions combined. Staff maintenance requires tracking paid absentee hours for all staff, including support staff, planned absentee hours for all staff, unplanned absentee hours for all staff, totaling all vehicle maintainer hours spent at work for all staff, and

[6] Karlan, Dean & Gugerty, Mary K. *Measuring Impact Isn't for Everyone.* Stanford Social Innovation Review, 2014.

updating total numbers of full and part time mechanics, which will look like a quick headcount.

Analysis

When analyzing which measurement strategy would work best for Lane Transit District's (LTD) fleet division, Alnoor Ebrahim's *Measuring Social Change* brought to light two strategies that seemed to fit: the niche strategy and the integrated strategy. When using the niche strategy as a form of measurement, a program typically has low uncertainty over cause and effects and has low control over their program's outcomes. The niche strategy focuses on measuring the outputs of a program whereas the integrated strategy focuses on measuring outputs, individual outcomes, and sometimes societal outcomes. The integrated strategy typically evaluates programs that have low uncertainty about cause and effect but have high control over their outcomes.

Initially, it was easy to assume that LTD's fleet division would fall under the niche strategy for its form of measurement. In *Measuring Social Change*, an ambulance company named Ziqitza Health Care Limited (ZHL) used the niche strategy to ensure that their program was achieving its intended results. Because of ZHL's low causal uncertainty and its low control over outcomes, the niche strategy was the best fit for their program's evaluation. Table 2.3 in Chapter Two of *Measuring Social Change* displays "Vehicle Maintenance and Inventory" under its "Key Activities". Because of this, it seemed as if the niche strategy would be a great fit for measuring LTD's fleet division. However, after further consideration, it became apparent that the integrated strategy would work best. Although LTD's fleet has low uncertainty about the cause and effect of its program regarding its overall mission, it has high control over its outcomes in regard to its fleet. Because LTD does extensive vehicle maintenance, it is easy to see how the program's

inputs and activities directly relate to the outcomes it produces. This led us to the conclusion that the integrated strategy would work best when evaluating LTD's fleet division.

LTD's Fleet Logic Model:

- Organizational Performance
    - Inputs:
        - Employees
            - Measuring metrics like total all vehicle maintainer hours spent at work for all staff
            - Conducting mechanic staff head counts
        - Vehicles
            - Both standard and articulated vehicles
        - Funds
        - Infrastructure
            - Parking lot for vehicles
            - Maintenance tools
            - Mechanic shop
    - Activities:
        - Data collection
            - Measuring metrics like staff hours and absentee hours
        - Maintenance
            - Preventative maintenance like tire checks and oil changes
            - Mechanical failure repairs
    - Outputs:
        - Data adequately collected

        - Staff performing adequate preventative maintenance
        - Staff performing adequate mechanical failure repairs
- Social Performance
    - Individual Outcomes
        - Community has access to environmentally responsible transit options
        - Safe transit
        - Reliable transit
    - Societal Outcomes:
        - Lane County has lower carbon footprint on atmosphere
        - Safe roads in Lane County
        - Lane County residents getting to where they need to go when they want to go

Existing performance measures that LTD collects that work with the integrated strategy

- Vehicles:
    - Number of road calls due to technical faults.
    - Total lost vehicle miles.
- Maintenance:
    - Total number of standard vehicles in fleet.
    - Total number of articulated vehicles in fleet.
    - Total vehicle maintenance hours by vehicle maintenance support staff.
    - Total ALL vehicle maintenance hours.
    - Total ALL vehicle maintainer hours at work.
    - Total ALL vehicle maintenance support staff hours.
    - Total ALL vehicle maintenance support staff hours at work.

- Total mechanic FTE.

Additional performance measures that LTD should adopt to measure its performance

To align with LTD's mission of improving life for a diverse group of community members we recommend the following additional performance measures and data collection activities: (a) tracking staff performance, (b) types of vehicle technical assistance calls, (c) vehicles currently not operating due to mechanical issues, and (d) vehicle logs.

Tracking staff performance

Setting up a system in which staff maintenance activities are audited and reviewed for accuracy and quality. The use of your staff hours is more effective when maintenance activities are performed using industry best practices. Tracking staff performance allows for opportunity to both review whether you are getting the best service for your vehicles possible and if your staff need additional training.

Types of vehicle technical assistance calls

Tracking the vehicle technical assistance calls by type provides opportunity to see if there are trends in the types of issues you encounter. Spotting trends can improve the way you address maintenance through adjusting your staff training and adjusting your purchasing style (e.g. purchasing different tires if you see a trend of failure in a specific type).

Vehicles currently not operating

Tracking which vehicle types are not operating inform both your purchasing decisions and which fleet are available to the community. Some vehicle types inherently serve certain populations such as para-transport vehicles. Tracking breakdowns and fleet availability by type provides an opportunity to evaluate vehicle purchases in order to best serve all populations.

Vehicle Logs

Creating vehicle logs that track vehicle standard maintenance such as oil changes, gas mileage, age, and larger mechanical issues allows you to get an at a glance view of the health of any given vehicle. This information can inform LTD's ability to deliver the output of reliable transportation through informed data-based decision making regarding any given fleet and its reliability.

These activities on their own lead to deliverable outputs such as fleet on the road, and people getting reliable transportation, but the coordination of these performance measures and data collection activities work together to provide greater control over LTD's larger scale, long term outcomes including more responsible use of environmental resources, affordable transportation, and improved quality of life for community members[7].

Potential Limitations/Other Considerations

For the purpose of evaluating fleet's performance, we felt it best to focus on how the smaller interventions lead to coordinated outputs that contribute to the larger outcomes of LTD. In order to best measure how fleet contributes to larger scale intended outcomes for LTD it would be important to utilize a measurement strategy that considers how inter-departmentally each part of LTD contributes to the greater goals of equitable, reliable, affordable, and environmentally responsible public transportation. Evaluating from this holistic lens will allow for more informed controls for potential outside factors that may have influenced your outcomes, thus giving a more accurate picture of what successful outcomes can be attributed or contributed to LTD activities versus what may have been a result of external factors[8].

[7] Ebrahim, Alnoor. *Measuring Social Change: Performance and Accountability in a Complex World*. Stanford Business Books, 2019.
[8] GAO.gov. (n.d.). *Strategies to Help Ensure Validity and Reliability of Data.* Retrieved from U.S. Government Accountability Office: https://www.gao.gov

Other potential issues that may arise are within the tracking system both for vehicle logs, and staff performance tracking. Vehicle maintenance logs are only as accurate as the staff utilizing them. Standardizing this process with a checklist and minimum requirements for descriptive text for each maintenance activity will have a positive impact on the proper use of the vehicle logs thus ensuring they are a useful tool to track vehicle health. Additionally, tracking maintenance activities feed the employee performance evaluation process. This may lead to employees providing information that is desirable rather than entirely accurate. A way to address this issue is to provide training and support in response to issues in performance rather than punitive action, and to incentivize proper use of vehicle maintenance logs either through a recognition system for employees using best practices, or as a metric utilized in the regular evaluation process[9].

Conclusion

Lane Transit District would benefit greatly if they choose to adopt the integrated strategy as it aligns well with fleet by having low uncertainty between cause and effect and having high control over outcomes. Using integrated strategy to evaluate the organization is the best strategy when taking into consideration all the different pieces that fit into the fleet category such as staffing mechanics, maintenance activities, mileage tracking, age counting and roadside assistance tracking. Being able to properly evaluate all these different aspects of fleet is crucial to achieving LTD's mission to provide safe and efficient public transportation. The additional performance measures and data collection activities of tracking staff performance, types of vehicle technical assistance calls, vehicles currently not operating due to mechanical issues, and

[9] Ibid.

vehicle logs will all be pieces in the continued improvement of LTD's fleet system. Combining all of these things will allow greater control over outputs, and ultimately continue to assist LTD in achieving their goal to improve the quality of life of Lane County commuters.

Appendix B

Operations

LTD Operations Evaluation

TO: Mark Johnson, Assistant General Manager, Lane Transit District
FROM: Cheyenne Holliday, Emily Moore, Katie Fields, Leslie Oxford, Nadine Philp
SUBJECT: LTD Operations Evaluation
DATE: 11/25/2019
CC: Saurabh Lall, Assistant Professor

EXECUTIVE SUMMARY

The purpose of this memorandum is to provide recommendations to Lane Transit District (LTD) for the most relevant measures and metrics to use to evaluate their operations. LTD is a special taxing district serving the transportation needs of Lane County. Its mission is to use public transportation to increase the independence of their community in a way that promotes equity and sustainability. After careful consideration of the different ways to evaluate LTD's operational metrics, we recommend moving from a niche strategy to an integrated strategy that includes normative and impact measurements. In order to identify the best ways for LTD to evaluate its performance, this memo is built around frameworks developed by Alnoor Ebrahim in *Measuring Social Change*: *Performance and Accountability in a Complex World.* These frameworks include niche, integrated, emergent, and ecosystem strategies for program management. Our analysis also draws on supplemental materials provided through PPPM 565.

BACKGROUND & CONTEXT

Program evaluation and performance measurement are best used to gain insights into causal relationships, which in turn helps to ensure the best use of limited financial and human capacity for program execution. In general, these assessments should be used when they identify information that is not already known and when they will not cause

harm. In the context of public transit, where the primary goal is to transport people from point to point, some measures are already apparent and do not warrant further consideration, such as the relationship between employment center locations and increased use of transit stations nearby or times of day with high frequency of use.

While internal evaluation of operations metrics is helpful in monitoring specific goals related to on-time service and employee attendance, looking externally to transit agencies serving similar populations, especially with similar types of service (i.e., bus rapid transit and standard bus service in the case of LTD) can be useful in identifying level of performance and understanding opportunities for improved operations.

LTD is in somewhat of a unique position among transit agencies in the United States because of its high level of ridership compared to the population served and the fact that LTD provides bus rapid transit (BRT) to a mid-sized metropolitan area. Identifying comparable agencies for purposes of comparative evaluation is therefore somewhat difficult. Cities with similarly-sized service populations (within 60,000 of LTD's service population) with comparable levels of ridership per capita include Gainesville, Florida (pop. 187,781); Atlantic City, New Jersey (pop. 248,402); Waterbury, Connecticut (pop. 194,535); Trenton, New Jersey (pop. 296,668); Santa Barbara, California (pop. 195,861); and Ann Arbor, Michigan (pop. 306,022)[1]. Transit agencies providing BRT to similarly-sized populations include Transfort in Fort Collins, Colorado, and CTTransit in Hartford, Connecticut[2]. A variety of additional factors impact the extent to which any of

[1]Hughes-Cromwick, MacPherson. *2019 Public Transportation Fact Book*. Washington, D.C.: American Public Transportation Association, April 2019. Retrieved from https://www.apta.com/wp-content/uploads/APTA_Fact-Book-2019_FINAL.pdf. 34.
[2] Ibid, 36.

these populations and agencies are truly comparable to LTD including geography, proximity to a university, and area median income. In general, comparing LTD's own performance over time is likely to provide more meaningful information than attempting to compare against other transit agencies.

RECOMMENDATIONS

We recommend the integrated strategy as the measurement strategy for LTD's operations department. Integrated strategy is characterized by low uncertainty of cause and effect and high control over outcomes[3]. The operations department has low certainty over cause and effect because it has a strong approximation of causal relationships, empirically observable and quantifiable indicators, and clear indicators for LTD's desired outcomes, such as sustainability, quality, reliability, and accountability (see Appendix A). LTD operations has high control over outcomes because it provides direct services to the community, does not have a lot of competition in the area, and has easily measurable data including ridership demographics.

The integrated strategy measures performance by standardizing delivery for outputs, meaning that each department is responsible for creating its own outputs, combining outputs in a systematic way, and then accessing independent outcomes, which can be done by professionals or academic institutions[4]. LTD is an ideal candidate for this method of measurement because each department collects, delivers, and quantifies its

[3]Ebrahim, Alnoor. *Measuring Social Change: Performance and Accountability in a Complex World*. Stanford, CA: Stanford Business Books, 2019. 38.
[4] Ebrahim, Alnoor. *Measuring Social Change: Performance and Accountability in a Complex World*. Stanford, CA: Stanford Business Books, 2019. 116-117.

own outputs, departments combine outputs for the common LTD mission statement, and the University of Oregon is assisting assessment of LTD's outcomes (see Appendix A).

We recommend the integrated strategy for LTD because its website states that it provides reliable transit services that address the needs of the community, a viable alternative to automobiles, and leadership in the development of the region's transportation system, along with practicing safety and maintaining safe and accessible vehicles, services, and facilities with sound fiscal and sustainability management[5]. By collecting data on on-time departure performance, scheduled vehicle trips, and driving hours by drivers, LTD can monitor its performance on sustainability and reliability. LTD can use the data collected on training hours by drivers and paid absenteeism hours by drivers to monitor performance on safety and leadership in the field in terms of training and how it treats its drivers. Lastly, by collecting data on the number of full-time drivers and the number of part-time drivers, LTD can monitor its performance on fiscal and sustainability goals. LTD can combine the data collected from other departments to contribute to its mission.

ANALYSIS

Operations is the mechanism by which LTD accomplishes its mission of providing people with the independence to achieve their goals, creating a more vibrant, sustainable, and equitable community. Thus it is imperative that LTD operations function at the utmost capacity. This is depicted in the logic model which you will find in Appendix B.

[5] "About Us." About Us > Lane Transit District, https://www.ltd.org/about-us/.

Proposed measurement strategies:

- **Descriptive:** This evaluation style would describe the process of the LTD operations provides, but would not measure the cause and effects of the operations. LTD operations could use this strategy when establishing new programs, as this evaluation style is ideal for early stages of a program. - *Not Recommended at this time.*
- **Normative:** This evaluation style is used for passing judgements based on preset criteria. LTD already has benchmarks for successful operations.- *Recommended.*
- **Impact:** LTD operations would best measure their community impact with this evaluation style. It looks at cause and effect relationships. - *Highly Recommended.*
- **Prospective:** This evaluation style looks to future prospects. LTD could use this when planning for new operations. This evaluation style would assist LTD operations making informed decisions about future projects. - *Not Recommended at this time.*
- **Explanatory:** This evaluation style looks into why a particular cause leads to a particular effect. For LTD operations, this style is unnecessary because existing evidence shows the importance of its transportation operations. - *Not Recommended.*

Contingency Approach: When looking at the contingency approach, it is imperative to look at the amount of LTD operations uncertainty for cause and effect and their control over outcomes. LTD operations has low uncertainty over the cause and effect of their services. This is due to the outside understanding of the value of public transportation services. According to the *Public Transportation Fact Book*, the importance of public transportation has reduced impacts of city's pollution[6].

[6] Hughes-Cromwick, MacPherson.

LTD operations has low control over outcomes. At this point, LTD operations does not show the control of its outcomes due to limitations of its evaluations. Its current evaluation looks at operations without exploring the societal impacts of its operations. This is an area we recommend is explored[7]. For this section, refer to Appendix C.

- **Niche:** LTD operations currently **DOES** have a niche strategy. According to LTD's mission, this evaluation strategy is not in line with its goals to impact society. A niche strategy does not have the capacity to look at overall outcomes. However, LTD wants to accomplish societal changes via transportation. Consequently, this is an area where we recommend a change.
- **Integrated:** LTD operations **SHOULD** have an integrated strategy. This strategy would address the issues found in the niche strategy for LTD operations. If they were to use an integrated strategy, LTD would begin to evaluate increased societal impacts.
- **Emergent:** LTD operations does **NOT** have an emergent strategy.
- **Ecosystem:** LTD operations does **NOT** have an ecosystem strategy.

Threats to Validity: It is imperative to address threats to validity concerning the current evaluation that LTD's operations uses, including construct, internal, and external validity[8] .

Construct Validity

- *Inappropriate operationalization:* The current evaluation does address the main question being evaluated, but there is room for increased depth. The current evaluation looks at

[7] Ebrahim, 2019.
[8] U.S. Government Accountability Office Training Institute- Appendix 1: Strategies to Help Ensure Validity and Reliability of Data.

hours driven, trips made, and drivers working. The evaluation does not address greater societal issues, or look at LTD's operations impact.

- *Evaluation Apprehension:* Currently when drivers are being evaluated, they may be altering their responses in order to respond in a way that would be favorable to LTD as their employers.

Internal Validity

- *Regression to the Mean:* LTD's operations change throughout the year depending on weather, holidays, and schools being in session.
- *Program not fully implemented:* Many of LTD's operations are not being fully used at the same time. When funding fails, LTD's operations may be scaled back.

External Validity

- Situational Effects: LTD drivers may act differently when they are being evaluated. This impacts the external validity of the current evaluation.
- Differential Mortality: LTD's operations are affected by seasonal needs. For instance, when UO students first move to Eugene, they are more likely to use the EMX. However, there are many individuals who use LTD daily year-round in order to commute.

POTENTIAL LIMITATIONS & OTHER CONSIDERATION

There are three primary limitations to consider, which may exist with the current recommended method of Integrated Strategy.

1. Limited control over societal outcomes from the vantage of Operations.

   a. This requires a greater reliance on other areas of LTD to determine long-term validity of measures[9].

2. Lack of appropriate programmatic comparisons.
   - It's hard to innovate new methods and compare best practices when other like programs are absent for analysis.
3. Focus on funder priorities rather than community interests and/or social change goals and outcomes.
   - Required to track certain measures that may not be necessary to their goals as a department, which take some cost and time.

Conclusion

LTD is committed to continually questioning "if there is a better way" to serve its community through mass transit. LTD is a unique organization because it has higher ridership than other cities of similar size and has implemented bus rapid transit services. Keeping in mind the above potential limitations and considerations, we recommend an evaluation of LTD's operations that includes normative and impact measurement strategies. We recommend LTD use the above integrated strategy to evaluate its operations in order to ensure that it continues to lead the field of transit agencies serving mid-sized cities and surrounding communities.

[9] Ebrahim, 2019, pg. 110

References

"About Us." About Us > Lane Transit District, https://www.ltd.org/about-us/.

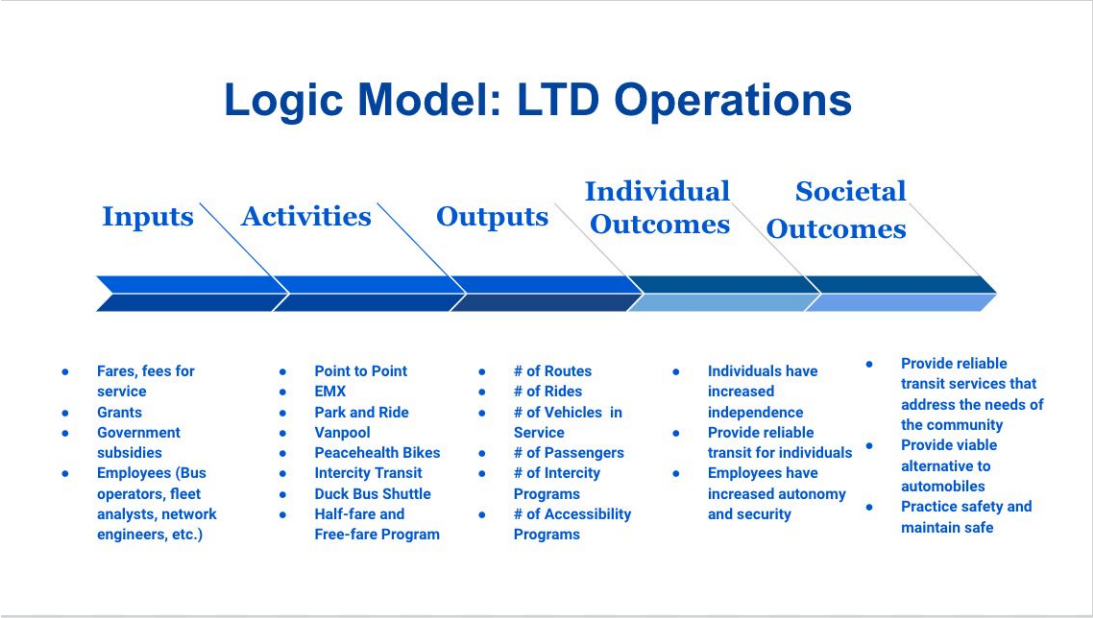
Hughes-Cromwick, M. (2019, April). *2019 Public Transportation Fact Book.* Washington, D.C.: American Public Transportation Association. Retrieved from https://www.apta.com/wp-content/uploads/APTA_Fact-Book-2019_FINAL.pdf

Ebrahim, Alnoor. Measuring Social Change: Performance and Accountability in a Complex World. Stanford Business Books, 2019.

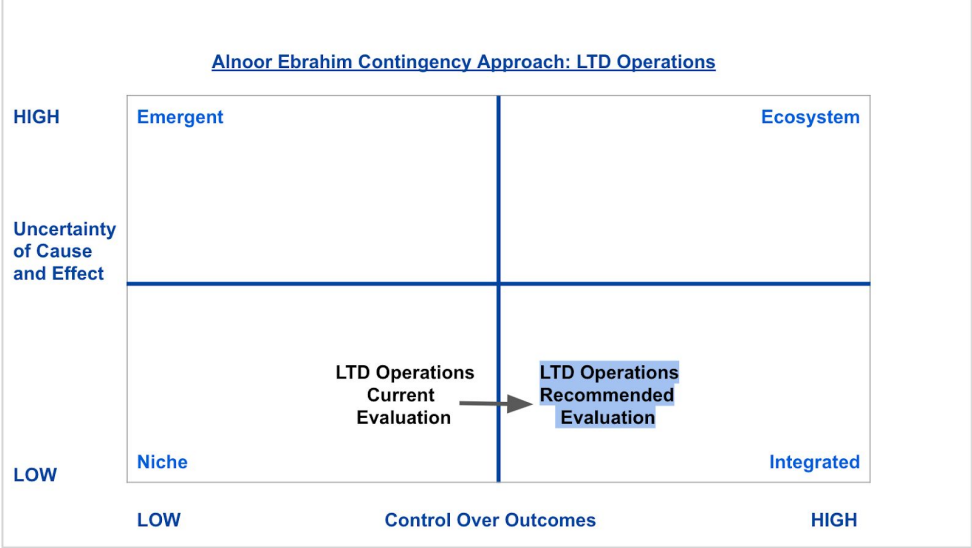
Appendix A:

Operational Metrics	
16	**On-Time Departure Performance (%): Mixed**
16a	**On-Time Departure Performance (%): Electronic, 0 <> + 5 Minutes**
16b	**On-Time Departure Performance (%): Alternative Methodology**
17	Total Scheduled Vehicle Trips
17a	Total Missed Trips
SD1a	Total driving hours by drivers
SD4a	Total other at work hours by drivers
SD5a	Total training hours by drivers
SD6and7a	Total all paid absenteeism hours by drivers
SD6a	Total paid & planned absenteeism hours by drivers
SD7a	Total paid & unplanned absenteeism hours by drivers
SD8a	Total unpaid & unplanned absenteeism hours by drivers
SDa	Total PAID Driver Hours [SDai + SDao for SD1-SD7]
SDaWORK	Total ALL Driver Hours at Work [SDai + SDao for SD1-SD5]
B14	**Total Driver FTE**
B14a	Total Number of Full-Time Drivers (Headcount)
B14b	Total Number of Part-Time Drivers (Headcount)

Appendix B:



Appendix C:



LTD Operations Performance

MEMORANDUM

TO: Lane Transit District

FROM: Annalissa Calvin, Rebecca Foley, Devon Kramer, Kyomi Tamura, Harrison Jensen

SUBJECT: LTD Operations Performance

DATE: 11/25/19

EXECUTIVE SUMMARY

The purpose of this memorandum is to review the performance indicators Lane Transit District (LTD) currently uses to measure its operations — how it gets riders to and from locations within the LTD service district — and its strategy for doing so. LTD's performance indicators are compared to indicators used by the public transportation service in Fort Collins, Colorado, and indicators proposed by the International Bus Benchmarking Group (IBBG). As LTD has a low degree of control over outcomes and low causal uncertainty, LTD should follow a niche strategy. We also recommend that LTD track traffic patterns, causes of accidents, and seek the input of its riders.

LTD Performance Measurement Metrics & Strategy: Operations

Background and Context:

The Case for Evaluation

While it has become a standard for nonprofits and government agencies to evaluate programs and performance, the process varies widely from organization to organization. There is immense pressure to draw causality between an organization's efforts and social change, despite knowing that it does not always accurately portray an organization's performance. However, "the more important challenge is one of aligning measurement with goals and strategy, especially the goals that an organization can reasonably control or influence" (Ebrahim, 2019, p. 11). Program evaluation helps nonprofits understand the complicated challenges they seek to improve, confirm what strategies work, and maintain transparency with stakeholders and clients (Lall, Week 2).

For public organizations, this ongoing improvement is essential. Transit agencies like LTD have many different programs and goals, and therefore require a variety of program evaluation approaches.

Evaluation Comparison: Eugene and Fort Collins

Eugene and Fort Collins are similarly sized college towns, both hovering around a population of 165,000 ("About Eugene", 2018; "Fort Collins Facts", 2019).

Both cities share community values of connection to the outdoors and environmental sustainability. Fort Collins' transport measures reflect a city wide focus on sustainability — "The central premise of a sustainable operation is that it balances human, economic, and environmental factors in decision making and management" (City Council, 2011, p. 11).

Fort Collins' evaluation system includes continuous feedback and response mechanisms as part of plan creation and evaluation, as "monitoring programs with a few key high-quality indicators are more effective than those that include dozens of indicators of variable quality… The monitoring program should initially focus on a few key indicators and expand over time as others are identified" (City Council, 2011, p. 76).

For Fort Collins, a key benchmark is to have 20 passengers an hour on all busses for all routes. Data is kept on passengers through driver estimates and fare boxes, and routes are discontinued if they are below the 20 passengers per hour goal (City of Fort Collins, 2010).

International Evaluation Example: International Bus benchmarking Group

The International Bus Benchmarking Group (IBBG) suggests using data from the customer's point of view as a Key Performance Indicator (KPI) for other benchmarking groups. IBBG's goal is to create "a systematic process of continuously measuring, comparing and understanding an organization's performance and changes in performance" (Trompet, 2010). In order to do this, IBBG established six different groups of KPIs to identify the problems, strengths, and weaknesses of bus services and to monitor service performance over time.

In addition to collecting data on multiple KPIs, IBBG measures excess waiting time (EWT) and customer satisfaction through surveying.

- Excess Waiting Time measures...
    - The average waiting time in which the passengers wait longer than the scheduled wait time (Trompet, 2010).
    - The regularity of scheduled headways. IBBG states that this is the only indicator that is a "true customer-oriented method" (Trompet, 2010).
- Customer Satisfaction Survey (CSS)
    - IBBG posted an online survey for four weeks to collect passenger's comments, with the goal of receiving more than one thousand responses. The questions were all scale evaluations, from disagree to agree, with "don't know" as an option.
    - The types of questions asked concerned availability, accessibility, information, time, customer care, comfort, environmental impact, security, and overall satisfaction.
    - Then, IBBG asked customers their opinion on which three areas of service IBBG should prioritize. After the survey was completed, IBBG removed the datasets which

contained improper responses before being included in the equal random sample (Trompet, Parasram, & Anderson, 2013).

The KPI measures that IBBG uses are similar to indicators that LTD uses, such as percentage of bus arrivals on time, total labor hours, staff absenteeism, number of third party accidents, etc. Along with these measurements, IBBG uses EWT and CSS, which provide an indication of the passenger's point of view.

Recommendations:

The Niche Strategy at a Glance

The niche strategy is used for performance measurement in contexts in which "an organization has the advantage of good knowledge about cause and effect but has little control over outcomes" (Ebrahim, 2019, p. 79). As such, this strategy focuses on "immediate short-term benefits, rather than long-term outcomes" (Ebrahim, 2019, p. 52).

LTD Using the Niche Strategy

LTD's operations measures focus on short-term outputs. For example, LTD's goal of providing on-time bus transit services 90% of the time is a short-term output (Operations *Monthly Report Summary, 2019)*. Rather than collect measures on whether its service delivered passengers to their next location on time, LTD's operations measures concern the number of on-time departures and missed trips. Focusing on short-term outputs relates to the low control over outcomes as LTD is not placing emphasis on long-term effects.

LTD's operations measures have low causal uncertainty. Evidence has long suggested that increased on-time departures and arrivals for buses combined with more frequent bus routes positively correlates with both increased ridership and likelihood of travelers arriving to their final destinations on time (Transit Tomorrow, 2018). However, LTD has low control over whether or not passengers make it to their destination on time. Once riders exit the bus, LTD can no longer track a passenger's route, giving them limited control over this outcome.

Similarly, LTD has limited control over passengers' comfort and safety. Better training of drivers suggests low causal uncertainty in providing safe and comfortable rides for its passengers. However, LTD does not have complete control over this outcome because of outside factors like harsh weather conditions, the number of accidents not at the fault of LTD bus drivers, or conflicts between passengers.

LTD recognizes the increased likelihood of connected communities and increased community engagement as a result of its services. By providing reliable bus rides, LTD "allows all individuals the freedom not to rely on a personal vehicle, and not to depend on friends and family for

transportation" (Walker, 2018, p. 7). LTD asserts a high cause and effect relationship between on time departure performance and its intended societal outcomes. However, LTD does not have control over outside factors such as an individual's desire to engage in their community, limiting the control LTD has over these intended societal outcomes.

Standardizing Operations

An important aspect of the niche strategy is standardizing outputs, as standardization and quality control generate meaningful outputs (Ebrahim, 2019, p. 52). Standardization ensures consistency in outputs. LTD's low uncertainty for cause and effect, paired with low control over outcomes, allows LTD to depend on the standardization of its measurements to increase the likelihood of its intended outcomes.

Using the Niche Strategy to Measure Efficiency

LTD's success in achieving its outcomes can be linked to the efficiency of delivering its key outputs. LTD has a good understanding of cause and effect (Lall, Week 4), implying that success in delivering outputs will likely result in the intended outcome. LTD measures the efficiency of its outputs through the number of buses on time, number of accidents per 100,000 miles, and number of complaints per 100,000 boardings. As such, high efficiency for these outputs will likely generate its intended outcomes.

Analysis:

Choosing the Niche Strategy Over the Integrated Strategy

Initially, we considered recommending the integrated strategy since both LTD and the Aga Khan Rural Support Programme (AKRSP), a program detailed in the Ebrahim (2019) text, are both the sole organization who provide their specific service in their area. However, we chose niche strategy over integrated strategy because LTD has low control over outcomes whereas the AKRSP does not.

Unlike AKRSP's various programs which directly affect the quality of its beneficiary's livelihoods, LTD cannot directly control its intended individual and societal outcomes. Thus, LTD's operations fit best with niche strategy.

Logic Model

LTD Operations				
Organizational Performance			Social Performance	
Inputs	Activities	Outputs	Individual Outcomes	Societal Outcomes
Total driving hours by drivers	Total scheduled vehicle trips	On time departure performance	People get where they need to on time	More connected, accessible communities
Total other work hours by drivers	Considering customer feedback	Total missed trips	LTD riders can rely on safe, and comfortable services	Community engagement
Total training hours by drivers	Training drivers	Increased ridership on public transit		
Total all paid absenteeism hours by drivers	Collecting measurements	Paid drivers		
Total number of full-time drivers	Driving buses	Trained drivers		
Total number of part-time drivers		Complaints		
Salary measurements				

Existing Performance Measures

LTD measures the number of on-time departures and missed trips to help measure efficiency and determine the reliability of LTD's transit services. Understanding and documenting the cause of the missed trips informs LTD as to how it could adapt its current system to limit the number of missed trips.

LTD also measures the number of avoidable and unavoidable accidents per 100,000 miles and the number of complaints per 100,000 boardings. Measuring these outputs allows LTD to determine its efficiency in providing safe and comfortable rides.

In addition, LTD measures total driving hours, paid and unpaid absenteeism, total training hours, and the number of full-time and part-time drivers.

It is important for LTD to use these existing measurements because a niche strategy suggests that LTD should focus on its outputs, and these important input and activity measurements provide data on its outputs' efficiency.

Additional Performance Measures to Collect

LTD should measure Lane County traffic patterns to determine if there is a link between increased traffic and the number of missed trips. LTD does measure the number of missed trips due to

detours, but does not mention what the detours were caused by. Measuring traffic patterns may provide more information about the reasons for missed trips.

LTD should also measure traffic patterns to determine if on-time performance is correlated with certain times of the day. Knowing if there are specific times of the day that consistently result in late buses would tell LTD whether its bus schedule needs to be updated to reflect traffic tendencies.

LTD should also collect data on the causes of accidents. Passengers rely on comfortable and safe transit services, so LTD should collect data on how best to keep its passengers safe.

LTD should randomly survey its riders to determine if its service helped get its riders to their final destinations on time. The only way to know whether riders get to their final locations on time is to ask them and find out how its provided services influenced those answers. Using Customer Satisfaction Surveys like IBBG and Fort Collins would provide insight on the efficiency of LTD's transit services.

LTD should also randomly survey its passengers to measure the satisfaction of its riders, as complaints per 100,000 boardings is not an accurate representation of overall satisfaction. Those who make complaints under the current method of measurement may only represent the riders who are angry or passionate enough to do so. Consequently, satisfaction for typical passengers is not represented.

Potential Limitations/Other Considerations

Measuring individual and societal outcomes is a common challenge among organizations with niche strategies because of the multitude of factors that influence those outcomes. The measurements LTD use do not inform whether or not people got to their final destination on time, if rides were reliably safe and comfortable, or if riders were more engaged and connected in their community. As such, before LTD goes forward with the recommendation of a niche approach, LTD should recognize the limitations in understanding its role in the intended outcomes.

Unusual Traffic Patterns and Other Unforeseeable Situations

Outliers skew data, and when there is unusual activity, it can paint a different image than what's considered normal. For example, in Eugene, traffic surrounding areas near the University increases dramatically when it's college move-in day, there's a game at Matthew Knight Arena, and when the university hosts the Olympic Trials for track and field. On these days, the buses may run late or miss their trips altogether, making sticking to a bus schedule difficult.

Noted in LTD's *Operations Monthly Report Summary* is the number of missed trips due to construction, accidents in which LTD is (and is not) involved in, being late, and mechanical problems among other reasons (2019). These situations are all completely out of LTD's control. If LTD cannot

control all situations which cause missed trips, then it's impossible for LTD to accurately measure outcomes, forcing them to stay focused on its short-term outputs.

Unforeseeable situations like outliers in data, accidents, and construction make using the niche strategy difficult. The niche strategy considers how outside factors make controlling outcomes difficult, but does not directly suggest a solution, limiting the ability of the niche strategy to work for LTD's operations as needed.

Conclusion

LTD has a unique opportunity to increase connectivity and encourage engagement in the Eugene and Springfield area through a reliable, safe, and convenient transit service. While a lack of control over individual and societal outcomes poses challenges that may seem difficult for a transit service to surmount, we believe that LTD can reach those goals by focusing on delivering consistent outputs. Output centric performance measures that incorporate feedback and track what both LTD and passengers care about -- qualities like safety, comfort, and timeliness -- ensure that the services LTD provides not only help people get from point A to point B, but are well-suited to and can dependably meet passenger expectations. By integrating the measurement strategy we recommend, we believe that LTD will be better able to connect communities throughout Lane County.

Works Cited

About Eugene (2018). Retrieved from https://www.eugene-or.gov/1383/About-Eugene

City Council (2011). Fort Collins master transportation plan. *City of Fort Collins*. Retrieved from https://www.fcgov.com/planfortcollins/pdf/tmp.pdf

City of Fort Collins (2010). Driven by data- transfort. Retrieved from https://www.youtube.com/watch?v=VivYen4uXbM

Ebrahim, A. (2019). Measuring social change: performance and accountability in a complex world. *Stanford: Stanford University Press.*

Fort Collins Facts (2019). Retrieved from https://www.fcgov.com/visitor/fcfacts.php

Lane Transit District (2019). Operations monthly report summary.

Lall, S. (2019). Week 2. Powerpoint. Retrieved from https://canvas.uoregon.edu/courses/143728/files/folder/Week%202?preview=7256876

Lall, S. (2019). Week 4. Powerpoint. Retrieved from https://canvas.uoregon.edu/courses/143728/files/folder/Week%204?preview=7342859

Trompet, (2010). Development of key performance indicator to compare regularity of service between urban bus operators. *Imperial College London*, *2216*(1). doi: 10.3141/2216-04

Trompet, M., Parasram, R., & Anderson, R. J. (2013). Benchmarking disaggregate customer

satisfaction scores of bus operators in different cities and countries. *Transportation Research Record: Journal of the Transportation Research Board, 2351*(1), 14–22. doi: 10.3141/2351-02

Walker, J. (2018). Transit tomorrow: existing conditions and choices report. *Lane Transit District.*

Appendix C

Risk Management

MEMORANDUM

TO: LTD Risk Management

FROM: James Brown, Trevor Irish, Megan Patrignelli, and Sarah Reiter

SUBJECT: Program Evaluation of Current LTD Risk Management Evaluation

DATE: November 25, 2019

CC: PPPM 565 Program Evaluation

EXECUTIVE SUMMARY

LTD's Performance Management is currently accomplished by tracking metrics across five categories (Fleet, Operational, Service Planning, Sustainability, and Risk Management). The key recommendation of this memo is that certain metrics currently categorized as Fleet and Operations should be cross-integrated into Risk Management to provide a more holistic strategy for performance measurement. Background information is given on some state and national transit organizations to provide context for our report.

BACKGROUND AND CONTEXT

Comprehensive program evaluation and performance measurement is essential for success. Without an adequate performance measurement system, stakeholders will not understand how effective their programs truly are. They may not know what program areas need improvement and further investment. Decision makers within LTD should understand how to evaluate the efficacy of programs using key performance indicators and data.

When evaluating and determining the possible risks associated with LTD's transit programs, certain characteristics should be included. According to the Transit Cooperative Research Program (TCRP) Report 88[1] "key characteristics" of an effective performance-measurement system are:

1. Stakeholder acceptance: Formal acknowledgement by stakeholders that project objectives have been met.
2. Linkage to agency and community goals: Do the variables being measured align with community values and interests?
3. Clarity: Are the measurements clear?
4. Reliability and credibility: Can stakeholders and others rely on the evaluation measures?
5. Variety of measures: Are there diverse enough measures in place to assess the program?
6. Number of measures: Are there too many or too few measures in place?
7. Level of detail: Are the measurements thorough and concise?
8. Flexibility: Is the evaluation responsive to program changes and shifting priorities?
9. Realism of goals and targets: Are goals and targets being met?
10. Timeliness: How long does data take to collect and analyze?
11. Integration into agency decision-making: Are findings and recommendations introduced and adopted after evaluation?

[1] Barker, B. (2003). Transit Cooperative Research Program (TCRP) Report 88. (PDF) Federal Transit Administration. Retrieved from: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_report_88/guidebook.pdf

TCRP's report also identifies 10 categories of performance measures that can be used to form a transit agency's goals and objectives:

1. Availability
2. Service delivery
3. Community
4. Travel time
5. Safety and security
6. Maintenance and construction
7. Economic
8. Capacity
9. Paratransit
10. Comfort

The Oregon Department of Transportation (ODOT), includes performance measures such as Special Transit Rides, Passenger Rail Ridership, Intercity Passenger Service, and Transit Conditions.[2] Nationally, the American Bus Benchmarking Group (ABBG) recommends accessible, established evaluation tools and benchmarks for bus and transit programs. The ABBG was established in 2011 to provide a confidential forum for mid-sized bus organizations to learn from each other by comparing performance, sharing experiences, and identifying best practices.[3]

This report focuses on optimizing LTD's risk management program evaluation and performance measurement, using some of these factors in our analysis and recommendations.

[2] Oregon Department of Transportation. (2017). OPTP Performance Measures. (PDF). Retrieved fromhttps://www.oregon.gov/ODOT/Planning/Documents/OPTP-Performance-Measures.pdf
[3] American Bus Benchmarking Group. (2018). About. Retrieved from https://americanbusbenchmarking.org/?page_id=11

RECOMMENDATIONS

We recommend LTD utilize an "Integrated Strategy"[4] to evaluate risk management performance. An "Integrated Strategy" is a evaluation strategy in which the outcomes of factors not strictly within LTD's Risk Management category would be considered. Under this strategy, outcomes from Fleet or Operations may be considered interdependent with Risk Management outcomes. These are outcomes over which LTD has a high degree of control, including the critical safety precautions measured by Fleet or Operations metrics. The combined outcomes of interventions, such as bus maintenance and staff training, are stronger than any single intervention alone. To measure impact using an Integrated Strategy, LTD should:

- **Standardize delivery of outputs:** Before integrating data from other categories into risk management, LTD should be sure that the data gathered will be in a format useful for measuring the goals of multiple categories. Without access to the raw data, we could not determine whether or not this is the case, but we believe the metrics we have selected for inclusion into the integrated approach will be usable by risk management as-is.
- **Combine outputs in a coordinated way:** Monitoring the individual outputs of Fleet and Operations metrics can serve as an output for risk management assessment, because keeping up with ideal performance in those areas will affect possible risk outcomes.
- **Assess interdependent outcomes:** Example - When metrics such as "age of buses" or "hours of staff training" change, are there corresponding changes in the number of injuries or collisions?

[4] Alnoor Ebrahim, "Measuring Social Change" (Stanford Business Books, 2019), 51–191.

ANALYSIS

We selected an Integrated Strategy[4] for LTD's evaluation of risk management performance, because it is ideal in situations where administrators have of low degree of uncertainty about the cause and effect of their outputs and high control over outcomes. This is appropriate for LTD because they have control over metrics related to Fleet, Service Planning, and Operations; all of which impact risk management. For example, LTD controls how often they service buses, where they are driving, how they train route drivers to respond to incidents, and how often they perform fleet maintenance. Controlling for these outputs can impact risk management outcomes, such as the reduction of preventable collisions. The same may hold true when integrating other metrics with risk management outcomes.

We also considered a "Niche Strategy,"[4] which is ideal for programs in which there is low uncertainty about cause and effect and low control over outcomes. However, because LTD has a great deal of control over the outcomes, and a very low degree of uncertainty regarding cause and effect of risk, we chose not to recommend a Niche Strategy.

We briefly considered "Emergent" and "Ecosystem" strategies[4], but felt they did not fit in with LTD's goals for evaluation because both strategies are used in situations of high uncertainty about cause and effect and therefore not appropriate for LTD's risk management evaluation.

Lane Transit District LOGIC Model

LTD Resources	LTD Risk Management Activities	LTD Outputs	Rider Outcomes	Societal Outcomes
• Payroll Tax $ • Federal assistance $ • 300 employees • Fares • Historical Data • ABBG data • David Lindelien	• Data collection • Driver training • Staff training • Rider education, esp. signage • Infrastructure, esp. bus lanes • Bus maintenance • Risk reduction policies	• Safe rides • Undamaged property • Safe passengers • Safe staff • Staff hours saved	• Safe, stress free, efficient, and timely transportation • Increased mobility and independence, esp. for persons with low-income or disabilities • Greater quality of life • Cheaper fares when risk is properly managed	• Less traffic, especially due to collisions • Greater social equality between varying transit-abled groups • Increased economic activity

LTD's current risk management metrics focus on vehicle and property damage, lost staff time, and injuries. We recommend including the following measures to fully utilize the integrated strategy we have recommended:

- Number of Road Calls Due to Technical Faults
- Total Lost Vehicle Miles
- Total Missed Trips
- Total Training Hours by Drivers

These metrics are already being tracked by LTD, but are not included in the risk management evaluation criteria. Including them in the risk management assessment will help LTD understand a larger picture of risk awareness and prevention.

POTENTIAL LIMITATIONS

The key limitation for the Integrated Strategy we have selected is the complexity of measurement. Using metrics for multiple outcomes means that there will be an increased amount of uncertainty about why a change in one metric has resulted in a change in another metric. This is at the core of what we mean by the term "interdependent outcomes." While interdependent outcomes have the ability to give us a more comprehensive picture of risk tracking, these can also skew data.[4] For example, if LTD uses measures which have the potential to counteract each other, the data could be more difficult to interpret. Essentially, interdependent outcomes also make it difficult to isolate the true impact of any one variable.

We recommend an annual review of all metrics by the heads of each performance measurement category, to see what metrics may hold value in more than one category. We also recommend periodic reviews by an external party (such as the one we are conducting) to evaluate LTD's performance measurement strategies.

CONCLUSION

Implementing an Integrated Strategy for LTD's Risk Management evaluations will allow LTD to think about risk management in a more holistic manner. These changes will allow LTD Risk Management to track performance without adding any new metrics. An annual review of LTD's metrics can help identify where performance management strategies need tweaked. Broadening the metrics pertaining to risk evaluation can better prepare LTD for the future, while learning from the mistakes of the past.

Appendix D

Service Planning

Service Planning

MEMORANDUM

TO: Lane Transit District

FROM: Angie Bravo, Renee Gordon, Kathie Hsieh, Morgan Mann & Rosemarie Oakman

SUBJECT: Service Planning

DATE: 11/25/19

CC: Saurabh Lall

EXECUTIVE SUMMARY

The purpose of this memo is to define program evaluation and program measurement as they relate to public transit. This will be achieved by an analysis of different performance strategies and what is most appropriate for LTD. LTD is already collecting performance measures in line with the American Bus Benchmarking Group (ABBG), which they are currently a member of. Current measurement systems of Orange County Transportation Authority, the San Joaquin Regional Transit District, and Spokane Transit District, who are all members of ABBG, are utilized to establish best practices within the industry related to service planning. A niche strategy is recommended as the evaluation strategy LTD should employ moving forward.

LTD Performance Measurement Metrics & Strategy: Service Planning

Background and Context:

Program Evaluation is the process of determining and applying systematic methods to answer questions about how well a program is working. An evaluation may include a periodic or ongoing examination of a program, as well as a one-time study of a program (Newcomer, 2015). Program evaluation provides insight on improvements, findings, and actionable learning about programs to its stakeholders both within and outside of an organization. With transit programs, program evaluations are particularly important because they can give insight into how services provided by the agency can be improved to better service their mission. This information should help guide the organization's tactics and management to improve.

Performance measurement is the ongoing process of monitoring and reporting of a program's achievements or progress toward predetermined objectives or goals. The performance measurements typically address the process, outputs, and or the results/ outcomes. The American Bus Benchmarking Group (ABBG) is a "is a consortium of mid-sized bus agencies in North America that was established in 2011 to benchmark performance and share experiences and best practices." Benchmarks related to service planning that ABBG cites as Fixed-Route Key Performance Indicators are passenger boarding, vehicle miles and hours, passage per revenue mile, customer information, passenger miles per revenue capacity mile and per seat mile, total cost per vehicle mile, total operating cost per revenue mile and hour and peak fleet utilization (ABBG, 2016, p.15). According to Jeramy Card, performance measurements at LTD are collected through Automatic Passenger Counters (APC) and Automatic Vehicle Location (AVL) systems. LTD is collecting passenger boarding data, and GPS and route adherence (on time/late) data at the stop level (Personal Communication, 2019).

Comparable Organizations

Orange County Transportation Authority wants to help increase their ridership. To do so, they measure the productivity of their bus routes in relation to the number of rides taken by passengers. This gives them a clear idea about how the productivity of their buses affect ridership. Another thing that OCTA measures is how many customer complaints they get for every boarding. This helps OCTA understand what routes that need more attention, and how to improve the services that they are offering. OCTA has done a variety of public surveys to understand their customers and potential customers better, and have evaluated their service plans to fit the needs of their customers.

The San Joaquin Regional Transit District (RTD) network covers the greater Stockton metropolitan area, including several neighboring communities. RDT Focuses on improving overall mobility for the citizens of San Joaquin County. RTD's service measurements include population density, employment density, rider demographics, and community developments. RTD evaluates the effectiveness of individual routes by measuring the number of boarding passengers on a particular route. Another measurement is trip length. RTD Metro service has an average trip length of approximately 3.9 miles, which is much lower than other service types within the RTD system. This measurement provides the average ridership and demonstrates that passengers appear to travel between points on the route, rather than use the entire route (San Joaquin Comprehensive Operational, 2009, Analysis).

The Spokane Transit Authority (STA) serves Spokane County which is similar in size to Lane County served by LTD. STA supports the transportation needs through bus, rapid bus, paratransit and vanpool. These are similar to the services that LTD provides. STA's mission statement is defined as, we are dedicated to providing safe, accessible, convenient, and efficient public transportation services to the Spokane Region's neighborhoods, and businesses and activity centers. STA's performance measures are tied to a set of objectives that pertain to the following priorities: ensure safety, earn and retain the community's trust, provide outstanding customer service, enable organizational development, and exemplify financial stewardship. See Figure 1. STA publishes the results of their performance measures on a quarterly basis and annually.

Recommendations:

We recommend niche strategy of evaluation because it focuses on the part of the market with no other form of competition along with a strict measurement of outputs and systems of standardization (Ebrahim, 2019). LTD is not competing with any other organization in Lane County, providing mass transit, so a niche strategy would be the optimal evaluation strategy. The niche strategy of evaluation is effective when an organization has the advantage of good knowledge about cause and effect but has little control over long term outcomes. (Ebrhim, 2019). LTD's current performance measures are already in place for the niche strategy to maximize efficiency while benchmarking for service planning.

Analysis:

- **Integrated Strategy:** The integrated strategy is when the outcome is greater than the sum of the parts, and this is found through coordinated interventions of niche projects (Ebrahim, 2019). This did not seem appropriate because it requires more components than just transportation. If LTD were working with city planners, policymakers, and the City of Eugene Street Maintenance department, an integrated strategy would be an appropriate approach.
- **Emergent Strategy:** Emergent strategy is appropriate when projects have high uncertainty about cause and effect in addition to low control over the outcomes (Ebrahim, 2019). According to the logic model we've created, LTD does have control over the outcomes such as creating an affordable transportation option and access around Eugene and Springfield, thus making the emergent strategy not applicable.
- **Ecosystem Strategy:** This strategy includes a variety of different intervention strategies working together to increase control over outcomes (Ebrahim, 2019). As mentioned above in the integrated strategy, LTD does not incorporate inventions from various sources making the ecosystem strategy an ill fit.

Logic Model of LTD's Service Planning:

Inputs:	**Activities:**	**Outputs:**	**Individual Outcomes:**	**Societal Outcomes:**
Buses Fuel Staff (Drivers, Service Planners)	Regularly Scheduled Bus Routes	Number of Routes Number of Buses in Motion Number of Bus Stops Number of Driver and Staff Trainings Price of the Ride, Quality of the Bus	Affordable Transportation Option Reduced Emission and Carbon Footprint Access around Eugene and Springfield	Number of Car on the Road Reduced Decrease of Drinking and Driving Decrease in Car Accidents Affordable Transportation

Current measurements LTD is collecting data on related to service planning include total passenger boarding, total passenger miles, actual total vehicle miles, actual total vehicle hours, number of average weekday passenger boardings, size of service area, the size of the area served, population in service area, population in area served as well as actual average commercial speed. These performance measurements can all be utilized to inform a niche strategy.

OCTA measures customer input as part of their service planning to better support their community. While LTD hosts community input sessions during their open board meetings, we suggest that the service

planning department track the number of customer complaints in comparison to specific fixed routes, buses, drivers, etc. This can help LTD track more detailed information about the services that they are providing.

- OCTA measures their customer complaints and adopted the standard of receiving no more than one customer complaint per 7,000 boardings. They have weekly reviews of their complaints and track them to identify areas that need improvement and make efforts to minimize their complaints. It would be beneficial for LTD to increase measurement input systems to ensure consistently high quality outputs.

Based on RTD's current measurements, it is recommended that LTD includes a strategy to measure the average trip length for passengers. This measurement will provide a way to track which trips (A to B) are used more frequently on a particular route. This can help LTD better monitor the amount of ridership between points on the route.

Looking at how STA closely aligns their performance measures to their priorities we recommend that LTD do the same with regard to service planning. Thus, it's recommended that LTD tracks fixed route ease of use. Adapting the measures that STA uses: percent of urbanized population with basic bus service within ½ mile walk, percent of fixed route passenger boardings occurring at locations where passenger shelter is provided, and percent of population within area within ½ mile 15 minute frequency (minimum 12 hours per weekday). This can help LTD's service planning better approach how to effectively and efficiently provide routes throughout Lane County.

Potential Limitations/Other Considerations:

Through email communications Jeramy Card mentioned "we *(LTD)* don't have goals by department. We abide by LTD mission statement and the standards set out in our service policy." Without clear goals in the service planning department, it can be challenging to know what to track and how to track beneficial changes. We recommend that the LTD service planning department consider coming up with goals before implementing new strategies.

Jeramy Card also mentioned that the onboard "Origin and Destination" survey is currently being conducted once every four years. This provides a limitation to the data that is collected because riding patterns are only being tracked once every four years. More consistent surveys will be able to provide more detailed information about how they should be changing their services to provide more rides to the community. We recommend that LTD focus on performance measurement through a niche strategy so that they may have more control over outcomes.

Conclusion:

LTD would benefit from a niche strategy of program evaluation due to the strict systems of measurement that are already in place. This strategy is the most appropriate for LTD because it closely aligns with their current model in a way that the other strategies do not because of their lack of direct competition and the lack of other contributors. Through an examination of other medium-sized transportation departments, a list of recommendations such as consumer complaint tracking and specific segment analysis, and align their service planning performance measures to empower people with the independence to achieve their

goals, creating a more vibrant, sustainable, and equitable community. LTD could achieve higher quality outputs in their mass transportation.

Citations:

American Bus Benchmarking Group. (2017). *ABBG Introduction Presentation.* https://americanbusbenchmarking.org

Ebrahim, A. (2019). *Measuring Social Change: Performance and Accountability in a Complex World*. Stanford, CA: Stanford Business Books, an imprint of Stanford University Press.

Newcomer, K. E., Hatry, H. P., & Wholey, J. S. (2015). *Handbook of Practical Program Evaluation, 4th Edition*. San Francisco, CA: John Wiley & Sons.

Orange County Transportation Agency. (2018). *FY 2018, Q1, Detailed Report*. Orange County, CA. https://www.octa.net/pdf/FY-2018-Q1-Detailed-Report-PM.pdf

San Joaquin Regional Transit District. (2019). *Projects and Reports. Comprehensive Operations Analysis*. http://sanjoaquinrtd.com

Spokane Transit Authority. (2019). *The Plan*. http://stamovingforward.com/plan

Appendix

Priorities	Performance Measures
Earn and Retain the Community's Trust	• Ridership • Service Effectiveness (passengers per revenue hour) • Customer Security (personal safety and driver driving safely) • Public Outreach
Provide outstanding customer service	• On-Time performance • CS Call Center/ Paratransit Reservations (abandoned calls/ customer service response time) • Professionalism and Courtesy • Driver Announcements/ Introduction • Cleanliness of Coach/ Van • Complaint rate • Maintenance Reliability
Enable Organizational Success	• Training Rate • Annual Employee Evaluations • Governance
Exemplify Financial Stewardship	• Cost Efficiency • Cost Effectiveness • Cost Recovery from User fees • Maintenance Cost • Financial Capacity
Ensure Safety	• Preventable accident Rate • Injury Rate (workers comp time loss/claims per 1,000 hours)

Figure 1. Spokane Transit Authority's priorities and performance measures.

Service Planning in LTD Services

MEMORANDUM

TO: PROFESSOR SAURABH LALL

FROM: MADDIE NEWMAN, JOEY ALONGI, JACOB MORGAN, JUSTIN PASAG & NATALIE PETERS

SUBJECT: SERVICE PLANNING IN LTD SERVICES

DATE: 3/4/20

CC: JERAMY CARD

EXECUTIVE SUMMARY

Lane County District (LTD) strives to be a cost efficient and effective bus transit service for the Lane County community. To attain this goal, LTD must focus on service standards, an effective performance measurement system, and continuous service evaluations. The focus of our research was limited to improved service measurement through techniques such as benchmarking. Our goal was to provide LTD service planners with an evaluation framework to help modify and expand their services to meet their target service goals.

LTD Performance Measurement Metrics & Strategy: (Service Planning)

Background and Context:

The purpose behind program evaluation is that it allows organizations to answer questions they may have about their program operations and the results of the programs using systematic methods. (Saurabh Lall). In regard to transportation agencies such as Lane Transit District, which serves not only the cities of Eugene and Springfield but other surrounding communities, the importance of making sense of the results of various programs is instrumental in the mission of helping the community through public transportation. However, the Lane Transit District cannot solely rely on the data their organization has collected through their evaluations. Instead, LTD should be using benchmarking when trying to make sense of specific areas such as service planning. When using benchmarking transit agencies will need to choose other transit agencies that share similar characteristics (Trompet, Anderson, & Graham, 2018). Consequently, a comparison between the Lane Transit District and the Metropolitan Transit Authority of New York City would not make sense since the population size and methods of transportation are different. By using benchmarking, it allows transit agencies to gain new information since it provides these agencies with the ability to compare the results of various program evaluations (Trompet et al., 2018). For the Lane Transit District, a transit agency that is similar in size and type that could belong within the benchmark group is Monterey-Salinas Transit. When measuring performance Monterey-Salinas Transit is observing conditions such as land use, the economics of the local area, and even demographics. For example, in regard to economics and

how it relates to performance, Monterey-Salinas Transit is looking at a multitude of factors that include everything from the distribution households in certain parts of the city of Salinas that do not own private vehicles to how to severe poverty areas are only in certain parts of the city (*SALINAS AREA SERVICE ANALYSIS-II Final Report*, 2012).

While this is just one example of what other transit agencies are doing to measure the efficiency of their programs and understand the results of their programs, LTD could use Monterey-Salinas Transit and other comparable programs as a benchmark to help LTD measure their effectiveness in serving their community. Although the Monterey-Salinas Transit agency would be able to be a necessary benchmark for LTD, there are also national examples of how transit agencies are being evaluated that would provide LTD with a much more bigger picture perspective. For example, the Federal Transit Administration will evaluate the Bus Rapid Transit and learn which features of this particular program is effective in public transportation ("Evaluation Introduction | Federal Transit Administration," n.d.). To do this, the Federal Transit Administration plans to use transit agencies that are using the Bus Rapid Transit system ("Evaluation Introduction | Federal Transit Administration," n.d.). Some of the impacts the Federal Transit Administration would like to evaluate range from how ridership will increase because of improved bus speeds to the effect the Bus Rapid Transit will have on traffic ("Evaluation Introduction | Federal Transit Administration," n.d.). Even though this program evaluation is taking place on the national level Lane Transit District could still gain from this study because LTD could base their program evaluation on how the Federal Transit Administration evaluates their program.

Recommendations:

When looking at LTD service planning and the many different programs they use to provide service to the general population, there are 2 strategies that work with their system.
The first recommended strategy would be an Ecosystem Strategy. This strategy focuses on the use of several organizations using the Niche Strategy to come together to provide the recipients everything they need. Niche Strategy refers to a program that looks at one issue. The organization expects the program to have a certain effect, and the organization knows the program has the desired effect. LTD provides many services, from a large bus system taking you all over Lane County all the way to RideSource program, which "seeks to assist residents in accessing the most appropriate and cost-effective transit option for specific trips."(Ebrahim, pg. 85, 2019) These services provide different benefits to people. However, when combined together, they make an even greater impact than if they operated by themselves. When LTD does all these programs in unison, they have an effect, but it is difficult to determine which program is causing this. Instead of evaluating each individual service, you would evaluate the combined efforts
The other recommended strategy would be the Ecosystem Strategy. This is a strategy where LTD would utilize several other organizations to help expand their services and increase the success of their goals. This could include working with nonprofits, city governments, and even private contractors. Working with these groups would help boost the number of different services they provide, increase the service area, and increase the number of people who can use these services. Working in unison with other organizations and entities will help them more efficiently achieve their goals.

Analysis:

Both the Niche strategy and the ecosystem strategy are logic methods of measurement because both provide the necessary framework for a public agency program. The ecosystem strategy is optimal for LTD because of its functionality within a city as one of many providers of safe reliable transportation. By working with and gathering information from separate programs or for-profit private enterprise, LTD can determine if it is best served with the current program or if there is a necessary adjustment they should consider. Considering Niche measurements can also assist LTD. By looking through a Niche program analysis, LTD can simply measure the current purpose of the program, determine whether that goal is being fulfilled, then expand their ability if that is the feasible next step. For example, If LTD is to consider expanding to a new part of Eugene and establishing a bus stop/transportation route from that location, a Niche measurement determining whether or not current transport systems that are available around this area are being used, and if so, to what capacity? Once this has been determined, an ecosystem approach, for example perhaps working with Uber of the Taxi system to see how often rides are requested from this area can better help LTD determine if a new route is necessary.

The most helpful date relating to our measurement strategy relates to the current number of passengers a week that utilize the LTD system (B1). If more less users comes from one area and it seems that service could be used better in a different area that does not currently have access to the LTD program, it may be more worthwhile closing down one route in favor of another. As said above, a great measurement for this would be the sharing of data with private enterprise such as Uber, Lyft, and the Taxi service to determine where a need exists. Ultimately, service to unnecessary places coupled with an unhelpful schedule could cost LTD while not benefiting the community as was intended by the program.

Potential Limitations/Other Considerations

One thing to consider is how development of a community is often transit oriented. Although this transit focused development can fall under different categories based on the associated mode of transit; for example, urban downtown, neighborhoods and community town centre are all more likely to develop where there is a bus system. This transit-oriented development doesn't just impact how individuals will rely on certain modes of transportation over others, but it will also explain the differences in use between certain areas.

In order to effectively follow the ecosystem strategy, they must evaluate how the partnership with the University of Oregon impacts service rates and feedback. Although LTD is a reliable service provider; it's important to determine if it would be as successful if they didn't have that partnership. If UO students could not ride for free, would they still reach such a large 18-23 age range. That data would tie into the weekly number mentioned in the analysis, as students live in certain areas over others.

Developers should also consider the increasing modes of transportation present around LTD stops. For example, Uber, Lyft, PeaceHealth Bike Share and Oregon Taxi are all going to impact the amount of service LTD can provide. By comparing these programs while looking at the

demographics using each, will help LTD combine the Niche and ecosystem strategy. An effective approach would be to look into what other transportation systems may come to this area in the future years to see if they can pre-determine the markets they may struggle with the most. In our analysis and recommendations, we noticed how closely Niche and Ecosystem strategies intersect to strengthen results. This could limit the accuracy of overall analytics if one strategy produces incorrect or insufficient data. This is an important consideration to be aware of so measures can be put in place to protect recommendations if that is to occur.

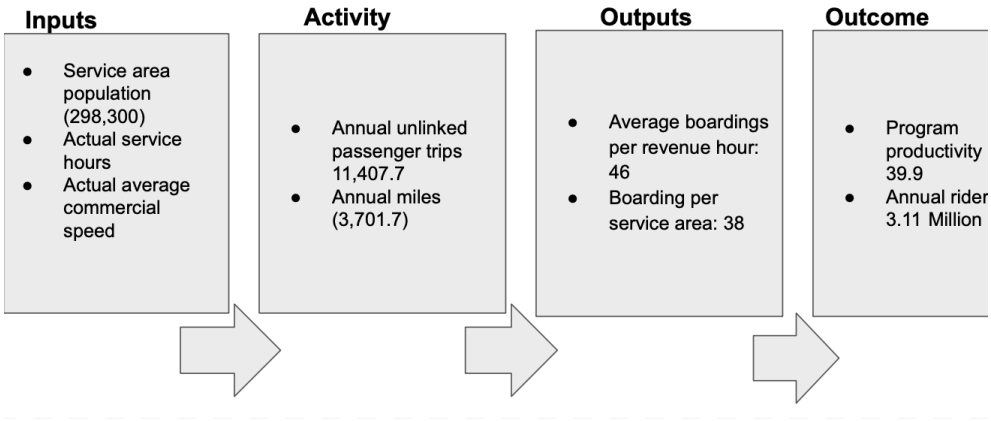
Conclusion

Performance data and service standards are important criteria for making service planning decisions. For LTD specifically, benchmarking is an integral way for LTD to learn new information about their services. For instance, benchmarking tracks the productivity and efficiencies of their current routes. It is a cost-effective technique that can measure how well LTD is serving its community.

In addition, LTD should consider an ecosystem strategy in partnership with other private, nonprofits, and governmental organizations in the community. This partnership would allow LTD to expand the number and quality of the services they currently provide. Furthermore, these community ties could also allow them to have access to more resources and power in order to achieve these goals in a timely and financially efficient manner.

The ongoing evaluation of LTD services allows planners to identify services that are performing well, as well as the others that are lagging. Evaluation markers would serve as an alert that a service either needs revision, elimination, or improvement. Continuous monitoring will provide the agency with the capability to track changes in the system's performance and identify transit trends in the area, such as spikes in ridesharing apps or PeaceHealth bike usage. Overall, these evaluation standards will lead to better service planning decisions.

Appendix A: Logic Model



Appendix B- Works Referenced

Currie, Graham. "Strengths and Weakness of Bus in Relation to Transit Oriented Development." *Reconnectingamerica.org*, reconnectingamerica.org.

Ebrahim, A. (2019). *Measuring social change: performance and accountability in a complex world*. Stanford, CA: Stanford Business Books.

Evaluation Introduction | Federal Transit Administration. (n.d.). Retrieved November 12, 2019, from https://www.transit.dot.gov/research-innovation/evaluation-introduction

SALINAS AREA SERVICE ANALYSIS-II Final Report. (2012).

Trompet, M., Anderson, R. J., & Graham, D. J. (2018). Improved understanding of the relative quality of bus public transit using a balanced approach to performance data normalization☆. *Transportation Research Part A: Policy and Practice*, *114*, 13–23. https://doi.org/10.1016/j.tra.2017.11.019

Instructions & Assessment Rubric

- This memo is worth the following percent of your grade:
  - 10% for 565 students | 15% for 465 students
- Here are a couple of standards for memo formatting and additional guidance. You may find others online.
  - https://wagner.nyu.edu/files/students/WritingMemos.pdf (from NYU Wagner School of Public Service).
  - https://twp.duke.edu/sites/twp.duke.edu/files/file-attachments/policy-memo.original.pdf (From Duke University)
- 3 Cs for good memo writing - compelling, clear and concise.
- Use appendices as needed to provide additional information, but stay focused in the main memo text. As an evaluator, an important first step is convincing program managers that you are clearly explaining *why* measurement is important and *how* it can be done.
- If you have questions about the measures in your topic area, how LTD currently uses them, or any other background information you may want, you are **encouraged to reach out to the following LTD staff**. The staff members are aware of the project, which is part of the Sustainable Cities Year Partnership at UO, and will do their best to respond or speak with you. However, please be respectful of their time and be professional in all your correspondence and communication with them.
- Contact information for LTD Staff
  - General Questions: Andrew Martin – Andrew.martin@ltd.org
  - Fleet Metrics: Matt Imlach - matt.imlach@ltd.org (541-682-6163)
  - Service Planning: Jeramy Card - jeramy.card@ltd.org (541-682-6148)
  - Operations: Mark Johnson – mark.johnson@ltd.org (541-682-6193)
  - Sustainability: Kelly Hoell – kelly.hoell@ltd.org (541-682-6146)
  - Risk Management: David Lindelien – david.lindelien@ltd.org (541-682-6152)
- Finally, this is meant to be a project that introduces you to an important part of an evaluation process, and also to give you the chance to encounter a field that you may not be familiar with. **You are NOT expected to be experts in transit**, or know the ins-and-outs of transit performance. Many external evaluators and even internal evaluators in large organizations like the World Bank are not domain experts or get to select the specific programs they evaluate.
- You should be able to complete the project in 2-3 weeks and find some useful ways to help LTD think about performance measurement differently. So be creative and have fun with this project!
- Assessment Rubric

	Excellent	Good	Fair	Insufficient
Quality of analysis and recommendations				
Integration of relevant course material as needed				
Organization and clarity of writing				
Creativity of ideas				

Appendix E

Sustainability

Future Sustainability Evaluation

MEMORANDUM

TO: KELLY HOELL, LTD

FROM: ALICE MORRISON, ADRIANA FLORES, JADE CHAMNESS, NINO DGEBUADZE, PAUL HERMAN

SUBJECT: FUTURE SUSTAINABILITY EVALUATION

DATE: 11/25/19

Executive Summary

The purpose of this memorandum is to present Kelly Hoell and her Lane Transit District (LTD) team with a new logic model based on two identified objectives (i.e. reducing negative net environmental and social impacts) and recommend new measurement metrics based on a review of internal metrics, ABBG metrics, and similar agency metrics. This document includes recommendations made by the Sustainability group on behalf of the Sustainability City Year Program at the University of Oregon, a Program Evaluation project collaboration.

Recommended measurement metrics:

- **Internal Metrics:** Since LTD is committed to a triple-bottom line approach, consider adopting new current internal metrics that reflect the three pillars of sustainability: **social, economic, and environmental measures**.
- **ABBG Metrics:** Consider measuring **pollution consumption, creating emission inventory profiles, and using infrastructure capacity** as a measurement strategy.
- **Similar Agency Metrics:** Consider using more specific GHG measures to support environmentally informed decisions around emissions and reductions. Examine select considerations and measurements developed by Chicago Transit Authority if interested in an expansion. Consider

additional tools and measurements to improve evaluation processes and strengthen their sustainability evaluation.

Section 1: Theory of Change (Logic Models)

LTD's existing sustainability theory of change is focused on the environmental benefits of transit, known as emissions displacement.[1] In the future, LTD hopes to take a more active role in reducing greenhouse gas emissions (GHG) through three key actions: developing new sustainability efforts, completing a fleet procurement plan, and increasing adherence to a triple bottom line approach.

Current Logic Model

LTD's sustainability theory of change revolves around the inherent environmental benefit of transit: emissions displacement. This concept encompasses the greater urban density encouraged by public transit. Urban density has two main benefits: it reduces vehicle miles traveled (VMT) for communities and makes walking and biking more attractive options as the distance between needed services is reduced. Essentially the current theory of change is: if transit exists in any form in the community, there will be benefits in the realm of reduced GHG emissions based on the urban planning and growth around a reliable transit network. LTD's current logic model exemplifies this viewpoint:

[1] LTD GHG inventory, meeting with Kelly Hoell, November 6, 2019.

Table A: Current Logic Model for LTD, Sustainability

Organizational Performance			**Social Performance**	
Inputs	Activities	Outputs	Individual Outcomes	Societal Outcomes
Fleet vehicles	Driving vehicles	Fuel consumed	Reduced VMT between destinations	Greater urban density
Fuel	Fueling vehicles	VMT of fleet vehicles	More trips partially taken by foot or bike	Reduced environmental toxicity
Route design		Passenger miles	Fewer single passenger vehicle trips	Reduced GHG emissions
Driver training		Tailpipe emissions		Less traffic noise

Possible Future Logic Model

Since creating the position of Sustainability Program Manager in 2018, Kelly Hoell and her LTD team have started to evaluate how to reduce negative net environmental and social impacts. For this memorandum, a new "possible future logic model" is developed with new and updated activities, outputs and outcomes that align with LTD's objectives (Table B, below). The theory of change detailed here includes the inherent, emissions displacement-based value but goes further. If these proposed future changes are enacted, the theory of change would be if LTD performs their service with lower GHGs (through methods described below) they will further reduce GHG emissions and negative community effects by promoting ridership along with urban density.

Please note: this model is based on our group's research and assumptions and is not the basis for our recommendations in Section 2. Recommendations are based on the current logic model and its goals (Table A, above).

Table B: Possible Future Logic Model for LTD, Sustainability

Organizational Performance			**Social Performance**	
Inputs	Activities	Outputs	Individual Outcomes	Societal Outcomes
Fleet vehicles	Driving vehicles	Fuel consumed	Reduced VMT between destinations	Greater urban density
Mix or renewable and nonrenewable fuels	Fueling vehicles	VMT of fleet vehicles	More trips partially taken by foot or bike	Reduced environmental toxicity
Route design	**Promoting renewable fuel use**	Passenger miles	Fewer single passenger vehicle trips	Significantly reduced GHG emissions
Driver training	**Building renewable fuel infrastructure**	Tailpipe emissions	**Renewable fuel options for public transit**	Less traffic noise

Strategy

Based on the LTD's positioning, a Niche strategy best describes its sustainability efforts. There is low uncertainty about cause and effect of public transit's impact (e.g. greenhouse gas emissions, fuel consumption by type) on the environment. However, LTD also has low control over outcomes as they cannot control the entire ecosystem in Lane County (e.g. individual behaviors, government regulations, and accidents). Therefore, when introducing new measurement, we consider developing metrics that correspond to LTD's Niche strategy.

Section 2: Measurement Strategy

Internal Metrics Recommendations

Since LTD is committed to a triple-bottom line approach, we suggest additional metrics that reflect the three pillars of sustainability.

- **Social measures:** Consider adding social measures to existing metrics to better convey LTD's contribution to the sustainability goals. Metrics are related to issues of equity and fairness of public transit (i.e. creating affordable transportation access for vulnerable individuals). They measure 1) accessibility for lower income families and people with disabilities, and 2) affordability and safety and security of fleet, such as public transport-related deaths. [2] For example, low-income households near transit indicators can measure the percentage of the population below the federal poverty level living 10 minutes walk from the transit station.
- **Economic measures:** Consider measuring per capita congestion delay, per capita transport energy consumption, efficient pricing, annual operating costs, average time per trip.
- **Environmental measures:** LTD already accounts for greenhouse gas emissions and fuel consumption. Consider also measuring noise levels, land area consumed by public transport facilities, waste from the vehicles, usage of renewable fuels, and the average age of fleet on the road.[3]
- **Additional measures** to consider: the satisfaction of citizens and variety and quality of transport options (social indicators), household expenditure allocated to transport (economic), transport emission costs (economic) and population exposed to noise (environmental).[4]

Recommendations of ABBG Metrics

Since 2011, LTD has participated in a private forum for U.S. transit systems called The American Bus Benchmarking Group (ABBG). LTD and the twenty-three other participating transportation system members are encouraged to achieve sustainable outcomes. While LTD has its own sustainability plans, it is important to note that improving macro-level sustainability outcomes requires supplementing in-depth environmentally focused indicators. **ABBG can further these sustainability standards by establishing additional metrics for their transit constituents.**

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[2] Chris De Grueter, Graham Curries, Geoff Rose (2016). Sustainability Measures of Urban Public Transport in Cities: A World Review and Focus on the Asia/Middle East Region, MDPI.
[3] Elements of Success: Urban Transportation Systems of 24 Global Cities. Mckinsey & Company, 2018.
[4] Marzieh Reisi, Lu Aye, Abbas Rajabifard, Tuan Ngo (2014). Transport Sustainability Index: Melbourne Case Study. *Ecological Indicators.*

ABBG has established a set of data item codes for transit systems to monitor performance.[5] The following measurement strategies are intended as comparable markers to further ABBG's sustainability performance data as a collective transit membership. The addition of these codes provides greater transparency and moves beyond compliance for responsible, sustainable assessment.

- Fuel consumption is a current ABBG metric. Consider measuring **pollution consumption** — specifically to determine noise and greenhouse emissions — to prioritize efforts in reducing emissions and toxicity levels.
- In addition to the current ABBG metrics, consider creating **emission inventory profiles**. Natural resource consumption metrics would provide a basis to include and determine the use of energy in relation to the sources of fuel types.[6]
- Consider using an **infrastructure capacity**[7] as a measurement strategy that intersects current and recommended measurements on a productivity level.[8] While ABBG currently defines fuel consumption and revenue seat capacity per mile, they might also consider how infrastructure affects low to high density environments, road conditions, and other service area characteristics.

These recommendations apply to ABBG metrics provided within the sustainability data theme and were adopted from best-practice transit research studies and corresponding agency approaches.[9] Please note that the code list provided to the Sustainability team is not exhaustive. ABBG's unique set of codes have been presented for the development of the sustainability theme measures (i.e. sustainability, fleet, operations, etc.)

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[5] Sustainability City Year Program, *Program Evaluation Project*. Sustainability Data Theme Item Codes.
[6] VIA Metropolitan Transit, More Than Just a Ride: The Community Benefits of VIA Metropolitan Transit, VIA Metropolitan Transit, San Antonio, TX, October 1997.
[7] Transit Cooperative Research Program. "*A Guidebook for Developing a Transit Performance-Measurement System*." Chapter 3: Case Studies of Successful Programs (2003): 60.
[8] VIA Metropolitan Transit, More Than Just a Ride: The Community Benefits of VIA Metropolitan Transit, VIA Metropolitan Transit, San Antonio, TX, October 1997.
[9] Sustainability City Year Program, *Program Evaluation Project*. Sustainability Data Theme Item Codes.

and do not encompass the full spectrum of potential metrics that could be used cohesively or intersectionally.[10]

Similar Agency Approaches & Background

In an attempt to gain a deeper understanding of sustainability measurements, we reviewed measurements used by two other transit agencies — Sun Metro in El Paso, Texas, Chicago Transit Authority in Chicago, IL — and an independent transit review organization, Victoria Transport Policy Institute. Notable shared measurements include: GHG, person miles of travel, and cars off the road. However, several measurements were identified for LTD to consider.

Sun Metro, El Paso, Texas: LTD should consider adopting Sun Metro's specific GHG measures, positioning LTD to make more environmentally informed decisions around emissions and reductions.[11] Sun Metro measures the following:

- Daily emissions of PM (particulate matter) per PMT (person miles of travel)
- Daily emissions of CO per PMT
- Daily emissions of ozone precursors NO (oxides of nitrogen) and VOC (volatile organic compound) per PMT

Chicago Transit Authority, Chicago IL: LTD should weigh the following considerations and measurements if they are interested in expanding:

- Natural features: Air quality, water, and biological, geology and soils
- Community features: Land use and economic development, environmental justice, historical and archaeological, visual quality, noise and vibration, displacement and relocations

[10] Hoell, Kelly. September 16, 2019. GHG Inventory Results, memorandum, Lane Transit District. Eugene, OR.
[11] Ramani, T. L., Zietsman, J., Ibarra, K., & Howell, M. (2013). Addressing Sustainability and Strategic Planning Goals through Performance Measures: Study of Bus Rapid Transit Systems in El Paso, Texas. *Transportation Research Record*, *2357*(1), 33–40. https://doi.org/10.3141/2357-04

- Vehicular traffic and parking features: Vehicle traffic volumes and speeds, vehicle diversion routes, and parking
- Transit, bicycle, and pedestrian features: Transit travel times and reliability, transit ridership and demand, and connectivity to bike-share
- Construction and operational features: Energy, safety, and hazardous materials

These measurements and considerations were developed by Chicago Transit Authority when they were evaluating the potential environmental impact of an anticipated 16-mile expansion. The evaluations were highlighted in an extensive report that explored the sustainability impact of the expansion.

The Victoria Transport Policy Institute: This independent transit review organization recommends the following tools and measurements LTD can use to improve their evaluation process and strengthen their sustainability evaluation.

- Global Footprint Network measures the estimated land and water resources for different activities and organizations.[12]
- Neighborhood Sustainability: Sixty urban sustainability indicators with useful quantification methods
- Happy Planet Index: Calculates the resources needed to create" happy communities"; takes into account the amount of resources consumed.

Conclusion

In conclusion, LTD is encouraged to consider the new logic model based on two identified objectives (i.e. reducing negative net environmental and social impacts) and new measurement metrics based on a review of internal metrics, ABBG metrics, and similar agency metrics.

LTD could improve their sustainability evaluation process by considering the adoption of new internal metrics, including social, economic and environmental measures, and similar agency metrics including more

[12] Ibid.

specific GHG measures to support environmentally informed decisions around emissions and reductions. ABBG might also consider adopting new measures regarding pollution consumption, creating emissions inventory profiles and using infrastructure capacity as a measurement strategy.

Please don't hesitate to reach out with future questions related to the recommendations in this memorandum. Our group appreciates your consideration.

Appendix A: Sustainability Data Theme Item Codes

Code	Data Item Description
Sustainability Data Theme	
FD11cS	Annual diesel vehicle passenger mile of standard vehicles in fleet
FD11cA	Annual diesel vehicle passenger mile of articulated vehicles in fleet
FD11bS	Annual actual total diesel vehicle mile of standard vehicles in fleet
FD11bA	Annual actual total diesel vehicle mile of articulated vehicles in fleet
FD11aS	Annual diesel fuel consumption in gallons of standard vehicles in fleet
FD11aA	Annual diesel fuel consumption in gallons of articulated vehicles in fleet

Figure A-1. The American Bus Benchmarking Group (ABBG) sustainability data theme item codes for the Sustainability City Year Program, Program Evaluation project.

Appendix F: LTD Performance Measures, 2019

Code	Data Item Description
Fleet Metrics	
SD2b	Total vehicle maintenance hours by vehicle maintainers
SD3c	Total vehicle maintenance support hours by vehicle maintenance support staff
SD6and7b	Total all paid absenteeism hours by vehicle maintainers
SD6and7c	Total all paid absenteeism hours by vehicle maintenance support staff
SD6b	Total paid & planned absenteeism hours by vehicle maintainers
SD6c	Total paid & planned absenteeism hours by vehicle maintenance support staff
SD7b	Total paid & unplanned absenteeism hours by vehicle maintainers
SD7c	Total paid & unplanned absenteeism hours by vehicle maintenance support staff
SD8b	Total unpaid & unplanned absenteeism hours by vehicle maintainers
SD8c	Total unpaid & unplanned absenteeism hours by vehicle maintenance support staff
SDbALL	Total ALL Vehicle Maintainer Hours [SDbi + SDbo for SD1-SD8]
SDbWORK	Total ALL Vehicle Maintainer Hours at Work [SDbi + SDbo for SD1-SD5]
SDcALL	Total ALL Vehicle Maintenance Support Staff Hours [SDci + SDco for SD1-SD8]
SDcWORK	Total ALL Vehicle Maintenance Support Staff Hours at Work [SDci + SDco for SD1-SD5]
B15	**Total Mechanic FTE**
B15a	Total Number of Full-Time Mechanics (Headcount)
B15b	Total Number of Part-Time Mechanics (Headcount)
FD1S	Total number of standard vehicles in fleet
FD1A	Total number of articulated vehicles in fleet
FD2S	Average age of standard vehicles in fleet
FD2A	Average age of articulated vehicles in fleet
10	**Number of Road Calls Due to Technical Faults**
11	**Total Lost Vehicle Miles**
BD1	**Age of buses**
BD1a	0-2 yrs
BD1b	2-6 yrs
BD1c	6-10 yrs
BD1d	10-14 yrs
BD1e	14-18 yrs
BD1f	18-22 yrs
BD1g	>22 yrs

LTD Contact Fleet: Matt Imlach – matt.imlach@ltd.org

541-682-6163

Code	Data Item Description
Operational Metrics	
16	**On-Time Departure Performance (%): Mixed**
16a	**On-Time Departure Performance (%): Electronic, 0 <> + 5 Minutes**
16b	**On-Time Departure Performance (%): Alternative Methodology**
17	Total Scheduled Vehicle Trips
17a	Total Missed Trips
SD1a	Total driving hours by drivers
SD4a	Total other at work hours by drivers
SD5a	Total training hours by drivers
SD6and7a	Total all paid absenteeism hours by drivers
SD6a	Total paid & planned absenteeism hours by drivers
SD7a	Total paid & unplanned absenteeism hours by drivers
SD8a	Total unpaid & unplanned absenteeism hours by drivers
SDa	Total PAID Driver Hours [SDai + SDao for SD1-SD7]
SDaWORK	Total ALL Driver Hours at Work [SDai + SDao for SD1-SD5]
B14	**Total Driver FTE**
B14a	Total Number of Full-Time Drivers (Headcount)
B14b	Total Number of Part-Time Drivers (Headcount)

Operations: Mark Johnson – mark.johnson@ltd.org

(541)682-6193

Code	Data Item Description
Service Planning	
1	**Total Passenger Boardings**
1W	Total "Wheelchair" Boardings
1P	Total ADA Paratransit Boardings
2	**Total Passenger Miles**
3	Scheduled Revenue Vehicle Miles
4	**Actual Total Vehicle Miles [4a + 4b + 4c]**
4a	Actual Revenue Vehicle Miles
4b	Deadheading Miles (non-revenue)
4c	Other Non-Revenue Miles
5	Scheduled Revenue Vehicle Hours
6	**Actual Total Vehicle Hours [6a + 6b + 6c]**
6a	Actual Revenue Vehicle Hours
6b	Actual Layover Vehicle Hours (non-revenue)
6c	Deadheading Hours (non-revenue)
9b(i)	Fleet in Use During Peak Hour
B1	**Number of average weekday passenger boardings (unlinked trips)**
B16a	**Size of service area (square miles)**
B16b	**Size of area served (square miles)**
B17a	**Population in service area**
B17b	**Population in area served**
B12	**Actual average commercial speed**
B12a	Actual average commercial speed in peak time
B12b	Actual average commercial speed in off-peak time

LTD Contact Service Planning: Jeramy Card – jeramy.card@ltd.org

541-682-6148

Code	Data Item Description
Sustainability	
FD11cS	Annual diesel vehicle passenger mile of standard vehicles in fleet
FD11cA	Annual diesel vehicle passenger mile of articulated vehicles in fleet
FD11bS	Annual actual total diesel vehicle mile of standard vehicles in fleet
FD11bA	Annual actual total diesel vehicle mile of articulated vehicles in fleet
FD11aS	Annual diesel fuel consumption in gallons of standard vehicles in fleet
FD11aA	Annual diesel fuel consumption in gallons of articulated vehicles in fleet
FdScapS	Annual actual total revenue seat capacity mile of standard vehicles in fleet
FdScapA	Annual actual total revenue seat capacity mile of articulated vehicles in fleet

LTD Contact Sustainability: Kelly Hoell – kelly.hoell@ltd.org

(541) 682-6146

Code	Data Item Description
Risk Management	
12a	Number of Preventable Vehicle Collisions
12b	Number of Unpreventable Vehicle Collisions
12c	Number of Collisions on Property
13	**Number of Passenger Injuries**
14	**Number of 3rd Party Injuries**
15a	**Number of Staff Injuries**
15b	**Number of Incidents Causing Staff Lost Time**
15c	**Total Staff Lost Time from Incidents (hours)**

LTD Contact Risk Management: David Lindelien – david.lindelien@ltd.org

541-682-6152

SCI Directors and Staff

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