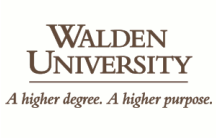

2015

Business Strategies to Improve On-Time Deliveries and Profits in Southcentral Alaska

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This is to certify that the doctoral study by

Donald R. Leaver II

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Abstract

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by

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Traffic congestion can cause late deliveries, decreased profits from vehicle fuel idling in traffic, and delayed distribution in tight delivery windows. The focus of this study was on developing strategies that business leaders could use to increase on-time deliveries. The conceptual frameworks for this case study were systems theory, traffic equilibrium theory, bathtub theory, and kinematic wave theory. Data were collected from semistructured interviews with 6 delivery service leaders from 3 delivery businesses in Southcentral Alaska. In addition, secondary data were collected from government information. Interview responses were coded to identify trends including delivery time, business activity, and amount of roadway congestion. Two major themes emerged from the interviews: time of day affecting when traffic congestion occurred, and limited alternate transportation routes causing congestion in Southcentral Alaska. The findings indicated that the best strategy to help reduce traffic congestion involved instituting toll optimization and high occupant vehicles lanes. The implications for effecting social change include how business leaders can help reduce traffic congestion using toll optimization, and how high occupant vehicle lanes could encourage Southcentral Alaskans to carpool.

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Section 1: Foundation of the Study

Southcentral Alaska experienced a population growth spurt affecting business delivery systems in the form of traffic congestion (Municipality of Anchorage, 2012). The population of Southcentral Alaska grew from 30,500 to approximately 380,000 between 1950 and 2013, which comprised half the population of the state of Alaska (Municipality of Anchorage, 2012). A portion of Southcentral Alaska encompasses two boroughs: the Municipality of Anchorage to the south, including Alaska's biggest city, and Matanuska-Susitna (Mat-Su) borough to the North (Municipality of Anchorage, 2012).

The state of Alaska boroughs closely equate to parishes in Louisiana, and counties in the rest of the United States (U.S. Department of Transportation, 2013). The increase in population affected the number of vehicles on Southcentral Alaska highways (Municipality of Anchorage, 2012). As traffic congestion increased, business leaders required effective strategies to increase or maintain on-time deliveries (Campbell & Ehmke, 2014).

In Southcentral Alaska, sensitivity to vehicle congestion by business leaders increased, as business production and profits decreased (Municipality of Anchorage, 2012). Strategies and incentives required consideration: alternate work hours or production centers outside congested areas (Chinnam, Güner, & Murat, 2012). Business leaders may alleviate traffic congestion, and help increase profits by increasing on-time deliveries to customers with sensitive supply chain requirements. In this qualitative case study, I explored strateties that business leaders could use to increase on-time deliveries.

Background of the Study

The population growth of Southcentral Alaska in the form of traffic congestion presented problems to business leaders desiring to increase profits by increasing on-time distribution to clients with critical supply chain deadlines (Qian, 2014). The population of Southcentral Alaska grew 80 % over 63 years causing traffic issues (Municipality of Anchorage, 2012). Southcentral Alaska commuters experienced 17 hours of yearly travel time (YTT) delay in 2011 (U.S. Department of Transportation, 2013). Travel time delay included the amount of additional travel time during the year, divided by the number of people who commuted in vehicles, in an urban area (U.S. Department of Transportation, 2013). One factor not discussed in any detail included how businesses delivery leaders explored strategies, such as alternate transportation, or shift in alternate work hours, might help reduce traffic congestion to increase on-time delivery of customer products.

Northern residents relied on human and natural resources for economic growth and sustainability (Hymel, 2009). Southcentral Alaska citizens relied on transportation infrastructure and services for mobility, economic activity, and connectivity to deliver goods and services (Municipality of Anchorage, 2012). The progress of transportation, specifically the transportation evolution in serving the population and traffic growth, constituted the character and function of the area, as well as the earnings of the business community (Maxwell, 2012).

Problem Statement

Traffic congestion negatively affects business profits because consumers demand merchandise in tight delivery window times (Campbell & Ehmke, 2014). Traffic

congestion cause delivery industry leaders in the United States to travel approximately 5.5 billion hours of extra travel time, $121 billion delay and fuel costs (or $818 per U.S. commuter) and $27 billion in truck freight moving costs (U.S. Department of Transportation, 2013). Business on-time deliveries continue to suffer because over 50% of travel-time delays are attributable to traffic congestion (Chinnam et al., 2012). The general business problem is that traffic congestion shrinks business on-time deliveries and reduces profits for the company. The specific business problem is that some leaders lack strategies to increase on-time deliveries.

Purpose Statement

The purpose of this qualitative descriptive case study was to explore strategies business leaders required to increase on-time deliveries. The population was comprised of three delivery businesses located in Southcentral Alaska. The sample included six business delivery leaders. The delivery businesses included food delivery, courier delivery, and freight delivery services.

The six participants were business leaders who were autonomously able to make decisions without supervision. I retrieved research documents and government sources from the Institute of Social and Economic Research at the University of Alaska Anchorage via the Internet. The information included publically posted information. A stratified purposeful sample of six business delivery leaders of three delivery businesses encompassed the participant pool in conducting the case study.

The research was essential for effecting social change, as business and transportation administration leaders in Southcentral Alaska determine suitable spending

strategies to reduce traffic congestion. The findings can contribute to social change by providing Southcentral Alaska business leaders strategies to reduce traffic congestion, which will lead businesses in the delivery industry to increase profits. In addition, the findings could change the way commuters travel to and from work by decreasing traffic congestion.

Nature of the Study

I used a qualitative method and case study design to collect and compare data in the business delivery industry to identify potential business strategies on ways to help increase business profits. Maxwell (2010) used quantitative methods to prove or disprove a predetermined state, compared states of living, or actions to each other. My intention was not to gather statistical information to examine traffic congestion; therefore, I did not select a quantitative method (Tashakkori & Teddlie, 2009).

Many qualitative designs exist, however qualitative researchers choose between five primary designs: (a) phenomenological design, (b) narrative design, (c) grounded theory design, (d) ethnography design, and (e) case study design (Yin, 2014). I considered each of the designs for the study. Yin (2014) used a case study design in social science investigations to explore the *how* and *why* of a phenomenon over time. Yin applied case studies by reviewing four components involving a study's (a) question, (b) proposition, (c) unit of analysis, (d) logic linking data to the proposition, and (e) the criteria for interpreting the findings. Yin used case studies to incorporate the most effective methods by providing organizational leaders' information on how to determine strategies, such as addressing traffic congestion. The strategies included increasing

profits through mechanisms, such as carpooling, alternate work hours, virtual employment, or productions centers located outside the city center.

Research Question

The central research question guiding the study was: What strategies do business leaders require to increase on-time deliveries? I used an open-ended, semistructured interview question format to answer the main research question. Semistructured interview questions provided in-depth responses from six participants (Scholz & Zuell, 2012). I interviewed six business delivery leaders and established data saturation. Data saturation refers to the breadth of information collected when interview contributions no longer add new information (Bunce, Guest, & Johnson, 2006). When data saturation occurred, I stopped the interview process.

My interview questions fell under three distinct categories. Questions 1-4 were focused on the problem and costs related to the problem. Questions 5-6 were about what changes the company has made in its delivery routes to avoid traffic congestion. Questions 7-8 were focused on what further changes were needed. The interview questions follow in the next paragraph (also see Appendix A).

Interview Questions

1. What traffic congestion issues, if any, is your company experiencing?
2. What are the costs from lost delivery times because of traffic congestion?
3. What changes have you experienced in traffic patterns over the past 5 years?
4. How have changes in traffic patterns affected your company profits over the past 5 years?

5. What driving pattern changes have you made, if any, to avoid traffic congestion?
6. What effect have these driving pattern changes had in terms of on-time deliveries of products?
7. What strategies do you use, if any, to circumvent key traffic congestion times within the delivery schedule?
8. What affect has changing delivery times and routes had on on-time performance?
9. What suggestions would you make deliveries more efficient for your company?
10. What further information can you provide to help me understand traffic congestion issues and your response to them?

Conceptual Framework

The conceptual framework involved four theories. The theories included: (a) systems theory, (b) traffic equilibrium theory, (c) bathtub theory, and (d) kinematic wave theory. What follows is an exploration of the four theories relating to traffic congestion and the effects congestion can have on the delivery of products and business profits.

Systems Theory

Systems theory includes a compilation of analyzing and approaching problems to find solutions through a team of scholars by optimizing at maximum frequency and minimal costs through a complex network of interactions (Von Bertalanffy, 1969). Von Bertalanffy (1969) published systems theory because politicians frequently requested an

approach to finding solutions to pressing problems, such as traffic congestion, in metropolitan areas. Systems theory involved many parts comprising a system, each possessing interrelationships with the other parts of the system. Von Bertalanffy concluded interrelationships boded noteworthy because the application of an external influence upon one part of a system affected other parts of a system. Traffic congestion involved an interrelationship between commuters and vehicles (Von Bertalanffy, 1969).

Traffic Equilibrium Theory

Traffic equilibrium theory involves urban commuter expressways, and peak-hour traffic congestion, balanced to meet increased maximum road capacity (Downs, 1962). Downs (1962) analyzed the near-equal amount of traffic on the roadway capacity during a 24-hour period by using commuter scenarios to form a set of assumptions. One commuting scenario contributed to the highest form of nontraffic equilibrium, which added to the amount of congestion (Downs, 1962). Additionally, Downs showed a corresponding decrease to business profits for businesses within traffic-congested corridors when morning and evening rush hour occurred. The theory of traffic equilibrium was appropriate for this study because the theory allows researchers to combine a set of assumptions with road capacity data to form valid results (Downs, 1962).

Bathtub Theory

Bathtub theory reflects the concept of water flowing into a bathtub corresponding to cars entering a traffic stream or freeway (Arnott, 2013). Arnott (2013) described the illustration of congestion bathtub theory, as water flowing out of the bathtub,

corresponding to cars exiting from the bathtub, and the height of water in the bathtub, corresponding to traffic density (Arnott, 2013). Arnott stated traffic velocity negatively affected traffic density, and the congestion outflow is the proportional multiple of the product of density and velocity. Above a critical density, outflow decreased as density increased (Arnott, 2013). When traffic demand increased relative to capacity by applying an optimal time-varying toll, the result generated financial benefits, which boded larger than financial benefits obtained from standard models (Arnott, 2013). The implications of the bathtub theory mimic the challenges Southcentral Alaskan commuters endured reflecting traffic congestion and the impedance of timely delivery of products.

Kinematic Wave Theory

The kinematic wave theory is the theory of traffic dynamics of vehicles in one direction assumed independence of vehicles to the opposite direction instantaneously (Jin & Zhang, 2013). Jin and Zhang (2013) suggested depending on time of the day additional traffic occurred in one direction than the opposite direction because of variable traffic dynamics. The variable in kinematic wave theory is freeway congestion because of the time of the day (Jin & Zhang, 2013). Depending on how long rush hour traffic occurred in one direction, business profit margins decreased for businesses along the congested corridor during the period (Kuwahara, Mehran, & Naznin, 2012). During a short time interval, traffic separated into a number of nonlinear resonant systems, correlated to time of the day depending on congestion (Jin et al., 2013). I used Kinematic wave theory of vehicle congestion to analyze traffic in Southcentral Alaska, because the

increased traffic dynamics affect business profits negatively when business delivery requirements fail.

Definition of Terms

Congestion delay: The travel time incurred because of traffic congestion between two geographic points (Celikoglu, 2013).

Congestion pricing: The price levied to travel across a highway, expressway, or limited access freeway (Charles, Ferreira, Tavassoli-Hojati, & Washington, 2013).

Cordon toll: The price levied regardless of the distance of the highway corridor traveled (Kilani, Lara, Palma, & Piperno, 2013).

Linear toll: The price levied to travel on the highway relative to distance traveled (Kilani, Lara, Palma, & Piperno, 2013).

Nonrecurrent congestion: When traffic congestion occurs on an arterial roadway because of redirecting of traffic from another roadway, because of the impedance of roadway construction or vehicle accident (Charles et al., 2013; Washington, 2013).

Peak hour traffic: The highest vehicle traffic on a roadway in a 24-hour period (Sweet, 2014).

Set partitioning scheduling: Set partitioning includes the ridership reliability used to formulate regional bus scheduling as multi-objective programming solutions with the minimum cost to buses (Bo, Ming, & Wen-Zhou, 2013).

Spatial accessibility: The process consists of the calculation of travel cost, which is in time or distance (Bland, Svenson, & Yiannakoulias, 2013).

Toll Optimization: The procedure consists of the flexibility for enforcing a charge for commuters to travel on managed roadway lanes (Arnott, 2013).

Traffic congestion: The oversaturation of vehicles above roadway capacity (Sweet, 2014).

Vehicle miles traveled (VMT): The number of miles a vehicle has traveled in the distance and time (Bhattacharjee & Goetz, 2012).

Assumptions, Limitations, and Delimitations

Assumptions

The first assumption that I made in this study included delivery leaders located in urban centers desired the reduction of traffic congestion to increase profits. Delivery service employers often analyzed changes in congestion levels to determine yearly profits by location, and prepared annual budget reports for product distribution decisions (Bland et al., 2013). The second assumption was that the delivery business leaders would self-identify as experts to contribute to research in understanding traffic congestion in the area. Business delivery leaders may not label themselves as proficient candidates to contribute to the study because of modesty, or a desire to avoid drawing unnecessary attention.

Limitations

One limitation of this study is that the findings and conclusions may not be applicable to populations outside the area of Southcentral Alaska, which included the Mat-Su Borough, and the Municipality of Anchorage Borough (labeled as Southcentral

Alaska in the study). Without further exploration of other business locations in the United States, generalization of conclusions may not be suitable.

Delimitations

The study included three delimitations: geographic location, type of business, and population. The geographic location of the study was Southcentral Alaska. The focus of the study involved three delivery businesses, including a sample of six business delivery leaders who managed product deliveries within Southcentral Alaska.

Significance of the Study

Traffic congestion negatively affects both worker access to employment centers, and the efficiency of product shipments (Hymel, 2009). Business leaders have ignored vehicle congestion as a problem contributing to profit loss (Hymel, 2009). Southcentral Alaska continues as a growing region in both population and vehicle congestion in which 90% of outside shipments arrive and depart from the area for commerce in the entire state of Alaska (Goldsmith, Killorin, & Larson, 2006). The amount of congestion continues to grow, which effects business deliveries in Southcentral Alaska.

When business leaders explain how to implement changes to help reduce traffic congestion and increase profits, business leaders suggest offering incentives to their employees to use alternate transportation, such as busses, bicycles, and taxis (Evans & Wener, 2011). Manager-developed plans include other processes, such as (a) alternate production centers located outside the urban core areas, (b) virtual employment using technology from home, (c) staggered work hours, or (d) cooperative agreements with other businesses to locate additional parking areas. In addition, business incentives may

enhance employee job satisfaction potentially increasing company profits, and reducing traffic congestion.

Contribution to Business Practice

I explored decreasing business profits because of traffic congestion in a growing U.S. region. By reducing traffic congestion, leaders in the business delivery industry could create efficiencies in delivery processes providing better services to related companies, and customers in the region, which could increase profits. Findings from this study might inform the Alaska Department of Transportation and Southcentral Alaska policy-makers on the preeminent ways to plan transportation corridors to reduce traffic congestion and increase business profits.

The sustainability of local businesses relied on well-organized traffic implementation (Hymel, 2009). Gaining perspectives from local businesses, leaders demonstrated the importance of the social partnership between business and community (Hymel, 2009). Southcentral Alaskans have mostly relied on natural resources for economic growth and sustainability (Municipality of Anchorage, 2011). Policy-makers (Maxwell, 2012; Municipality of Anchorage, 2011) pursued deeper perceptive of traffic congestion delays and transit services to address gaps among knowledgeable transportation policies, available travel options, and management of the transportation systems. Business gaps included: (a) potential impedance on congestion reduction strategies, (b) contributing to vehicle operating costs, such as additional fuel burned although parked in traffic, (c) higher pollution costs from engines idling, and (d) small

transport services to help reduce the amount of vehicles on the road (Goldsmith et al., 2006).

I developed a deeper understanding of business strategies needed to reduce vehicle congestion in Southcentral Alaska and increase business profits. Sensitivity to traffic congestion varies by industry regions, and attributable to differences in each industry sectors cost of required inputs (Treyz, Vary, & Weisbrod, 2003). Congestion slows metropolitan growth, inhibits agglomeration economies, and shapes economic geographies (Sweet, 2011).

Findings from this study contributed to the body of knowledge by exploring the negative effects of traffic congestion in northern regions, and explored alternatives for commuters in support of business strategies. In addition, the study significance reflected a growing desire by business leaders to alter paradigms to increase business profits because of traffic congestion. Business leaders in Southcentral Alaska recognize the population of the region continued to grow, and an effective congestion reduction strategy needed to be developed. This study was the first of its kind linking traffic congestion to lost business profits in Southcentral Alaska.

Implications for Social Change

The decrease in vehicle operating costs contributes to the (a) decline of additional fuel burned while parked in traffic, (b) decrease in higher pollution costs from engines idling, (c) increase in transportation sustainability and the effect on social change, and (d) promotion of economic growth and development to Southcentral, Alaska. Advancement of options to reduce traffic congestion and provide various solutions for ways to travel

may influence the economic growth of a community (Maxwell, 2012). The implication for social change can increase through community worth, and provide business leaders with the potential to thrive. Citizens willing to accept various initiatives before suggesting an approach to solutions could benefit by increased commerce, quality of life, and social effects. Learning about traffic efficiencies from key community stakeholders can tap into a wealth of information on consumers' behavior. The results can increase the effectiveness and efficiency of linking businesses to customers, thus simultaneously increasing customer satisfaction, and in improving profitability for business owners.

A Review of the Professional and Academic Literature

Assessing and prioritizing cost effective strategies to mitigate the effects of traffic incidents represented a challenge for road network managers (Charles et al., 2013). Transportation is an important part of residents' lives, by the traveling experience of commuters, the cost and speed of shipping freight for businesses, and the safety of transportation users (Municipality of Anchorage, 2011). Business leaders suffer profit losses because congestion affects business costs, productivity, and decreased on-time deliveries (Treyz et al., 2003).

Traffic congestion has increased vehicle-operating costs, such as additional fuel burned in traffic, and contributed to higher CO^2 pollution from engines idling (Goldsmith et al., 2006). Seventy percent of Southcentral Alaska employees have worked in an urban environment, versus 30% who have worked in remote rural areas (Municipality of Anchorage, 2011). Scholars, such as Charles et al. (2013) focused on the detection of

traffic congestion; yet little discussion exists on the movement of goods and services, on-time delivery of products, and the correlation of profit loss to businesses.

Traffic congestion affects business profits. Charles et al. (2013) determined traffic congestion directly influenced business costs, productivity, and output levels. Goldsmith et al. (2006) identified traffic congestion as the variable affecting the growth of U.S. and international cities in terms of movement of freight and services in a timely manner. Similarly, freight transportation mirrored regional planning efforts to reflect freight traffic (Gagliano, Goodchild, & Rowell, 2014). The results indicated that the success of freight delivery companies incorporate the relationship between on-time truck deliveries and supply chain efficiencies because of successful regional planning efforts (Gagliano et al., 2014).

To determine how previous researchers addressed how business leaders might help mitigate traffic congestion and increase on-time deliveries, I searched management-themed databases compiled by Business Source Complete, Science Direct, Google Scholar, and ABI/INFORM Complete. Topics researched included *business locations*, *production centers*, *warehousing*, *distribution centers*, *commuting*, *decision-making*, *expressways*, *freeways*, *highway transportation*, *peak hour traffic*, *traffic congestion*, *traffic equilibrium*, *traffic flow*, *traffic relationships*, *urban areas*, *urban highways*, and *urban transportation*. I used 149 academic and government sources to augment the study. I ensured the quality of material by confirming 88% of the sources were from peer-reviewed articles (106 of 121 peer-reviewed), published within 5 years of the anticipated graduation date. From the database searches, I developed 10 interconnected

themes and identified four theories that relate to traffic congestion and business delivery services from peer-reviewed literature.

Systems Theory

In the literature review, I explored four theories linked to the problem of traffic congestion affecting business on-time delivery. The four theories included (a) systems theory, (b) traffic equilibrium theory, (c) congestion bathtub theory, and (d) kinematic wave theory. Von Bertalanffy (1969) indicated automobile traffic is not the number of vehicles in operation, but included a system to plan or arrange.

Systems theory consisted of a compilation of analyzing and approaching problems to find solutions through a team of scholars, optimizing at maximum frequency and minimal costs, through a complex network of interactions (Von Bertalanffy, 1969). Additionally, system theory included analysis, which helped understand traffic congestion in Southcentral Alaska by examining the business problem of decreasing profits through lost time, which traffic congestion created. Von Bertalanffy stated politicians frequently asked for the systems approach to problems, such as traffic congestion in metropolitan areas. Orosz, Stepan, and Wilson (2010) indicated the goal of traffic modeling is to understand the fundamental macroscopic dynamics happening over a length of time including the formation and propagation of stop-and-go waves.

Systems theory could help explore how the macroscopic driving patterns during congestion emerged from driver behavior at the microscopic level (Orosz et al., 2010). The understanding of the driver behavior is invaluable when developing new control strategies for vehicular traffic (Orosz et al., 2010). Orosz et al. suggested scholars

explore emerging information technologies for the measurement, control, and optimization of decreasing traffic congestion.

Determining efficient, intelligent transportation systems provide engineers to achieve real-time traffic management by controlling traffic lights, and informing drivers via variable message signs about temporary speed limits (Orosz et al., 2010). In addition, vehicle cruise control devices and fully autonomous vehicles of the future could accomplish the goal of congestion-free and accident-free traffic (Orosz et al., 2010). The limitations of the theory included that the study research involved relatively small geographical area of Alaska.

Traffic Equilibrium Theory

Traffic equilibrium theory consists of the theory of urban commuter expressways and peak-hour traffic congestion, which balanced to meet increased maximum capacity (Downs, 1962). Traffic equilibrium is the near-equal amount of traffic on the roadway capacity during a 24-hour period (Downs, 1962). Downs (1962) analyzed a commuter decision-making model and its underlying set of assumptions.

Downs developed three commuting scenarios. Scenario 1: a city segregated with automobile-driving commuters only. Scenario 2: a city segregated with both automobile-driving and bus-riding commuters. Scenario 3: a city segregated with automobile-driving, bus-riding, and light rail commuters. From the three scenarios, scenario 1 contributed to the highest form of nontraffic equilibrium, which contributed to the amount of congestion (Downs, 1962). Additionally, Downs suggested a corresponding decrease to business profits for businesses located close to commuter expressways, when

morning and evening rush hour existed. Shi and Yu (2014) suggested using the traffic equilibrium model to measure vehicle turning volumes at road intersections for traffic volumes measured proportionally to road capacity. Measuring turning volumes at busy intersections helped avoid vehicle crowding at some road intersections, effectively promoting road network efficiency, reduced delay in the road intersection, and alleviated traffic congestion (Shi & Yu, 2014).

Bathtub Theory

Bathtub theory reflected the concept of water flowing into a bathtub corresponding to cars entering a traffic stream or freeway (Arnott, 2013). Arnott (2013) further described the illustration of congestion bathtub theory as water flowing out of the bathtub corresponding to cars exiting from the bathtub, and the height of water in the bathtub corresponding to traffic density. Arnott stated traffic velocity negatively affected traffic density, and the congestion outflow is the proportional multiple of the product of density and velocity. Above a critical density, outflow decreased as density increased (Arnott, 2013). When traffic demand increased relative to capacity, applying an optimal time-varying toll to generated financial benefits may be larger than financial benefits obtained from standard models (Arnott, 2013).

Kinematic Wave Theory

Depending on the time of day, traffic congestion could be heavier in one direction than the opposite direction (Jin & Zhang, 2013). Jin and Zhang (2013) described kinematic wave theory as traffic dynamics of vehicles to one direction assumed independence of vehicles to the opposite direction instantaneously. Jin and Zhang

suggested that depending on the time of the day, additional traffic occurred in one direction than the opposite direction. The variable in kinematic wave theory is not freeway lane capacity, but is the time of day. In addition, depending how long rush hour traffic occurred in one direction, business profit margins decreased for businesses along the congested corridor during the period (Kuwahara et al., 2012) During a short-time interval, traffic separated into a number of nonlinear resonant systems correlated by time of day to congestion (Jin & Zhang, 2013). Kinematic wave theory of vehicle congestion related to business profits (Jin & Zhang, 2013).

During traffic congestion, a higher number of vehicle operating costs and maintenance existed because of additional fuel burned, although parked in traffic, to higher pollution costs from engines idling (Goldsmith et al., 2006). Additionally, the byproduct of traffic congestion affected commuter drive time to and from places of employment (Goldsmith et al., 2006). Business leaders relied on evidence-based design strategies on natural resources for economic growth, (a walkable community) because of the limited transit services to transport workers to and from the worksites (Amekudzi, Barrella, & Bones, 2013).

Real-time Delivery Processes and Control

To increase on-time deliveries to consumers, researchers developed methods to close the gap on reducing traffic congestion, or at least tried to mitigate the effects of traffic congestion affecting on-time deliveries (Bock & Ferrucci, 2014). Genevieve (2014) noted that the delivery of goods in urban areas involved the responsibility of public and private companies order and deliver commodities in the interest of the

consumer. Travel demand models involved aiding infrastructure investment and transportation policy decisions (Gagliano et al., 2014). Unfortunately, travel demand models primarily reflected passenger travel, and most models in use by public agencies included poorly developed freight components (Gagliano et al., 2014). Freight transportation reflected an important piece of regional planning, and regional models should more accurately identify freight traffic (Gagliano et al., 2014). Freight research incorporated the relationships between truck movements and company characteristics in a manner sufficient to freight travel models (Gagliano et al., 2014).

The responsibility involved local governments for providing transportation models and the right infrastructure for roadway capacity (Hasser & Visser, 2010). One transportation model called the Dynamic Pickup and Delivery Problem with Real-Time Control (DPDPRC) model involved a real-world transport tool designed for express courier companies to integrate real-world aspects of crucial traffic modeling and simulation (Bock & Ferrucci, 2014). Various dynamic traffic events transpired unexpectedly during the day, such as new request arrivals, traffic congestion, and vehicle disturbances integrated in the simulation model (Bock & Ferrucci, 2014). The importance of methods and models of transportation involved the effectiveness of the measures implemented (Comi & Nuzzolo, 2014).

Off-hour delivery times also affected consumer Internet shopping (Browne, Nemoto, & Visser, 2014). Research indicated Internet shopping contributed to the biggest portion of home delivery of products resulting in traffic congestion (Browne et al., 2014). For young customers who consider convenience and speed as prerequisites,

online shopping became a new type of consumption (Chen, Liao, & Lin, 2011). The rapid changes of consumer behavior regarding Internet shopping during the last 10 years influenced patterns of transportation routes within urban areas (Browne et al., 2014). In addition, business-to-customer home delivery markets increased gradually, because virtual stores enlarged and developed, e.g. mail order, TV marketing, e-commerce (Chen et al., 2011).

In contrast, consumers regarded car convenience as an important determinant of where to choose to shop, and perceived shopping malls as a superior source of the convenience (Reimers, 2013). Additionally, shipping-fee charged by online retailers' affected customers order frequency and cart size (Jiang, Liu, & Shang, 2013). With the sole exception of parking close to desired stores, malls offer car-borne shoppers more access and parking (Reimers, 2013). Some of the changes resulted in increased pressure for road traffic networks to change in sensitive areas, which provided opportunities for the use of vehicles powered by alternative fuels by supporting certain sustainability strategies (Browne et al., 2014).

Another model researched by Globb and Regan (2003) tested a problem on the relationship between company leadership perceptions of the effects of traffic congestion on business operations, and adoption of a routing and scheduling (R/S) software to help reduce on-time delivery of products. Results indicated the R/S software worked when the demand to re-route drivers affected customers' requirements during traffic congested periods (Globb & Regan, 2003). The researchers identified which types of trucking

companies affected by congestion and which types likely to adopt such software (Globb & Regan, 2003).

Chen, Liao and Lin (2011) combined online shopping and home delivery, and attempted to use organization rules to determine unknown bundling of fresh products and non-fresh products in a hypermarket. Chen et al. divided customers in groups by clusters based on customer product preferences. The cluster preferences attracted customers in hypermarkets and established an effective and efficient online shopping and home delivery business model for business leaders (Chen et al., 2011). With an online shopping and home delivery model, business leaders expected to attract more customers, open up broader markets, and earn higher profits for hypermarkets (Chen et al., 2011).

Deblanc, Fortin, and Morganti (2014) stated e-commerce experienced steady growth over the past decade by widespread different segments of the population, including suburban and rural households. The authors indicated pickup points (a central repository located in the centrality of a neighborhood) represented a fast-growing alternative to home delivery, and accounted for approximately 20% of parcel deliveries to households in France (Deblanc, Fortin, & Morganti, 2014).

The research findings indicated pickup points included a well-established option to home deliveries, and the presence of pickup points covered urban, suburban, and rural areas (Deblanc et al., 2014). Although pickup point density in remote areas decreased faster than population density, rural e-consumers' accessibility to pick-up point sites reached a viable level (Deblanc et al., 2014). Pickup point services generated new types of business-to-business freight trips not yet included in urban freight models (Deblanc et

al., 2014). Applying the pickup point model could be a possible solution to less traffic congestion and faster delivery times. The limitations included the behavior of consumers willing to travel to pick-up points to retrieve customer products.

The primary objective of the models is to reduce the delay of the arriving product because of traffic congestion, which decreased profits for a company (Bock & Ferrucci, 2014). The objective of the DPDPRC model is to minimize vehicle-operating costs in response to dynamic traffic events, and enabled a real-time control approach to perform plan adaptations simultaneous to the execution of the transportation service (Bock & Ferrucci, 2014). According to Grant-Muller, Laird, & Mussone (2014), assessing the cost distribution (e.g., according to priority routes or urban traffic segments) included assessing the delivery of both transport objectives and wider social objectives. The authors' findings revealed a continuous adaptation of the transportation plan according to dynamic events improved the solution quality in many scenarios (Bock & Ferrucci, 2014; Globb & Regan, 2003). Perhaps the DPDPRC and the R/S models included scenarios will aid Southcentral Alaska to reduce on-time delivery of products to consumers.

Alternate Transportation Strategies

Business leaders lacked awareness on how traffic congestion affected an employer's organization (Rowangould, 2013). The awareness became important, particularly in an era of global markets, for both employment and productivity growth (Rowangould, 2013). The movement of people and commodities continued to increase and will outpace roadway infrastructure capacity in the United States (Rowangould, 2013). Moving larger products of commodities by freight rail rather than truck services

led to a potential cost-effective product delivery-time strategy (Rowangould, 2013). The limitation of alternate transportation model involved convincing the population commuter rail included tangible benefits to commuting, which decreased traffic congestion, and increased on-time deliveries.

Business delivery services, such as freight rail, not only offered a substitute for heavy industrial truck travel, but also produced cleaner, energy efficient, and safer alternatives than trucking services (Rowangould, 2013). According to Aminnayeri, Fatemi-Ghomi, and Hajiaghaei-Keshteli, (2014), rail transportation presented an efficient and inexpensive mode of transportation between supply chain partners. The process included a multi-model system, production, and rail transportation to deliver orders from a facility to warehouses (Aminnayeri et al., 2014).

The problem involved determining both production schedule and rail transportation allocation of orders to optimize customer service at a minimum cost (Aminnayeri et al., 2014). Researchers and government agencies suggested merging transportation and freight movement policies as an alternative to increase truck payload utilization to alleviate externalities produced by freight transportation (Mesa-Arango & Ukkusuri, 2013). Mesa-Arango and Ukkusuri (2013) stated understanding and enhancing the economic mechanisms led to freight consolidation eased the implementation of freight consolidation strategies, which increased profits for shippers and carriers, reduced freight-related negative externalities, and relieved traffic congestion.

A need existed for alternate transportation using commuter, or light rail, to move large sets of the population between employment centers and residential areas (Power,

2012). The number of commuter trips increased to 10.7 billion nationally, which is the highest in 1956 (Aminnayeri et al., 2014). In Southcentral Alaska, the bus system existed as a critical transportation link for economic viability (Goldsmith, 2009).

Every year, approximately four million passengers used the public transportation system in Southcentral Alaska, which provided an affordable means for employees and families to traverse the community (Municipality of Anchorage, 2012). Southcentral Alaska bus system carried approximately 45,000 bicycles a year allowing riders freedom once riders arrived at their destinations (Municipality of Anchorage, 2012). Population involved only a subset of what can be transported using alternate transportation (Power, 2012). Subway systems moved freight within a city business district (CBD) to enhance the smooth flow of goods, reduced the number of on-street unloading vehicles, and protected the environment (Ito, Kikuta, Tomiyama, Yamada, & Yamamoto, 2012).

The subway system mitigated urban transport problems, such as traffic congestion, environmental affect, and delivery delays, particularly during winter when heavy snowfall impaired traffic operation in the northern hemisphere (Ito et al., 2012). Aftabuzzaman, Currie, and Sarvi (2011) quantitatively measured homogeneously socioeconomic commuters' travel habits in a geographic region, using commuter starting and destination points. Fewer differences existed for commuting habits on light rail than with vehicle commuters, but vehicle commuters' exhibited higher levels of stress and increased negative moods (Evans & Wener, 2011). The context of commuter rail concluded the commuter mood might be positive, without the control of driving a vehicle

in traffic, by relying on public transportation to accomplish the same outcome (Evans & Wener, 2011).

Evans and Wener (2011) used a mediational method to analyze why negative moods existed in the traveling public during vehicle travel. Evans and Wener findings identified the effort and predictability of commuters, mostly accounted for the elevated stress associated with vehicle commuting. In contrast, Banister (2011) concluded, although the efficiency of light rail systems advanced, traffic congestion still increased by 20 percent.

Researchers analyzed the local bus and taxi services quantitatively by measuring consumer ridership and economic benefits (Bo et al., 2013; Goldsmith et al., 2006). The problem included understanding the correlation of uncertain environmental data, such as weather, traffic delay, or equipment malfunction (Bo et al., 2013). Bo et al. studied the problem using a set-partitioning method for trips completed by a bus service. Set partitioning is a method practitioners used to calculate ridership reliability, to formulate regional bus scheduling schemes, as a multi-objective programming solution, with the minimum expenses to operate buses (Bo et al., 2013).

Chen, Wu, and Yan (2012) studied taxi pooling using a trial-and-error experience-based method, and found taxi pooling is neither effective nor efficient. Additionally, government officials perceived the solution included increasing public transportation prices (Chen et al., 2012). The results indicated the demand decreased for accessible transportation, especially to accommodate the population with small children, senior

citizens, and the temporarily and permanently disabled (Power, 2012). The population perceived no tangible benefits to a taxi service (Power, 2012).

Many cities, such as Denver, Colorado, incorporated aging public structures, and underdeveloped, or inadequate transportation systems to support growing metropolitan centers (Ding, Lin, Wang, & Xie, 2012). Denver engineers' solution involved the construction of a light rail system to help reduce traffic congestion (Ding et al., 2012). Bhattacharjee and Goetz (2012) analyzed Denver's Vehicle Miles Traveled (VMT) data, from 1992 to 2011, to determine the success of the light rail system. Bhattacharjee and Geotz used the temporal analysis method through insight into changes in the level of highway traffic, before and after the opening of three light rail segments, which included the Central, Southwest, and Southeast Corridors. Bhattacharjee et al. findings indicated light rail reduced the level of traffic along some of the adjacent highways for a short period by 40%, although vehicle congestion still occurred.

Although freight rail, light and commuter rail, bus service, and taxi service reduced traffic congestion throughout urban areas on a minimal level, alternate transportation commuting times and distances to employment centers increased (Evans & Wener, 2011). Additionally, vehicle congestion affected the environment, as well as health consequences for travelers, because of stress from the commuting trip, also increased (Evans & Wener, 2011). Researchers indicated planning for sustainable alternate transportation systems ought to incorporate the broader effects on system effectiveness, environmental integrity, economic development, and the social quality of life (Amekudzi et al, 2014; Haire, 2009; Sedelmaier, 2003).

Congestion versus Supply Chain Strategies

Business leaders reduced manufacture expenses by minimizing production costs to moving locations outside city limits because of traffic congestion and time-delivery of products (Fathian, Jouzdani, & Sadjadi, 2013). Bland, Svenson, and Yiannakoulias (2013) studied geographic, spatial accessibility variations by asking important questions concerning the efficiencies of the production processes. Business leaders determined efficiencies by where business services locate (Bland et al., 2013).

One example included freight delivery locations, such as adjacent to major airports for shorter delivery times, faster sorting, and processing (Bland et al., 2013). Practitioners labeled the location method as spatial accessibility (Bland et al., 2013). Spatial accessibility is a method linking the calculation of travel time and distance (Bland et al., 2013). The advantage is to combine production and transportation services, thus eliminating the incurrence of traffic congestion by traveling across town (Bland et al., 2013).

Fu, Huo and Zhao (2012) noted the problem of production scheduling and coordination, delivery-time window, and capacity constraints. In the study, Fu et al. determined a company could earn an increased profit only if employees manufactured products within a production window, and delivered products before the product's committed delivery-time. Business leaders interested in increasing profits monitored the product manufacturing and delivery process to maximize the profit line and minimized capacity constraints (Fu et al., 2012).

Supply chain strategies often involved market characteristics including price, service level, delivery-times, and various quality-like performances (Qian, 2014). For various market divisions, the market characteristics, such as customer sensitivity on behavior, fluctuated between operation performance terms of cost, delivery time, service level, and quality (Qian, 2014). The supply chain strategy applied, also, to investment decisions on costs and product delivery-time reductions (Qian, 2014).

Effective supply chain strategies included a maximum value in spending to reduce delivery-times and improved the service-level quality. Qian (2014) suggested one firm focus more on cost reductions, or quality-like performances, based on market characteristics, although another firm focuses on best market segments with better supply chain performances, resulting in better product delivery-times (Qian, 2014). Increased competition in business environments required firms provided not only quality, but also timely service with minimal cost (Bookbinder & Ulku, 2012).

Hoque and Juman (2014) indicated transportation costs produced an important role in logistics and supply chain management from multi-source to multi-destination. Considerable attention in minimizing the cost of transportation within the distribution process including fixed supply and demand quantities varied within a certain range in a period because of the disparity of the global economy (Hoque & Juman, 2014). The transportation problem received attention from researchers who developed an interrelated model included the inventory costs during movement of products and the cost associated with the product destination (Hoque & Juman, 2014).

Hoque and Juman cultivated a theoretical analysis on developing the lower and the upper bounds of transportation costs and product distribution using heuristic solution techniques to the model. A comparative study on solutions of small size numerical problems showed promising performance of the upper bound technique (Hoque & Juman, 2014). Additionally, Hoque and Juman findings indicated a number of choices of supplies and demands within the model's respective range increased as the number of suppliers and buyers increased.

Offering a delivery-time guarantee increased the demand for a product or service, or provided a firm to charge a price premium (Bookbinder & Ulku, 2012). The concepts of lean manufacturing, emphasizing more on cost reduction, and flexible or agile manufacturing combined accordingly based on market characteristics (Qian, 2014). Aaltonen & Mutka (2013) showed that although project-level business models often derive top–down from firm-level business models, project managers also created autonomous business models included a bottom–up effect on a firm by shaping existing business models.

Bland, Svenson, and Yiannakoulias studied spatial accessibility calculating time and distance between consumer demand locations based on travel costs and the supply chain efficiencies. Bland et al. analyzed a gravity-based measure of spatial accessibility to provide similar information, for both travel cost metrics and supply chain processes. Researchers,' such as Bland et al. (2013) found spatial accessibility is a potential strategy a business owner used to help increase supply chain processes. Production costs,

correlating with travel costs at production locations, increased efficiency of the supply chain by increasing business profits (Chen et al., 2013).

Gendreau, Kopfer, and Wang (2014) analyzed the transportation planning process of a freight business and indicated the benefits of including external resources. To improve profitability, freight business leaders organized their company's operational transportation planning systematically (Gendreau et al., 2014) The freight companies considered not only their company's own fleet, but also vehicles from closely related subcontractors in vertical cooperation, autonomous common carriers on the transportation market, and cooperating partners in horizontal coalitions (Gendreau et al., 2014).

By introducing subcontracting, the conventional routing of own vehicles extended to an integrated operational transportation planning, which simultaneously constructed fulfillment plans with the lowest costs using the own fleet and subcontractors' vehicles (Gendreau et al., 2014). A combination with development strategies increased the profitability by exchanging invitations among partners in horizontal coalitions. Findings showed cost reductions using the planning approach (Gendreau et al., 2014). The effective model provided a strategy to help reduce traffic congestion to boost on-time deliveries and increased company profits.

Business Economic Toll Road Strategies

Traffic congestion affected the growth of urban economies (Charles, Ferreira, Tavassoli-Hojati, & Washington, 2013). One technique city policy-makers used to control congestion is to introduce road-charging methods called toll roads (Kay, Nan, Nikolas, & Rashid, 2012). Kay et al. (2012) indicated toll road pricing, and newer

transportation policies, reduced traffic congestion in transportation networks, such as freeways and expressways. Government officials encouraged the use of tolls roads to increase transportation subsidies although reducing vehicle congestion (Kay et al., 2012).

Policy-makers suggested using roadway tolls for governments to benefit from the profits for highway maintenance (Hensher & Mulley, 2012). Hensher et al. (2012) predicted reform of road pricing to become popular, as a form of road maintenance subsidies, for major cities in the future. The challenge of road pricing included convincing commuters to pay the increased cost of tolls, which discouraged governments to apply road charges to commuters (Hensher et al., 2012). However, toll road optimization reduced traffic congestion, and added billions of dollars in revenue for urban areas (Yu, 2011). Tax revenues increased from the growth induced by freer-flow travel, which included three to five times than the costs of non-toll roads (Yu, 2011). The economic cost of congestion validated the need for expenditure on increased roadway capacity (Low & Odgers, 2012).

Holguin–Veras (2011) studied the analyses of time–distance pricing and comprehensive financial policies targeting delivery carriers and customers involving tolls and incentives for behavior change regarding delivery-time choices. The research indicated, though delivery carrier tolls levied on customers as an additional fee, and provided an incentive for behavior change, the magnitude of the expected toll transfers under real life conditions indicated too small to have any meaningful effect on consumers' choice of delivery-times (Holguin-Veras, 2011). Researchers developed mathematical formulations to gain insight into the best way to distribute financial

incentives to consumers of urban deliveries to maximize participation in off-hour deliveries (Holguin-Veras, Jara-Diaz, & Silas, 2012). The key conclusion showed to change the joint behavior of carrier and customer, financial incentives (or programs foster unassisted off-hour deliveries) should be made accessible to customers in exchange for deliverers commitment to do off-hour deliveries to avoid congestion (Holguin-Veras, 2011).

Yu (2011) findings suggested an additional pleasant travel experience through improved access reducing congestion by 10% to key employment and retail centers, and produced entrepreneurship of increased business within a region. Although small in percentage, the strategy of using billions of dollars from a region's toll costs, benefited employers and employees by increased productivity and business profits (Treyz et al., 2011). Residents spent up to 141 million hours per year delayed in traffic, at an estimated annual cost (in wasted time and fuel) of $3.3 billion (Poole, Rubin, & Swenson, 2012). The wasted fuel affected carbon dioxide emissions (CO_2) of idling vehicles, which contributed to greenhouse gasses.

Congestion pollution Mitigation Strategies

The effects of vehicle exhaust through vehicles idling in traffic appeared substantial (Akbar & Dulal, 2013). Urban area vehicle exhaust contributed to approximately 75% of the global energy consumption, and up to 80% of global greenhouse gas emissions (Akbar & Dulal, 2013). Cavallaro and Nocera (2012) indicated approximately one-third of vehicles produced a significant role of CO_2 emissions. The reason traffic emissions increased during the last two decades stems from

the increased number of vehicles on highways (Igamberdiev, Mahmod, Pueboobpaphan, & Van Arem, 2010).

Vehicle emissions produced the key source of air pollution in urban areas (Figliozzi, 2011). Additional vehicle congestion, during peak morning and evening hours, increased environmental, social, and political pressures, and limited the negative effects associated with CO_2 pollution (Figliozzi, 2011). Policy-makers planned to reduce CO_2 emissions by designing regulations forcing vehicle manufacturers to increase the use of carbon-neutral alternative fuels (Cavallaro & Nocera, 2012).

Local governments in Southern California requested assistance in the desire to reduce a minimum of 80% of CO_2 vehicle emissions (Figliozzi, 2011). To aid the local government, researchers,' such as Asakura, Ishida, Kitaoka, and Mori (2012) created multiple reproductions of traffic congestion models through large-scale networks of vehicle directions and unique start-stop traffic flows. Askaura et al. (2012) presented various calculations of CO_2 emissions because of vehicle tracking devices installed to correlate with real-time data although maintaining normal vehicle operations, which assisted in the reduction of CO_2.

Reducing CO_2 emissions, in many cases, appeared not a priority for local governments because policy-makers encountered increasing competing priorities (Akbar et al., 2013). Business leaders desiring to increase profits needed to encourage the efficiency of supply chain management, production processes, and commercial vehicle movements (Akbar et al., 2013). Additionally, although ensuring the efficiencies, organizations needed to promote environmental quality, livable communities, and

economic growth (Figliozzi, 2011). The complex dynamic and stochastic environment affects commuter traffic moving daily on the urban area highways (Pan, Sumalee, Szeto, & Zhong, 2011).

Another option to help combat CO_2 pollution is the reduction of urban sprawl (Nash, 2012; Williamson, 2013). The minimized amount of traffic on roadways involved incorporating livable communities in the urban core (Nash, 2012; Williamson, 2013). Urban population growth spawned new developments in environmental, traffic management, and legislation policies, which led urban policy-makers to implement state growth management programs (Nash, 2012). Past policies generated discussions, from Alaskan communities, on the future population growth of Southcentral Alaska (Goldsmith, 2009). Although the Eisenhower interstate system aided the United States to connect metropolitan areas, urban sprawl increased in an unparalleled rate, which contributed to increased traffic congestion (Williamson, 2013).

Warehouse Location Strategies

Business suppliers suggested congestion strategies by locating production centers away from the distribution networks to avoid vehicle congestion (Geunes & Konur, 2011). Urban distribution workers required carriers to deliver goods to receivers within specified time windows (Taniguchi et al., 2011). Transportation, warehousing, retail, and manufacturing sectors comprised the highest production cost among business ventures (Fosgerau & Lindsey, 2013).

Business suppliers analyzed solutions by increasing truck packing to heavier, longer, wider, and higher to reduce vehicle congestion (Cosgrove & Holahan, 2012).

Researchers,' such as Geunes et al. (2011) used the symmetric model to identify changes in congestion levels and costs, which affected production locations and distribution decisions. Additionally, businesses addressed urban freight flows by implementing a novel agent-based method to analyze the effect of warehouse congestion (Ciarallo, Heath, & Hill, 2013).

Based on traffic surveys, researchers estimated 13.4% of vehicles entering a CBD included delivery/service vehicles (Casey, Rao, Mantilla, Pelosi, & Thompson, 2013). Crainic, Mancini, Perboli, &Tadei (2012) findings indicated urban freight delivery travel cost decreased although fixed, operational, and environmental costs increased. The results further indicated the expected dynamics of the symmetric competitive location model deconflicted with business profits, particularly with business expansion (Ciarallo et al., 2013).

Bryan and Srinivasan (2014) presented a stochastic model assessing the value of real-time shipment tracking information for supply systems consisted of a retailer, a manufacturer, and multiple stages of transportation. The process started by the retailer receiving demand for a product from a customer, and the retailer placed the customer order to the manufacturer (Bryan & Srinivasan, 2014). Shipments sent out by the manufacturer moved through multiple stages before the product reached the retailer, where each stage represented a physical location, or a step in the replenishment process (Bryan & Srinivasan, 2014). Findings indicated when a lack of information existed in the shipment process, information on the order status in the supply system included

necessary tracking for the retailer to calculate orders every time to lower the long-run average cost of the supply systems process (Bryan & Srinivasan, 2014).

Bard and Jarrah (2013) presented a strategic network design problem faced by retrieval and delivery companies operating in metropolitan areas serving two or more classes of customers. Researchers targeted a division of the population treats commercial and residential customers separately; a situation motivated by consumer respective geographic densities and the size and frequency of consumer demand (Bard & Jarrah, 2013). Bard and Jarrah instituted a study implementing scenarios combined two retrieval and delivery networks involving commercial and residential consumers to determine the best process-analysis results.

The authors determined demand vehicle capacity, time on the road, and the aspect ratio of the individual led to a complicated clustering problem with variable constraints (Bard & Jarrah, 2013). The results showed a significant reduction in fleet size achieved when the two networks combined (Bard & Jarrah, 2013). The findings also indicated small reductions existed when separately maintained resultant clusters satisfied certain desirable properties (Bard & Jarrah, 2013).

Traffic Congestion Reduction Strategies

Traffic congestion incorporated various delays and impedances (Ison, Quddus, & Wang, 2009; Maxwell, 2012). The problem studying congestion is to differentiate between intrinsic delays and the impedances of vehicle congestion (Ison et al., 2009). Congestion also affected delivery carriers' cost structure as congestion worsened the relative rate of wages and overtime (Figliozzi, 2011).

Researchers, such as Celikoglu (2013) studied traffic congestion by producing congestion dynamic models along freeways and arterial corridors. The models represented the net vehicle inflow from ramps as a location-dependent function of the demand, to vehicles entering and exiting the highway (Celikoglu, 2013). Arnaout and Bowling (2011) modeled the congestion dynamics by using the Cooperative Adaptive Cruise Control (CACC) method. Arnaout et al. examined the analog CACC method in a traffic network versus a digital geospatial-positioning system (GPS).

The scholars (Arnaout et al., 2011) findings indicated the vehicle velocity of a preceding vehicle in a freeway network differed by the use of the CACC system versus a digital GPS system. Using a traffic simulation model of freeway on-ramps, Arnaout and Bowling implemented disturbances by triggering stop-and-go traffic, and used the CACC system to examine the effect on the traffic performance (Arnaout et al., 2011). Researchers,' such as Jia, Tao, Tian, and Yuan (2013) demonstrated the CACC methodology included effective understanding why delays occur, which provided policy-makers to implement effective congestion mitigation techniques.

Cortes, Grosso, Guadix and Munuzuri (2012) indicated one most common regulation in both medium and large cities involved the establishment of delivery-time windows, whereby delivery vehicles can only access the most innermost and congested areas of the city during a pre-specified time of day. To help understand how delivery-time windows affected traffic congestion, the authors established a system of mini-hubs where delivery vehicles idled at the mini-hubs, and the final deliveries of products completed on foot (Cortes et al., 2012). Given the optimal location of the mini-hubs

included the right location for the operation of the system, the authors formulated a location model, and applied a computational process based on genetic algorithms to optimize the model (Cortes et al., 2012). The findings showed the delivery of freight in urban areas using mini-hubs lessened the restrictions and regulations previously constrained the efficient flow of goods to consumers (Cortes et al., 2012).

High Occupancy Vehicle Lane Strategies

Governmental officials in metropolitan areas, such as Phoenix, Arizona, implemented a variety of strategies to reduce traffic congestion and delays (Brennan, Le, Poe, Sarath, & Short, 2012). The strategies ranged from enlarging infrastructure capacity, encouraging carpooling through High Occupancy Vehicle (HOV) lanes, and charging vehicle commuters by using traffic tolls, and other various methods (Sweet, 2014; Brennan et al., 2012). Researchers,' such as Bento, Hughes, and Kaffine (2013) investigated carpooling lanes, and indicated traffic congestion decreased when fuel prices increased. Policy-makers encouraged carpooling, when the presence of a carpool lane provided a substitute to driving alone (Bento, Hughes, & Kaffine, 2013).

Motorists on highways with an HOV lane experienced a 30% decrease in vehicle congestion compared to a highway without an HOV lane (Bento et al., 2013). Drivers, who travelled in HOV lanes, observed an immediate decrease in traffic congestion (Bento et al., 2013). Commuters also responded positively to the increased fuel costs over time (Bento et al., 2013). Drivers' positive response to the increased fuel costs suggested commuters considered carpool formation positively affected the decrease in traffic congestion (Bento et al., 2013).

Kilani, Lara, Palma, and Piperno (2013) used a monocentric method to illustrate how HOV lanes affected business profits using tolls in the proximity of business centers. Scholars (Kilani et al., 2013) considered a non-linear toll compared to a cordon toll. The results indicated driver decisions for different sub-systems of a transportation network differed whether HOV lanes in a controlled access freeway, or driving on an urban arterial highway (Kilani et al., 2013). Businesses located in the operational network study area exhibited a decreased amount of business profits, by vehicles traveling on HOV lanes (Haddad, Geroliminis, & Ramezani, 2013).

Similarly, urban areas also used dynamic message signs (DMS) as electronic signs displayed messages on roadways; providing travel times, traffic congestion, AMBER alerts, and special events (Khattak, Lochrane, & Chandra, 2012; Terroso-Saenz, 2012). Researchers,' such as Khattak et al. (2012) implemented quantitative congestion studies through count-data models (either Poisson, or negative binomials and their extensions), and developed a relationship between the frequencies of traffic crashes. The results indicated traffic flow increased two-fold when traffic accidents occurred (Ison, Quddus, & Wang, 2010). Businesses need to understand carpooling exists as an important strategy to mitigate traffic congestion (Ison et al., 2010). Another strategy to mitigate traffic congestion is traffic technologies.

Traffic Technology Strategies

Engineers advanced traffic technology research to an increased level, which scholars accurately collected meta-data in real-time traffic inputs, through systems, such as the intelligent transportation systems (ITS) (Jianming, 2012). Some of the technology

systems displayed through internal sources by cooperative vehicular system designs (Rietveld, Van Ommeren, & Wentink, 2012). Route guidance is an example of internal technology helped to reduce traffic congestion, by considering the general equilibrium effects of information (Rietveld et al., 2012).

Vehicular research methods, such as the CoTEC (Cooperative Traffic congestion detection) method, included novel-cooperative techniques, based on Vehicle-to-Vehicle (V2V) communications (Bauza & Gozalves, 2012). Engineers designed the CoTEC method to detect traffic congestion, and incorporated a large-scale, highway scenario in a vehicular system, using an internal computer system called iTETRIS© (Bauza & Gozalves, 2012). The software is a unique open-source simulation platform, which software engineers created to investigate the effects of cooperative vehicular systems (Bauza & Gozalves, 2012). Researchers,' such as Rietveld et al. (2012) collected meta-data using the ITS technology to examine traffic congestion velocity, vehicle flow, and traffic statuses of certain road segments in vehicles internally as route guidance. Additionally, to add to research, the authors suggested a heuristic method to examine information on what causes drivers to change their departure times, in a way to exacerbate congestion (Rietveld et al., 2012).

The authors (Boussetta, Diaz, & Gomez, 2012) findings indicated actual ITS technology relieved the broad spectrum of challenges, which affected modern traffic infrastructures. However, many cities operated without the implementation of the ITS technology for many years (Boussetta et al., 2012). The ITS engineering and related

software is an innovative and effective strategy for road traffic management and safety (Bauza et al., 2012).

Congestion Management Strategies

Bachman, Gurgel, Sabina, Simas, and Xu (2012) perspective on congestion management data provided a supplemental view on regional performance for congestion management and directly related to residents, on the development of livability and mobility standards. For example, metadata, in the form of global positioning systems (GPS) generated vehicle travel performance metrics in Denver, Colorado, calculating travel time indexes, number of stops, and traffic delays (Bachman et al., 2012). Engineers minimized commuter travel delay, by altering signal control systems on arterial roads (Bachman et al., 2012). Calculating travel time indexes highlighted the capability of generating temporal-related utility in the urban economy by providing the goods required by the end-consumers at the right time in the right place (Corazza, Musso, & Tozzi, 2013).

One method called *responsive signal control for arterial*, or RESSICA, is a case-based reasoning (CBR) method, formulated to control traffic congestion, by matching traffic patterns and corresponding signal timing plans (Hossian, Kattan, & Radmanesh, 2011). Scholars, such as Hossian et al. (2011) tested the RESSICA method, in a corridor network, with four signalized intersections, under various levels of non-recurrent congestion scenarios. The results indicated the RESSICA method outperformed the existing pre-timed/actuated signal control system by reducing travel time, delay, stop delay, and intersection delay in the study area (Hossian et al., 2011). Hossian et al.

further used the RESSICA method to decrease high traffic fluctuations at multiple intersections.

Wen and Yang (2013) used another method, called Arena, to combine the research by analyzing inter-arrival times and inter-departure times of signal control systems, at intersections, simulating the arriving and leaving times of cars on road. Wen et al. showed efficiencies occurring in traffic systems urban areas because the average waiting time of cars at every intersection sharply dropped when red light durations decreased and green light durations increased. Hossian et al. (2011) and Wen et al. (2013) included very effective findings to reduce traffic congestion using the Arena and RESSICA methods.

During emergencies, the value of efficient traffic systems, in urban areas increased; because of natural disasters occurred such as hurricanes (Chung, 2012). Chung (2012) showed weather emergencies incurred negative effects on traffic congestion. The growing requirement for designing effective evacuation plans increased when multiple storms occurred in a short timeframe (Fernandes, Fonseca, & Moynihan, 2011). The traffic congestion resulting from simultaneous evacuation of several million residents reduced the effectiveness of the evacuation plan (Fernandes et al., 2011). Louisiana included one area of the country prone to hurricanes, besides Florida. Baton Rouge, Louisiana, (the state capital) ranked at the bottom for traffic congestion, among medium-sized urban areas (Antipova & Wilmot, 2012).

Feng, Xu, and Zhu (2012) previously determined avoiding sections of highway possessing traffic congestion positively affected the orderly evacuation process. Baton

Rouge engineers constructed two bypasses, expanded highway capacity, and used a travel display method to estimate travel for each alternative. Engineers analyzed reduction in travel time, resulting from implementation of each alternative (Feng et al., 2012). Researchers, such as Antipova et al. (2012) referenced the status quo and evaluated the alternatives in the estimated change, in vehicle miles traveled (VMT) and vehicle hours traveled (VHT). The finding revealed the reduction in travel compared with the estimated construction cost of each alternative (Antipova et al., 2012). The analysis further revealed, improving the existing road network effectively reduced traffic congestion and cost to approximately one-third of the highway bypasses (Antipova et al., 2012). However, the Louisiana state road-congestion plan required frequent updates to handle the population growth of Baton Rouge (Antipova et al., 2012).

Traffic congestion and road accidents increased external costs of transportation, and reducing congestion affects prevailed as the number one goal of transportation policy-makers (Ison et al., 2009). The cause of traffic congestion and road accidents occurred because of poor driving habits, poor road network, inadequate road capacity, and lack of parking facilities (Etika & Ukpata, 2012). Additionally, secondary congestion occurred on arterial streets when congestion occurred on freeway boundaries (Li, Li, & Wang, 2011).

Highway maintenance workers affected another cause of congestion known as freeway work zones. Freeway work zones included patching, paving, lane marking, debris removing, and right-of-way weeding, and caused temporary capacity reduction in

freeway lane capacity (Li et al., 2011). Li et al. (2011) indicated freeway work zones accounted for 10% of traffic congestion in the United States.

Transition and Summary

In Section 1, I introduced this study's problem statement, conceptual framework, literature review, and research question. I used a qualitative case study to explore traffic congestion reduction strategies businesses can implement to increase business profits. I reviewed academic literature regarding the supply chain, economic benefits, and the existence of alternate transportation and mitigation strategies to help decrease traffic congestion and increase business profits. Section 2 contains a description of my study's (a) research design, (b) research instruments, (c) data analysis, (d) the six participants, and (e) ethical considerations.

Section 2: The Project

Section 2 includes the research method and design of the doctoral study, instruments, and data analysis technique to analyze the research problem. The case sampling criteria included six participants and strategies to ensure validity and reliability. I explain the process to collect, analyze, and maintain confidential data from the six participants by adhering to Walden University's IRB policies.

Purpose Statement

The purpose of this qualitative descriptive case study was to explore what strategies business leaders required to increase on-time deliveries. The population that I was comprised of three delivery businesses located in Southcentral Alaska. The sample included six business delivery leaders. The delivery businesses included food delivery, courier delivery, and freight delivery services.

The six participants were business leaders autonomously able to make decisions without supervision. I retrieved research documents and government sources from the Institute of Social and Economic Research at the University of Alaska Anchorage via the Internet. The information included publically posted information. The participant pool consisted of a stratified, purposeful sample of six business delivery leaders of three delivery businesses.

This research was essential for effecting social change, as business and transportation administration leaders in Southcentral Alaska determine suitable spending strategies to reduce traffic congestion. The findings can contribute to social change by providing Southcentral Alaska business leaders strategies to reduce traffic congestion,

which will lead businesses in the delivery industry to increase profits. Additionally, the findings could change the way commuters travel to and from work by decreasing traffic congestion.

Role of the Researcher

In a qualitative study, I am the data collection instrument (Krauss & Peredaryenko, 2013). The individual researcher, in a qualitative study, is the most appropriate instrument for inquiries aiming to arrive at the understanding of the data collection, and the promotion of critical awareness through the interview method (Krauss & Peredaryenko, 2013). I used the interview method, along with the inclusion of research documents and government sources to conduct the study.

I followed the protocol and study guidelines of the Belmont report (United States Department of Health and Human Services, 1978). The process included exploring data provided by study participants, and analyzing the secondary data for methodological triangulation. The interview protocol included treating six participants as autonomous agents, and second, entitled any participant with the protection of *diminished autonomy* (United States Department of Health and Human Services, 1978). My goal was to present findings accurately, preserve the confidentiality of the study participants, and to conduct research within ethical limitations.

Prior business experiences working with and interviewing fellow leaders in the U.S. Air Force strengthened my interview process. Although having previously worked in Alaska, I retained familiarity with the region but preserved no previous relationships with anyone involved in the study. To address potential research bias, I persisted to

mitigate any of my own individual views of the research, and discerned the presence of bias through my own personal lens (Marshall & Rossman, 2011). The task was to hear and interpret the behavior and reflections of the phenomena from the six participants, and to gain new insights from volunteers who participate in the interviews. To protect from threats to validity, and to assess the validity of the interview questions, I strengthened the validity of the study by using member checking.

I engaged in member checking by contacting participants to discuss participant contributions and validated the correctness of retrieved information. Member checking involved sharing the results of the interpretation of the data with the six participants for verification (Marshall & Rossman, 2011). I explored precisely the six participant interview replies, rather than surmising any recalled responses (Marshall & Rossman, 2011).

Participants

I used a stratified sampling strategy to select six business delivery leaders as the sample represented three delivery businesses in Southcentral Alaska. The population consisted of three delivery businesses including a food delivery, courier delivery, and freight delivery services. Each of the six participants made decisions autonomously. The stratified sampling strategy revealed how people or groups perceive concepts (Yin, 2014). I used stratified sampling because purposeful sampling involved the appropriate selection of participants based upon specific characteristics of population size, selection criteria, and knowledge of the area (Tashakkori & Teddlie, 1998).

A sample of six participants was sufficient for achieving the purpose of this study. To ensure data saturation, interviews continued until the addition of interview data no longer added new information, and the interviews stopped (Bunce, Guest, & Johnson, 2006). Bowen (2008) suggested evidence of data saturation included the presentation of the data, and a discussion via the forms of research included during the analysis. The criteria required to participate in the study were to be a business leader or manager who had a minimum of 8 years' experience drawn from three business delivery organizations in Southcentral Alaska, who had knowledge of customer destination needs, and who had knowledge of traffic congestion in the urban area.

The strategies to gain a working relationship with the six participants for the study first included searching the phone numbers (through Internet search tools) for each business in the food delivery, courier delivery, and freight delivery services in the study area. I initiated phone consultations with prospective business leaders to gain Interest in the study. Business delivery leaders possessed direct knowledge and involvement with Southcentral Alaska traffic congestion because of the frequent travel in the area.

Second, I wrote an electronic invitation distributed via the Walden University e-mail portal to the six participants. To be mindful of confidentiality and ethical protection of the six participants, I included a consent form and attached the form to the e-mail invitation to prepare the six participants for the interviews (Appendix B), and I included the interview protocol (Appendix D). I possessed no personal or business relationships with the intended six participants of the study.

I stored raw data in a password-protected database, and will maintain these data for a period of 5 years. I also included hard copies of data to be stored in a locked cabinet for 5 years. After 5 years, I will destroy these materials. I included a coding system to assign pseudonyms in order to protect the anonymity of the six participants (P1-P6).

Research Method and Design

Qualitative methods include an in-depth understanding of various experiences defined through life dynamics (Yin, 2014). Scholars have explained participant life experiences facilitated knowledge of the dynamics in which literature gaps occurred (Yin, 2014). I used a descriptive case study approach because of my goal of exploring vehicle congestion linked with the loss of business profits, and strategies that can help reduce traffic congestion for the delivery business industry. Qualitative designs incorporated the necessary data to draw conclusions based on instruments, such as interview questions, questionnaires, or secondary data to compare and triangulate data results (Yin, 2014).

The data collection process included interviews, research documents, and government sources to triangulate the findings from the data in the study. Triangulation of data was a method to evaluate and establish the validity by analyzing research questions from multiple perspectives (Guion, Diehl, & McDonald, 2011). I used data triangulation to incorporate the six interview responses with the collection of government secondary data to explore theoretical perspectives. The task was to use a qualitative method to explore what strategies business leaders might possess to move shipments efficiently in Southcentral Alaska to increase business profits. The case study design

linked with a qualitative method comprised the appropriate mechanisms for conducting business and social research.

Method

I collected and compared data in the business delivery industry to identify and explore potential business strategies on ways to help increase business profits. Maxwell (2010) used quantitative methods to prove or disprove a predetermined state, compare states of living, or action to each other. A quantitative method was not appropriate because no empirical investigation of observable phenomena via statistical, mathematical, or computational techniques was needed in this study. Similarly, a mixed method was not appropriate because a mixed method requires quantitative and qualitative elements (Tashakkori & Teddlie, 2009).

This study was an exploration of traffic congestion linked to business profits by leaders in the delivery business industry who satisfied daily travel deadlines. No previous research linked business profits to traffic congestion in Southcentral Alaska. For these reasons, a qualitative method and case study design was the best fit for exploring the problem of how some business leaders lack strategies to address traffic congestion to increase profits.

Research Design

Many qualitative designs exist, however qualitative researchers chose between five primary designs including: (a) phenomenological, (b) narrative, (c) grounded theory, ethnography, and (d) case study (Yin, 2014). I considered each of the designs for the

study. Yin (2014) used a case study design in social science investigations to explore the *how* and *why* of a phenomenon.

Moustakas (1994) identified structures of an experience by interpreting the originally given descriptions of the situation in which the experience occurs. Moustakas primary interest was to achieve understanding of an experience, individual, or groups of individuals to predict future behaviors. A phenomenological design was inappropriate because the focus was perspectives on conditions, rather than lived experiences.

Narrative design incorporated life stories directly applicable to an isolated experience, and understanding those experiences narratively (Clandinin, 2010). Clandinin (2010) studied narrative designs by following a recursive and reflexive process, with starting points in conveying living stories, incorporating data, moving to the interim, and including final research texts. Additionally, scholars using narrative designs emphasize ethical matters and form new theoretical knowledge of peoples' experiences (Clandinin, 2010). The narrative design lacks relevance for the doctoral study because I did not discuss living stories from people experiencing traffic congestion.

A theorist using a grounded theory design combines induction and deduction in a theory-building process over time (Bendassolli, 2013). Theorist can incur risk by stratifying data into previous conceptual categories, which inhibits producing large volumes of codes for empirical material, and hinders the categorization and conceptual development process. Grounded theory lacked relevance to the study because grounded theorists combine induction and deduction in the theory-building process over time.

Garson (2013) used ethnography design to provide qualitative research for exploring cultural phenomena. According to Garson, the ethnography design, which is a sociological empirical design, explores the understanding and the processes of meanings in the lives of cultural groups. An ethnographic design was not an appropriate design for the doctoral study because the focus was not of any one cultural group.

I chose a case study design because the purpose of this study closely aligned to a social science issue to investigate the how and why of the phenomenon over time (Yin, 2014). Case study research consists of five components involving: (a) a study's question, (b) the study's propositions, (c) the study's unit of analysis, (d) the logic linking the data to the propositions, and (e) the criteria for interpreting the findings (Maxwell, 2010). Antipov et al. (2012) used case study designs to explore the reduction of traffic congestion through alternate transportation systems, such as carpooling, alternate work hours, or constructing alternate roadways bypassing primary routes. I incorporated how traffic congestion affected on-time deliveries, and why the significance of the phenomenon included value to the findings. A case study design was the best fit for exploring the business problem.

Population and Sampling

The population for the research consisted of three delivery services requiring time-dependent delivery of products in the boundaries of Southcentral Alaska affected by traffic congestion. Delivery leaders explained the constraints of on-time deliveries because of traffic congestion, and possessed first-hand knowledge concerning the organization's profit margins (Campbell & Ehmke, 2014). I used a stratified sampling

technique because of the narrow inclusion criteria for the study sample size. Suri (2011) stated not essential to collect information from everyone in a metropolitan city to achieve valid and credible findings. In addition, Suri indicated the sampling in qualitative research necessitated only a subset of the population and referred to as sample chosen for a given research enquiry.

To achieve data saturation, I continued to interview the six participants until the addition of data added no new information or themes (Bowen, 2008). Primary data for the research consisted of open-ended, semistructured interview questions because of the six participants' substantive and accumulative contribution to knowledge (Lambert, 2008) Open-ended, semistructured interview questions qualified as an appropriate, descriptive instrument for case studies for research exploration (Lambert, 2008). A stratified sampling of six participants qualified as a subset of the population and referred to the sample chosen for the study's research enquiry (Suri, 2011). The eligibility criteria for the six study participants included (a) business delivery leaders and managers in Southcentral Alaska autonomously abled to make decisions (without supervision), (b) at least 8 years of work experience, (c) no relationship with me, and (d) reside in Southcentral Alaska.

The process for finding participants included searching the phone numbers for each business (using Internet search tools) in the food delivery, courier delivery, and freight delivery services in each region in Southcentral Alaska by phone for e-mail addresses. After Walden Institutional Review Board (IRB) approval, I contacted each delivery company by e-mail and followed-up with a phone consultation. The task was to

identify each participant in the process until I identified six business leaders from each of the three business delivery organizations. After identifying the six participants, I first sent the interview questions through the Walden University e-mail system for the six participants to become familiar with the interview questions. E-mail was the preferred method for sending interview questions as the information quickly arrived to the destination. The intent was to send interview questions (Appendix A) and the consent form (Appendix B) to the six participants by Walden e-mail for submission. Once I received the consent forms, I established a day and time for interviews using video/phone conferencing.

On the day of the interview, I used the following process to interview the six participants:

1. The video/phone interview began with introductions and an overview of the research topic.
2. I advised the participant that I was sensitive of their time and thanked them for agreeing to participate in the study.
3. I reminded the participant of the recorded interview and the conversation we were about to have would remain strictly confidential.
4. I turned on the recorder and announced the participant identifying code, as well as the date and time of the interview.
5. The interview lasted approximately 20 to 30 minutes to obtain the six responses from 10 interview questions and follow up questions.

6. I explained the concept of member checking, ensured each question was thoroughly explained, and confirmed the answer provided by the participant was recorded.
7. After confirming that answers recorded to the satisfaction of the participant, the interview concluded with a sincere thank you for participating in the study.

Ethical Research

Before conducting research, activities in the study complied with the ethical standards of Walden University. Upon IRB acceptance of the proposal from Walden University, I proceeded with contacting the six participants. IRB approval information was available and documented in the completed study documentation. Walden IRB approval number for this study is 01-22-15-0304718.

Prior to conducting research, I disclosed any risk factors by repeatedly offering the six participants the option to withdrawal from the interview process at any time without penalty. No incentives existed to encourage the six participants to volunteer for the interview. After conducting enough interviews to ensure data saturation, I began data organization, coding, and analysis.

I remained open and honest about the participant process by explaining interview questions thoroughly and answered any participant questions before, during, or after the interview. If a participant desired to withdraw from the interview at any time, the participant process ended with no questions asked. However, none of the six participants withdrew from participation of the study. I explained to the six participants that data

would remain in a locked safe in my home for a minimum of 5 years to protect the confidentiality of the participants.

After the 5 years, I will destroy participant interview data. The research interview questions are in Appendix A, and the consent form is in Appendix B. After completion and approval of the doctoral study, I will send a one-page summary from the research results to each participant.

Data Collection

Identification of multiple sources of evidence includes adequate collection of data in a case study (Yin, 2014). I drew a purposeful sample of six business leaders to conduct the case study. Yin stated how to prepare for the interview regarding various instruments (such as recording devices), data collection techniques, and data organization techniques.

Instruments

I used the interview method as the study instrument and a positivist approach for data to support the research. The positivist approach was the basis for positive verification of experiences, rather than introspection or intuition (De Massis & Kotlar, 2014). The interview questions included 10 semistructured, open-ended questions provided to the participants to describe answers based on their knowledge and experience.

I recorded interview questions and categorized data through a Microsoft © Excel spreadsheet. In addition, I analyzed data through exploring interview responses by delivery time, business activity, and the extent of roadway congestion. The steps for the

assessment of reliability included documenting each participant's answers by combining the questions through an open process. Reliability requires scrutinizing a researcher's work to determine expectations, raw data, interpretation, and reporting findings (Yin, 2014).

I used interviews, research documents, and government sources to triangulate the data in the study. I retrieved the research documents and government sources from the Institute of Social and Economic Research at the University of Alaska Anchorage via the Internet. The information included publically posted information. Methodological triangulation of data provides a means to verify and ascertain the validity of the research by analyzing study questions from multiple perspectives (Guion et al., 2011).

To achieve data saturation, I continued to interview the six participants until the addition of data added no new information or themes. In addition, the important issue with data saturation was for researchers' ability to replicate the study (Bowen, 2008). With the sixth interview, no new information or themes occurred from the participants; therefore, the interview process ceased.

I encouraged interview honesty by informing the six participants to answer none, some, or every question without consequence for not answering questions. However, only six interviews' responses contributed to the data collection process. To protect from threats to validity, and to assess the validity of the interview questions, I used member checking.

Member checking involved sharing the results of the interpretation of the data with the six participants for verification (Marshall & Rossman, 2011). I member checked

by contacting the six participants to discuss the six participant contributions and validating the correctness of retrieved information. Marshall and Rossman (2011) suggested researchers make changes resulting from misinterpretations ensuring the accuracy of data. If the data in the interview answers revealed any inconsistency of answers from each participant, I followed-up with a telephone call to participants and made revisions or adjustments based on follow-up feedback.

My undertaking was to analyze whether interview answers exhibited the same results in the sample, assuming similar knowledge and experience occurred from the six participants. Once the interviews ceased, I followed-up with clarification questions to amplify and expand answers. The interview questions are located in Appendix A.

Data Collection Technique

I interviewed and video recorded six business delivery leaders responsible for timely delivery of products throughout Southcentral Alaska, and used a predetermined interview question format matching elements of the main research question of the study. The following interview protocol outlined the data collection process.

First, I searched the phone numbers for each business (using Internet search tools) in the food delivery, courier delivery, and freight delivery services in each region of the Mat-Su borough and Municipality of Anchorage Borough (Southcentral Alaska) to retrieve e-mail addresses of business delivery leaders and managers. Once I obtained the e-mail addresses, I e-mailed business delivery leaders of the three companies to introduce myself and discuss the background of the study. The second task was to schedule a day and time, through e-mail, to call each of the businesses to gain rapport and trust with the

business delivery leaders and further discuss the intent of the study. Once I gained rapport with business delivery leaders, the third task was to ask the business delivery leaders to participate in the interview process by using a video web camera tool for real-time interviews.

The fourth task was to send, via e-mail, the consent form to the six prospective participants to discuss confidentiality and answer any questions generated from the six participants. I completed the fourth task by a separate phone call. The fifth task, after receiving the consent forms, was to initiate the interviews using a video web camera tool to record the interview on a specified appointment time. I kept data confidential and will keep data under a locked container for 5 years at my home of residence. In 5 years, I will destroy all collected data. The case study entailed reviewing comparative business practices on the efficiency of business on-time delivery of products, and the reduction effects of traffic congestion resulting in possible increased business profits. The interviewing technique to collect data determined successful strategies related to how business leaders in Southcentral Alaska increased on-time deliveries and increased profits for their company.

Data Organization Techniques

First, I stratified the study data into two groups, which included descriptive and interpretive data. Then, I categorized interview answers through a system of research logs using Microsoft © Excel spreadsheets. Next, I transposed interview answers into descriptive, and interpretive categories by further labeling as (a) traffic congestion costs, (b) perspective on changes in traffic patterns, (c) driving pattern changes affecting

customer satisfaction, and (d) changes in delivery times affecting company performance. In addition, I compared interpretive data with descriptive data to determine the constraints and benefits of reducing congestion within the business strategies for increasing profits.

Second, I derived peer-reviewed research and government documented data of congestion mitigation techniques through a system of research logs using Microsoft © Excel spreadsheets. I highlighted key facts of other research studies reflective of congestion reduction techniques from other geographical areas. The peer-reviewed and government documents, labeled *secondary data*, included contrasts on congestion relief issues in the traffic system, in the geographic study area.

I stored the descriptive, and interpretive data on my home computer supported with an external hard drive using Microsoft Office© software. My computer includes a password-protected process with a distinct password only known to me. The next step was to publish the recorded data in the doctoral study to serve as a guideline for future research. Then, I guaranteed the primary and secondary storage data for 5 years. After the 5 years, I will destroy all participant interview data.

Data Analysis Technique

The following is a list of interview questions whose responses I utilized for data analysis.

1. What traffic congestion issues, if any, is your company experiencing?
2. What are the costs of lost delivery times because of traffic congestion?
3. What changes have you experienced in traffic patterns over the past 5 years?

4. How have changes in traffic patterns affected your company over the past 5 years?
5. What driving pattern changes have you made, if any, to avoid traffic congestion?
6. What effect have these driving pattern changes had in terms of on-time deliveries of products?
7. What strategies do you use, if any, to circumvent key traffic congestion times within the delivery schedule?
8. What effect have changing delivery times and routes had on on-time performance?
9. What suggestions would you make deliveries more efficient for your company?
10. What further information can you provide to help me understand traffic congestion issues and your response to them?

I recorded the interpretive and descriptive data from the interview answers in a Microsoft Office© Excel. The software enabled me to perform a descriptive analysis of the six participants' answers to develop interpretive data for accurate results. The interview answers provided information on the traffic congestion problem and potential solutions for mitigation.

The next step was to organize the six participants' answers, by coding (P1, P2, P3, etc.) research responses as (a) traffic congestion costs, (b) perspective on changes in traffic patterns, (c) driving pattern changes affecting customer satisfaction, and (d)

changes in delivery times affecting company performance, filling the spreadsheet columns' headings, and the six participant responses filling the spreadsheet rows. Visual display outcomes represent the findings of the research, and serve as the best vehicle to communicate the data to readers. I triangulated data methodologically to explore and establish the validity by analyzing data addressing the research questions via multiple data sources (Guion, Diehl, & McDonald, 2011).

I used methodological data triangulation to incorporate the six interview responses with the collection of research documents and government sources to explore theoretical perspectives. I retrieved the research documents and government sources from the Institute of Social and Economic Research at the University of Alaska Anchorage via the Internet. The information included publically posted information. The results of the study benefit the six participants in understanding delivery route issues. Upon completion of the study, I will provide a 1-page summary of findings, to the six participants, as a courtesy.

Reliability and Validity

Scholars selecting a qualitative method demonstrate rigor in performing research to institute trust in the findings of a research study (Lipshitz, 2010; Thomas & Magilvy, 2011). Thomas and Magilvy (2011) described rigor as a process to enable scholars to reproduce a study for establishing *dependability, credibility, confirmability*, and *transferability* of research findings. The reliability and validity criteria for qualitative studies include dependability for the reliability of a study, and credibility, transferability,

and confirmability for the validity of a study. I continued to listen to the six participant answers recorded through a video web camera tool multiple times to ensure validity.

Reliability

Reliability in research depends upon the methods used to incorporate evidence leading to a dependable outcome (Street & Ward, 2012). The perceptions of research data, and subsequent deductions made by scholars, included factors in the reliability of a study (Kisely & Kendall, 2011). Internal consistency and test-retest also comprised part of the reliability assurance process (Torrance, 2012).

Internal consistency guarantees evaluation methods bodes meaningful to the study (Torrance, 2012). To assure reliability of my study, I remotely collected (through on-line public records from the Alaska Department of Transportation website) multiple data sources, such as interviews, research documents, and government sources to incorporate the evidence leading to a dependable outcome (Yin, 2014). I retrieved research documents and government sources from the Institute of Social and Economic Research at the University of Alaska Anchorage via the Internet. The information included publically posted information.

Validity

Thomas and Magilvy (2011) proposed three criteria for evaluating the validity of qualitative research: *credibility*, *transferability,* and *confirmability*. For the purpose of this study, six participants who recognized the phenomena of interest, and evaluated the integrity of the findings (Thomas & Magilvy, 2011) assured credibility. For qualitative studies, transferability (external validity) can only be assured by providing other

researchers with sufficiently detailed descriptions of a study's environment, participants, and processes to judge its relevant for addressing other studies' research problems (Brysiewicz & Erlingsson, 2013). Confirmability refers to how a study's findings presumed confirmable by others (Thomas & Magilvy, 2011). One method to confirm study results was to explore the data analysis technique to evaluate for potential bias (Thomas & Magilvy, 2011).

I addressed the assurance of the validity of this study by using member checking. Member checking involved sharing the results of the interpretation of the data with the six participants for verification (Marshall & Rossman, 2011). I included three steps to confirm the accuracy of data collected from participants by member checking. First, I conducted follow-up interviews to confirm the views, perspectives, and experiences to interview questions (Torrance, 2012). In qualitative studies, scholars consider conclusions to be context specific by not generalizing the findings (Torrance, 2012).

Second, I related the study data back to the interview questions, research question, and purpose statement (Robson, 2011). Third, I used interviews, research documents, and government sources for methodological triangulation of the study's findings and conclusions (Guion et al., 2011). I retrieved research documents and government sources from the Institute of Social and Economic Research at the University of Alaska Anchorage via the Internet.

Transition and Summary

Section 2 included a description of the study design and considerations made in the design of the research project. In Section 2, I described the research design

considerations defining the study's (a) methods, (b) research design, (c) participant criteria, (d) target population, (d) sampling method, and (e) the ethical treatment of individuals. In addition, I explained how the collection, organization, and analyzed data incorporate from documentation to the six participant interviews. Finally, I showed how my study's reliability and validity were assured by employing multiple data sources, including interviews, research documents, and government sources, and by using member checking.

Section 3 includes descriptions of how other researchers apply findings and conclusions from the study, to professional practice and the implications for change. Section 3 includes (a) an overview of the study, (b) a presentation of findings, (c) applicability to professional practice, and (d) implications for social change. I conclude Section 3 with recommendations for action on further research based upon the results of the study, reflections of my experience with the research process, and a comprehensive summary of the study.

Section 3: Application to Professional Practice and Implications for Change

Section 3 includes descriptions of how other researchers may apply findings and conclusions from the study to professional practice and the implications for change. I include (a) an overview of the study, (b) a presentation of findings, (c) applicability to professional practice, and (d) implications for social change. I provide recommendations for action and further study based upon the results of the study. Section 3 concludes with a reflection of my experience with the research process, how my thinking may have changed resulting from the experience of the research process, and a conclusive summary of the study.

Overview of Study

The purpose of this qualitative case study was to explore what strategies business leaders required to increase on-time deliveries. The findings, conclusions, and recommendations of the study provided essential insights that offered alternatives on transportation options from alternate transportation to increased road capacity. The conclusions from the research yielded an opportunity for improving on-time deliveries and enhancing business performance. In addition, the findings also included opportunities to improve sustainable initiatives augmenting positive social change.

The data collection process consisted of six one-on-one, semistructured interviews with business leaders working in three business delivery companies, which included food delivery, courier delivery, and freight delivery services. I conducted these semistructured interviews with business professionals of whom six participants responding to 10 semistructured interview questions related to the six participants' experiences and

insights in evaluating traffic congestion in Southcentral Alaska, and on-time deliveries. The semistructured nature of the interviews provided the six participants the flexibility to elaborate on the interview responses, and convey deliberate reflections on the topic. Data collection ceased after six participant interviews, as the interview process reached data saturation.

To protect the identity of the six participants, I assigned specific pseudonym to each participant. The designation codes included P1-P6 to each participant as identified in the three most noticeable business delivery disciplines: (a) food delivery service, (b) courier delivery service, and (c) freight delivery services. Finally, I removed any word, dialect, lingo, or terminologies, that could overtly imply any of the six participants' organization, or identify them as individuals.

I recorded and transcribed the six interview responses, and entered them into a Microsoft Excel document, for data organization, independent analysis, and data storage. The semistructured six interview responses provided corroborating evidence of the specific problem and the necessity for the study. The six participants' experiences and insights also elucidated a solution to how to assess the sustainability of transportation and business effectively.

Presentation of the Findings

The presentation of findings section contains a discussion of six participants' knowledge and experience of contributors. The section also included: (a) presentation of secondary government documents and artifacts, (b) qualitative interpretation of the six participants' responses, (c) participants' answers related to the conceptual framework and

the academic literature of the study, and (d) participants' answers helped address the research question of the study. Finally, I covered an analysis and interpretation, and reviewed the initial assumptions and a discussion of the findings leading to answering the research question.

Conclusions emerged from the collection and deliberation of experience and insights of six business delivery leaders and managers working in Southcentral Alaska. I collected the six participant responses using a 10-question semistructured interview protocol. The intent was to obtain answers to the 10 questions resulting from the review of academic literature on the evaluation of the hindrance of traffic congestion environment, delivery times, and sustainability concepts.

Summary of Secondary Data Collected

To understand the analysis and context of interview answers from the six participants, I reviewed background of information garnered from research documentation and government sources from various databases. The following summarizes secondary sources setting the foundation linking the six participants' perspectives. The section includes (a) Southcentral Alaska transportation infrastructure, (b) Southcentral Alaska road system, (c) public transportation system, (d) pedestrian/bicycle system, (e) freight distribution system, and (f) regional connector system.

Southcentral Alaska transportation infrastructure. Southcentral Alaska transportation infrastructure includes many available travel options. According to the Municipality of Anchorage (2012), the transportation network in Southcentral Alaska

involved six essential elements: (a) roads, (b) public transportation, (c) pedestrian system, (d) bicycle system, (e) freight distribution, and (f) regional road connections. Most commuters (approximately 90%) used existing arterial connections in Alaska's biggest city in Southcentral Alaska (Hughes, McPherson, & Speth, 2009). Only a small percentage of travelers (less than 10%) bypassed the area because of the lack of alternate routes (Hughes et al., 2009). The primary destinations during the peak commuting periods from the north, northeast, and the south included the Glenn Highway, Parks Highway, and the Seward Highway in Southcentral Alaska (Hughes et al., 2009).

Southcentral Alaska road system. Southcentral Alaska's road network existed as the most visible component of the transportation system where approximately 89% of the private, commercial, and public vehicles included only private vehicles (Hughes et al., 2009). The Municipality of Anchorage 2035 Metropolitan Transportation Plan (2012) indicated that the busiest traffic routes in the geographical area played an important role of the region's mobility, and the freeway portions of the system accommodated approximately one-third of vehicle miles traveled. The existing transportation system included barriers for access and circulation, and involved a perception of an unfriendly pedestrian environment combined with congestion that increased with the population ("Anchorage Metropolitan Area Transportation Solutions," 2011).

The challenges appear likely to continue as Southcentral Alaska population projected to increase to 55,000 additional residents, and an employment base of roughly 8,100 within the next 20 years ("Anchorage Metropolitan Area Transportation

Solutions," 2011). Traffic studies in Southcentral Alaska includes previous quantitative research to determine time to traverse road sections based on mapping GPS vehicle data to continuous flows ("Anchorage Metropolitan Area Transportation Solutions," 2011). One example included a study involving 80 vehicles equipped with tracking devices that reported the speed, location, and direction of vehicles to a central server every 10 to 60 seconds, and generated a map that provided drivers with the amount of time to traverse arterial roadways in Southcentral Alaska ("Anchorage Metropolitan Area Transportation Solutions," 2011).

The means of determining the time to traverse a roadway included dividing the distance of a roadway by the average speed of a vehicle traveling along that roadway, known as the speed model ("Anchorage Metropolitan Area Transportation Solutions," 2011). The majority of roads in Southcentral Alaska include traffic-regulated (as opposed to free-flowing traffic) vehicles that report a speed of zero when stopped at a traffic signal ("Anchorage Metropolitan Area Transportation Solutions," 2011). The findings indicate that the traffic signal interruptions affect the average speed along the specific roadway, and typically provide a time to traverse substantially different from the actual amount of time ("Anchorage Metropolitan Area Transportation Solutions," 2011).

Public transportation system. Southcentral Alaska public transportation includes the public bus system (including AnchorRIDES and Share-a-rides vans shuttling people from the Mat-Su Valley to the city), Matanuska-Susitna Community Transit (MASCOT), Valley Mover bus system, taxi services (owned by private taxi companies but regulated by the city), and a limited commuter rail service operated by the State of

Alaska (Municipality of Anchorage, 2010). In 1972, voters of Southcentral Alaska approved a ballot issue to inaugurate a municipal public transportation service (Municipality of Anchorage, 2010). The reason that communities voted for the transportation initiative resulted from increased population of 144,200 by 1974 (Municipality of Anchorage, 2010). In 1982, public transportation provided 156,000 hours of service and attracted 4.01 million passengers as Southcentral Alaska grew because of the large military expansions, and oil development, which included the construction boom of oil found in the Prudhoe Bay, Alaska (Municipality of Anchorage, 2010).

Public transportation involves a vital necessity for any population center. In Southcentral Alaska, public transportation provides a benefit for allowing the public an option to travel when individuals lacked ownership of vehicles (Goldsmith et al., 2006). In contrast, a variety of factors effects the ridership volumes of public transportation including (a) the number of transfers required for travel, (b) travel time, (c) frequency of travel, (d) suitability of routes for desired trips, (e) bus stop amenities (such as weather protection),(f) cost of service, and (g) cost of alternate means of transportation (Municipality of Anchorage, 2012). Between 2002 and 2010, Southcentral Alaska experienced an increase of more than 34% for a full weekday and weekend ridership count of public transportation (Municipality of Anchorage, 2010).

Pedestrian/bicycle system. Every solution to transportation in Southcentral Alaska affected people and the quality of life (Municipality of Anchorage, 2007). Transportation solutions must be assessed against the solutions that change or impact

neighborhoods or community cohesion, travel patterns, and accessibility (Municipality of Anchorage, 2010). When provided with access to sidewalks, trails, and other walkable features, residents were 28% to 55% more likely to choose walking over other modes of transportation (Municipality of Anchorage, 2010).

Although commonly called *bicycle* (or bike) paths or trails, the facilities are never restricted to bicycles only. Referring to paths as *bicycle trails* may mislead individuals to think that bicycles involve no place on nearby roads. However, pedestrian-oriented transportation facilities include parts of a transportation system.

Bike trail facilities involve sidewalks and dedicated paths in Southcentral Alaska (Municipality of Anchorage, 2007). Such features as public telephones, roadside emergency call stations and rest areas common to the area (Municipality of Anchorage, 2007). Other pedestrian-oriented facilities include bus stops and shelters, pedestrian overpasses and underpasses, and restroom facilities at roadside rest areas (Municipality of Anchorage, 2007). Individuals in Southcentral Alaska continued to use pedestrian and bicycle facilities as their primary mode of transportation to and from work to help alleviate traffic congestion (Municipality of Anchorage, 2007).

Freight Distribution System. Freight distribution affects every individual in the community, and includes a fundamental aspect to the community's high standard of living (Municipality of Anchorage, 2001). In addition, the important sectors of freight included critical segments for everyday living (Municipality of Anchorage, 2001). Commodities consumed from the source to the public arrived via the freight industry in Southcentral Alaska (Municipality of Anchorage, 2001).

Freight distribution in Southcentral Alaska accounted for 90% of goods used by Alaska's communities (University of Alaska Anchorage, 2011). Nearly every container of goods used by Alaskans originated in shipments from the Port of Tacoma, Washington, to the port of Anchorage, Alaska, on a daily basis (University of Alaska Anchorage, 2011). Freight distribution in Southcentral Alaska presented a factor in traffic congestion because the more goods and services hauled to customer destinations, the more vehicles existed on roads (University of Alaska Anchorage, 2011).

Regional Connector System. Southcentral Alaska Highway system varies between large multi-lane expressways to two-lane thoroughfares. Nearly half of Alaska's population resides in Southcentral Alaska. State transportation engineers allocate only a portion of funding from state appropriations to build new roads, and connected existing thoroughfares to relieve vehicle congestion (University of Alaska Anchorage, 2011). An integral part of relieving congestion concerns building new highway infrastructure.

Alaska policy-makers developed a Community Transportation Program (CTP) to fund surface transportation projects at the local level ("Advocacy Advanced," 2012). Much of the funding provided by Alaska's Surface Transportation Program includes funding to the CTP for roads ("Advocacy Advanced," 2012). Rankings for Southcentral Alaska road projects using a formula for evaluating (a) road capacity, (b) traffic congestion, (c) public transportation transit times, (d) and the availability of sidewalks and bike trails ("Advocacy Advance," 2012).

Excluding the safety of the traveling public, Southcentral Alaska's number one priority was to complete the road connections originally planned by traffic engineers (Municipality of Anchorage, 2011). Over $3 billion paid by the Federal Government and the State of Alaska between the years of 2000 and 2010 helped complete Southcentral Alaska's road system (Municipality of Anchorage, 2011). Traffic congestion relief continues to be a reason road connections needed completion in Southcentral Alaska. The interview answers of the six participants matched the data gathered based on the six participants experience and knowledge of Southcentral Alaska's highways and roads.

Overview of Participant Perspectives

The reliability and validity of this study's conclusions manifest by the diversity of the six participants in three different business delivery services: (a) food delivery, (b) courier delivery, and (c) freight delivery services. The mixture of backgrounds aided in the six interview responses, views, and insights on the topic of traffic congestion and business delivery services. The six participants include a business leader or manager who had a minimum of 8 years' experience, but averaged 23 years among the six participants.

Each of the six interviews took between 20 and 30 minutes. Even though the six participants included various views about traffic congestion, and suggested an array of diverse responses for on-time deliveries, the six participants agreed on factors for why traffic congestion existed in Southcentral Alaska. Table 1 summarizes the six participants' delivery industries by columns and rows. Column 1 indicated the delivery service (food delivery, courier delivery, and freight delivery), column 2 represented the

number of participants, and column 3 represented the average years of experience from each participant.

Table 1

Synopsis of Background Identified by Participant

Delivery service	Number of participants	Average years' experience
Food delivery	2	30
Courier delivery	2	19
Freight delivery	2	20

Different Participants but Similar Perspectives

The six participants shared core understandings and definitions of the foundations of transportation, and the process of delivery distribution. Differences emerged by what value the six participants leveraged through suggestions on how to alleviate congestion. As the different companies (food delivery, courier delivery, and freight delivery services) included various goals and needs, the relevancy of responses from the six participants were varied but similar because of knowledge and experience. Table 2 contains the summary of the six participants' responses through interpretive data.

Column 1 represented the P-code of each participant labeled P-1 through P-6. Column 2 indicated how traffic congestion affected delivery times from each participant. Column 3 represented how traffic congestion affected business profits from each industry. Column 4 indicated how the amount of roadway congestion affected delivery

times. Column 5 represented the results of the analysis indicating the best solution to help reduce the problem in each row of the table.

Table 2

Summary of the Six Participant Responses Through Interpretive Data

P	Delivery time	Business activity	Amount of roadway congestion	Results
P1	Deliveries were negatively affected based on time of day because of heavy road congestion.	Traffic congestion was affected by fewer deliveries, which decreased profits because of lack of scheduled deliveries.	Heavy roadway congestion was only based on time of day. Time of day of heavy congestion included 7:00 AM - 9:00 PM and 4:00 PM-6:00 PM.	Time of day affected on-time deliveries because of congestion. Needed toll or HOV lanes to reduce congestion.
P2	Deliveries negatively affected based on time of day because of heavy road congestion.	Traffic congestion was affected by fewer deliveries, which decreased profits because of lack of scheduled deliveries.	Heavy roadway congestion was only based on time of day. The time of day included 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM.	Time of day affected on-time deliveries because of congestion. Needed toll or HOV lanes to reduce congestion.
P3	Late deliveries were experienced mainly to the south on the Seward Highway because of accidents depending on the time of day. Highway scales were another variable that delays delivery times.	Traffic congestion was affected by fewer deliveries, which decreased profits because of lack of scheduled deliveries.	Heavy congestion contributed to late deliveries. Avoided the 6:45 AM to 8:15 AM and 4:45 PM to 5:45 PM time frame because of congestion.	Time of day affected on-time deliveries because of congestion. Needed toll or HOV lanes to reduce congestion.

(Table continues)

P	Delivery time	Business activity	Amount of roadway congestion	Results
P4	Fuel costs increased from parked in traffic. Deliveries were sometimes canceled from customer frustration.	Participant indicated that traffic congestion caused 10% of late deliveries a year. Business profits decreased because of delayed deliveries.	Heavy traffic congestion was experienced between 7:00 AM to 9:00 AM and 5:30 PM to 7:30 PM.	Time of day affected on-time deliveries because of congestion. Needed toll or HOV lanes to mitigate congestion.
P5	Fuel costs increased from parked in traffic. Delayed deliveries and cancelled deliveries occurred from customers.	Participant indicated that traffic congestion caused 60% of late deliveries a year. Business profits decreased because of delayed deliveries.	Traffic congestion occurred between 5:30 AM to 7:30 AM and 5:30 PM to 7:30 PM. Company lost 100% of deliveries during peak congestion hours, and 30% of deliveries during non-peak congestion hours because of traffic.	Time of day affected on-time deliveries because of congestion. Needed toll or HOV lanes to mitigate congestion.
P6	Fuel costs from parked in traffic contributed to delivery time constraints because of traffic congestion. Late deliveries occurred mainly to the south because the lack of alternate routes.	Traffic affected by heavy congestion during peak morning and evening traffic. Business profits suffered because fewer deliveries accomplished.	Traffic congestion occurred between 7:30 AM to 9:00 AM. The increased population in Southcentral Alaska contributed to more vehicles on highways.	Time of day contributed to late delivery times because of congestion. Suggested Toll or HOV lanes to reduce congestion.

Delivery Time

The six participants in the food, courier, and freight delivery services clarified that understanding the transportation environment in Southcentral Alaska alone was as a complex process that required multidimensional assessments. The reason, according to the six participant responses, was that time-sensitive or critical deliveries boded crucial to the organizations' clients. One way the participants' concluded would alleviate traffic congestion included GPS to reduce the time for the delivery of food or manufactured goods. However, two of the six participants indicated GPS in Southcentral Alaska lacked software updates in some cases, and hindered the on-time delivery of products to clients.

Business Activity

From another perspective, three of the participants affected by business activity conveyed that knowledge of the area's road system contributed to efficiencies of deliveries, and the ability to understand customer expectations aided in achieving client satisfaction. Pre-notification of impending delayed deliveries provided the key to effective business relationships with customers. The analysis of the six participants' responses showed the knowledge of employees' abilities to communicate with the customer with professionalism and the ability to provide updated delivery information generated customer satisfaction regardless of the late delivery.

Amount of Roadway Congestion

Three of the participants indicated using smaller vehicles versus larger vehicles allowed quicker product deliveries. The three participants explained that using smaller vehicles allowed versatility and flexibility through congested locations versus heavier,

longer vehicles. In addition, smaller vehicles saved fuel. All six participants indicated vehicle congestion occurred, on average between 7:00 AM to 9:00 AM in the mornings, and 5:00 PM to 7:00 PM in the evenings. However, because of the lack of alternate routes in Southcentral Alaska, accidents and construction zones were primary factors of vehicle congestion during off-peak congestion hours.

Delivery Time Results

Finding indicated that time of day affected on-time deliveries because of roadway congestion. In addition, all six participants cited the lack of alternate routes as barriers to vehicle congestion in Southcentral Alaska. However, as the semistructured interviews progressed, the six participants became less optimistic about finding a single solution to mitigate vehicle congestion. Four of the six participants suggested education, training, and highway funding as the key to circumvent traffic congestion.

The six participants discussed the need for different alternate road segments as a suggestion to alleviate congestion. One solution included connecting the Glenn Highway and Seward Highway segments to one continuous freeway with no signalization. One of the six participants' perceived that traffic would flow faster within Alaska's biggest city as a continuous free-flowing highway. The suggestion of connecting the highways as a continuous freeway was not as a new proposal. Hughes, McPherson, and Speth's (2009) research indicated that the existing arterial roadway (versus freeway) connection of the Glenn and Seward highways shows congestion during the peak morning and evening hours.

In 2008, three major signalized intersections on the existing arterial roadway connection failed to alleviate congestion in the A.M. and P.M. peak hours (Hughes et al., 2009). Future models indicated in 2035, nearly every signalized intersection on the Ingra/Gamble road couplets, and the Fifth/Sixth Avenue couplets, (which connects the Glenn and Seward highways) will contribute to increased congestion because of traffic signals in the A.M. and P.M. peak hours in Alaska's biggest city (Hughes et al., 2009). The six participants' experiences appear to match the previous research concerning times and location of peek vehicle congestion dynamics.

Data Analysis: Two Major Themes

The six participants conveyed various opinions and insights on how traffic congestion affected on-time deliveries. The results from the interviews showed two major themes: traffic congestion occurred based on time of day, and the lack of alternate travel routes existed to avoid congestion. In the first theme, the six participants recognized traffic congestion occurred based on time of day.

The six participants' experiences of traffic congestion occurring based on time of day matched the previous findings indicating the time required for a vehicle in Southcentral Alaska's biggest city to travel from one direction to another direction was delayed by 30% when traffic congestion existed (Municipality of Anchorage, 2012). Six participants stated because traffic congestion occurred primarily between 7:00AM to 9:00AM and 5:00 PM to 7:00 PM in Southcentral Alaska, business owners scheduled deliveries before or after congestion. The constant change of scheduling resulted in fewer deliveries, in which profit losses occurred.

The second major theme the six participants was that no alternate routes existed in Southcentral Alaska traveling to the north of Alaska's biggest city and to the south where the population increased 40% in the last 20 years. One of the six participants stated even with the best knowledge of Southcentral Alaska's roadway system, too many *chokepoints* allowed congestion to occur primarily because of vehicle accidents, or roadway construction. Three of the six participants explained that the chokepoints existed because new construction to alleviate traffic congestion has not occurred in the last 20 years.

The participants' demographics provided an assortment of experiences, perceptions, and ideas providing comprehensive evidence and reliability to the study. The integrity, sincerity, and honesty of the six participant responses improved the validity of the conclusions. The six participants' similar inputs in the responses provided additional assurance for the interpretations and conclusions of the study, which eventually helped answer the research question.

Theme 1: Congestion and Time of Day

The first topic of discussion involved how time of day affected vehicle congestion in Southcentral Alaska. Vehicle congestion time of day related with traffic equilibrium theory because traffic equilibrium theory addresses variation in urban commuter expressways densities of non peak-hour and traffic congestion for increasing maximum roadway capacity (Downs, 1962). The discussion on the topic related to how the six participants explained Southcentral Alaska's roadway infrastructure, and how potential solutions.

The descriptive data from the six participants' answers resulted from using a Microsoft Excel spreadsheet insights' data for identifying issues potentially affecting roadway congestion. The insights stemming from the analysis included: (a) cost of traffic congestion, (b) perspectives on changes to traffic patterns, (c) driving pattern changes affecting customer satisfaction, (d) changes in delivery times affecting company performance, and (d) knowledge and experience of the six participants' organizations as a whole. Table 3 includes a summary of the six participants' answers. I coded each of the participants' with P-codes labeled P1 to P6.

Results from the summary indicated traffic congestion negatively affected all companies' performance. In addition, company performance negatively affected customer perception of the business. Contractual obligations suffered because of negative perceptions of the delivery service businesses.

The data in Table 3 indicated fuel wasted in traffic effected company profits. The increase in traffic congestion triggered longer wait times for delivery of products to customers, which decreased customer satisfaction. In most cases, business performance decreased because of traffic congestion resulting in the negative perception of the company for the lack of on-time deliveries. In addition, the lack of alternate routes provided no options for companies to avoid congestion during tight delivery windows.

One strategy to avoid congestion included delivering products in off-peak hours. The strategy inconvenienced customers and increased business personnel over-time, which decreased company profits. Contractual obligations also suffered because of client requirements.

Table 3

Summary of the Six Participant Responses Through Descriptive Data

P	Traffic congestion costs	Perspectives on changes to traffic patterns	Driving pattern changes affecting customer satisfaction	Results
P1	Company experienced increased amount of fuel idling in traffic. Congestion led to fewer deliveries affecting profits because of more fuel burned in traffic. Lack of knowledge to avoid congestion negatively affected profit margins.	Participant indicated only one way in and out of primary distribution area. Avoided areas for accidents because of congestion. Lack of alternate routes in and out of core urban areas affected changes to traffic. Lack of updated GPS software affected when new roads were built. Needed toll optimization to mitigate traffic congestion.	Longer routes to destination equaled longer time of delivery of products to customers, which decreased customer satisfaction. To avoid congestion, deliveries were made at night inconveniencing customers.	Traffic congestion negatively affected company performance because of decreased on-time deliveries, which equaled negative perception of the company. Contractual obligations suffered because of client requirements.
P2	Provided enough lead time to make delivery; cost was not affected. Company had a four hour window to make deliveries. Traffic congestion costs were increased because of increased cost of fuel.	Southcentral Alaska needed to build roads around congested areas. Too many stop lights existed on arterial roads. No continuous freeway between two major highways in the downtown core. Companies used GPS for deliveries, but not all geographical areas are labeled, which resulted in delayed deliveries. Needed toll optimization to mitigate traffic congestion.	Longer routes to destination equaled longer time of delivery of products to customers, which decreased customer satisfaction. The company prepared in advance which routes to take depending on time of day.	Traffic congestion negatively affected company performance; less on-time deliveries equaled negative perception on company. Contractual obligations suffered because of client requirements.

(Table Continues)

P	Traffic congestion costs	Perspectives on changes to traffic patterns	Driving pattern changes affecting customer satisfaction	Results
P3	Accidents on roadways were the main contributor to traffic congestion. Only one road north heading in and out of the area. If accidents occurred, traffic congestion occurred and caused delays for deliveries. Increase fuel and time lost contributed to negative profits. Lack of new major roadways built in last five years.	Round-a-bouts used only at major arterial intersections, and not expressways were traffic lights were located. Engineers added new expressway lanes (south), which added to roadway capacity. Suggested toll optimization to mitigate traffic congestion. Two major highways needed to be connected as one continuous freeway to alleviate congestion.	Delays in deliveries caused negative customer satisfaction regardless of the variable contributing to delays. Too many "chokepoints“ existed in Southcentral Alaska. Scheduled time-sensitive/critical deliveries around known traffic congestion periods. Build production centers away from city.	Extensive knowledge of the roadway infrastructure allowed for predetermined route for deliveries. Effectively communicated with customers when incurring heavy congestion periods about late deliveries. Company used different vehicles for appropriate product loads to gain efficiencies.
P4	Accidents on roadways were the main contributors to traffic congestion. Only one road north heading in and out of the area. If an accident occurred, traffic congestion caused delays in deliveries. Increased fuel and time lost contributed to negative profits. Lack of new major Freeways or expressways built in the last five years existed.	People were driving faster to get to the destinations quicker. Needed toll optimization to mitigate traffic congestion, including added lanes on expressways heading south allowed the ease of traffic congestion. Needed to connect Glenn-Seward Highway Suggested alternate transportation through increased bus services, or commuter rail.	Delays in deliveries caused negative customer satisfaction regardless of the variable contributing to delays. Too many chokepoints in-and-around Southcentral Alaska. Staggering work hours may help reduce traffic congestion.	Departing earlier to arrive at destination helped circumvent delivery delays because of traffic congestion; communicated specific appointment times to clients after periods of heavy congestion.

(Table Continues)

P	Traffic congestion costs	Perspectives on changes to traffic patterns	Driving pattern changes affecting customer satisfaction	Results
P5	Traffic congestion cost 60% of business because of extra time needed to deliver products. Extra time on the road also increased fuel usage. Traffic congestion caused the business not to grow. Accidents on roadways were the main contributors to congestion during peak hours.	Traffic patterns became worse as population grew. Needed an alternate route like a loop around city. Will not deliver to military bases to the north because of heavy congestion on peak hours. Round-a-bouts were a possible solution to less signalization. Education to elected leaders will help understand traffic congestion problem. Needed to connect Glenn-Seward Highway. Suggested toll optimization to mitigate traffic congestion.	Customers were not willing to wait for late deliveries, and will sometimes cancel deliveries. One lane added to Seward Highway southbound in Alaska's biggest city in Southcentral Alaska. Constant communication on delivery times to customers helped customer satisfaction.	Will not deliver products to customers during peak AM and PM hours. Traffic congestion occurred between 5:30 AM to 7:30 AM and 5:30 AM to 7:30 PM. Lost 100% of deliveries during peak congestion hours, and 30% deliveries during off peak hours because of traffic.
P6	Fuel wasted by idling traffic contributed to congestion cost to the company. Frequent equipment maintenance and employee overtime included as contributors to congestion costs.	Traffic engineers constructed round-a-bouts around Southcentral Alaska. However, not enough round-a-bout facilities existed to make a difference to mitigate congestion. Engineers added new southbound lanes to the Seward Highway. Needed toll or HOV lanes.	Company scheduled deliveries around rush hour traffic to avoid congestion. Suggested connecting the Glenn and Seward Highways to a free-flowing limited access freeway. Education was the key to lobbying elected officials of the congestion problem.	Company will not deliver products to customers during peak congestion hours. Company developed centralized system to deliver products on time.

Cost of Traffic Congestion

Participants P1, P2, P3, P5, and P6 indicated that the amount of fuel burned parked in traffic contributed to a portion of lost revenue. P5 indicated that, over the past 10 years, fuel prices increased 60% particularly in Alaska where fuel prices remained high because of the relative remoteness of the area. P3, P4 P5, and P6 indicated accidents on roadways because of weather conditions, or animals on highways, such as moose collisions contributed to traffic congestion, and late delivery times. P5 noted traffic congestion stymied business growth, and caused a 60% of revenue loss. P6 stated that the company losses totaled approximately 10,000 dollars per year. P3, P4, and P5 added that a lack of alternate roadway routes existed resulted in less travel options in Southcentral Alaska.

Participant P1, P2, P3, P4, P5, and P6 asserted that proper coordination, scheduling, and planning provided key elements in the sustainability of an organization from on-time deliveries. Proper coordination of deliveries validated the kinematic wave theory of vehicles because, depending how long rush hour traffic occurred in one direction, business profit margins decreased for deliveries serving the congested corridor during the period (Kuwahara et al., 2012). Specifically, the six participants named scheduling, precise service-level agreements, and factoring the time and cost of travel in the implementation of a delivery. P1, P2, and P3 delivery service areas included Southcentral Alaska and beyond, which required longer travel periods.

The six participants interviewed indicated leadership and management needed to consider (a) personnel skills, (b) define leadership hierarchies, (c) outline communication

paths, and (d) delineate roles and responsibilities to their employees. P1 and P5 stipulated that the lack of knowledge to avoid congestion, particularly new employees, negatively affected profit margins. In contrast, P2 and P6 noted that company managers provided enough lead-time to make deliveries on time to mitigate profit losses because of increased gridlock.

Participants P3, P4, P5, and P6 maintained that accidents on roadways particularly in the winter, contributed to profit losses because of traffic congestion. P3 and P4 cited the lack of alternate highways to avoid traffic accidents contributed to increased fuel costs, lost time parked in traffic, and late delivery times. Similarly, P5 and P6 suggested Alaska's biggest city needed an Interstate loop around the city to avoid vehicle congestion, or a free-flowing freeway in Alaska's biggest city between two major expressways.

P5 cited cooperation among businesses' leaders and the Alaska Department of Transportation should help prevent traffic accidents, and designs for future roadway development. The cooperation between business leaders and Alaska Department of Transportation authenticated the systems theory because Von Bertalanffy (1969) who posited that a compilation of analyzing and approaching problems similar to traffic congestion helped find appropriate solutions. Business leaders should collaborate with policy-makers for feedback to meet the needs and requirements of each organization.

Perspective on Changes to Traffic Patterns

P1, P2, and P3 indicated too many chokepoints existed on the highway to the north and south from Alaska's biggest city in Southcentral Alaska. Chokepoints existed

when only one highway leads from point A to point B, and involved the vulnerability to traffic closures because of accidents. P5 and P6 noted that traffic congestion intensified because of Southcentral Alaska's increase in population. Participant P3 explained that if a bridge on the primary highway route north failed because of an earthquake, traffic could not pass through the area. P3 indicated that the problem of the bridge outage involved commuter gridlock from Alaska's biggest city to the Matanuska Valley resulting in profit losses from delayed deliveries.

P1 and P4 explained that their company's delivery drivers use GPS navigational aids to traverse Southcentral Alaska highways. However, it appeared navigational aids in Southcentral Alaska lacked reliability because of non-updated traffic congestion information. Participant P1 and P4 added that traffic engineers yielded the most reliable option to use based on the conditions of the situation to access near real-time traffic congestion information. Participants' P3 and P5 asserted that the knowledge and experience of personnel should guide the selection of viable, reliable, and accessible highways leveraged as best tools.

Concerning congestion mitigation techniques in Alaska's biggest city, P3, P5, and P6 suggested inserting roundabouts, which are circular traffic circles eliminating the need for signalization. P6 indicated not enough round-a-bouts existed within city limits. Participants' P3, P5, and P6 suggestions replicated findings from previous studies using roundabouts. According to the Federal Highway Administration (2014), roundabouts reduced injury crashes by 75 percent at intersections where stop signs or signals

previously used for traffic control. In addition, reducing vehicle accidents at intersections reduced traffic congestion (Federal Highway Administration, 2014).

Participant P3, P5, and P6 proposed using HOV lanes as an additional means to mitigate traffic congestion. The HOV lane proposal validated the bathtub theory because Arnott (2013) stated traffic velocity negatively affected traffic density, and congestion outflow was the product of traffic density and velocity. P4 continued on the concept of HOV lanes by suggesting adding a toll optimization lane (a highway lane for which vehicle drivers are charged) to earn revenue for the area road networks, and help reduce traffic congestion. P1, P2, P3, P4, P5, and P6 indicated adding lanes to existing freeways and instituting HOV or toll optimization lanes would increase roadway capacity, and help traffic flow quicker, which could allow for increased deliveries and faster delivery times by lowering vehicle congestion.

Driving Pattern Changes Affecting Customer Satisfaction

The six participants viewed changes affecting customer satisfaction because of increasing the reliability of deliveries as strategic processes returning high profits with minimum expenses. P1 and P2 indicated that longer routes to destinations equaled longer delivery times of products to customers, which decreased customer satisfaction. However, participants P5 and P6 attributed strong customer relation strategies to precise accountability standards for delivery performance, which formed strong customer satisfaction. P5 indicated customers despised late deliveries. P5 further stated that customers searched for businesses elsewhere to avoid companies identified with late deliveries.

The six participants indicated that, to ensure long-standing relationships with customers, acting on customer feedback was an essential means to keeping clients. P3, P4 and P6 stated that the constant communication between delivery employees and clients helped increase customer satisfaction. P3, P4, and P5 noted that although customers prefer no delays in deliveries, customers understood that congestion would happen. Customers would forgive delivery delays during high congestion periods as long as constant updates occurred between delivery services and patrons.

Changes in Delivery Times Affecting Company Performance

Participants P1, P2, and P3 stated fewer on-time deliveries equaled negative perception of the companies. P4 indicated drivers departed earlier in the morning to arrive at destinations to deliver products on time. P5 and P6 cited that traffic congestion hindered product deliveries during peak congestion hours. P5 asserted products delivered later in evening fulfilled delivery promises, although customers displayed displeasure with later delivery times.

P1 and P2 indicated that many times their companies' drivers were unable to meet contractual delivery obligations because of traffic congestion. P3 stated that extensive knowledge of the roadway infrastructure and capacity in Southcentral Alaska was essential for predetermined routes for reoccurring deliveries to clients. As a result, managers needed to train employees on Southcentral Alaska transportation infrastructure for increasing the efficiency of product deliveries.

The six participants recognized the assortment of elements influenced traffic congestion that ultimately affected industries, organizations, and customers; of these

three, the needs of the customer were the highest priority. The six responses indicated to prioritize customers' needs, leaders should identify strategies to mitigate congestion, and define end-user expectations. Inexperienced managers tended to overlook intangible elements, such as stakeholders identification or customer expectations.

The six participants explained that business leaders must identify major customers and stakeholders' to manage the expectations and needs of the customers. Leaders need to understand congestion mitigation strategies, and identify the expectations and responsibilities of key players to make the right decisions. Business managers must have a complete understanding of the (a) what, (b) when, (c) how, and (d) where the problem of congestion develops to expand (a) effective service-level agreements, (b) expectation management, (c) milestones, (d) datelines, and (e) budget proposals across the lifespan of the business. Three of the six participants mentioned employee proficiency, and efficient supply-chain management as important for successful delivery services.

Knowledge and Experience: The Best Tools Available

As I collected data, the six responses shifted from the novel idea of a single inclusive tool toward mitigating traffic congestion, to defining, developing, and instituting a better more efficient transportation *system* in Southcentral Alaska. P1 and P2 indicated that technology evolved regularly, so professionals in the transportation field must continue to be educated on traffic issues to support the environment. P2 traveled to other areas similar to Southcentral Alaska, and stated more areas of the United States, such as Tampa, Florida, included more efforts of education to elected officials in efficient transportation systems.

P2 indicated Tampa, Florida, involved the correct balance of mass transit, pedestrian trails, and adequate freeway systems to incorporate the growing population. Findings from a study by Barbeau, Brakewood, and Watkins (2014) indicated efficiencies for mass transit increased by two minutes because of the idea of providing passengers with real-time information (RTI) in Tampa, Florida. Passengers displayed significant increased levels of satisfaction with the time the passengers waited for mass transit, and how often mass transit arrived at the stop on time (Barbeau, Brakewood, & Watkins, 2014). The findings indicated evidence that RTI significantly improved the passenger experience of waiting for mass transit, which had been one of the most disliked elements of transit trips in Tampa, Florida (Barbeau et al., 2014).

P3 and P4 warned about managers who depend solely on primary routes when delivering products on time. When hiring new delivery drivers, managers tend to rely on resumes or initial interviews to determine the capabilities and flexibility attributes of an employee. When a new hire was knowledgeable about the delivery system, but does not show initiative for researching best delivery routes, the loss of initiative may be a sign that the employee may be losing practical motivation for doing a good job. Business leaders and managers need to periodically review and certify employee capabilities to avoid the issue of motivation.

Theme 2: The Need for Alternate Roadway Routes

As the six participants explained, the problem of traffic congestion exists in Southcentral Alaska, and congestion effects on-time deliveries. The participants' suggested building alternate routes that would help alleviate congestion. Alternate

roadway routes aligned with systems theory by helping find solutions to congestion, such as alternate roadway routes (Von Bertalanffy, 1969). Often, city traffic engineers use systems theory to find solutions to traffic congestion problems (Von Bertalanffy, 1969).

P1, P2, P3, and P6 agreed that connecting the Glenn and Seward highways, as a freeway component, would eliminate signalization. In contrast, P5 asserted connecting the Minnesota Drive bypass to the Glenn/Seward highway in Alaska's biggest city would be a more appropriate project for a southern alternate route.

The six participants agreed on many of the alternate roadway projects involving similar elements, ideas, or specifications regardless of the project's cost or period to construct. In contrast, participant P3, P5, and P6 disagreed in building the Knik Arm Bridge linking the Mat-Su Borough to Alaska's biggest city as an alternate route north because the bridge involved an increased expense to the state of Alaska. However, the interviews transcripts revealed suggestions for a more focused congestion mitigation techniques.

The congestion mitigation techniques include critical strategies for reducing traffic congestion utilizing alternate routes. An example of an agreement and disagreement from the P3, P5, and P6 included the suggestion involving building an alternate route that would aid in evacuation of north and south inhabitants in case of a natural disaster. P1 and P2 indicated the Knik Arm Bridge would suffice for a second route in Southcentral Alaska to travel instead of the primary Glenn Highway route. The bridge would provide drivers with an option for a second route north in case of a natural disaster or emergency.

In contrast, P3, P5, and P6 suggested increasing the capacity of the Glenn and Seward highways as an alternative. Previous researchers indicated the Knik Arm bridge would cost $1Billion (Goldsmith, 2009). However, the six participants suggested HOV lanes or toll optimization to mitigate traffic congestion. Toll optimization may help construction and maintenance of city roadway infrastructure, but would require the public to drive in the dedicated lanes.

Another suggestion from participant P4 was to provide alternate transportation, such as an extended bus system or commuter rail. P4 indicated southcentral Alaska City leaders previously explored research on commuter rail, and showed an anticipated $834,000 in revenue or 18.4 % of the operating cost needed to run the system. The commuter rail service could operate during peak commute hours only, which would include three trips within Southcentral Alaska in the morning and three in the evening (Municipality of Anchorage, 2011). The proposed service could operate using three trains on 30-minute intervals during the peak periods, resulting in 8.6 revenue hours and 315 revenue miles (Municipality of Anchorage, 2011). In contrast, P5 stated that Southcentral Alaska population was not big enough to support such a venture, such as commuter rail.

Critical Strategies to Eliminate Traffic Congestion

Study findings indicated a relation between sustainability and traffic congestion reduction. The six participants' provided views of how to mitigate traffic congestion sustainably. When discussing sustainability, the six participants named long-term goals, such as toll optimization (P1, P2, P3, P4, P5, and P6), roundabouts (P3 and P5), free-

flowing freeways (P3, P4, and P5), alternate transportation (P1, P2, P3, P4, and P5), and HOV/toll optimization lanes (P1, P2, P3, P4, P5, and P6). The six participants validated the need to mitigate traffic congestion to increase delivery profits.

Transportation sustainability involves another strategy to mitigate traffic congestion. P4 indicated, for example, staggering work hours by business leaders to reduce traffic congestion as a way for the roadway capacity of Southcentral Alaska to be sustainable. In contrast, P3 indicated that production centers away from the dense population might aid in reducing traffic congestion because the traveling public would be working away from the city's center.

P1 and P2 indicated sustainability depended on how strategy achievements affected the organization first, and then how well the initiative achieved the expected goals. P1 and P2 stated that the ability to evaluate process output and competences included important business characteristic of transportation system sustainability. P5 cited education to Southcentral Alaska elected leaders as a way to enlighten elected officials. P3 and P4 indicated customer expectations should help define the crucial strategies, which may help alleviate traffic congestion and increase on-time deliveries.

Analyzing Organizational Strategy Opinions

The six participants agreed selecting the right strategy or tools to improve and measure the elements for reducing traffic congestion would be a difficult task that required vast knowledge and subject expertise. When designing congestion mitigation strategies, business managers need to evaluate (a) time, (b) money, (c) labor, and (d) quality control in selecting the most effective strategies. Effective congestion mitigation

strategies should reflect unbiased data, so the evaluation criteria ensured the strategy maximizes the full cost of the project, although preserving uncompromising commuter access throughout the process.

From another perspective, the six participants noted delimitations of congestion reduction strategies. For example, the delimitations attributed to budget constraints are determinants of the optimal strategy. Two Participants indicated that not understanding the delimitations implied a misconception of the strategy, and might cause confusion.

Constraints

Not enough alternate roadway routes exist in Southcentral Alaska for business services to prepare for deliveries. The lack of alternate routes primarily north and south of Alaska's biggest city increases the travel time of business delivery services distributing merchandise. The decreased federal or state financial assistance was a factor inhibiting the ability of legislatures to upgrade roadways to support the growing population of Southcentral Alaska. Traffic congestion causes business delivery services to lose profits because of delayed deliveries and wasted time in traffic. No HOV/toll optimization lanes exist in Southcentral Alaska because of budget constraints in the state of Alaska.

Benefits

Southcentral Alaska government officials need education on the critical factors leading to upgrading and constructing increased roadway capacity and alternate highway routes. Effective education can allow Alaska Department of Transportation engineers to prepare future projects, and optimize construction costs. Business leaders' need to work together to help the community and Southcentral Alaska government officials understand

the effects of traffic congestion on local business delivery services' performance for potential benefits of increased delivery performance to the communities.

The Research Question Answered

In this heading of the presentation of findings, I answered the research question: What strategies do business leaders require to increase on-time deliveries? The findings from this study showed educating key stakeholders including business owners, political decision-makers, and others impacted by the strategies of implementing toll optimization and High Occupant Vehicle (HOV) lanes was imperative to help reduce traffic congestion in Southcentral Alaska. The six participants demonstrated overwhelmingly that toll optimization and HOV lanes are the key elements of a sustainable strategy because the increased revenue from roadway tolls would aid in decreasing congestion, and increasing funding for roadway maintenance. The findings from this study tied toll optimization and HOV lanes to existing literature, which cited drivers, who travelled in HOV lanes, observed an immediate decrease in traffic congestion (Bento et al., 2013). Delivery services leaders may provide the findings to Southcentral Alaska elected officials on toll optimization and HOV lanes, which could lead to improving the profitability of business delivery services.

Applications to Professional Practice

This heading contains potential applications from my study's findings, which may affect professional practice when aligned with the managers' needs for selecting elements and criteria relevant to the support of a business delivery services. In this study, I developed conclusions from the knowledge and insights from six business leaders of

delivery services in Southcentral Alaska. In the conclusions of the study, I linked the existing body of knowledge to the conceptual framework by showing a corresponding decrease to business profits for businesses within traffic-congested corridors when morning and evening rush hour occurred (Downs, 1962). The analysis of the data showed toll road optimization, and added HOV lanes as potential solutions for improving the evaluation of the road traffic sustainability.

Creating a transportation optimization program, such as toll optimization and HOV lanes can result in less congestion in an urban environment. The needs, expectations, and requirements of Southcentral Alaska business leaders should focus on the best business practices, key elements, and current industry trends, for moving goods and services effectively and efficiently. Toll optimization/HOV lanes should encourage managers to engage with employees to find ways to improve current internal delivery processes by researching less congested routes for on-time deliveries. Toll optimization/HOV lanes should assist business leaders to be more involved with their decisions on when to deliver goods and services to their customers. Ultimately, as managers become more comfortable with the details of toll optimization/HOV lanes, the toll/HOV lanes should present delivery service leaders with the right knowledge to select the best routes for deliveries.

In summary, the goal of toll optimization/HOV lanes should incentivize business delivery professionals to avoid routes containing urban congestion, and facilitate taking routes for increasing on-time deliveries of goods and services to their customers. However, the success of toll optimization/HOV lanes depends on the knowledge,

experience, and abilities of transportation experts to identify and apply best-practice concepts for roadway for designs. Business leaders needed to motivate key elected officials responsible for funding urban roadway designs, to seek environmental knowledge, and gain understanding of business delivery industry best practices.

Implications for Social Change

Implementing or improving sustainable business delivery services involve a constructive influence in social change. A toll optimization/HOV lane project could facilitate the sustainability for businesses, and increase revenue for state government and businesses because of more frequent and on-time deliveries. When business leaders require delivery service employees to research efficient traffic routing models, employee awareness will increase in the organization's business outputs involving efficiencies of on-time deliveries to meet customer requirements. The understanding of business inputs and outputs could lead to the improvement of the relationship among business segments, as well as enhance the sustainability of transportation in Southcentral Alaska. In addition, as businesses (such as delivery services) individually mature with other business segments, (such as the financial services) the internal organizational supply chain processes and culture could become more sustainable across businesses, employees, and communities.

The implication of social change could transform how business leaders implementing an internal education program on best practices to avoid traffic congestion might affect commuter behavior. Commuter behavior changes could lead to creating or overhauling other forms of alternate transportation, and making alternate transportation

sustainable including the local mass transit system, or pedestrian transportation systems. Business opportunities could result from improving organizations' sustainability. Business leaders will accomplish their corporate duty by leading business employees to sustainable improvement processes through protecting the environment, helping the economy, and inspiring society on a global scale. In addition, business delivery leaders recognize that educating their key elected officials on toll optimization/HOV lanes might help increase on-time deliveries. More business delivery leaders could implement such programs of educating elected leaders, thereby making customers, the environment, and the economy the ultimate winners.

Recommendations for Action

The results of the study revealed that educating key stakeholders including business owners, political decision-makers, and others affected by the findings on the strategies of implementing toll optimization and High Occupant Vehicle (HOV) lanes was imperative to help reduce traffic congestion in Southcentral Alaska. The first step to help reduce congestion includes delivery leaders staggering delivery times to avoid congestion. The second step includes business leaders advising key stakeholders on the need for alternate travel routes to avoid congestion. The final step includes business leaders informing policy-makers on implementation techniques to toll optimization/HOV lanes for decreasing traffic congestion through state legislative sessions or municipality assembly meetings.

Business leaders need to pay attention to toll optimization, and how HOV lanes and traffic circles result in better traffic flow and increase state revenue for future

transportation projects. Business leaders disseminate the results of the study through continual education to Southcentral Alaska elected officials on the foundation of what increasing business and transportation sustainability and reducing congestion means to the public. In addition, business leaders need to provide congestion reduction strategies through Alaska state legislative sessions and municipality assembly meetings.

Recommendations for Further Research

From the findings of the study, I identified the geographic location as a limitation to the issue of assessing traffic congestion and business delivery times. Southcentral Alaska was an appropriate research setting. However, different locations may, or may not provide analogous results for addressing the same research question. Considering the limitations of this study, the following is a list of recommendations for future research, on strategies to reduce traffic congestion to increase on-time deliveries to increase profits:

1. Future researchers could focus on the newer and available technology elements for decreasing traffic congestion and increasing business profits for a larger population in a different location.
2. Future researchers could conduct a quantitative study comparing other areas of the United States, similar to Southcentral Alaska by examining the correlation between commuter behavior to traffic congestion, and how congestion reduction strategies might be beneficial for improving the profitability of delivery service companies.

3. The population domain of the research could shift from delivery services to another business segment in logistics or multimodel supply-chain production on similar areas outside of Southcentral Alaska.
4. Future researchers could utilize the same design in another area with similar geography to Southcentral Alaska.

Reflections

While completing this study, I explored options to improve the relationship between business delivery services, and traffic congestion to gain an understanding of the transportation environment in Southcentral Alaska. The initial research into academic literature revealed a surplus of elements, methodologies, and tools available to evaluate Southcentral Alaska transportation infrastructure, and the internal processes of the business delivery environment. As the research and semistructured interviews progressed, I encountered and integrated articles and artifacts from the academic literature, and opinions and insights of transportation professionals.

From my research, I revealed that the evaluation of sustainability in the business delivery environment would not be a simple adjustment of solely decreasing traffic congestion. During the course of the study, the research process and resultant findings tested biases, notions, and principles, challenging the idea that assessing sustainability would be a relatively simple task. My prior convictions on the need for a sustainable transportation industry remain strong and unchanged. Educating key stakeholders on toll optimization/HOV lanes might create a process for assuring the sustainability of multiple environments (such as traffic congestion and delivery services) simultaneously.

Summary and Study Conclusions

Section 3 included the descriptions of findings and conclusions from the study to professional practice and the implications for change. I included an (a) overview of the study, (b) a presentation of findings, (c) applicability to professional practice, and (d) implications for social change. I also provided recommendations for action and further study based upon the results of the study. I concluded this section with a reflection of my experience with the research process, how my thinking changed resulting from the experience of the research process, and with a conclusive summary of the study.

The six participant interviews revealed a need for alternate transportation, such as an efficient mass transit systems, freight distribution, and increased roadway capacity. Budgetary concerns incorporated the six participant answers, and the importance of educating elected officials involved a relationship between Southcentral Alaska Department of Transportation and the business delivery services' leaders. The six participants explained that toll optimization and HOV lanes needed construction in Southcentral Alaska. In addition, the findings from my study identified a gap in the delivery service environment by revealing traffic congestion constraints. Business leaders should develop a program to help mitigate the remedial congestion constraints by educating elected officials on an effective and efficient toll optimization program.

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Appendix A: Interview Questions

Primary Research Phenomena under study

Strategies business leaders require reduce traffic congestion and increase on-time deliveries and increase profits in Southcentral Alaska.

Primary Research Goals

Research goals are to investigate whether traffic congestion is a factor that contributes to the decrease in profits because of the lack of on-time deliveries.

1. What traffic congestion issues, if any, is your company experiencing?
2. What are the costs from lost delivery times because of traffic congestion?
3. What changes have you experienced in traffic patterns over the past 5 years?
4. How have changes in traffic patterns affected your company over the past 5 years?
5. What driving pattern changes have you made, if any, to avoid traffic congestion?
6. What effect have these driving pattern changes had in terms of on-time deliveries of products?
7. What strategies do you use, if any, to circumvent key traffic congestion times within the delivery schedule?
8. What effect have changing delivery times and routes had on on-time performance?
9. What suggestions would you make deliveries more efficient for your company?

10. What further information can you provide to help me understand traffic congestion issues and your response to them?

Appendix B: Consent Form

My name is Donald Leaver, and I am a doctoral student at Walden University that is conducting this study. Completion of the research will potentially provide insight and information on the effects businesses have on congested roadways in and around Southcentral Alaska. You are invited to take part in a research study of a qualitative form concerning highway congestion in Southcentral Alaska, and its negative effects on business profits. You were invited for the study because you are a leader in this field. This form is part of a process called "informed consent" to provide you to understand this study before deciding whether to take part.

Background Information

The purpose of this study is to explore what strategies business leaders require to increase on-time deliveries. The participants of the study involve business leaders autonomously able to make decisions without supervision. The criteria required to participate in the study is a business leader or manager who has a minimum of 8 years' experience drawn from three business delivery organizations in Southcentral Alaska, has knowledge of customer destination needs, and who has knowledge of traffic congestion in the urban area.

Procedures

If you agree to be in this study, you will be asked to answer questions regarding the above stated topic; this will last for approximately 20 min.

Voluntary Nature of the Study

Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. If you decide to join the study, you can still change your mind during the study. Your interview answers will be audio recorded.

In addition, a process called "Member checking" occurs after the data has been collected and transcribed to increase the credibility and validity of the study.. Member checking involves communicating with each individual participant, and verifying I have interpreted the information correctly. The purpose of member checking is only to ensure the researcher is interpreting participant contributions correctly.

Risks and Benefits of Participating in the Study

Participating in the study may involve minor discomforts such as fatigue or stress; however, it is unlikely the study poses risks to safety or wellbeing. If you feel stressed during the study, you may stop at any time. You may skip any questions without consequence. This consent form protects your privacy and information will be kept confidential.

The benefits may contribute to the larger community by providing Southcentral Alaska policy-makers strategies to reduce traffic congestion, which can lead businesses in the delivery industry to increase profits.

Compensation

No compensation is offered for participating in the interview.

Confidentiality

Any information you provide will be kept confidential. The researcher will not use your information for any purposes outside of this research project. Also, the researcher will not include your name or anything else that could identify you in any reports of the study. Data will be kept secure on an external drive locked in a fire-protected safe accessible only by me, and destroy data after 5 years, as required by the university.

Adverse Event/Criminal Activity

If a participant reports criminal activity, the researcher must report the activity to the study organization, according to the organization's policy.

Contacts and Questions

You may ask any questions you have. If you have questions later, you may contact the researcher via [redacted]. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is [redacted]. Partaking in the interview will commence 5 calendar days after you consent to participate. You may print or save a copy of the consent form.

Statement of Consent

I have read the above information, and I understand the study well enough to make a decision about my involvement. By agreeing to participate in the study, please reply, via e-mail, indicating, **"I consent."**

Appendix C: National Institute of Health Form

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Donald Leaver II** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 01/16/2012

Certification Number: 830756

Appendix D: Interview Protocol

Interview: Business Strategies to Improve On-Time Deliveries to Increase Profits in Southcentral Alaska

1. The video/phone interview began with introductions and an overview of the research topic.
2. I advised the participant that I am sensitive of their time and thank them for agreeing to participate in the study.
3. I reminded the participant of the recorded interview and the conversation we were about to have remained strictly confidential.
4. I turned on the recorder and announced the participant identifying code, as well as the date and time of the interview.
5. The interview lasted approximately 20 to 30 minutes to obtain the six responses from 10 interview questions and follow up questions.
6. I explained the concept of member checking, ensured each question was thoroughly explained, and confirmed the answer provided by the participant was recorded.
7. After confirming that answers recorded to the satisfaction of the participant, the interview concluded with a sincere thank you for participating in the study.

Appendix E: Email Contact to Business Delivery Services

Hello **(Potential Participant)**, my name is Donald Leaver and I am a doctoral student from Walden University. The reason I am writing you is to invite you to participate in a research study. I am seeking business delivery leader volunteers as participants in my study regarding what strategies do business leaders require to increase on-time deliveries. I anticipate the research may contribute to social change by providing Southcentral Alaska policy-makers strategies to reduce traffic congestion, which can lead businesses in the delivery industry to increase profits.

If you are interested in participating in this valuable research, please email reply with any questions you may have.

Regards,

Donald Leaver

Doctoral Candidate

Walden University