

**Effect of Transformational Leadership and Organizational Innovativeness
on Motor Carrier Performance**

by

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ABSTRACT

This dissertation developed a theoretical model of the relationship between transformational leadership, organizational innovativeness, and organizational performance, both operational and financial. To test the model, data were collected from upper management at motor carriers that provide for-hire transportation services within the continental United States. A survey was developed using existing, validated scales for each of the constructs. Contact data were collected for 500 motor carriers to include individual names, positions, and e-mail addresses. The survey was administered on-line using Qualtrics. Over 4,000 e-mails were sent directly to 1,959 desired points of contact with the link to the survey. The 158 usable responses represented an 8% individual response rate and a 32% company response rate.

Analysis of the data using structural equation modeling revealed that all hypotheses were supported. The results of this study support a direct and indirect effect of transformational leadership on the bottom line performance of an organization. Two mediators, organizational innovativeness and operational performance, were tested and the amount of variance in financial performance accounted for by the hypothesized model was 38%. Implications for researchers and practitioners are discussed along with limitations and areas for future research.

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CHAPTER 1: INTRODUCTION

As a vital part of the supply chain, motor carriers represent the largest single transportation mode in the world in terms of both tonnage and revenue. Motor carriers move 70% of all cargo transported in the United States and represent 78% of the total transportation costs; this totaled approximately \$592 billion in 2010 (Cooke, 2011). The efficiencies and effectiveness of today's supply chain may be at risk because of bottlenecks in the transportation system, vulnerabilities to disruptions, volatility of fuel costs, and the need to address the growing number of emission and energy constraints (Hillestad, Van Roo, and Yoho, 2009).

It is critical that businesses are capable of finding distribution services when needed because any disruptions in the outbound flow of goods may result in longer lead times, which will have a negative effect on firm performance (Pettit, Fiksel, and Croxton, 2008; Weishäupl and Jammerneegg, 2010; Wilson, 2007). Giunipero and Eltantawy (2004) went further by stating that a transportation disruption could have a crippling effect on the entire supply chain. This means that motor carrier operational and financial performance, especially that of the larger carriers, has the potential to affect the entire supply chain.

During each of the last six years, the American Transportation Research Institute has surveyed a representative sample of for-hire and private motor carriers regarding the top issues facing the industry. Table 1.1 contains the issues identified in their most recent survey along with a detailed description of the issue (American Transportation Research Institute, 2010).

An inherent characteristic of a supply chain is that issues for one member will have an effect on the other members (Skipper and Hanna, 2009). The aforementioned motor carrier issues may lead to increased costs as well as the decreased availability and reliability of transportation services, which could represent significant risks for a supply chain that is more vulnerable today than it has ever been (Wagner and Bode, 2008).

Therefore, motor carrier leadership, innovativeness, and performance may have immediate implications for the motor carrier, but may also have far reaching implications on the entire supply chain.

Table 1.1. Top 10 Motor Carrier Issues

Issue	Description
1. The rebound of the U.S. economy	Decreased demand during the economic downturn resulted in carriers downsizing or going out of business (American Transportation Research Institute, 2010).
2. Implementation of Compliance, Safety, Accountability (CSA) 2010	The higher driver safety standards of the Federal Motor Carrier Safety Administration's CSA 2010 program may reduce the number of eligible drivers (Roberts, 2011; Watson, 2011).
3. Cost of compliance with government regulation	Government regulations may thwart recruitment because they are seen as an invasion of privacy and in direct opposition to the independence that many people seek as truck drivers (Cantor and Terle, 2010).
4. Impact of the new hours-of-service rules	The Federal Motor Carrier Safety Administration proposed hours-of-service rule could lead to productivity losses and capacity constraints (Kvidera, 2010; McNally, 2011).
5. Driver shortages expected as consumer demand increases	During the economic downturn motor carriers cut hiring and training of new drivers. The cost of replacing truck drivers is between \$2,200 and \$21,000 (Suzuki, Crum, and Pautsch, 2009).
6. Volatility of fuel prices	At the end of April 2011 diesel reached a 30-month national average high of \$4.064 per gallon (U.S. Department of Energy, 2011).
7. Reduced funding for highway infrastructure	Underfunding highway infrastructure maintenance could increase congestion, which increases delivery time and decreases productivity (Konur and Geunes, 2010).
8. Cost of meeting onboard truck technology requirements	On-board technologies represent a significant investment for motor carriers, but the costs and benefits of these systems has not been documented by the Federal Motor Carrier Safety Administration (American Transportation Research Institute, 2010).
9. Cost of compliance with environmental mandates	Motor carriers are under constant pressure to be more environmentally friendly. Current environmental topics include anti-idling regulations, reduced speed for large commercial motor vehicles, and carbon taxing (American Transportation Research Institute, 2010).
10. Inflexibility in truck size and weight	Federal size and weight limits that date back to 1991 are causing productivity losses and traffic congestion (McNally, 2010).

MOTOR CARRIER CHARACTERISTICS

Legislative changes over the last 30 years have had a major impact on the motor carrier industry. The Motor Carrier Act of 1980 deregulated interstate trucking and introduced competitiveness by stripping the Interstate Commerce Commission's authority to control entry into the trucking industry and regulate commodity routes (Levinson, 2009). In 1995, intrastate trucking operations were deregulated by the Trucking Industry Regulatory Reform Act, which prohibited states from controlling routes, services, and rates within their borders (Bureau of Transportation Statistics, 2009). Until 2007, motor carriers had the authority to collectively establish rates, which was primarily done through one of the 11 motor carrier bureaus. The antitrust immunity granted to the motor carriers was terminated by the Surface Transportation Board in May 2007. The removal of motor carrier antitrust immunity was the "final step" in making the motor carrier industry fully competitive (Surface Transportation Board, 2007, p. 4).

Belzer (1994) stated that many motor carriers did not have the capability to transform quickly to the deregulated operating environment. In the first five years following deregulation more than one-third of carriers with annual revenues in excess of one million dollars exited the industry (Zingales, 1997). Motor carriers that innovated and adapted quickly to the new environment not only survived, but experienced increased revenue while improving customer service (Gentry and Farris, 1992; Mentzer and Gomes, 1986; Zingales, 1997).

Although many industries are competitive, what makes the motor carrier industry different is that it is characterized by a derived demand that is highly competitive, with low profit margins, and few barriers to entry (Belzer, 2002; M. Douglas, 2010; Liu, Wu,

and Xu, 2010). The dynamic, complex, and competitive motor carrier industry is well suited for studying the benefits of transformational leadership and organizational innovativeness, which has been shown to be particularly effective in these types of environments (Bass, et al., 2003).

THEORETICAL JUSTIFICATION

Since the introduction of transforming leadership by Burns (1978) and the subsequent theory of transformational leadership proposed by Bass (1985a), the number of studies conducted on transformational (and charismatic) leadership surpassed the total number of studies on all other popular leadership theories combined (Judge and Piccolo, 2004). Transformational leadership, which is most commonly contrasted with transactional leadership, attempts to elevate the needs of the follower and develop the follower into a future leader (Avolio, Waldman, and Einstein, 1988; Bass, 1985a). These high-minded goals are attained by leaders who develop and communicate a vision of the organization's future (Carless, Wearing, and Mann, 2000), serve as an inspirational role model of integrity and fairness (Bass, 1985b), challenge followers to accept greater responsibility (Avolio, et al., 1988; Bass and Avolio, 1994), and genuinely understand the follower's strengths and weaknesses (Bass and Avolio, 1993a).

The phenomena of transformational leadership and innovativeness and their effect on operational performance and financial performance have not received much attention in supply chain research and have not been evaluated collectively with regard to motor carriers. Williams, Esper, and Ozment (2002) stated that virtually no articles highlight the importance of effective supply chain leadership. A recent stream of supply chain

leadership research that includes transactional and transformational leadership provides the conceptual framework to understand this still under-researched area (Defee, et al., 2009). However, there remains a scarcity of applied research on transformational leadership in the supply chain domain. This is *Gap 1*.

Transformational leadership has been found to have a positive relationship with subordinate satisfaction, motivation, and performance (e.g., Bass, 1998; Howell and Avolio, 1993; Lowe, Kroeck, and Sivasubramaniam, 1996). Although many studies have shown a positive relationship between transformational leadership and organizational performance, work is still needed to identify mediating variables (Bass, et al., 2003; Boerner, Eisenbeiss, and Griesser, 2007; Eisenbeiss, Van Knippenberg, and Boerner, 2008; Wolfram and Mohr, 2009; Yukl, 1999). Because senior leadership style has been shown to have a significant positive effect on organizational innovation (e.g., Eisenbeiss, et al., 2008; Jung, Chow, and Wu, 2003) and organizational innovativeness has been shown to have a significant positive impact on organizational performance (e.g., Deshpande, Farley, and Webster Jr, 1993; J. Han, Kim, and Srivastava, 1998; Hult, Hurley, and Knight, 2004; Keskin, 2006), this study will evaluate organizational innovativeness as a possible mediator between transformational leadership and organizational performance. Organizational innovativeness is the propensity of an organization to deviate from conventional industry practices by creating or adopting new products, processes, or systems (Deshpande, et al., 1993; Hult, et al., 2004; Knowles, Hansen, and Shook, 2008; Srinivasan, Lilien, and Rangaswamy, 2002). This adapted definition captures both the *adoption component* most commonly associated with Rogers' (2003) diffusion of innovation theory and the *creation component* prevalent in the

management literature that includes an organization's capacity for creativity (Gebert, Boerner, and Lanwehr, 2003) and openness to new ideas (Hurley and Hult, 1998). Studying organizational innovativeness as a possible mediator responds to the generic call for research into the possible mediators between transformational leadership and organizational outcomes as well as the specific call for empirical research regarding logistics innovation (Grawe, 2009). The need to identify and study these mediators as well as the need to expand theory-based research of innovation in an applied supply chain setting is *Gap 2*.

Organizational performance can be measured as two distinct but related constructs, operational performance and financial performance. Operational performance will be evaluated as a possible mediator between transformational leadership and financial performance, which will be the dependent variable. The study of operational performance as an important preceding factor to financial performance is supported in the literature (e.g., Inman, et al., 2011; Wouters, et al., 1999). Operational performance will be measured as overall service quality, cost of service, claims ratio, safety, and on-time delivery. These measures are not only consistent with measures used on other operational performance scales (e.g., Inman, et al., 2011; Pagell and Gobeli, 2009; Zelbst, Green Jr, and Sower, 2010), but they are also very close to what is widely accepted as the four basic factors of operational priorities: cost, quality, delivery, and flexibility (Yeung, et al., 2006). Financial performance will be measured as return on investment, return on sales, profit, profit growth, and operating ratio. These measures are commonly used in the literature for measuring a firm's financial performance (e.g., C. Han, Corsi, and Grimm, 2008; Inman, et al., 2011; Scheraga, 2010; Teo, Wei, and Benbasat, 2003; Wu

and Chuang, 2010; Yeung, et al., 2006). Recent literature has suggested that there is a positive relationship between operational performance and financial performance of the firm (Britto, Corsi, and Grimm, 2010; Inman, et al., 2011); however, a study of multiple operational measures and their impact on multiple financial measures could not be found. This is *Gap 3*. Figure 1.1 is a graphical representation of the knowledge gaps that this dissertation will address.

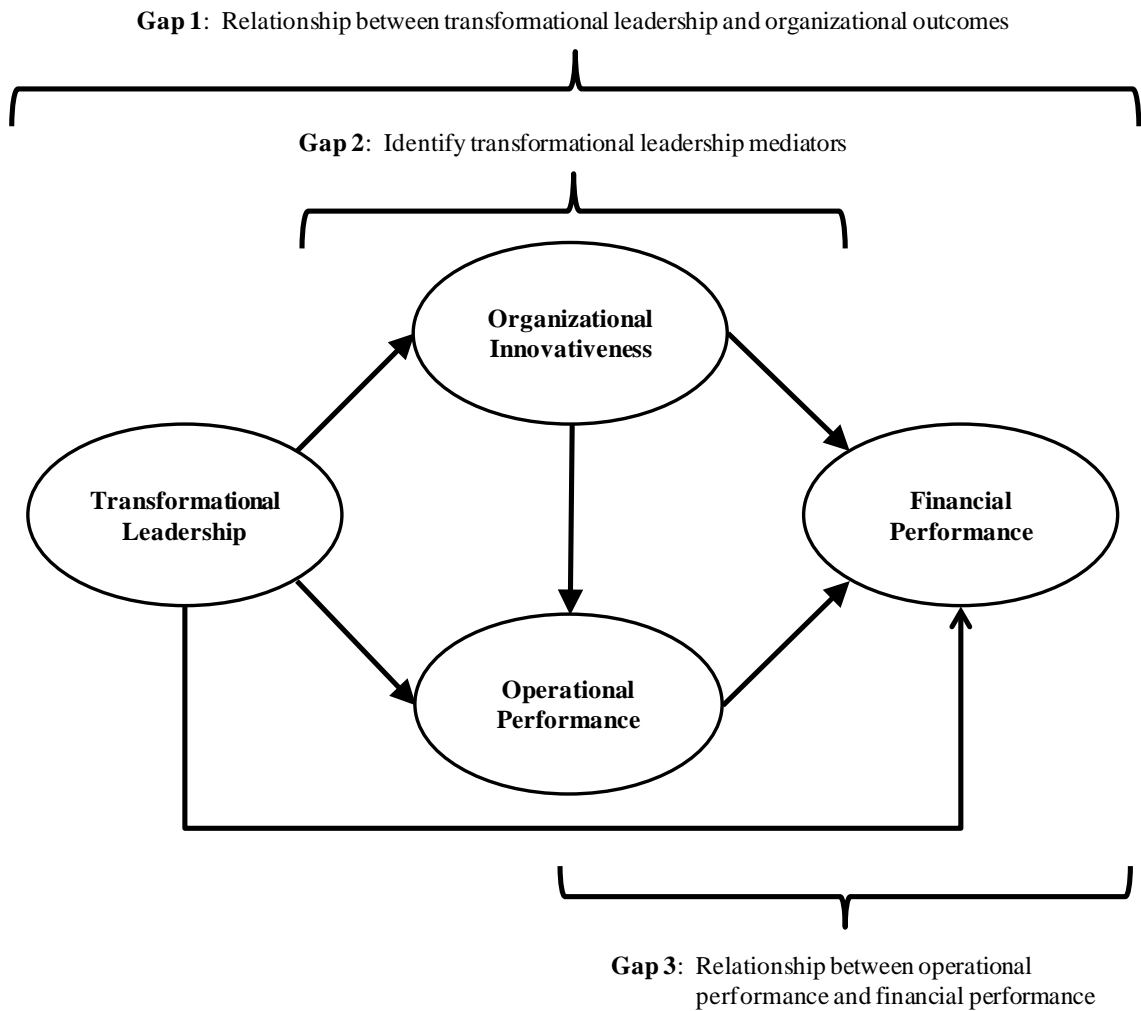


Figure 1.1. Gaps in Supply Chain Research

STATEMENT OF PURPOSE AND RESEARCH QUESTIONS

The purpose of this dissertation is to discover the effect of transformational leadership and innovativeness on motor carrier performance. To that end, this dissertation seeks to answer the following research questions:

1. What effect does transformational leadership have on motor carrier performance?
2. What effect does innovativeness have on motor carrier performance?
3. What effect does operational performance have on financial performance?
4. What is the relationship between transformational leadership, innovativeness, and motor carrier performance?

POTENTIAL CONTRIBUTIONS

The work presented in this dissertation offers several research and practitioner contributions. From the research perspective, this study provides value by expanding transformational leadership and innovativeness theory research within the motor carrier domain. Hopefully, this study will encourage further investigation into the impact that leadership and innovation have on supply chain performance.

For practitioners, discovering the nature of the relationships between leadership, innovation, and performance will be beneficial to motor carriers and may have a higher level supply chain impact. Improved operational performance (e.g., higher on-time delivery rate) has the potential to increase customer service levels and improve the relationship between the shipper and motor carrier. In addition to solvency of the company, increased financial performance has the potential to increase motor carrier capabilities through investment in new equipment and technologies.

DISSERTATION ORGANIZATION

The dissertation is divided into five chapters. Chapter 2 is a review of the literature germane to the research questions posed in Chapter 1. The review assimilates and describes the literature regarding transformational leadership, innovativeness, and organizational performance. The chapter concludes with the development and presentation of a conceptual model. Chapter 3 begins with the presentation of the hypotheses generated from the literature review and then describes the research design, population, sampling frame, development of the survey instrument, and the method of statistical analysis. Statements within the survey instrument were constructed by modifying existing measures that have demonstrated high validity and reliability. Chapter 4 contains participant and motor carrier characteristics, item-level data, an exploratory factor analysis, construct-level data, assessments of reliability and validity, analysis of the measurement model, analysis of the structural model, evaluation of alternate models, and the hypotheses are discussed as they relate to the results of the analysis. Chapter 5 contains a discussion of the findings, implications for researchers and practitioners, limitations, and suggestions for future research.

CHAPTER 2: REVIEW OF LITERATURE

This chapter assimilates and describes the literature regarding transformational leadership, organizational innovativeness, and organizational performance building the relationship depicted in the conceptual model.

TRANSFORMATIONAL LEADERSHIP

Since first introduced by James MacGregor Burns over three decades ago, considerable attention has been given to the study of transforming leadership. Burns (1978) identified two basic types of leadership, transactional, a relationship between leader and follower based upon an exchange of resources, and transforming, a relationship between leader and follower based upon mutual stimulation and elevation of the follower. Burns (1978, p. 4) stated that in addition to identifying and satiating a follower's current need, the transforming leader "looks for potential motives in followers, seeks to satisfy higher needs, and engages the full person of the follower."

The ethical component of transforming leadership was something novel to the study of leadership. Burns (1978) stated that transforming leadership becomes moral because it raises the level of human conduct and ethical aspiration of the leader and the follower. Burns' perception of transforming leadership was that of "an ethical, moral enterprise, through which the integrity of the [organization] would be maintained and enhanced" (Parry and Proctor-Thomson, 2002, p. 76). Therefore, leaders such as Hitler

who objectify their followers may wield great power, but they are not transforming leaders.

Although his work was dedicated to Burns and furthered the notion of transforming leadership by constructing the theory of transformational leadership, Bernard Bass (1985a) differed with Burns in three ways. First, he did not agree that transactional and transformational leadership are the extremes of a single continuum, rather Bass (1985a) proposed that leaders in varying degrees are both transformational and transactional. Second, Bass acknowledged that the leadership outcome could be positive or negative and still be transformational (i.e., Hitler's leadership, although immoral, was in fact transformational). Finally, Bass added the concept of "expansion of the followers' portfolio of needs and wants" as a requirement of transformational leadership (Bass, 1985a, p. 20).

In his study of 70 senior executives, Bass (1985b) reported that respondents likened the transformational leader to a benevolent father who inspired them to work long hours to meet the leader's expectations. The transformational leader encouraged self-development by allowing the follower to work autonomously, but remained accessible to provide the follower with support, advice, and recognition. The transforming leader engendered trust, admiration, loyalty, and respect (Bass, 1985b).

In another study, Bass (1985a) performed exploratory factor analysis on data collected from 104 military officers attending Army War College. The officers were asked to complete a 73-item questionnaire describing their supervisor. Three dimensions of transformational leadership were identified from the research: *charismatic leadership*, *individualized consideration*, and *intellectual stimulation*. Avolio, Waldman, and

Yammarino (1991) later added another component, *inspiration motivation*, and changed *charismatic leadership* to *idealized influence* to create the 4 I's of transformational leadership. Table 2.1 lists the 4 I's and a description of each component.

These four factors have been confirmed in empirical studies and dominate the general understanding of transformational leadership (Bass, et al., 2003; Hay, 2006).

Collectively these factors generate what Bass (1985a) referred to as performance beyond expectation.

Table 2.1. The Four I's of Transformational Leadership

Idealized influence	The leader puts follower needs above his/her own and is admired, respected, and trusted.
Inspirational motivation	The leader motivates followers by establishing a vision of the future and building team spirit.
Intellectual stimulation	The leader stimulates followers to challenge the status quo and be innovative.
Individualized consideration	The leader recognizes the individual needs of the follower and develops the follower for increased challenges.

Source: Adapted from Bass et al. (2003).

Transformational Leadership Compared and Contrasted

To better understand the domain of transformational leadership this section compares and contrasts it with transactional leadership, charismatic leadership, and servant leadership. Any discussion of transformational leadership will likely include a discussion of one or more of these alternate leadership styles.

Burns (1978) postulated that transformational leadership and transactional leadership were extremes of a single leadership continuum. Bass (1985a) disagreed and proposed that transformational and transactional leadership are two distinct concepts. He

argued that effective leaders exhibit varying levels of both transformational and transactional leadership. Transactional leadership is characterized by a *quid pro quo* relationship between the leader and the subordinate whereby the leader clarifies the role and requirements of the subordinate as well as what will be given in exchange for meeting those requirements (e.g., bonuses, merit increases, etc.) (Bass, 1985b; Howell and Avolio, 1993). The three dimensions of the transformation leadership construct are *contingent reward*, *active management by exception*, and *passive management by exception*. Contingent reward is the degree to which the leader clarifies expectations and offers recognition when those expectations are met (Bass, et al., 2003). Active management by exception is the degree to which the leader proactively monitors subordinate actions and behaviors and takes corrective action before a problem occurs whereas passive management by exception is the degree to which the leader corrects subordinate actions and behaviors after a problem has occurred (Judge and Piccolo, 2004).

In later work, Bass and Avolio (1993b) proposed the *augmentation effect* whereby transformational leadership complements and builds upon the foundation of transactional leadership. This explanation of the relationship between the two constructs highlights the different effect each has on the behavior of the follower. Transactional leadership encourages followers to meet expectations by achieving a negotiated level of performance to earn a predefined reward. Building on a foundation of transactional leadership, transformational leadership encourages followers to perform beyond expectations because of their commitment to the leader and the mission of the organization (Howell and Avolio, 1993).

The terms transformational and charismatic leadership are often used interchangeably. Judge and Piccolo (2004) stated that there is no consensus regarding the equivalence of charismatic and transformational leadership; however, many scholars have found little difference in the two leadership styles. While high shared variance between the two constructs indicates significant overlap, there is evidence of the discriminant validity of charismatic leadership (Rowold and Heinitz, 2007).

The study of charismatic leadership can be traced back to the work of Max Weber (1947) who described how followers attribute exceptional skills or extraordinary qualities to their leader and the implication of those perceived qualities on the organization (Barbuto, 2005; Yukl, 1999). House (1977) presented a theory of charismatic leadership that proposed that as followers observe the behaviors of their leader they attribute extraordinary abilities to them. This theory led to a stream of research that identified the key characteristics of charismatic leadership (Judge, et al., 2006). A widely accepted framework of charismatic leadership was developed by Conger and Kanungo (1998) in which the charismatic leader is someone who has and articulates a strategic vision, is sensitive to follower needs, displays unconventional behavior, takes risks, and is sensitive to their environment.

A key difference between charismatic leadership and transformational leadership is the latter's fundamental focus of transforming followers and the organization whereas the former may not seek to change anything. In calling for consistency and clarity when defining the term charismatic, Yukl (1999, p. 294) stated that the definition of charismatic leadership that includes the follower's attributing charisma to a leader they

identify strongly with is the “basis for differentiating between transformational and charismatic leadership.”

In his foundational work on servant leadership, Greenleaf (1977) stated that servant leaders ascend to a higher plane of motivation and focus on meeting the needs of their followers. They attend to the emotional needs of the follower and focus on developing the follower as the end result not as a means by which to meet an organizational goal (Ehrhart, 2004; Page and Wong, 2000). Stone, Russell, and Patterson (2004) opined that the study of servant leadership is in its infancy and that much of what has been done compares and contrasts servant leadership constructs to other leadership styles.

Researchers have asserted that the servant leadership construct and the transformational leadership construct have significant overlap (e.g., Farling, Stone, and Winston, 1999; Graham, 1991; Liden, et al., 2008). Servant leadership has a lot in common with the individualized consideration and intellectual stimulation components of transformational leadership (van Dierendonck, 2011). In fact, both constructs emphasize the importance of listening, mentoring, teaching, and empowering the follower (Stone, et al., 2004).

In what was described as the “first empirical research study investigating the distinctions between transformational and servant leaders,” Parolini, Patterson, and Winston (2009, p. 274) proposed five distinctions between servant and transformational leadership: *moral, focus, motive and mission, development, and influence*. Servant leadership is inherently moral because the leader subjugates self interest to the interest of others whereas transformational leadership may or may not be moral, as the needs of all

are subjugated to the needs of the organization (Graham, 1991; Stevens, D'Intino, and Victor, 1995; Whetstone, 2002). The focus of the leader is commonly used to differentiate between the styles. Graham (1991, p. 110) stated that “the primary allegiance of transformational leaders is clearly to the organization...rather than to follower autonomy or to universal moral principles.” The motive and mission distinction is similar to focus in that the servant leader is driven by a desire to influence the growth of the follower whereas the transformational leader is driven to change the organization (Smith, Montagno, and Kuzmenko, 2004). Servant leaders seek to develop the follower into an autonomous moral servant (Greenleaf, 1977) and transformational leaders seek to develop the follower into a future leader (Bass, 1995). Finally, the transformational leader influences the follower through charisma while the servant leader influences the follower through service (Stone, et al., 2004).

Relevant Transformational Leadership Research

Transformational leaders assume subordinates to be trustworthy, capable of handling complex problems, and capable of making a unique contribution to the organization (Bass and Avolio, 1994). This bottom-up approach to higher organizational performance includes coaching and mentoring subordinates (Yukl, 1999), raising the follower's self-esteem (Shamir, House, and Arthur, 1993), and creating a positive mood that increases the follower's level of effort (Ilies, Judge, and Wagner, 2006). These leaders encourage people to perform at higher levels thereby improving organizational level performance (Boerner, et al., 2007). Transformational leadership has been shown to have a significant relationship to a wide range of organizational outcomes (e.g., Howell

and Avolio, 1993; Kavanagh and Ashkanasy, 2006; P. K. C. Lee, et al., 2011; Sarros, Cooper, and Santora, 2008).

Transformational leadership has been shown to have a significant positive relationship with many outcomes that affect operational performance. Examples include increased employee organizational commitment (Avolio, et al., 2004; Barling, Weber, and Kelloway, 1996; Viator, 2001; Walumbwa, et al., 2004), enhanced job satisfaction and motivation (Bass, 1998; Bycio, Hackett, and Allen, 1995; Conger, Kanungo, and Menon, 2000; Kane and Tremble Jr, 2000; Koh, Steers, and Terborg, 1995; Nemanich and Keller, 2007), reduced absenteeism (Zhu, Chew, and Spangler, 2005), and higher quality output (Elenkov, 2002; Hoyt and Blascovich, 2003; Nicholls, 1988; Piccolo and Colquitt, 2006; Quick, 1992; Sivasubramaniam, et al., 2002).

In a longitudinal study of 48 research and development project groups comprised of 349 professionals, Keller (1992) found that transformational leadership had a significant positive relationship with higher overall quality of the project as well as budget and schedule performance. Similarly, Howell and Avolio (1993) found that leaders who displayed fewer of the transactional leadership characteristics and more of the transformational leadership characteristics had a positive effect on business-unit goals. Sosik, Avolio, and Kahai (1997) conducted a longitudinal study of 36 undergraduate student work groups performing a creativity task using a Group Decision Support System. They evaluated the effects of leadership style on group effectiveness and found that transformational leadership had both a direct and indirect relationship with performance of the group.

One of the most researched outcomes is financial performance. In fact, Parry (2000) stated that decades of research has provided consistent evidence (i.e., correlations of 0.30 or higher) that transformational leadership has a significant positive impact on the financial measures of organizations. It was also shown to affect employee perception of firm's financial standing relative to industry peers (Zhu, et al., 2005).

A pretest-posttest study of the effects of transformational leadership training, on 20 managers who were randomly assigned to either a training or a control group found that transformational leadership had significant effects on two aspects of financial performance (Barling, et al., 1996). Awamleh and Gardner (1999) reported that organizational performance (measured as sales, profit, market share, and other financial information) had a significant, positive relationship with followers' perception of their leaders charisma and effectiveness. The charismatic aspect of transformational leadership was shown to have a substantial effect on climate and financial performance in a sample of 50 supermarket stores of a large retail chain in the Netherlands (Koene, Vogelaar, and Soeters, 2002).

A survey of 293 employees from 32 business units within a large financial organization in Greece found an indirect positive relationship between transformational leadership and performance via its impact on achievement orientation (Xenikou and Simosi, 2006). Performance was measured as two separate objective measures of financial performance provided by the organization. In their study of nearly 100 Malaysian chief executive officers, Idris and Ali (2008) found that the relationship between transformational leadership and financial performance was mediated by best practices (i.e., business methods that provide competitive advantage through improved

operational performance). Wang, Tsui, and Xin (2011) studied the link between leadership and firm performance using data gathered from 739 matched pairs of middle managers and their supervisors within 125 Chinese firms. They found a direct relationship between transformational leadership behaviors that focus on the task and financial performance. However, the relationship between transformational leadership behaviors that focus on relationships and financial performance was mediated by employee attitude.

Change is the central process of transformational leadership, which makes it the ideal leadership style for promoting innovation (Bass and Riggio, 2006; Jaskyte, 2004; Pieterse, et al., 2010). Organizations adjust to change through its innovativeness and the creativity of its employees. There is growing interest in the relationship between transformational leadership and the creativity of the follower and the innovativeness of the organization (Gumusluoglu and Ilsev, 2009). Jung et al. (2003) acknowledged that only a handful of studies have looked at the relationship between transformational leadership and organizational innovativeness. Their study of 32 Taiwanese firms found a significant positive relationship between transformational leadership and organizational innovativeness. Eisenbeiss et al. (2008) found that the relationship between transformational leadership and team innovation was mediated by support for innovation, which was moderated by climate for excellence. Similarly, a study of 163 research and development personnel and managers at 43 Turkish software development companies found that transformational leadership positively influenced both organizational innovativeness and employees' creativity (Gumusluoglu and Ilsev, 2009).

Measuring Transformational Leadership

Several measurement instruments have been created to measure the transformational leadership construct. The Multifactor Leadership Questionnaire (MLQ) Form 5X has been referred to as the most popular (Antonakis and House, 2002; Judge and Piccolo, 2004; Schriesheim, Wu, and Scandura, 2009). In the MLQ Form 5X, transformational leadership is defined by the four dimensions listed in Table 2.1; however, idealized influence is further divided into two sub-categories, *attributed idealized influence* and *behavioral idealized influence*. In total the MLQ Form 5X has 36 questions with 20 pertaining to transformational leadership.

Another popular measurement instrument is the Leadership Practices Inventory (LPI) developed and validated by Kouzes and Posner (1988). The LPI measures five leadership practices: challenging the process, inspiring a shared vision, enabling others to act, modeling the way, and encouraging the heart. The LPI asks participants a total of 30 questions related to transformational leadership, six questions for each of the five leadership practices.

The previously mentioned measures are all relatively long representing a significant time investment of the participant. Carless et al. (2000) developed a reliable and valid transformational leadership scale that is shorter and easier to administer. The Global Transformational Leadership (GTL) is a short scale that captures seven key leadership behaviors. Data were collected from 1,440 subordinates and 66 District Managers regarding the leadership of 695 branch managers. The GTL scale was found to be highly reliable with support for convergent and discriminant validity. Carless et al. (2000) also found a strong correlation between the MLQ, LPI, and GTL.

Although it is the most often used measure of transformational leadership, many researchers have questioned the psychometric properties of the MLQ. Critics of the MLQ have primarily questioned the constructs dimensionality (Bycio, et al., 1995; Tepper and Percy, 1994). Transformational leadership sub-dimensions have on occasion collapsed into a single factor (Howell and Avolio, 1993). Carless (1998) found that the most recent version of the MLQ (Form-5X) measures a single, hierarchical construct of transformational leadership meaning that there is little justification to interpret individual subscale scores. As a result, several researchers have used an overall measure of transformational leadership (Hofmann and Jones, 2005; Judge and Bono, 2000; Powell, Butterfield, and Bartol, 2008; Yammarino, et al., 1997).

Additionally, the MLQ has been modified over the years in efforts to improve the measure. These modifications, while not uncommon in research, make it difficult for researchers to compare the results of past research and to develop and accumulate knowledge (Tejeda, Scandura, and Pillai, 2001).

Antonakis, Avolio, and Sivasubramaniam (2003) stated that the study setting and context could affect the results obtained with the MLQ, which implies that the study of heterogeneous organization types and environments diminishes the MLQ's validity (Zopiatis and Constanti, 2010). Conversely, the GTL has consistently demonstrated high reliability in a wide range of settings. For example, the GTL produced a Cronbach's alpha of .93 in a study of 338 head coaches of competitive level hockey teams (Tucker, et al., 2006), an alpha of .97 in a study of 319 Canadian employees at a long-term care facility (Arnold, et al., 2007), and an alpha of .94 in a study of 118 managers of

Australian retail travel businesses (Fitzgerald and Schutte, 2010). Because of its parsimony, validity, and demonstrated reliability the GTL was used in this dissertation.

ORGANIZATIONAL INNOVATIVENESS

Organizational innovativeness has been defined and measured in many different ways. One popular definition is based upon diffusion of innovation theory. Diffusion of innovation theory is a well-known and widely used theory that involves how, when, and by whom an innovation is adopted (Lippert and Forman, 2005). Diffusion is “the process in which an innovation is communicated through certain channels over time among members of a social system” and an innovation is “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, pp. 5, 12). Rogers (2003) defined innovativeness as the degree to which an organization is earlier in the adoption of an innovation relative to its peers.

Other definitions of innovativeness describe it as more complex than the simple adoption of innovations. Hurley and Hult (1998) stated that innovativeness is “the notion of openness to new ideas as an aspect of a firm’s culture.” Gebert et al. (2003, p. 42) defined the construct at the aggregate level and included “the capacity to utilize the creativity resources of the organization.” Investigating the multi-dimensionality of the organizational innovativeness construct, Wang and Ahmed (2004) identified five component factors of organizational innovativeness: product, market, process, behavioral, and strategic. The five dimensions tested provided insight into the complexity of the construct.

An adapted definition is used in this dissertation that captures both the *adoption component* most commonly associated with Rogers' (2003) diffusion of innovation theory and the *creation component* prevalent in the management literature that includes creativity (Gebert, et al., 2003) and openness to new ideas (Hurley and Hult, 1998). For this study, organizational innovativeness is defined as the propensity of an organization to deviate from conventional industry practices by creating or adopting new products, processes, or systems (Deshpande, et al., 1993; Knowles, et al., 2008; Srinivasan, et al., 2002).

Although research of innovativeness at the organizational level has received less attention than innovativeness research at the project level (Carayannis and Provan, 2008), it has been shown that organizational innovativeness through the efforts of followers has an important impact on organizational performance (Keskin, 2006; J. Lee, 2007; Olavarrieta and Friedmann, 2008). In one study that supports this relationship, Deshpande et al (1993) studied 50 Japanese firms. Two executives from each firm were interviewed by a market research firm along with two randomly selected customers of the firm. The innovativeness scale was created in such a way that captured creativity and the adoption of new products or processes. They found a significant positive relationship between an organization's innovativeness and performance, which was measured by combining self-reported data on the firm's profitability, size, market share, and growth rate. Deshpande et al (1993) asserted that the finding reinforced the notion put forth by Peter Drucker (1954) that innovation and marketing are the two primary reasons for a firm's existence.

A study by Han, Kim, and Srivastavas (1998) of 134 banks measured innovativeness by the adoption of innovations deemed as either technical or administrative. Performance was measured via self-reported data on the bank's growth and profitability. They also found a significant positive relationship between the organizations' innovativeness and its business performance.

Hult et al. (2004) studied firms with sales above \$100 million per year. To collect data on the constructs of interest, 1000 questionnaires were sent to marketing executives, which garnered 181 completed responses. Their measure of innovativeness captured the capacity to introduce a product, process, or idea within an organization. Performance was measured as profitability, growth in sales, market share, and general performance. They found that innovativeness was an "important determinant of business performance, regardless of market turbulence" (Hult, et al., 2004, p. 436).

Cho and Pucik (2005) examined the relationship between innovativeness, quality, growth, profitability, and market value at the organizational level. Their study incorporated data for 488 organizations gathered from COMPUSTAT and *Fortune* magazine's web site. The structural equation model showed that innovativeness without higher levels of product and service quality resulted in limited profitability; however, when both organizational innovativeness and quality improvement were balanced "a virtuous circle of growth, profitability, and premium market value" was created (Cho and Pucik, 2005, p. 569). Their study supports the mediating relationship of innovativeness and operational performance on financial performance.

ORGANIZATIONAL PERFORMANCE

Organizational performance is commonly used as a dependent variable for business research and is considered to be one of the most important constructs in the field of management (Pagell and Gobeli, 2009; Richard, et al., 2009). Measuring and analyzing organizational performance has an important role in turning goals into reality, which in today's competitive environment is paramount to the success and survival of a organization (Popova and Sharpanskykh, 2010). Richard et al. (2009, p. 722) stated that organizational performance "encompasses three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investments, etc.); (b) product market performance (sales, market share, etc.); and (c) shareholder return (total shareholder return, economic value added, etc.)."

In this dissertation, organizational performance was measured as two distinct but related constructs: operational (product market) performance and financial performance. As most motor carriers are privately owned, shareholder return was not evaluated. Operational performance as a separate complementary factor to financial performance is supported in the literature (e.g., Inman, et al., 2011; Wouters, et al., 1999; Wu and Chuang, 2010). For example, in a recent study by Britto, et al. (2010), the researchers found evidence that motor carrier financial performance was positively associated with one element of operational performance, safety.

Operational Performance

Considerable attention has been placed on non-financial (i.e., operational) performance measures by researchers and practitioners (de Leeuw and van den Berg,

2011; de Waal and Kourtit, 2009; Ittner, Larcker, and Randall, 2003; Wouters, et al., 1999; Wouters and Wilderom, 2008). In this dissertation, operational performance was measured as *service quality*, *cost of service*, *claims ratio*, *safety*, and *on-time delivery*.

Table 2.2 contains a brief description of each measure.

Table 2.2. Operational Measures

Service quality	This is the perceived congruence between customer expectation and the service provided.
Cost of service	This is the price paid for transportation service.
Claims ratio	This is the percentage of shipments that do not meet customer expectation.
Safety	This is the effectiveness of the company in preventing the loss of life, injury, and damage to property while performing its mission.
On-time delivery	This is the carrier delivering a shipment at the date and time promised.

Motor carriers provide time and place utility to shippers through the physical distribution of cargo. Providing high service quality strengthens corporate brands and increases customer satisfaction (Xing, et al., 2010). Studies have shown that many shippers value motor carrier service quality over transportation rates (Allen and Liu, 1995). Cost of service is a critical aspect of motor carrier operational performance in an industry that is highly competitive, with low profit margins, and few barriers to entry (Belzer, 2002; M. Douglas, 2010; Liu, et al., 2010). Claims ratio is a common measure of merit in the motor carrier industry. It is in effect a measure of imperfect order fulfillment. According to Britto, et al. (2010), the total costs for truck crashes in 2008 that included injury or death exceeded \$47 billion. Because of the liability and potential

costs, safety performance can have a significant impact on the viability of a motor carrier. On-time delivery is another aspect of quality and the motor carrier's ability to meet customer expectations. These measures are consistent with measures used on other operational performance scales (e.g., Inman, et al., 2011; Pagell and Gobeli, 2009; Zelbst, et al., 2010). They are also very close to what is widely accepted as the four basic factors of operational priorities: cost, quality, delivery, and flexibility (Yeung, et al., 2006).

Financial Performance

The financial side of supply chain performance has been identified as a promising area for future research and improvement (Protopappa-Sieke and Seifert, 2010). The dependent variable in the model is financial performance, which was measured as *return on investment, return on sales, profit, profit growth, and operating ratio*. Table 2.3 contains a brief description of each measure.

Table 2.3. Financial Measures

Return on investment	This is a leading traditional measure and is defined as the ratio of net operating profit to the net book value of assets. The net book value of assets is equal to the firm's assets less the value of intangibles and total liabilities.
Return on sales	This is the ratio of net operating profit to the sales made by the firm in the period.
Profit	This is equal to the firm's revenue minus the cost of goods sold and selling, general, and administrative expenses.
Profit growth	This is the change in profit over the period, expressed as the difference between profit last period and those this period.
Operating ratio	This is the operating expense divided by net sales.

Source: Adapted from Richard et al. (2009) and Scheraga (2010).

With the exception of operating ratio, these financial measures are commonly used in the literature (e.g., Inman, et al., 2011; Richard, et al., 2009; Teo, et al., 2003; Wu and Chuang, 2010; Yeung, et al., 2006). Operating ratio was also included because it is a commonly used measure of motor carrier efficiency (e.g., C. Han, et al., 2008; Scheraga, 2010).

PROPOSED MODEL

Based upon the review of the relevant literature, this dissertation proposes the following conceptual model (see Figure 2.1). Transformational leadership is an independent variable. Organizational innovativeness and operational performance are assumed to have both a direct and indirect relationship with financial performance. Financial performance is the dependent variable.

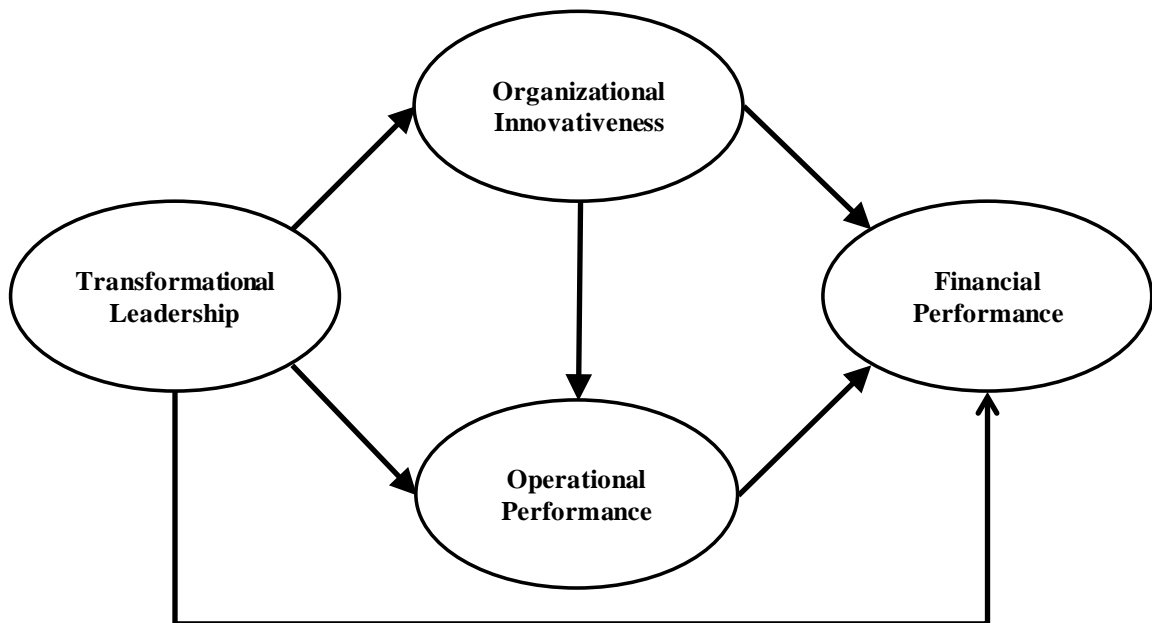


Figure 2.1. Conceptual Model

SUMMARY

Chapter 2 provided the review of the relevant literature and the rationale for the conceptual model presented. Based upon the review of this literature, hypotheses will be developed and presented in Chapter 3, as well as the methodology for investigating them.

CHAPTER 3: METHODOLOGY

This chapter presents the hypotheses developed based on the literature and describes the research methodology employed to test the hypotheses. The research design, population, and sampling frame are discussed as well as the method of survey administration. Statements within the survey instrument were constructed by modifying existing measures that have demonstrated high validity and reliability.

INSTITUTIONAL APPROVAL

The Institutional Review Board at Auburn University granted approval to conduct this study on 28 July 2011 under Protocol Number 11-236 EX 1107. A copy of the approval letter is located in Appendix A.

HYPOTHESIS DEVELOPMENT

The purpose of this dissertation is to examine the relationship between transformational leadership, organizational innovativeness, and organizational performance. This section presents the hypotheses developed based upon the review of the relevant literature.

Transformational Leadership and Financial Performance

A number of studies have shown a significant relationship between transformational leadership and desirable organizational outcomes. These outcomes have

included employee organizational commitment (Avolio, et al., 2004), reduced absenteeism and employee perception of firm sales relative to industry peers (Zhu, et al., 2005), and higher quality output (Hoyt and Blascovich, 2003). One of the most researched outcomes is financial performance. In fact, Parry (2000) stated that decades of research has provided consistent evidence that transformational leadership has a significant positive impact on the financial measures of organizations. Thus, this dissertation tested the following hypothesis.

Hypothesis 1: Transformational leadership is positively related to financial performance.

Transformational Leadership and Organizational Innovativeness

According to Hult et al.(2004), leaders, especially transformational leaders, have considerable control of the presence or absence of organizational innovativeness. Because transformational leaders are oriented toward innovation, their propensity to motivate and intellectually stimulate their followers imbues the follower with that same innovative inclination (Keller, 1992; J. Lee, 2007; Mumford, et al., 2002; Vinkenbunrg, et al., 2011). Therefore, this dissertation tested the following hypothesis.

Hypothesis 2: Transformational leadership is positively related to organizational innovativeness.

Transformational Leadership and Operational Performance

The qualities of the transformational leader result in organizational outcomes being achieved that are greater than outcomes achieved by transactional leaders (Bass,

1985a). As previously stated, transformational leaders raise the follower's awareness of the desired organizational outcome, encourage follower's to transcend their own personal interests, and enhance the abilities of the follower (Hult and Ketchen, 2007). Thus, this dissertation tested the following hypothesis.

Hypothesis 3: Transformational leadership is positively related to operational performance.

Organizational Innovativeness and Organizational Performance

The inclination toward innovation along with the shared vision established by the transformational leader enable the organization to achieve elevated goals (Howell and Frost, 1989). Organizational innovativeness through the efforts of followers has an important impact on organizational performance (Keskin, 2006; J. Lee, 2007; Olavarrieta and Friedmann, 2008). Because of the demonstrated relationship between innovativeness and organizational outcomes, the following hypotheses were tested.

Hypothesis 4: Organizational innovativeness is positively related to operational performance.

Hypothesis 5a: Organizational innovativeness is positively related to financial performance.

Hypothesis 5b: Organizational innovativeness will partially mediate the relationship between transformational leadership and financial performance.

Operational Performance and Financial Performance

Organizational performance is commonly used as a dependent variable for

business research (Pagell & Gobeli, 2009). In this dissertation, organizational performance is measured as two distinct but related constructs: operational performance and financial performance. The notion that operational performance is a separate complementary factor to financial performance is supported in the literature (e.g., Inman, et al., 2011; Wouters, et al., 1999; Wu and Chuang, 2010). In a recent study by Britto, et al. (2010), the researchers found evidence that motor carrier financial performance was positively associated with operational performance. Therefore, the direct relationship between operational performance and financial performance as well as two partial mediation relationships were evaluated. The following hypotheses were tested.

Hypothesis 6a: Operational performance is positively related to financial performance.

Hypothesis 6b: Operational performance will partially mediate the relationship between transformational leadership and financial performance.

Hypothesis 6c: Operational performance and innovativeness will partially mediate the relationship between transformational leadership and financial performance.

PROPOSED THEORETICAL MODEL WITH HYPOTHESES

Figure 3.1 portrays the theoretical model and the associated hypotheses. All hypothesized relationships between the constructs are positive.

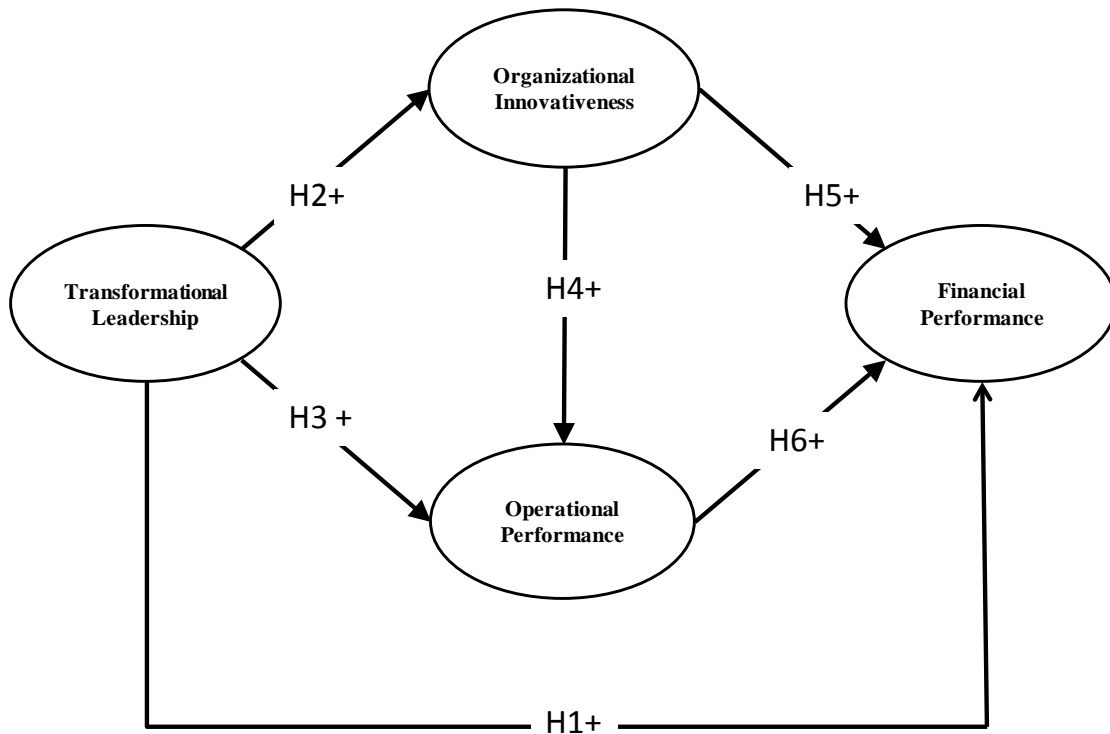


Figure 3.1. Theoretical Model

RESEARCH DESIGN

To develop an understanding of the relationship between transformational leadership, organizational innovativeness, and organizational performance, this empirical study employed a cross-sectional research design using data collected from an organizational setting with an online survey. Surveys are the most common data collection method for unobservable phenomena and are used to generalize from a sample to a population of interest (Dooley, 1995). An online survey method was selected because of its speed, ease of use, and high response rate as compared to paper survey methods (Griffis, Goldsby, & Cooper, 2003).

POPULATION AND SAMPLE

The population of interest is the entire North American for hire motor carrier industry. According to Federal Motor Carrier Safety Administration (FMCSA) (2011), there are nearly 1.3 million motor carriers that operate in the U.S. representing everything from UPS to a single truck owner/operator company. The FMCSA database contains the motor carrier's legal name, Department of Transportation number, type of operations, and contact information. Only 3,743 motor carriers have 100 or more trucks. Furthermore, that number was reduced to approximately 2,500 when municipalities, bus companies, and private fleets were excluded.

Based on the proposed model and the number of items in the survey, the degrees of freedom for the structural equation model were 224. With a .05 level of significance, a power of .80, and root mean square error of the approximation of .05 and .08 (null and alternate respectively) the minimum required sample size was 79 (Preacher and Coffman, 2006).

The sampling frame for this study included a stratified random sample of 500 motor carriers based upon firm size, company type, and service area. The diversity of the sample should enhance the generalizability of the results. Contact information for company executives, vice presidents, and directors from each motor carrier was gathered from motor carrier web sites and other commercial web sites such as Hoovers and Jigsaw. The targeted positions were Chief Operating Officer, Vice President of Operations, and Director of Operations/Logistics. The introduction letter located in Appendix B was e-mailed to the motor carrier points of contact. Executive-level knowledge was needed to answer strategic questions regarding the leadership style of the

organization's senior leader, organizational innovativeness, as well as operational performance and financial performance of the organization. To help ensure this sample yielded the necessary response rate two additional measures were taken: multiple points of contact from each motor carrier were e-mailed and participants who completed the survey earned a \$5 donation for the American Red Cross.

INSTRUMENT DEVELOPMENT

Existing measures were adapted and incorporated into a single survey instrument to capture participant beliefs about transformational leadership, innovativeness, and organizational performance. Additional questions were included in the survey to collect demographic information of the participants. The survey was administered using Qualtrics, a commercial software package licensed to Auburn University and hosted on the university's web site.

Transformational leadership (TL) is a leadership style in which the leader identifies the need for change, develops a vision for the organization, inspires followers to work toward that vision, and executes the change with the commitment of the followers. It was operationalized in this dissertation as participant perceptions of the leadership style of the motor carrier's senior leader. The validated seven-item Global Transformational Leadership scale (Carless, et al., 2000) was adapted to measure transformational leadership. Two of the items were deemed to be compound items (e.g., "[the leader] is clear about his/her values and practices what he/she preaches"). Each of the two compound items was separated into two items increasing the number of statements for transformational leadership to nine. As shown in Table 3.1,

transformational leadership was measured on a 7-point Likert scale anchored with “Never” and “Always” to be consistent with the other scales.

Table 3.1. Transformational Leadership

Please indicate how frequently your organization’s senior leader exhibits the following characteristics. (Never, Very Rarely, Rarely, Occasionally, Often, Very Often, Always)

TL1: Communicates a clear and positive vision of the future

TL2: Treats staff as individuals, supports and encourages their development

TL3: Gives encouragement and recognition to staff

TL4: Fosters trust, involvement and cooperation among team members

TL5: Encourages thinking about problems in new ways and questions assumptions

TL6: Is clear about his/her values

TL7: Practices what he/she preaches

TL8: Instills pride and respect in others

TL9: Inspires me by being highly competent

Notes: Adapted from Carless et al. (2000). Original Cronbach’s alpha was .90

Organizational innovativeness (IN) was defined as the propensity of an organization to deviate from conventional industry practices by creating or adopting new products, processes, or systems. It was operationalized in this dissertation as participant perceptions regarding the innovativeness of the motor carrier and was measured using the four-item scale shown in Table 3.2. Srinivasan, et al. (2002) developed the organizational innovativeness scale by modifying the five-item scale validated by Deshpande, et al. (1993). They replaced three reverse scored items with two new items. Organizational innovativeness was measured on a 7-point Likert scale anchored with “Far Worse” and “Far Better” than their closest competitors.

Table 3.2. Organizational Innovativeness

Please rank your organization's innovativeness relative to your closest competitors. (Far Worse, Worse, Slightly Worse, No Different, Slightly Better, Better, Far Better)

IN1: First to market with innovative new products and services

IN2: First to develop a new process technology

IN3: First to recognize and develop new markets

IN4: At the leading edge of technological innovation

Notes: Adapted from Srinivasan, et al. (2002). Original Cronbach's alpha was .91.

Operational performance (OP) reflects the organization's ability to efficiently and effectively provide services to the customer. It was operationalized as the participant perceptions regarding several measures of operational performance of the motor carrier and was measured using a modified version of the eight-item scale developed by Zelbst, Green Jr, and Sower (2010). As shown in Table 3.3, items that did not pertain to the motor carrier industry were deleted (e.g., inventory expense and inventory levels) and other items were adapted to represent the specific operational metrics of the motor carrier industry (e.g., replaced "Due date performance" with "On-time delivery"). Operational performance was measured on a 7-point Likert scale anchored with "Far Worse" and "Far Better" than their closest competitors.

Table 3.3. Operational Performance

Please rank your organization's performance relative to your closest competitors. (Far Worse, Worse, Slightly Worse, No Different, Slightly Better, Better, Far Better)

- OP1: Service quality
 - OP2: Cost of service
 - OP3: Claims ratio
 - OP4: On-time delivery
 - OP5: Safety
-

Notes: Adapted from Zelbst, et al. (2011). Original Cronbach's alpha was .97

Financial performance (FP) reflects the organization's sales and profitability. It was operationalized as the participant perceptions regarding several measures of financial performance of the motor carrier and was measured using a modified version of the four-item scale developed and validated by Inman, et al. (2011). One additional item, operating ratio, was also included (see Table 3.4). Financial performance was measured on a 7-point Likert scale anchored with "Far Worse" and "Far Better" than their closest competitors.

Table 3.4. Financial Performance

Please rank your organization's financial performance relative to your closest competitors. (Far Worse, Worse, Slightly Worse, No Different, Slightly Better, Better, Far Better)

- FP1: Average return on investment over the past 3 years
 - FP2: Average profit over the past 3 years
 - FP3: Profit growth over the past 3 years
 - FP4: Average return on sales over the past 3 years
 - FP5: Average operating ratio over the past 3 years
-

Notes: Adapted from Inman, et al. (2011). Original Cronbach's alpha was .92.

All of the original Cronbach's alphas were .90 or above providing evidence of high reliability. The adaptations to the original scales were kept to a minimum and were only done to make the items germane to the motor carrier industry. Appendix C contains the complete survey instrument. Eight survey questions collected demographic information. The first four questions asked for the participant's gender, age, industry experience, and current job experience. The remaining four questions asked for the number of power units, primary service market, service area, and the name of the motor carrier.

MODEL

Figure 3.2 is the structural equation model based upon the current theoretical model and the survey items. All items are reflective.

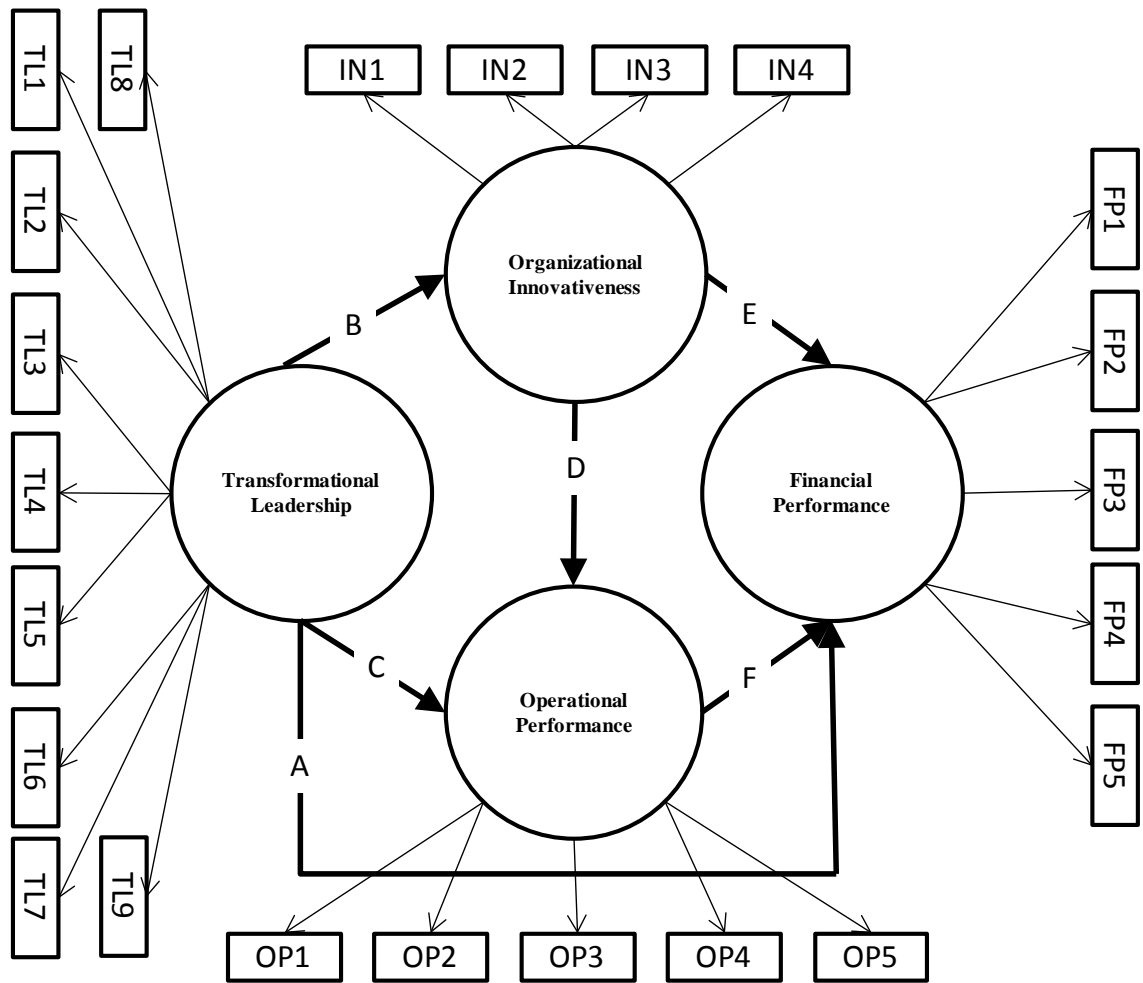


Figure 3.2. Structural Equation Model

LIMITATIONS AND ASSUMPTIONS

The primary assumption of this dissertation is that a single respondent from each motor carrier will have sufficient knowledge to answer the survey questions. A great deal of effort was expended to create a contact database for the selected motor carriers. The targeted positions were Chief Operating Officer, Vice President, and Director of Operations/Logistics. If the contact information for those positions was not available, information was collected for various other management positions (e.g., Vice President,

Executive, or Manager). The strategy to collect the best possible response data is to target the most appropriate contact for the particular motor carrier.

Potential limitations to the study are the sample size and achieving an acceptable response rate. Targeted administration of the survey to the desired participant is the primary method to enhance responses. Additionally, multiple contacts are available for the majority of motor carriers. Another tactic for increasing the response rate is a \$5 charitable donation to the American Red Cross in appreciation for the participant's time for each usable company response.

Methodologically, non-response bias and common method variance are concerns. Wave analysis, which is a dominant evaluation technique in supply chain research, was used to determine if early survey responses differed in some way from later responses (Wagner and Kemmerling, 2010). When results from the two waves do not differ, then there is evidence that non-response bias is not an issue (Rogelberg and Stanton, 2007). Because all items are measured using one survey instrument, common method variance could also be an issue. To test for the presence of common method variance, an unrelated construct (i.e., marker-variable) was added to the survey. The marker variable is assumed to have no relationship with at least one of the other constructs. If the correlation is not significant then there is evidence that common method variance is not a problem for the data (Lindell and Whitney, 2001).

DATA COLLECTION

Motor carrier web sites and other commercial web sites such as Hoovers and Jigsaw were used to develop a database of motor carrier points of contact. When

possible, three contacts from each company were collected. The targeted positions were Chief Operating Officer, Vice President, and Director of Operations/Logistics. The introduction letter located in Appendix B was e-mailed to each of the motor carrier points of contact.

Data was collected using an internet based questionnaire using the university approved and licensed Qualtrics software. All responses were housed within the secure Qualtrics software system, with access to the data limited to the primary researcher. No additional protection measures were deemed necessary to protect the confidentiality of the participant. The data file does not contain information that could link a particular response to the participant.

PRE-TEST

Two rounds of pre-testing were done on the survey instrument to ensure item specificity, representativeness, readability, functionality, and face validity. During the first round, four doctoral students and one logistician completed the survey and provided feedback. After some minor editing, the survey was sent to six supply chain management professors for a second round of pre-testing. Based on the professors' feedback, the order of the questions and minor grammatical edits were made to improve the flow and readability of the survey.

PILOT TEST

A pilot test of the survey was initiated using 150 motor carriers. After four weeks, 48 motor carriers had completed the survey for a response rate of 32%. There

were too few responses to conduct a test of the structural equation model; however, there was a sufficient number of responses to make initial evaluations of the relationships between the items, reliability of the constructs, and relationships between the constructs. The completed responses were analyzed in PASW 19. Appendix D contains the bivariate correlations of the items. As shown in Table 3.5, all constructs demonstrated acceptable reliability exceeding .8.

Table 3.5. Descriptive Data

	Mean	S.D.	TL	IN	OP	FP
TL	5.82	1.07	.96			
IN	4.73	1.46	.52**	.91		
OP	5.45	.94	.47**	.48**	.81	
FP	5.23	1.34	.20	.51**	.52**	.98

Note: TL = transformational leadership, IN = organizational innovativeness, OP = operational performance, FP = financial performance. Values along the diagonal are the internal consistency estimates (Cronbach's alpha). N = 48, ** $p \leq .01$.

Items were averaged for each construct and a linear regression model was used to determine the relationship between all three independent variables (transformational leadership, organizational innovativeness, and operational performance) and the dependent variable (financial performance). With an adjusted R^2 of .34, the regression model was significant ($F(3, 47) = 9.04, p < .001$). This demonstrates that a model containing transformational leadership, organizational innovativeness, and operational performance is a significant predictor of motor carrier financial performance. There is insufficient evidence ($t(47) = -1.40, p = .17$) to conclude that transformational leadership provides additional explanatory value for financial performance given that organizational

innovativeness, and operational performance are already included in the model. This was expected as the model proposed in this dissertation assumes a partially mediated relationship between transformational leadership and financial performance. There is sufficient evidence that organizational innovativeness ($t(47) = 2.82, p = .007$) and operational performance ($t(47) = 2.95, p = .005$) provide additional explanatory value for financial performance given that transformational leadership is already included in the model.

An exploratory factor analysis (EFA) was conducted using Principal Axis Factoring as the extraction method and Varimax with Kaiser Normalization as the rotation method (see Table 3.6). With one exception, all items loaded on the expected factor (loadings ranged from 0.59 to 0.93). It appears that OP2 may be problematic and may need to be removed in the final analysis. Although unanticipated, it does seem logical that *cost of service* would load with the financial performance measures rather than the intended operational performance measures.

Table 3.6. Pilot Test Exploratory Factor Analysis

	Factor			
	1	2	3	4
TL1	.83	.14	.17	-.66
TL2	.76	-.34	.13	.38
TL3	.83	.13	.18	.22
TL4	.85	.05	.21	.14
TL5	.80	.05	.36	-.84
TL6	.86	.06	.04	.26
TL7	.86	.03	.08	.20
TL8	.88	.06	.14	.23
TL9	.89	.19	.16	.09
IN1	.23	.20	.86	.20
IN2	.24	.24	.83	.20
IN3	.39	.42	.59	.00
IN4	.28	.21	.78	.22
OP1	.25	.22	.29	.78
OP2	.28	.57	-.22	.20
OP3	.11	.18	.22	.75
OP4	.09	.52	.15	.71
OP5	.34	.03	-.01	.73
FP1	.01	.92	.17	.10
FP2	-.02	.93	.20	.15
FP3	.12	.91	.19	.10
FP4	.12	.91	.25	.14
FP5	.03	.90	.25	.13
Eigenvalues	6.99	5.25	3.11	2.83
Variance Extracted	30.4%	22.83%	13.53%	12.32%

Note: N = 48

Participants were asked to provide general comments regarding the survey. Most participant feedback was encouraging. One response was simply “Exceptional” and another was “I applaud you for trying to figure this industry out and make a difference.” Several other participants were appreciative and asked to see the results of the study. Negative comments were “I think you will have biased results” and “this survey seemed to be written for an employee.” The former is a potential problem for all self-report data and the latter is a misunderstanding that the term “senior leader” applied only to the senior-most leader (i.e., chief executive officer, president, or owner) not all senior leaders in the organization. Overall, there seemed to be no problems with the questions in the survey as there were no missing data points and all participants who started the survey finished it. No changes were made to the survey before administration to the remaining carriers in the sample.

SUMMARY

Chapter 3 presented the hypotheses, population and sampling frame, the development of the survey instrument. A pilot test on 150 motor carriers provided evidence of the expected relationships among the constructs. Chapter 4 will describe how the data were gathered, the descriptive statistics of the data, and how it was analyzed.

CHAPTER 4: PRESENTATION AND ANALYSIS OF DATA

This chapter presents the analysis and results of the data collected to test the hypotheses put forth in Chapter 3. The chapter begins with a discussion of the study participants, participant demographics, and motor carrier demographics. The analysis of the data included testing for the effect of missing data, verifying the relationships using exploratory factor analysis, evaluating the measurement model through a confirmatory factor analysis, and using the structural model to address the hypotheses. Evidence of reliability and validity are presented and alternate models are evaluated.

PARTICIPANT DEMOGRAPHICS

The population for this dissertation consisted of all for-hire motor carriers operating within the continental United States. Motor carriers with fewer than 100 trucks were excluded from the original 1.3 million companies listed in the Federal Motor Carrier Safety Administration's 2011 Census. This helped to ensure that the motor carriers within the sample had the desired organizational structure necessary to evaluate the senior leader. This reduced the pool of potential participants to 3,743 motor carriers. Furthermore, that number was reduced to approximately 2,500 when municipalities, bus companies, and private fleets were excluded. The random sample of 500 carriers represented 20% of the population of interest. As demonstrated by the pilot test, participants from this sampling frame reported ample awareness of and experience with

the constructs of interest and therefore were judged to suitably represent the target population.

Multiple contacts at each motor carrier were sent an e-mail message containing the Institutional Review Board approval, the information letter, and an active link to the anonymous online survey. Of the 1,959 potential participants, 173 completed surveys were received. Two participants from 15 motor carriers responded to the survey. Each pair of duplicate responses was evaluated for completeness and the participant with the most experience in the industry was retained. The remaining 158 useable responses represent an individual response rate of 8%. Participant demographics are shown in Table 4.1.

Table 4.1. Participant Demographics

	Mean	Median	S.D.	Characteristic	Count	Percentage
Gender				Male	137	86.7%
				Female	21	13.3%
Age	50.5	51.0	9.2	< 35	10	6.3%
				35-49	54	34.2%
				> 49	91	57.6%
Industry Experience	23.8	25.0	11.3	< 10	18	11.4%
				10-20	42	26.6%
				> 20	97	61.4%
Experience in Current Position	9.8	8.0	6.9	< 5	42	26.6%
				5-10	78	49.4%
				> 10	37	23.4%

Notes: Counts may not sum to 158 because of missing data. N = 158.

Participants from upper-level management positions (COO, VP, Director, etc.) were targeted for their wealth of experience and proximity to the organizations' senior leader. The demographics reveal that the average participant was 50 years old with almost 24 years of experience in the motor carrier industry and nearly 10 years of experience in their current position. Although the names of many of the contacts could have been male or female (e.g., Chris, Pat, etc.); the percentage of female participants seemed to be proportional to the number of females within the contact database.

From the sample of 500 carriers, the 158 useable responses represent a motor carrier response rate of 32%. Motor carrier characteristics are shown in Table 4.2.

Table 4.2. Motor Carrier Characteristics

	Mean	Median	S.D.	Characteristic	Count	Percentage
Number of Trucks				< 500	65	41.4%
	1,559	600	2,436	500-2000	59	37.6%
				> 2000	33	21.0%
Type of Service				Truckload	80	50.6%
				Less-than-truckload	28	17.7%
				Flatbed	15	9.5%
				Tanker	14	8.9%
				Other	11	7.0%
Service Area				Refrigerated	9	5.7%
				National	53	33.5%
				Regional	50	31.6%
				North America	47	29.7%
			Worldwide	7	4.4%	

Notes: Counts may not sum to 158 because of missing data. N = 158.

As evidenced by the difference in the mean and median values for the number of trucks, the mean is heavily influenced by carriers such as UPS, which have a large worldwide fleet. The majority of the motor carriers report that their primary type of service is truckload or less-than-truckload. There were an approximately equal number of national, regional, and North American carriers represented in the responses. Seven worldwide carriers responded to the survey.

ITEM-LEVEL STATISTICS

Table 4.3 contains item-level details to include the mean, standard deviation, missing values, and percentage of missing values. Appendix E contains the bivariate correlations of the items.

The data were analyzed for missing values using PASW 19. The results of Little's missing completely at random (MCAR) test suggested that missing data were not dependent upon either the observed data or other missing data ($\chi^2(62) = 44.91, p = .95$). Missing values represented only 0.2% of the total survey item responses. No item had more than 5% of the data missing and the reason for the data loss was nonsystematic meaning that it is of little concern (Kline, 2011). The Estimation, Maximization (EM) algorithm was used to estimate the parameters in light of this small amount of missing data. Among the alternatives, the EM algorithm exhibits the least bias under these conditions and has fewer problems with convergence (Hair Jr, et al., 2010).

Table 4.3. Item Data

Item	Statement	Mean	S.D.	Missing
TL1	Communicates a clear and positive vision of the future	5.26	1.24	0
TL2	Treats staff as individuals, supports and encourages their development	5.49	1.27	0
TL3	Gives encouragement and recognition to staff	5.12	1.29	0
TL4	Fosters trust, involvement and cooperation among team members	5.21	1.43	0
TL5	Encourages thinking about problems in new ways and questions assumptions	5.34	1.41	0
TL6	Is clear about his/her values	5.72	1.35	0
TL7	Practices what he/she preaches	5.64	1.41	0
TL8	Instills pride and respect in others	5.44	1.47	0
TL9	Inspires me by being highly competent	5.52	1.56	0
IN1	First to market with innovative new products and services	4.86	1.43	1 (.6%)
IN2	First to develop a new process technology	4.78	1.53	0
IN3	First to recognize and develop new markets	4.69	1.41	0
IN4	At the leading edge of technological innovation	4.77	1.61	0
OP1	Service quality	5.86	1.03	0
OP2	Cost of service	4.65	1.27	0
OP3	Claims ratio	5.84	1.12	0
OP4	On-time delivery	5.72	1.06	0
OP5	Safety	5.77	1.20	0
FP1	Average return on investment over the past 3 years	5.17	1.50	1 (.6%)
FP2	Average profit over the past 3 years	5.07	1.50	2 (1.3%)
FP3	Profit growth over the past 3 years	5.06	1.52	1 (.6%)
FP4	Average return on sales over the past 3 years	5.01	1.43	1 (.6%)
FP5	Average operating ratio over the past 3 years	5.06	1.42	1 (.6%)

Note: TL = transformational leadership, IN = organizational innovativeness, OP = operational performance, FP = financial performance. N = 158.

Because one item did not perform well in the pilot study, a second exploratory factor analysis (EFA) was conducted using Principal Axis Factoring as the extraction method and Varimax with Kaiser Normalization as the rotation method (see Table 4.4). Except for OP2, all items loaded on the expected factor (loadings ranged from 0.50 to 0.91). OP2 was removed from further analyses because its factor loading was below the recommended .4 threshold (Hair Jr, et al., 2010).

Table 4.4. Exploratory Factor Analysis

	Factor			
	1	2	3	4
TL1	.75	.16	.21	.02
TL2	.84	.17	.20	.16
TL3	.81	.07	.18	.14
TL4	.85	.17	.18	.14
TL5	.76	.15	.24	.03
TL6	.82	.11	.01	.20
TL7	.87	.14	.03	.19
TL8	.88	.21	.08	.17
TL9	.86	.21	.10	.15
IN1	.16	.22	.87	.19
IN2	.16	.20	.86	.20
IN3	.26	.37	.55	.21
IN4	.23	.21	.78	.18
OP1	.14	.14	.23	.81
OP2	.19	.22	-.01	.28
OP3	.11	.19	.14	.65
OP4	.11	.21	.13	.82
OP5	.16	.13	.16	.50
FP1	.19	.88	.18	.19
FP2	.16	.91	.20	.20
FP3	.20	.84	.21	.20
FP4	.25	.87	.22	.21
FP5	.20	.88	.22	.22
Eigenvalues	6.64	4.50	2.95	2.64
Variance Extracted	28.88%	19.58%	12.80%	11.48%

Note: TL = transformational leadership, IN = organizational innovativeness, OP = operational performance, FP = financial performance. N = 158

CONSTRUCT-LEVEL STATISTICS

The imputed data set was used to calculate the construct-level descriptive data. Table 4.5 contains the mean, standard deviation, Cronbach's alpha (CA), composite reliability (CR), correlations, average variance extracted (AVE), and squared correlations for each of the constructs. The CR and AVE were calculated from the AMOS 19 output, where:

$$CR = (\Sigma \text{ standardized loadings})^2 \div [(\Sigma \text{ standardized loadings})^2 + (\Sigma \text{ measurement error})] \text{ and}$$

$$AVE = (\Sigma \text{ standardized loadings}^2) \div [(\Sigma \text{ standardized loadings}^2) + (\Sigma \text{ measurement error})].$$

Table 4.5. Descriptive Data

	Mean	S.D.	CA	CR	TL	IN	OP	FP
TL	5.42	1.22	.96	.96	.74	.18	.14	.18
IN	4.77	1.33	.91	.91	.43**	.73	.21	.29
OP	5.80	.90	.83	.84	.37**	.46**	.58	.20
FP	5.08	1.41	.98	.98	.42**	.54**	.45**	.89

Note: TL = transformational leadership, IN = organizational innovativeness, OP = operational performance, FP = financial performance. Average variance extracted is shown along the diagonal; correlations are shown below the diagonal; and squared correlations are shown above the diagonal. N = 158, ** $p \leq .01$.

ANALYSIS

The two-step procedure recommended by Anderson and Gerbing (1988) was used for this analysis. Before testing our hypothesized model, we performed a confirmatory factor analysis on the survey measures.

Measurement Model

Each latent construct was evaluated separately. All path coefficients were statistically significant and the model fit indices were acceptable (see Table 4.6). The construct models with their respective fit measures are located in Appendices F-I. The results of the confirmatory factor analysis (CFA) (see Figure 4.1) suggests a lack of exact fit for the model to the data based on the exact-fit test ($\chi^2(201) = 365.05, p < .001$). This is the standard null hypothesis significance test with the preferred outcome being a non-significant finding so that the null hypothesis may be accepted (Barrett, 2007). The exact fit test assumes that the observed covariances are no different than the model implied covariances, which is often considered to be overly stringent (e.g. Chen, et al., 2008; Makambi, et al., 2009; Pruitt, et al., 2010). The χ^2 test of exact fit is very powerful and often indicates statistically significant results for only minor model departures (Hu and Bentler, 1999).

Because of the noted issues with the exact fit test, many approximate fit tests have been developed that make adjustments for sample size, number of constructs, and the degrees of freedom. The approximate fit measures evaluated for this dissertation were the Comparative Fit Index (CFI), Root Mean Squared of Approximation (RMSEA), and the Standardized Root Mean Squared Residual (SRMR). The CFI, a test of the goodness of fit, is calculated as one minus the incremental improvement in the research model fit over that of the baseline model and is normed (i.e., has a range from 0–1) with acceptable fit generally being considered .95 or higher (Hair Jr, et al., 2010; Kline, 2011). RMSEA and SRMR are both tests of the badness of fit with acceptable values generally being less than .10 (Hu and Bentler, 1999). That is, both of these tests are expected to yield values

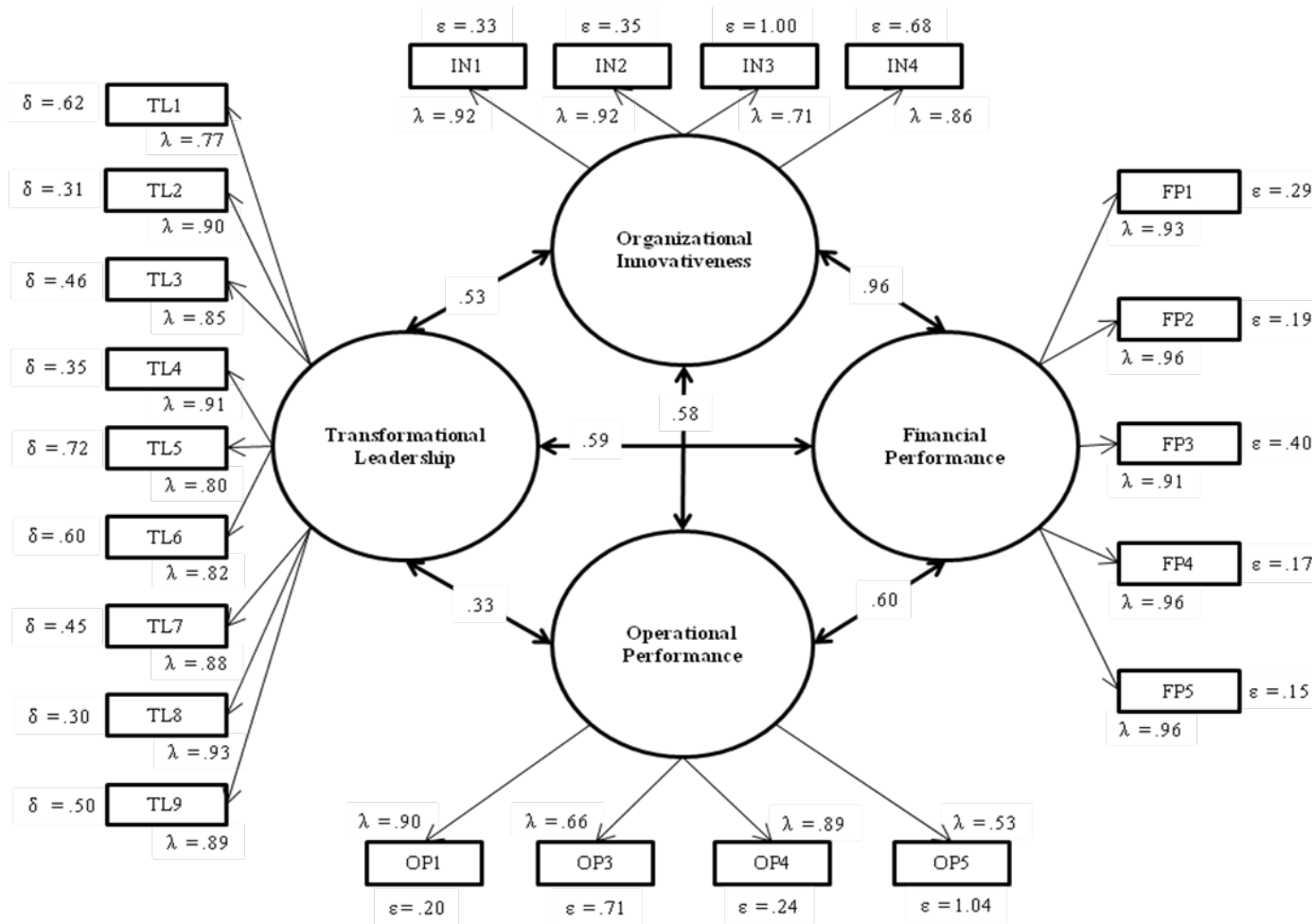
close to zero for a model with acceptable fit. RMSEA is estimated as the square root of the estimated discrepancy due to approximation per degree of freedom. SRMR is defined as the square root of the mean of the squared fitted residuals after the residuals have been divided by their respective standard deviations. The approximate fit indices suggested an acceptable fit to the CFA model (CFI = .96, RMSEA (90CI) = .07 (.06, .08), and SRMR = .06) (Hair Jr, et al., 2010).

Table 4.6. Confirmatory Factor Analysis

Path	Unstandardized Factor Loading	Standardized Factor Loading	Critical Ratio	Squared Multiple Correlation
TL1←TL	1.00	.77	(Fixed)	.60
TL2←TL	1.20	.90	12.80***	.81
TL3←TL	1.15	.85	11.89***	.72
TL4←TL	1.37	.91	13.03***	.83
TL5←TL	1.18	.80	10.99***	.64
TL6←TL	1.15	.82	11.32***	.67
TL7←TL	1.30	.88	12.44***	.77
TL8←TL	1.42	.93	13.34***	.86
TL9←TL	1.45	.89	12.62***	.79
IN1←IN	1.00	.92	(Fixed)	.84
IN2←IN	1.08	.92	18.63***	.85
IN3←IN	.76	.71	10.93***	.50
IN4←IN	1.06	.86	15.87***	.74
OP1←OP	1.00	.90	(Fixed)	.81
OP3←OP	.80	.66	9.23***	.43
OP4←OP	1.02	.89	13.69***	.78
OP5←OP	.68	.53	6.90***	.28
FP1←FP	1.00	.93	(Fixed)	.87
FP2←FP	1.02	.96	24.92***	.91
FP3←FP	.99	.91	20.68***	.83
FP4←FP	.98	.96	25.07***	.92
FP5←FP	.97	.96	25.71***	.93

Note: TL = transformational leadership, IN = organizational innovativeness, OP = operational performance, FP = financial performance. N = 158, *** $p \leq .001$.

Figure 4.1. Measurement Model



$\chi^2(201) = 365.05, p < .001, CFI = .96, RMSEA (90CI) = .07 (.06, .08), SRMR = .06$. All item loadings significant at .001. Standardized item loadings are indicated in the figure. All covariances are significant at .001.

Reliability and Validity

Before using the data to make inferences regarding the hypotheses, measures of reliability and validity were attained. The reliability of a construct is one minus the proportion of total observed variance due to random error (Kline, 2011). All four construct measures had a Cronbach's alpha greater than .83 providing evidence of internal consistency reliability. Composite reliability, which measures the reliability of the overall scale, was also used to evaluate reliability. As shown in Table 4.5, the composite reliability for each of the four constructs was above the recommended .6 level (Tseng, Dörnyei, and Schmitt, 2006).

Discriminant validity is the "degree to which two conceptually similar concepts are distinct" (Hair Jr, et al., 2010, p. 137). Following Fornell and Larcker's (1981) guidelines for assessing discriminant validity, the average variance extracted for each construct was compared with the square of the correlation between each possible pair of constructs. The AVE for each construct was larger than the squared correlation estimates between the constructs indicating discriminant validity (Fornell and Larcker, 1981; Hair Jr, et al., 2010). Another indication of discriminant validity is when the measures load only on the intended construct. As shown in Table 4.4, there was no cross loading. These two methods provide some evidence of the constructs' discriminant validity.

Convergent validity is the "degree to which two measures of the same concept are correlated" (Hair Jr, et al., 2010, p. 137). Convergent validity was evaluated using the output of the confirmatory factor analysis. Convergent validity is indicated when every item loads on the intended construct with a significant critical ratio (Gefen and Straub,

2005). All path coefficients were statistically significant with standardized loadings greater than .5 providing evidence of convergent validity.

As mentioned by Podsakoff and Organ (1986), Harmon's one factor test was used to determine if the threat of common method bias was significant. Analysis of the unrotated factor solution revealed four factors with eigenvalues greater than one. The four factors accounted for 77.07% of the unique variance collectively, and individually accounted for 46.11%, 15.37%, 8.22%, and 7.37% of the variance, respectively. Since there was no general factor that accounted for more than 50% of the variance (Podsakoff and Organ, 1986), common method bias did not appear to be a problem. Another technique recommended by Lindell and Whitney (2001) is to test for the presence of common method variance by adding an unrelated construct (i.e., marker-variable) to the survey. The marker variable is assumed to have no relationship with at least one of the other constructs (Malhotra, Kim, and Patil, 2006). The four-question construct *Attitudes toward Safety* was included in the survey (M. A. Douglas and Swartz, 2009). This construct did not correlate with any of the constructs of interest providing further evidence that common method bias was not a significant threat to the validity of the study.

Wave analysis, which is a dominant evaluation technique in supply chain research, was used to determine if there was evidence of nonresponse bias (Wagner and Kemmerling, 2010). If early survey responses do not differ in some way from later responses, then there is evidence to suggest that nonresponse bias is not an issue (Rogelberg and Stanton, 2007). The chief assumption and primary weakness of wave analysis is that late responders are similar to nonresponders; however, it has long been

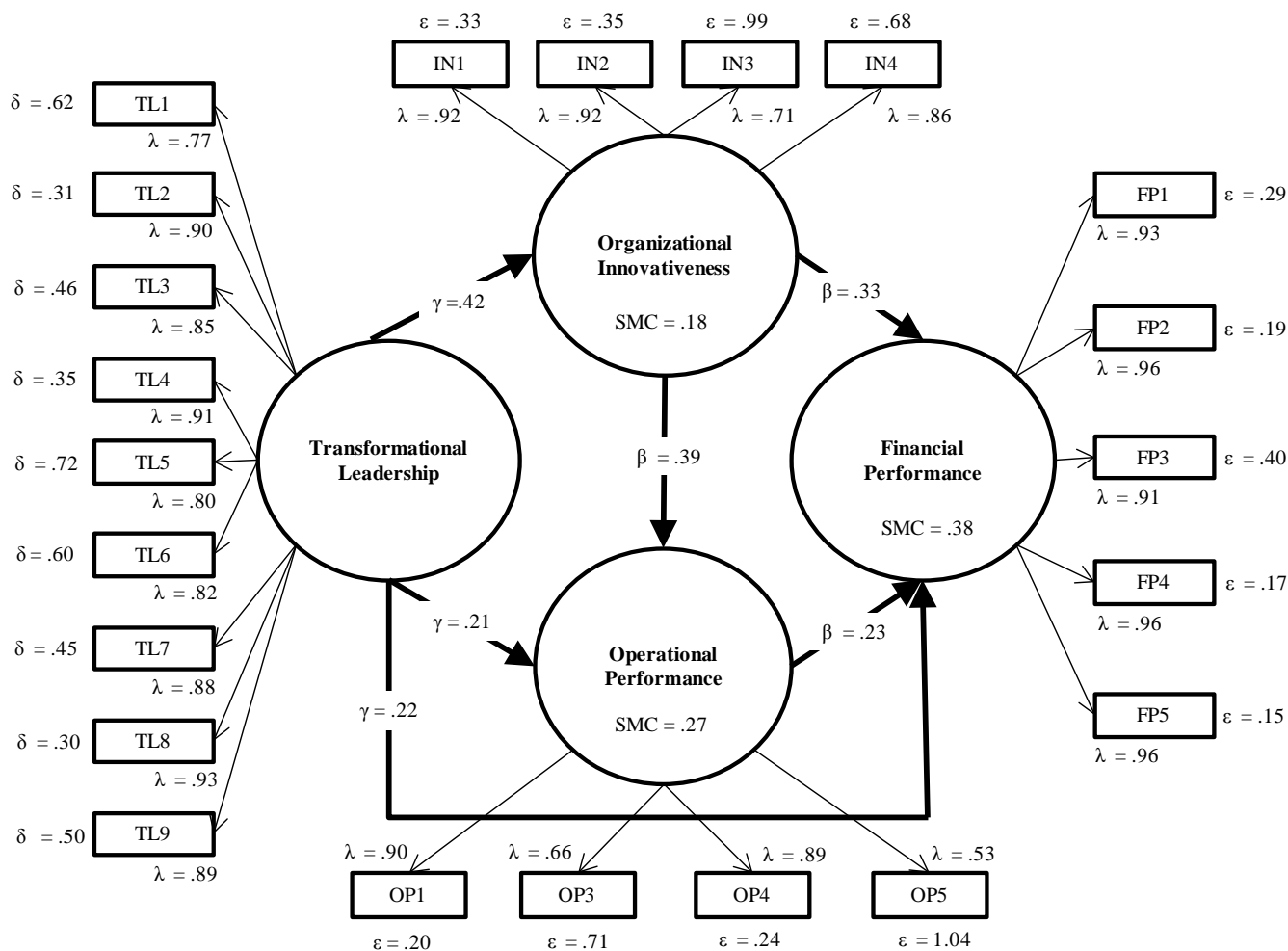
accepted that this technique provides a simple method of determining the probable direction of bias (Pace, 1939). The survey was administered during a two month period. Responses were tracked based upon the duration of time that elapsed between the first e-mail and the response received from the motor carrier representative. For example, Wave 1 indicates that a participant responded to the survey the first week an e-mail was sent to any point of contact within that organization. Responses were split into two groups. The early group included the first four waves and the late group included the last four waves. The average score for each item within the early group was compared to the average for each item from the late group. There were no significant differences in responses (all differences were within one standard deviation of the early group), suggesting that nonresponse bias is not of concern in this study.

Key informants were used in collecting the data for this dissertation. These informants were selected based upon their position and specialized knowledge, which may introduce bias (Phillips, 1981). Steps that were taken to help mitigate the single source bias included ensuring the respondents had a high level of relevant knowledge and stressing that the responses would remain anonymous (Fugate, Mentzer, and Stank, 2010). Following the procedure discussed by Ashenbaum and Terpend (2010), the duplicate responses that were received from 15 of the motor carriers were examined. Extreme variances and outliers among the duplicate responses would suggest a threat to validity. The responses were generally homogenous and analysis of the data at the construct level provided no evidence to suggest single source bias.

Structural Model

After finding an acceptable fit for the measurement model and evidence of reliability and validity, the structural model was assessed and the hypothesized relationships were examined. The structural model had acceptable fit indices $\chi^2(201) = 365.05$, $p < .001$, CFI = .96, RMSEA (90CI) = .07 (.06, .08), SRMR = .06 (Hair Jr, et al., 2010). All of the item path coefficients and item loadings are significant at $p \leq .01$. The square multiple correlation (SMC) for a latent variable can be interpreted the same way an R^2 in regression analysis is interpreted. It measures the capability of the model to explain the variance of the dependent variable. As shown in Figure 4.2, the model explains 38% of the variance in financial performance, 27% of the variance in operational performance, and 18% of the variance in organizational innovativeness.

Figure 4.2. Structural Model



$\chi^2(201) = 365.05, p < .001, CFI = .96, RMSEA (90CI) = .07 (.06, .08), SRMR = .06$. All item loadings and path coefficients significant at .01. Standardized item loadings and path coefficients are indicated in the figure.

Possible Equivalent Models

Based on the data collected, the hypothesized model has an adequate approximate fit; however, it is one of many possible models that could produce the same or better results (Raykov and Marcoulides, 2001). As recommended by Hair Jr. et al. (2010), the hypothesized model was built on sound theory indicating that major changes to the model would make little conceptual sense given the constructs involved. Therefore, several models with minor changes were run and the results were compared to the hypothesized model.

Model 1 is the hypothesized model in this dissertation and is the baseline for all comparisons. The results of the comparisons are contained in Table 4.7. Model 2 (see Appendix J) is the full mediation model (path $FP \leftarrow TL$ was deleted). Model 2 implies that there is no direct effect of transformational leadership on financial performance. The comparison reveals a statistically significant difference in the exact fit measures providing evidence that supports the hypothesized model.

Model 3 (see Appendix K) is the partial mediation through innovativeness only model (path $OP \leftarrow TL$ was deleted). Model 3 implies that the relationship between transformational leadership and financial performance is not mediated through operational performance. Model 4 (see Appendix H) is the partial mediation through operational performance only model (path $IN \leftarrow TL$ was deleted). Model 4 implies that the relationship between transformational leadership and financial performance is not mediated through organizational innovativeness. Again, the comparison reveals a statistically significant difference in the exact fit measure of Model 1 and the exact fit

measures of Model 3 and Model 4 providing evidence supporting the hypothesized model.

Model 5 (see Appendix L) is the partial mediation through innovativeness and operational performance model (paths $OP \leftarrow TL$ and $FP \leftarrow IN$ were deleted). Model 5 implies that the indirect effect of transformational leadership is $FP \leftarrow OP \leftarrow IN \leftarrow TL$. The comparison reveals a statistically significant difference in the exact fit measures of Model 1 and Model 5 providing evidence that supports the hypothesized model.

Model 6 (see Appendix M) is the partial mediators are unrelated model (path $OP \leftarrow IN$ was deleted). This model implies that there is no relationship between organizational innovativeness and operational performance. The comparison reveals a statistically significant difference in the exact fit measures of Model 1 and Model 6 providing evidence that supports the hypothesized model. Although not an exhaustive list of alternate models, the results presented in Table 4.7 provide additional support for the hypothesized model.

Table 4.7. Possible Equivalent Models

	χ^2	df	Sig	$\Delta\chi^2$	Δdf	Sig	CFI	SRMR	RMSEA (90CI)
Model 1	365.05	201	.00	-	-	-	.96	.06	.07 (.06, .08)
Model 2	373.34	202	.00	8.29	1	.00	.95	.08	.07 (.06, .09)
Model 3	371.33	202	.00	6.28	1	.01	.96	.07	.07 (.06, .09)
Model 4	392.64	202	.00	27.59	1	.00	.95	.16	.08 (.07, .09)
Model 5	385.77	203	.00	20.72	2	.00	.95	.09	.08 (.06, .09)
Model 6	384.88	202	.00	19.83	1	.00	.95	.09	.08 (.06, .09)

RESULTS OF THE HYPOTHESES TESTS

The model path coefficients provide evidence to draw conclusions regarding our direct effect hypotheses. Hypothesis 1 states that transformational leadership is positively related to financial performance. The results of this study provide empirical support for this relationship ($\beta = .33, z = 2.87, p = .004$). This indicates that transformational leadership has a direct, positive relationship with the financial performance of a motor carrier.

Hypothesis 2 states that transformational leadership is positively related to organizational innovativeness. The results support Hypothesis 2 ($\beta = .58, z = 5.12, p < .001$). This indicates that transformational leadership has a direct, positive relationship with the organizational innovativeness of a motor carrier.

Hypothesis 3 states that transformational leadership is positively related to operational performance. The results support Hypothesis 3 ($\beta = .21, z = 2.49, p = .013$). This indicates that transformational leadership has a direct, positive relationship with the operational performance of a motor carrier.

Hypothesis 4 states that organizational innovativeness is positively related to operational performance. The results support Hypothesis 4 ($\beta = .28, z = 4.51, p < .001$). This indicates that organizational innovativeness has a direct, positive relationship with the operational performance of a motor carrier.

Hypothesis 5a states that organizational innovativeness is positively related to financial performance. The results support Hypothesis 5a ($\beta = .35, z = 3.90, p < .001$). This indicates that organizational innovativeness has a direct, positive relationship with the financial performance of a motor carrier.

Hypothesis 6a states that operational performance is positively related to financial performance. The results support Hypothesis 6a ($\beta = .34, z = 2.72, p = .006$). This indicates that operational performance has a direct, positive relationship with the financial performance of a motor carrier.

The comparison of alternate models provides evidence to draw conclusions regarding the indirect effect hypotheses (Kline, 2011). Hypothesis 5b states that organizational innovativeness will partially mediate the relationship between transformational leadership and financial performance. Comparing the hypothesized partial mediation model to Model 4 where the path between transformational leadership and organizational innovativeness is deleted provides evidence that supports Hypothesis 5b ($\Delta\chi^2 = 27.59, \Delta df = 1, p < .001$).

Hypothesis 6b states that operational performance will partially mediate the relationship between transformational leadership and financial performance. Comparing the hypothesized partial mediation model to Model 3 where the path between transformational leadership and operational performance is deleted provides evidence that supports Hypothesis 6b ($\Delta\chi^2 = 6.28, \Delta df = 1, p = .01$).

Hypothesis 6c states that operational performance and innovativeness will partially mediate the relationship between transformational leadership and financial performance. Comparing the hypothesized partial mediation model to Model 5 where the path between transformational leadership and operational performance is deleted and the path between innovativeness and financial performance is deleted provides evidence that supports Hypothesis 6c ($\Delta\chi^2 = 20.72, \Delta df = 2, p < .001$). Table 4.8 provides a summary of the findings.

Table 4.8. Hypotheses Results

Hypothesis	Test Statistic	Result
H1: TL is positively related to FP.	$\beta = .33, z = 2.87, p = .004$	Supported
H2: TL is positively related to IN.	$\beta = .58, z = 5.12, p < .001$	Supported
H3: TL is positively related to OP.	$\beta = .21, z = 2.49, p = .013$	Supported
H4: IN is positively related to OP.	$\beta = .28, z = 4.51, p < .001$	Supported
H5a: IN is positively related to FP.	$\beta = .35, z = 3.90, p < .001$	Supported
H5b: IN will partially mediate the relationship between TL and FP.	$\Delta\chi^2 = 27.59, \Delta df = 1, p < .001$	Supported
H6a: OP is positively related to FP.	$\beta = .34, z = 2.72, p = .006$	Supported
H6b: OP will partially mediate the relationship between TL and FP.	$\Delta\chi^2 = 6.28, \Delta df = 1, p = .012$	Supported
H6c: OP and IN will partially mediate the relationship between TL and FP.	$\Delta\chi^2 = 20.72, \Delta df = 2, p < .001$	Supported

SUMMARY

Chapter 4 described the analysis and the results of the data collected to test the hypotheses put forward in Chapter 3. The chapter discussed the population, sampling frame, participant demographics, and company demographics. The analysis of the data included testing for the effect of missing data, verifying the relationships using exploratory factor analysis, evaluating the measurement model through a confirmatory factor analysis, and using the structural model to address the hypotheses. Evidence of reliability and validity were presented and alternate models evaluated.

CHAPTER 5: DISCUSSION

This study was designed to test and evaluate the relationships between transformational leadership, organizational innovativeness, and organizational performance, both operational and financial. In Chapter 4, the data collected from 158 motor carriers was used to test the nine proposed hypotheses. All nine hypotheses were supported as depicted in Figure 5.1.

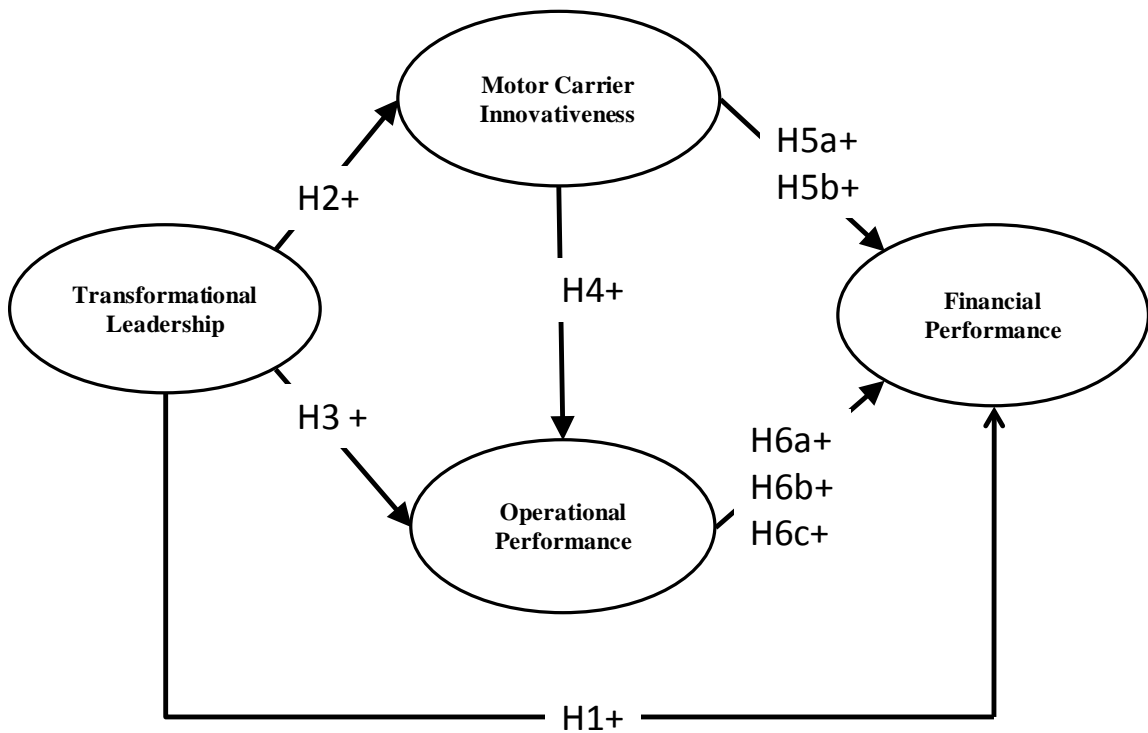


Figure 5.1. Theoretical Model

This chapter presents a discussion of the dissertation. First, the research and theory implications are discussed. Then, there is a discussion of what the findings mean to practitioners; particularly to leaders in an industry as competitive and demanding as motor carrier transportation. Next, the limitations of the study and propositions for future research are presented. Finally, an overall summary of the study is provided in the conclusion.

IMPLICATIONS FOR RESEARCHERS

The phenomena of transformational leadership and innovativeness and their effect on organizational outcomes have received little attention in supply chain research and have not been evaluated collectively with regard to motor carriers. The statistical results from our hypothesized model provide empirical support for the impact of transformational leadership and organizational innovativeness on the organizational outcomes of motor carriers; a vital link in the supply chain. These findings substantiate past research that has shown a significant relationship between transformational leadership and desirable organizational outcomes (e.g., Avolio, et al., 2004; Hoyt and Blascovich, 2003; Zhu, et al., 2005). Thus, this study provides additional evidence to support that leaders who display visionary, inspirational, and goal-oriented behaviors positively impact the bottom-line performance of the organization. Our results help to fill the void (*Gap 1*) in the supply chain leadership literature identified by Williams, Esper, and Ozment (2002).

Previous studies have called for more research to identify mediating variables of transformational leadership and positive organizational outcomes (Bass, et al., 2003;

Boerner, et al., 2007; Eisenbeiss, et al., 2008; Wolfram and Mohr, 2009; Yukl, 1999).

Our findings provide further evidence that a leader's propensity for change permeates the entire organization and that innovativeness does indeed partially mediate the relationship between transformational leadership and financial performance. Our results help fill a void (*Gap 2*) in the literature by providing empirical evidence that organizational innovativeness is a mediator between transformational leadership and organizational outcomes. This study also strives to answer Grawe's (2009) specific call for empirical research regarding logistics innovation.

Organizational performance can be measured as two distinct but related constructs, operational performance and financial performance; however, little research has investigated the relationship between these two constructs in the supply chain literature. One recent study found evidence to support a positive relationship between one aspect of operational performance, safety, and financial performance of the firm (Britto, et al., 2010). Our results assist in filling the void (*Gap 3*) in supply chain literature by providing empirical support for the positive relationship between the two constructs using multiple aspects of operational performance and multiple aspects of financial performance.

Based on the data collected, all nine hypotheses were supported and the hypothesized structural model accounted for 38% of the variance in financial performance. The following sections put forth the research implications for each of those findings.

Transformational Leadership and Financial Performance

Transformational leadership is a leadership style in which the leader identifies the need for change, develops a vision for the organization, inspires followers to work toward that vision, and executes the change with the commitment of the followers. It was operationalized in this dissertation as participant perceptions of the leadership style of the motor carrier's senior leader. The seven-item Global Transformational Leadership scale (Carless, et al., 2000) was adapted to measure transformational leadership.

The dependent variable for this study was financial performance, which reflects the organization's sales and profitability. It was operationalized as the participant perceptions regarding several measures of financial performance of the motor carrier and was measured using a modified version of the four-item scale developed and validated by Inman, et al. (2011).

Hypothesis 1 stated that transformational leadership is positively related to financial performance. The results of this study provide empirical support for this relationship ($\beta = .33$, $z = 2.87$, $p = .004$) indicating that transformational leadership has a direct, positive relationship with the financial performance of the firm. Thus, this dissertation provides additional evidence to support that leaders who display visionary, inspirational, and goal-oriented behaviors positively impact the bottom-line performance of the organization.

Transformational Leadership and Organizational Innovativeness

Organizational innovativeness was defined as the propensity of an organization to deviate from conventional industry practices by creating or adopting new products,

processes, or systems. It was operationalized in this dissertation as participant perceptions regarding the innovativeness of the motor carrier and was measured using a four-item scale that was a modification of the scale presented by Srinivasan, et al. (2002).

Hypothesis 2 stated that transformational leadership is positively related to organizational innovativeness. The results supported Hypothesis 2 ($\beta = .58, z = 5.12, p < .001$) indicating that transformational leadership has a direct, positive relationship with organizational innovativeness. This finding supports the idea that leaders have considerable control over the presence or absence of organizational innovativeness and that the leader's propensity for change permeates the entire organization.

Transformational Leadership and Operational Performance

Operational performance reflects the organization's ability to efficiently and effectively provide services to the customer. It was operationalized as the participant perceptions regarding several measures of operational performance and was measured using a modified version of the eight-item scale developed by Zelbst, Green Jr, and Sower (2010).

Hypothesis 3 stated that transformational leadership is positively related to operational performance. The results supported Hypothesis 3 ($\beta = .21, z = 2.49, p = .013$) indicating that transformational leadership has a direct, positive relationship with the operational performance of the organization. This finding substantiates the claim that transformational leaders raise the follower's awareness of the desired organizational outcome, encourage follower's to transcend their own personal interests, and enhance the abilities of the follower (Hult and Ketchen, 2007). The finding also suggests that leaders

who display visionary, inspirational, and goal-oriented behaviors positively impact the operational performance of the organization.

Organizational Innovativeness and Organizational Performance

The inclination toward innovation enables the organization to achieve elevated goals (Howell and Frost, 1989), which has an important impact on organizational performance (Keskin, 2006; J. Lee, 2007; Olavarrieta and Friedmann, 2008). Therefore, the relationships between innovativeness and the two organizational outcomes were tested.

Hypothesis 4 stated that organizational innovativeness is positively related to operational performance. The results supported Hypothesis 4 ($\beta = .28$, $z = 4.51$, $p < .001$) indicating that organizational innovativeness has a direct, positive relationship with the operational performance of the organization. Hypothesis 5a stated that organizational innovativeness is positively related to financial performance. The results supported Hypothesis 5a ($\beta = .35$, $z = 3.90$, $p < .001$) indicating that organizational innovativeness has a direct, positive relationship with the financial performance of the firm. Hypothesis 5b stated that organizational innovativeness will partially mediate the relationship between transformational leadership and financial performance. The results supported Hypothesis 5b ($\Delta\chi^2 = 27.59$, $\Delta df = 1$, $p < .001$) indicating that organizational innovativeness partially mediates the relationship between transformational leadership and financial performance.

Operational Performance and Financial Performance

Organizational performance was measured as two distinct but related constructs: operational performance and financial performance. The notion that operational performance is a separate complementary factor to financial performance has been supported in the literature (e.g., Inman, et al., 2011; Wouters, et al., 1999; Wu and Chuang, 2010). As expected, there was a significant positive relationship between operational performance and financial performance.

Hypothesis 6a stated that operational performance is positively related to financial performance. The results supported Hypothesis 6a ($\beta = .34, z = 2.72, p = .006$) indicating that operational performance has a direct, positive relationship with the financial performance of the firm. Hypothesis 6b stated that operational performance will partially mediate the relationship between transformational leadership and financial performance. The results supported Hypothesis 6b ($\Delta\chi^2 = 6.28, \Delta df = 1, p = .01$). Hypothesis 6c stated that operational performance and innovativeness will partially mediate the relationship between transformational leadership and financial performance. The results supported Hypothesis 6c ($\Delta\chi^2 = 20.72, \Delta df = 2, p < .001$). The evidence suggests that operational performance partially mediates the relationship between transformational leadership and financial performance. Support was also found for the direct impact of operational performance on financial performance.

IMPLICATIONS FOR PRACTITIONERS

Motor carriers move the majority of the cargo transported in the United States. The motor carrier industry is highly competitive with low profit margins and few barriers

to entry. Adding to these leadership challenges are fluctuating fuel prices, government regulations, underfunding of transportation infrastructure maintenance, and a shortage of drivers. While transformational leadership and organizational innovativeness have been shown to be particularly effective in these types of environments, there is little empirical evidence that can guide the senior leaders in the motor carrier industry.

There are several practitioner implications that can be taken from the findings of this study. These should be particularly insightful to senior leaders because they are based on inputs from upper-level managers with an average of 24 years in the industry and nearly 10 years in their current position.

First, the results provide significant evidence that the characteristics of the organization's senior leader have a tangible effect on the organization's performance. While this is not necessarily a surprising finding, the value of the results is the fact that certain types of behavior's (e.g., clear communication, encouragement, recognition) have a significant, positive impact on organizational outcomes.

While it is outside the scope of this study to evaluate or recommend specific innovations, the second implication has to do with the propensity of an organization to deviate from conventional industry practices by creating or adopting new products, processes, or systems. Organizations that were seen as more innovative by upper-level managers, were also seen as having higher operational and financial performance. Although senior leaders must include many strategic and tactical considerations when evaluating a potential innovation, it is clear that organizations that tend to be more innovative are reported to be more profitable.

Finally, many of the participants provided additional comments regarding transformational leadership and innovativeness. Both the quantitative and the qualitative data provided by the participants support the beneficial effects of transformational leadership and organizational innovativeness on both the operational and financial performance of the motor carrier. Additionally, participants indicated transformational leaders and an innovative organization fostered a positive work environment. Participants used terms such as loyalty, integrity, shared vision, and family when describing the organizational climate.

LIMITATIONS

The findings of this dissertation and the implications suggested above are subject to several limitations. First, structural equation modeling is considered a large sample technique (Kline, 2011). Multiple efforts were made to get a response from each of the 500 motor carriers in the sampling frame; however, the final sample size of 158 represented an individual response rate of 8% and a company response rate of 32%. While some researchers may consider the sample size to parameters ratio of 7:1 to limit the trustworthiness of the findings, the sample was nearly double the minimum required sample size recommended by Preacher and Coffman (2006). The sample size of this dissertation definitely contributed to the significant χ^2 ; however, the approximate fit measures, which are less sensitive to sample size, provided evidence of acceptable fit (Hu and Bentler, 1999).

Second, the research design may limit the generalizability of the findings. While the sample of motor carriers was selected largely at random, the individuals within each

of the organizations were purposively selected based on their positions. This ensured that the participant had the knowledge necessary to answer the survey questions, but it may have introduced additional sampling error. Other issues associated with this design include common method bias, nonresponse bias, and single source bias. Although some bias may be present, tests showed that the threat of each was negligible. The Harmon's one factor test (Podsakoff and Organ, 1986) and the marker-variable technique (Lindell and Whitney, 2001) provided evidence that common method bias was not a significant threat to the validity of the study. Wave analysis demonstrated that there were no significant differences in responses suggesting that nonresponse bias was not of concern in this study. Multiple steps were taken to help mitigate single source bias. Duplicate responses were examined and provided no evidence to suggest single source bias.

Next, researching transformational leadership and organizational innovativeness in a supply chain setting answers multiple calls for research (Defee, Stank, and Esper, 2010; Grawe, 2009). However, the focus of this dissertation was on a relatively unique subset of the supply chain, the motor carrier industry. Care should be taken when extrapolating these results to other portions of the supply chain.

Finally, no inference can be made regarding causality in this model. The cross-sectional data were gathered at one point in time, which provides insight into the linear relationship between transformational leadership, organizational innovativeness, and organizational performance; but is not sufficient to establish causality. Further research using multiple contacts within each organization over a period of time would be needed to develop casual relationships.

FUTURE RESEARCH

The hypothetical model proposed in this dissertation was built on sound theory and yielded significant results for all hypothesized relationships. In this section, propositions are put forth that provide avenues for future research.

The findings of this dissertation suggest that transformational leadership has a significant impact on the performance of an organization. Specifically, the results of this study support a direct and indirect effect of transformational leadership on the bottom line of an organization. Two mediators, organizational innovativeness and operational performance, were tested and the amount of variance in financial performance accounted for by the hypothesized model was 38%.

Survey participants were provided an opportunity to make comments following the questions on transformational leadership and organizational innovativeness, as well as at the end of the survey. Some representative comments (in italics) are presented along with the inferences from the results to provide propositions for future research.

The comments below contain insights regarding other possible mediators of the relationship between transformational leadership and financial performance that could account for some of the remaining variance in financial performance. The possible mediators are bolded and the average for the participant's transformational leadership responses is provided in parentheses.

*“Hands on leadership and direct access and communication inspire **trust** and **confidence** in the work force at all levels.” (6.89)*

*“The front line employees have a high level of **trust** in our leader and **respect** him.” (6.22)*

*“We are a reflection of our senior leader; **confident** in our direction and strategy for getting there.” (5.78)*

*“The relationship is one of **trust** and **open communication**.” (5.56)*

Recurring themes in the comments by participants who ranked their senior leader above the average score on the transformational leadership scale are trust, confidence, and open communication. These are only a few of the possible constructs that could be evaluated as mediators. Thus, the following proposition is offered.

P1: There are many possible mediators of the relationship between transformational leadership and performance outcomes. Future research should endeavor to identify and evaluate these mediators.

Another research area that needs exploration in the supply chain literature is the effect of leadership style on other organizational outcomes. Again, several representative comments (in italics) are presented along with the inferences from the results to provide a proposition for future research. These comments contain insights regarding other possible outcomes that may be affected by transformational leadership. In the comments

below, possible outcomes are bolded and the average for the participant's transformational leadership responses is provided in parentheses.

*“[The senior leaders creates] an extremely strong **culture of integrity** and world class leadership development.” (6.89)*

*“It is an organization with a family atmosphere. People enjoy working here and that is demonstrated in the **low turnover** we have in our office staff.” (7.00)*

*“[The leader is] close and personal to each individual and it carries beyond the work space...fosters incredible **loyalty**.” (6.11)*

*“Most of the employees have the same **passion for the business** as the CEO/owner.” (5.44)*

Common themes in the comments by participants who ranked their senior leader above the average score on the transformational leadership scale seem to portray a desirable work environment that inspires subordinates to share the leader's passion, engenders loyalty and integrity, and promotes employee longevity. Therefore, the following proposition is offered.

P2: Significant opportunity exists to study the link between transformational leadership and organizational outcomes, particularly in the supply chain literature.

As stated by Grawe (2009), innovation research is another area that needs exploration in the supply chain literature. Again, several representative comments (in italics) are presented along with the inferences from the results to provide a proposition for future research. In the comments below, important points are bolded and the average for the participant's organizational innovativeness responses is provided in parentheses.

*“We work to stay up with evolving technology but the industry is **so competitive**, size and business awards or losses really dictate the ability to move forward with new projects...” (3.25)*

*“We are not innovative on any level. The business is run the way trucking companies were run during the 1980's. While this sounds bad it really isn't as bad as it seems because a lot of the technology and industry **innovations are very overrated....often leading to complicating a very simple business.**” (1.00)*

“We follow the leader-we only do what the others in our industry make our customers demand. We are discouraged from using our company

*issued phones to their full capabilities and prohibited from having voice mail. **Our company is not a fan of technology.***” (2.00)

*“We are a basic nuts and bolts transportation company. **If you try to get too fancy you end up behind your competitors in terms of service and delivery.**”* (4.00)

Common themes in the comments by participants who ranked their organization below the average on the innovativeness scale seem to portray cautiousness and some skepticism regarding the implementation of innovations. It is also telling that these same participants marked their organization well below the average on the financial performance scale. Therefore, the following proposition is offered.

P3: Significant opportunity exists to study the link between organizational innovativeness and financial performance, particularly within the supply chain.

CONCLUSION

In this dissertation three gaps were identified in the supply chain literature. Gap 1 was the scarcity of applied leadership, particularly transformational leadership, research in the supply chain domain. Gap 2 was the need to identify and study mediators between transformational leadership and performance as well as the need to expand theory-based innovation research in an applied supply chain setting. Finally, Gap 3 was the need to

study multiple operational measures and their impact on multiple financial measures.

To address these gaps, relevant literature were reviewed in order to build a hypothetical structural model. Nine hypotheses were developed based upon the literature and multiple scales were tailored to collect the necessary data. A database of motor carriers was constructed and multiple points of contact were identified. Over 4,000 e-mails were sent to nearly 2,000 members of upper management within 500 motor carriers. Each e-mail contained the Institutional Review Board approval, the information letter, and an active link to the anonymous online survey. Of the 173 responses, 158 usable responses were evaluated using structural equation modeling. Evidence was found to support all nine hypotheses. These results are theoretically relevant in that they extend and expand leadership and innovation in the supply chain domain, as well as practically relevant in that they provide tangible evidence that leadership style and innovation have a significant effect on motor carrier performance.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL

Office of Research Compliance
115 Ramsey Hall, Auburn
Auburn University, AL 36849



Telephone: 334-844-5965
Fax: 334-844-4397
aoh@auburn.edu

August 4, 2011

MEMORANDUM TO: Robert E. Overstreet
Department of Management

PROTOCOL TITLE: "Effect of Transformational Leadership and Innovativeness on Motor Carrier Performance"

IRB FILE NO.: 11-236 EX 1107

APPROVAL DATE: July 28, 2011
EXPIRATION DATE: July 27, 2012

The referenced protocol was approved "Exempt" by the IRB under 45 CFR 46.101 (b) (2):

"Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:

- (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
- (ii) any disclosure of the human subjects' response outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation."

You should retain this letter in your files, along with a copy of the approved protocol and other pertinent information concerning your study. If you anticipate a change in any of the procedures authorized in your protocol, you must request and receive IRB approval prior to implementation of any modification. Please reference the above IRB file number in any correspondence regarding this project.

If you will be unable to file a Final Report on your project before July 27, 2012, you must submit a request for an extension of approval to the IRB in early July 2012. If your IRB authorization expires and/or you have not received written notice that a request for an extension has been approved prior to July 27, 2012 you must suspend the project immediately and contact the Office of Research Compliance.

A Final Report will be required to close your IRB project file. Please note that only copies of the approved electronic information letter should be provided to participants during the consent process.

If you have any questions concerning this Board action, please contact the Office of Research Compliance.

Sincerely,

Kathy Jo Ellison, RN, DSN, CIP
Chair of the Institutional Review Board
for the Use of Human Subjects in Research

cc: Dr. Sharon Oswald
Dr. Joe Hanna

APPENDIX B: INTRODUCTION LETTER

Dear COO, VP, or Director,

Please consider helping me with my dissertation research and the American Red Cross at the same time. I am an active duty U.S. Air Force officer and a doctoral candidate at Auburn University. My research is investigating the relationship between transformational leadership, innovativeness, and motor carrier performance. Your participation would be limited to the completion of an anonymous, 50-item online survey, which should take less than 10 minutes. In appreciation for your valuable input, we will donate \$5 to the American Red Cross for every company from which we get a completed survey. Please click the link below to begin the survey.

Survey Link: <http://auburncla.qualtrics.com/>

If you have any questions or would like additional information about my study, please e-mail me at robert.overstreet@auburn.edu. You may also contact my adviser, Dr. Joe Hanna, for more details at jhanna@business.auburn.edu. My American Red Cross point of contact is Ms. Jennifer Ryan. Her e-mail address is jryan@leeredcross.org.

Your input is vital to the success of my research and is very much appreciated.

Very Respectfully,
Robert E. Overstreet, Major, USAF
Doctoral Candidate, College of Business
Auburn University

APPENDIX C: SURVEY INSTRUMENT

 AUBURN UNIVERSITY		College of Business						
Please indicate how frequently <u>your organization's senior leader</u> exhibits the following characteristics.								
		Very Never	Rarely	Rarely	Occasionally	Often	Very Often	Always
Communicates a clear and positive vision of the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Treats staff as individuals and encourages their development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gives encouragement and recognition to staff.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fosters trust, involvement, and co-operation among team members.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourages thinking about problems in new ways.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is clear about his/her values.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Practices the values he/she preaches.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instills pride and respect in others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspires me by being highly competent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please rank your organization's innovativeness relative to <u>your closest competitors</u> .								
		Far Worse	Slightly Worse	No Different	Slightly Better	Slightly Better	Far Better	
First to market with innovative new products and services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
First to develop a new process technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
First to recognize and develop new markets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At the leading edge of technology innovation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rank your organization's performance relative to your closest competitors.

	Far Worse	Worse	Slightly Worse	No Different	Slightly Better	Better	Far Better
Service quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost of service.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Claims ratio.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On-time delivery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rank your organization's financial performance relative to your closest competitors.

	Far Worse	Worse	Slightly Worse	No Different	Slightly Better	Better	Far Better
Average return on investment over the past 3 years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Average profit over the past 3 years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Profit growth over the past 3 years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Average return on sales over the past 3 years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Average operating ratio over the past 3 years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate your gender.

- Male
- Female

Please indicate your age.

Please indicate the number of years experience you have in the motor carrier industry.

Please indicate the number of years experience you have in your current position.

Please indicate the total number of power units used by your motor carrier.

Please indicate your motor carrier's primary market (e.g., truckload, less-than-truckload, flatbed, tanker, refrigerated, package, etc.). Please list just one.

Please indicate the service area of your motor carrier (i.e., state, regional, national, North America, worldwide). Please list just one.

Please enter the name of your motor carrier. (This will be used for survey administration purposes only and will not be part of the analysis or the final report.)

APPENDIX D: PILOT TEST ITEM CORRELATIONS

	TL1	TL2	TL3	TL4	TL5	TL6	TL7	TL8	TL9	IN1	IN2	IN3	IN4	OP1	OP2	OP3	OP4	OP5	FP1	FP2	FP3	FP4	FP5	
TL1	1																							
TL2	.60**	1																						
TL3	.68**	.80**	1																					
TL4	.71**	.75**	.78**	1																				
TL5	.70**	.55**	.69**	.73**	1																			
TL6	.64**	.72**	.72**	.74**	.65**	1																		
TL7	.65**	.65**	.72**	.71**	.66**	.87**	1																	
TL8	.65**	.82**	.80**	.79**	.72**	.81**	.83**	1																
TL9	.76**	.64**	.76**	.79**	.79**	.81**	.83**	.83**	1															
IN1	.34*	.39**	.43**	.35**	.48**	.32*	.33*	.39**	.39**	1														
IN2	.37**	.31*	.39**	.45**	.42**	.30*	.37**	.39**	.40**	.85**	1													
IN3	.55**	.26	.46**	.43**	.58**	.36*	.34*	.40**	.52**	.61**	.60**	1												
IN4	.33*	.45**	.48**	.45**	.41**	.40**	.37*	.38**	.40**	.81**	.79**	.56**	1											
OP1	.22	.54**	.46**	.43**	.25	.41**	.42**	.45**	.37**	.48**	.47**	.43**	.48**	1										
OP2	.32*	.25	.31*	.23	.12	.26	.30*	.20	.24	.09	.19	.20	.19	.26	1									
OP3	.19	.29*	.24	.29*	.23	.30*	.26	.29*	.30*	.36*	.40**	.26	.31*	.60**	.15	1								
OP4	.15	.39**	.39**	.24	.11	.25	.23	.29*	.23	.42**	.37**	.38**	.39**	.79**	.45**	.57**	1							
OP5	.28	.40**	.39**	.32*	.23	.52**	.41**	.44**	.44**	.22	.24	.23	.25	.55**	.25	.58**	.42**	1						
FP1	.12	.05	.16	.12	.11	.13	.08	.13	.25	.37**	.39**	.40**	.36*	.31*	.48**	.31*	.54**	.09	1					
FP2	.11	.04	.18	.12	.09	.08	.07	.13	.20	.40**	.43**	.45**	.34*	.36*	.44**	.33*	.61**	.11	.92**	1				
FP3	.24	.14	.26	.21	.17	.21	.17	.21	.30*	.39**	.39**	.56**	.38**	.42**	.45**	.22	.59**	.14	.83**	.88**	1			
FP4	.24	.17	.30*	.21	.19	.22	.17	.26	.35*	.42**	.46**	.59**	.45**	.42**	.44**	.35*	.58**	.19	.90**	.90**	.89**	1		
FP5	.15	.06	.20	.13	.19	.13	.09	.17	.28	.40*	.43**	.50**	.43**	.32*	.40*	.42**	.53**	.18	.89**	.90**	.87**	.93**	1	

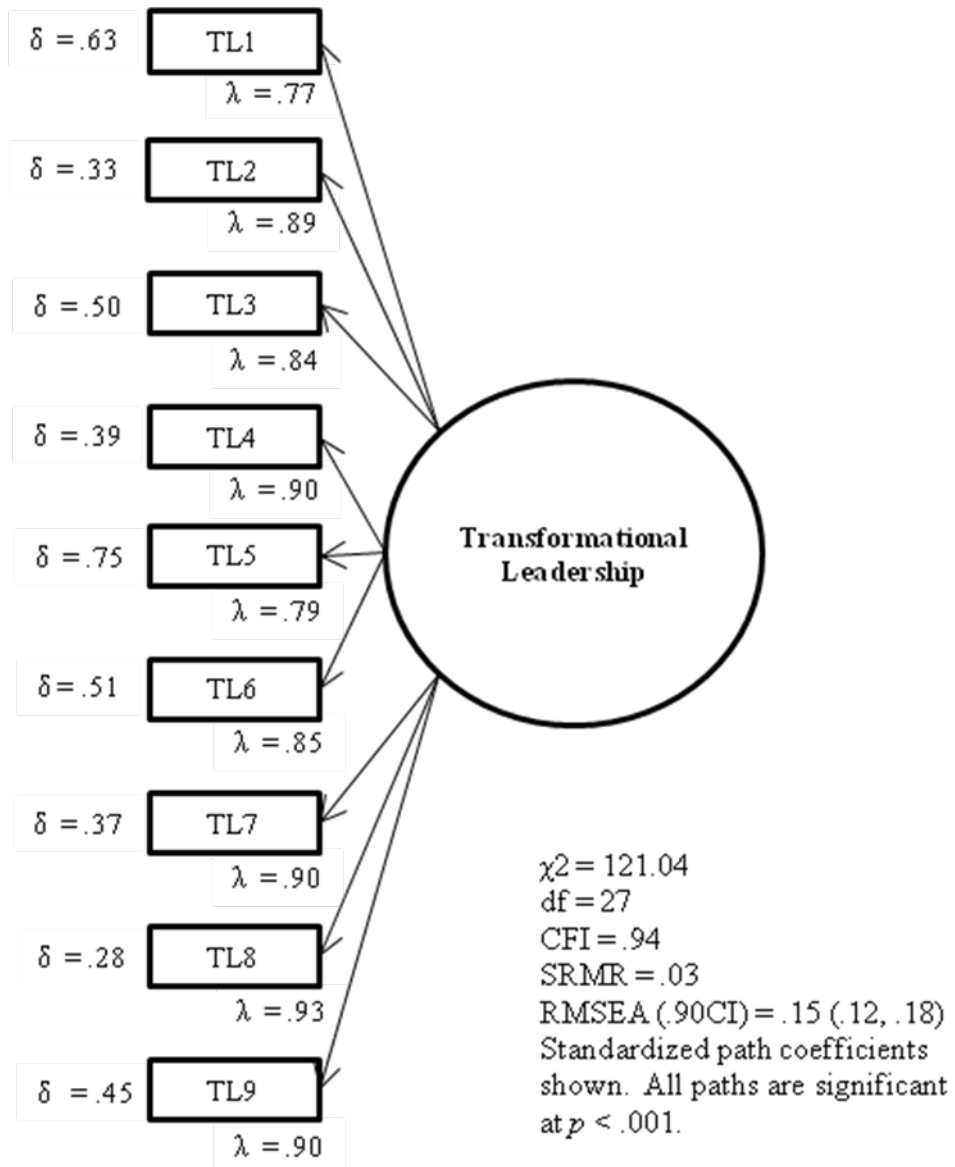
Note: N = 48, ** $p \leq .01$, * $p \leq .05$.

APPENDIX E: ITEM CORRELATIONS

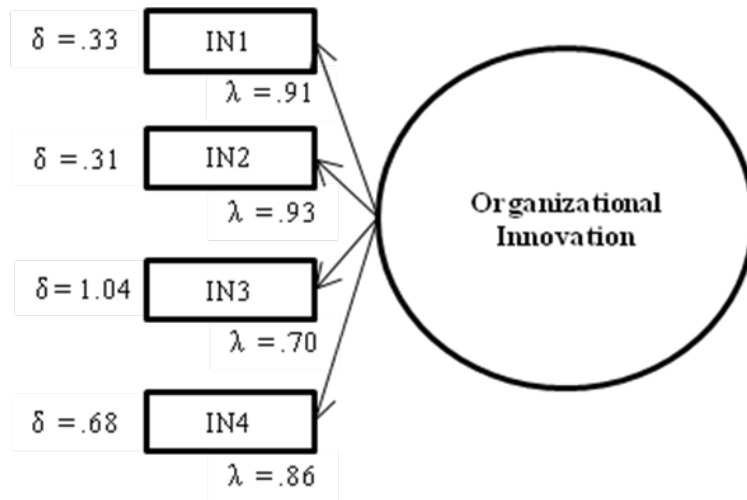
	TL1	TL2	TL3	TL4	TL5	TL6	TL7	TL8	TL9	IN1	IN2	IN3	IN4	OP1	OP2	OP3	OP4	OP5	FP1	FP2	FP3	FP4	FP5	
TL1	1																							
TL2	.69**	1																						
TL3	.69**	.79**	1																					
TL4	.70**	.82**	.80**	1																				
TL5	.68**	.70**	.70**	.74**	1																			
TL6	.64**	.74**	.65**	.70**	.65**	1																		
TL7	.68**	.77**	.70**	.78**	.66**	.87**	1																	
TL8	.66**	.83**	.77**	.86**	.71**	.77**	.86**	1																
TL9	.71**	.78**	.72**	.78**	.74**	.80**	.83**	.85**	1															
IN1	.33**	.39**	.33**	.33**	.40**	.23**	.24**	.30**	.32**	1														
IN2	.34**	.35**	.32**	.34**	.35**	.21**	.26**	.31**	.28**	.85**	1													
IN3	.41**	.39**	.40**	.44**	.39**	.29**	.30**	.35**	.42**	.68**	.61**	1												
IN4	.37**	.42**	.34**	.38**	.36**	.25**	.31*	.32**	.33**	.77**	.82**	.56**	1											
OP1	.20**	.37**	.32**	.31**	.22**	.29**	.30**	.31**	.31**	.43**	.40**	.41**	.39**	1										
OP2	.26**	.24**	.24**	.19**	.16*	.18*	.25**	.21**	.22**	.06	.14*	.21**	.13*	.28**	1									
OP3	.11	.27**	.22**	.30**	.23**	.26**	.26**	.27**	.25**	.29**	.36**	.28**	.28**	.56**	.23**	1								
OP4	.23**	.29**	.26**	.26**	.18*	.26**	.27**	.29**	.29**	.36**	.33**	.36**	.29**	.81**	.30**	.57**	1							
OP5	.19*	.24**	.23**	.26**	.18*	.33**	.30**	.30**	.30**	.30**	.28**	.30**	.31**	.44**	.16*	.54**	.43**	1						
FP1	.31**	.37**	.29**	.38**	.31**	.27**	.34**	.40**	.37**	.42**	.40**	.49**	.40**	.34**	.35**	.34**	.37**	.24**	1					
FP2	.32**	.37**	.25**	.37**	.33**	.26**	.31**	.39**	.38**	.44**	.41**	.52**	.40**	.36**	.28**	.36**	.40**	.28**	.92**	1				
FP3	.34**	.37**	.28**	.36**	.33**	.31**	.34**	.39**	.40**	.43**	.41**	.52**	.44**	.40**	.27**	.28**	.41**	.24**	.84**	.87**	1			
FP4	.36**	.42**	.34**	.41**	.35**	.36**	.37**	.46**	.46**	.46**	.44**	.57**	.45**	.38**	.27**	.35**	.40**	.32**	.89**	.90**	.87**	1		
FP5	.34**	.38**	.27**	.37**	.36**	.32**	.34**	.42**	.42**	.44**	.45**	.52**	.46**	.36**	.26**	.40**	.39**	.32**	.88**	.92**	.87**	.93**	1	

Note: N = 158, ** $p \leq .01$, * $p \leq .05$.

APPENDIX F: CFA—TRANSFORMATIONAL LEADERSHIP

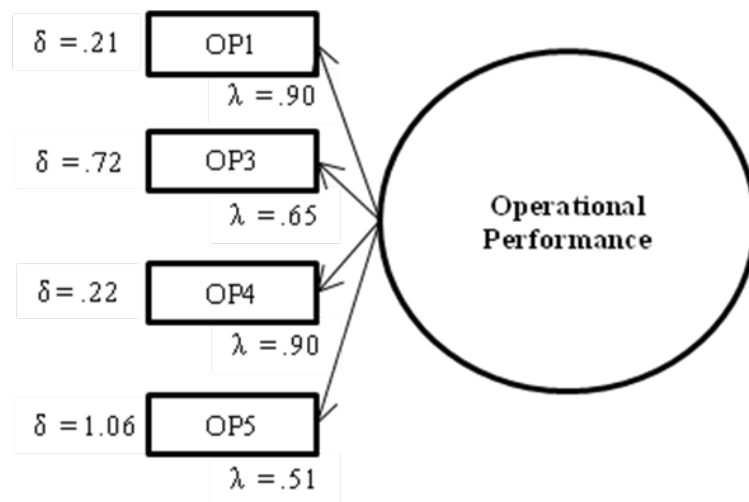


APPENDIX G: CFA—ORGANIZATIONAL INNOVATION



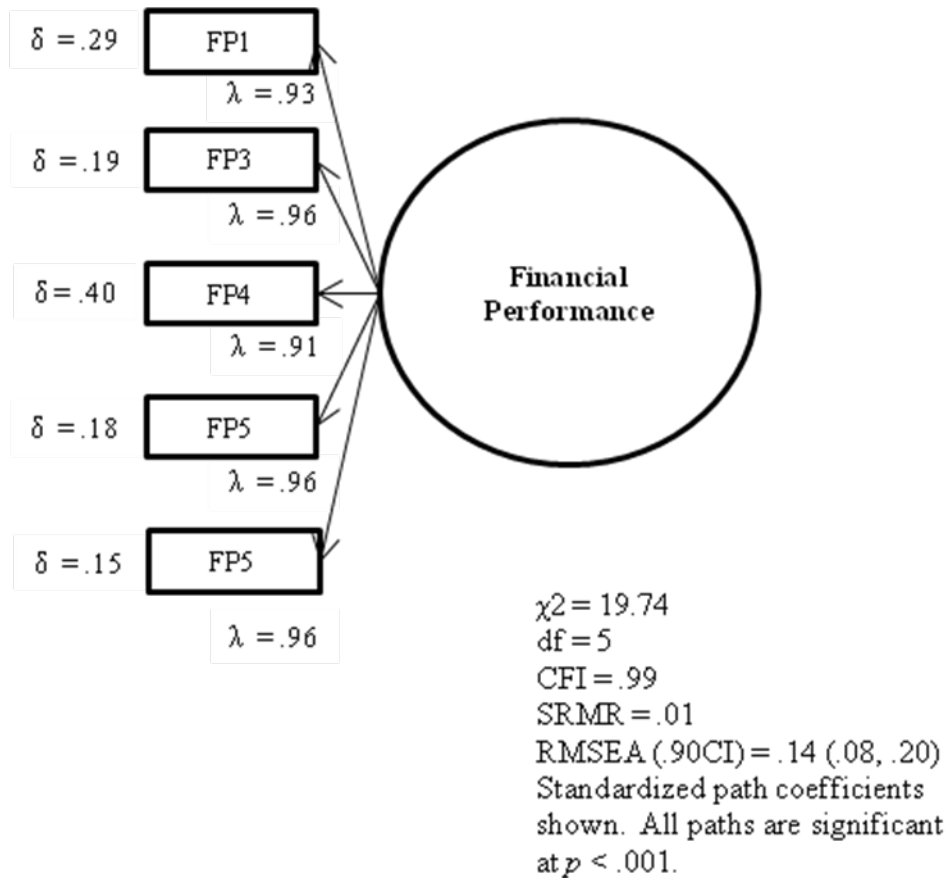
$\chi^2 = 9.09$
 $df = 2$
 $CFI = .99$
 $SRMR = .22$
 $RMSEA (.90CI) = .15 (.06, .26)$
Standardized path coefficients
shown. All paths are significant
at $p < .001$.

APPENDIX H: CFA—OPERATIONAL PERFORMANCE

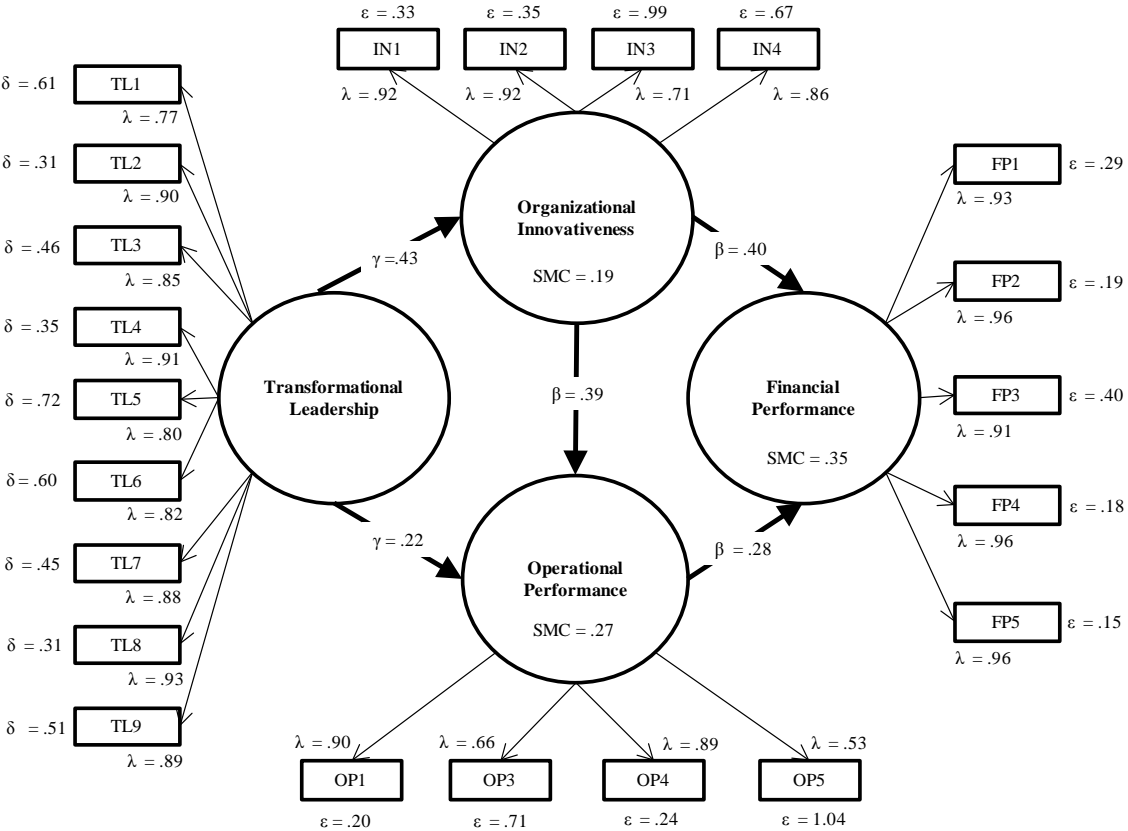


$\chi^2 = 17.77$
df = 2
CFI = .946
SRMR = .07
RMSEA (.90CI) = .22 (.14, .33)
Standardized path coefficients
shown. All paths are significant
at $p < .001$.

APPENDIX I: CFA—FINANCIAL PERFORMANCE

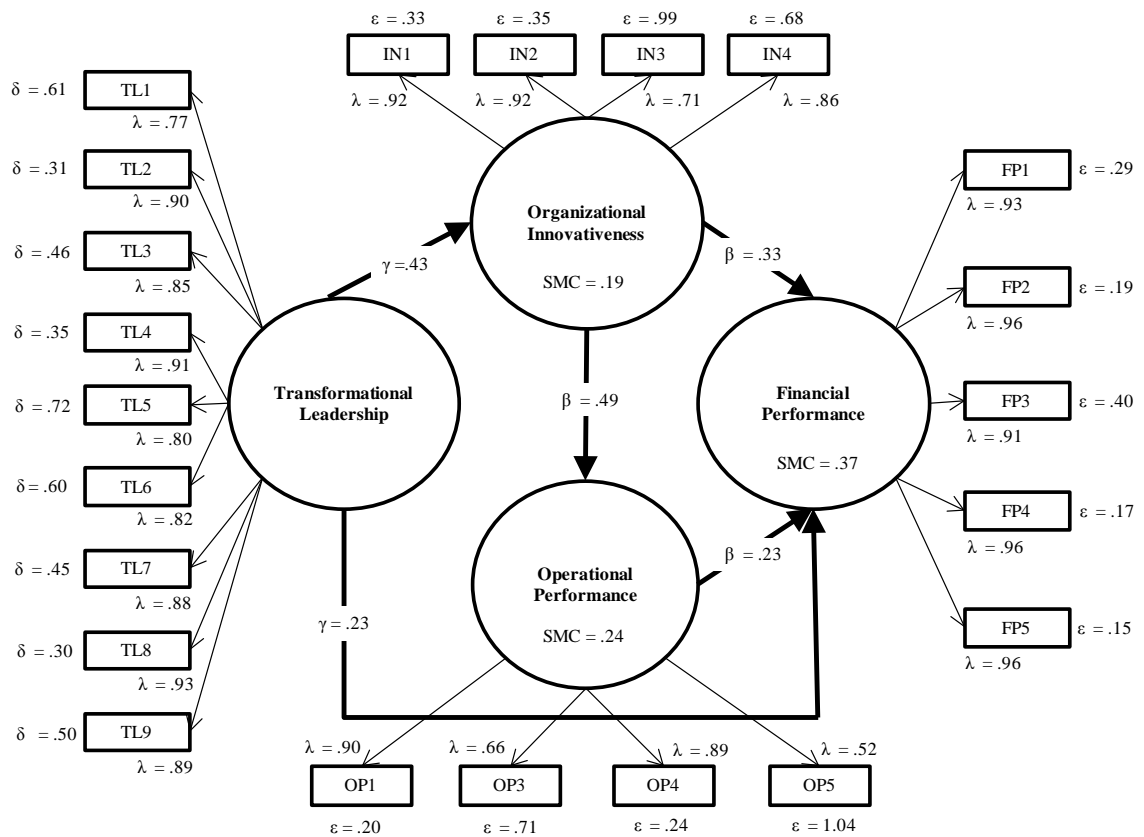


APPENDIX J: ALTERNATE MODELS—MODEL 2



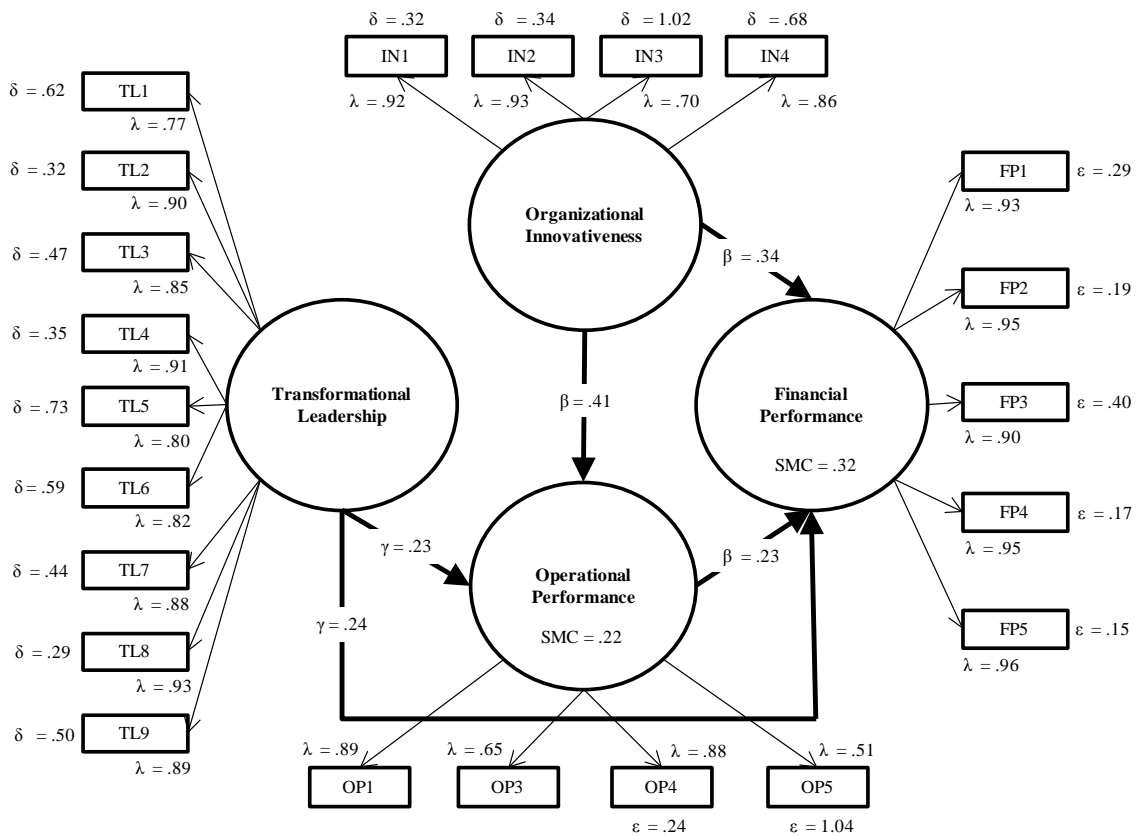
$\chi^2(202) = 373.34, p < .01, CFI = .95, RMSEA (90CI) = .07 (.06, .09), SRMR = .08.$

APPENDIX K: ALTERNATE MODELS—MODEL 3



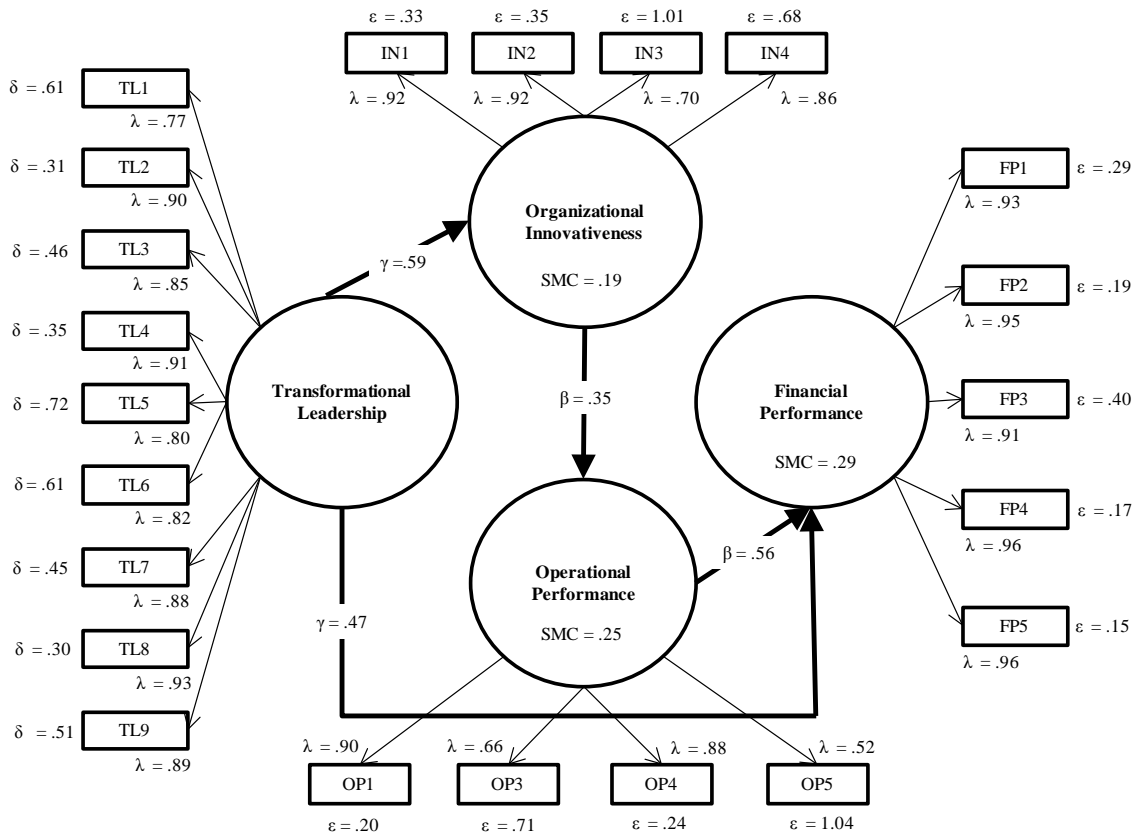
$\chi^2(202) = 371.33, p < .01, CFI = .96, RMSEA (90CI) = .07 (.06, .09), SRMR = .07.$

APPENDIX L: ALTERNATE MODELS—MODEL 4



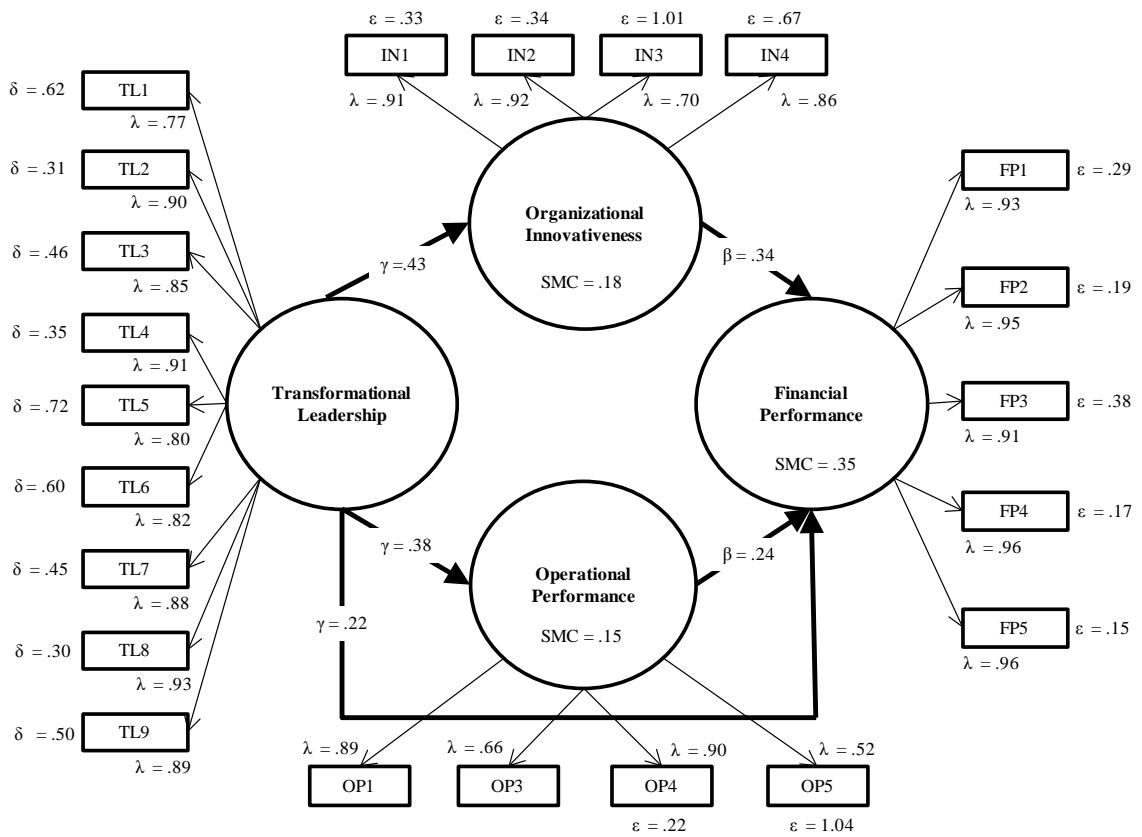
$\chi^2(202) = 392.64, p < .01, CFI = .95, RMSEA (90CI) = .08 (.07, .09), SRMR = .16.$

APPENDIX M: ALTERNATE MODELS—MODEL 5



$\chi^2(203) = 385.77, p < .01, CFI = .95, RMSEA (90CI) = .08 (.06, .09), SRMR = .09.$

APPENDIX N: ALTERNATE MODELS—MODEL 6



$\chi^2(203) = 384.88, p < .01, CFI = .95, RMSEA (90CI) = .08 (.06, .09), SRMR = .09.$