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# THE RELATIONSHIP BETWEEN PERCEIVED LEADERSHIP PRACTICES AND ORGANIZATIONAL CULTURE WITHIN THE AEROSPACE INDUSTRY

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# THE RELATIONSHIP BETWEEN PERCEIVED LEADERSHIP PRACTICES AND ORGANIZATIONAL CULTURE WITHIN THE AEROSPACE INDUSTRY

By
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Bradley M. McCain

We hereby certify that this Dissertation submitted by Bradley M. McCain conforms to acceptable standards, and as such is fully adequate in scope and quality. It is therefore approved as the fulfillment of the Dissertation requirements for the degree of Doctor of Business Administration.

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2010

CERTIFICATION STATEMENT

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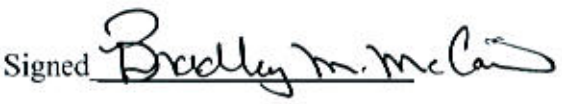
Signed 

Bradley M. McCain

# ABSTRACT

## THE RELATIONSHIP BETWEEN PERCEIVED LEADERSHIP PRACTICES AND ORGANIZATIONAL CULTURE WITHIN THE AEROSPACE INDUSTRY

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There is a common thread of leadership research that theorizes the dynamic between a leader's behavior and their followers is essential in encouraging employees to exceed expectations, thereby increasing organizational performance (Bass, 1985; Bennis & Thomas, 2002; Kouzes & Posner, 1987). Research indicates transformational leadership correlates well with organizational culture, but the number of empirical studies is few. Kouzes and Posner (2002) maintain that organizations create culture; therefore a leader's behavior can and does affect organizational performance. Schein (2004) maintains it is leadership's duty to step outside the organizational culture to initiate changes (by their behavior) when warranted.

The purpose of this study was to investigate the relationship between employee perceived leadership practices and organizational culture within the aerospace industry. The U.S. space shuttle operations prime contractor, United Space Alliance, was selected as the population for this research. This research addresses the current dilemma in NASA's manned spaceflight program and their contractors with regard to their future: Organizational and cultural change must occur or routine access to space for the United States will become obsolete (Bergin, 2007; Guthrie & Shayo, 2005; Mason, 2004). United Space Alliance provides a unique population within which to sample, as it is a joint venture LLC with employees of varying heritage companies and job occupations. Use of Kouzes and Posner's Leadership Practices Inventory–Other (LPI-O) and the Denison Organizational Culture Survey (DOCS) have not been performed in such an environment.

Web-based surveys collected data from the Manufacturing and Operations directorate (N = 1793). A total of 367 surveys were completed for an initial response rate of 20.47%. Both the LPI–O and DOCS raw mean scores were compared against published databases; only the Enabling Others to Act practice scored as a moderate impact. Customer focus scored the highest amongst cultural indices, with all three Mission indices ranking in the lowest percentiles. Regression analyses indicated neither leadership practices nor cultural traits explained any differences within respondents. Hierarchical regression revealed the five leadership practices accounted for 24% of the Total Culture variance. Pearson's Product-Moment correlation examined the strength of linear association between the variables. This study provided statistically significant ($\rho < .05$), weak to moderate positive correlation coefficients for all hypothesized relationships.

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First, I would like to thank my Mother and Father for their unconditional love and support through all of my academic endeavors; they never doubted I would finish this project, and were always available to help when needed.

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I am enormously grateful to Dr. Joe Heinzman for agreeing to step in as my committee chair, and ultimately assisting me in the establishment of a new committee. I would like to thank my methodologist, Dr. Aysegul Timur, and subject matter expert, Dr. Barry Barnes, for their timely and insightful comments during this effort. Their input contributed to a greater understanding of the research process on my part, and a higher quality product at completion. Also, special thanks to my extremely talented editor, Stephanie Ferrari, who managed to turn an engineer's writing into a coherent draft.

My sincerest gratitude goes to United Space Alliance, LLC, for their financial support in the pursuit of this degree, as well as for agreeing to allow my research to occur within the context of the organization. Special thanks to the executive management team of Jim Cawby, Mike Orr, and Vicky Lorick for all their assistance and support; Vicky offered constant encouragement and counseling, usually when I needed it the most.

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# Chapter I

# Introduction

## Industrial Setting

Kennedy Space Center is the home of America's spaceport Launch Complex 39 (LC39). Consisting of two launch pads, 39A and 39B, it is the only launch site in the world in which humans can be launched into earth orbit via a reusable launch vehicle, deliver payloads and astronauts with which to construct orbiting space stations, perform scientific missions to the benefit of all mankind, and return to earth.

United Space Alliance (USA) is responsible for conducting the daily operation and management of all aspects of the space shuttle fleet, including mission design and planning, flight operations, software development and integration, payload integration, astronaut and flight controller training and vehicle processing, and all launch and recovery operations (United Space Alliance, 2010). USA is a joint venture between Lockheed-Martin and The Boeing Company, which was formed in 1996 and subsequently awarded the initial Space Flight Operations Contract by NASA.

On February 1, 2003, the space shuttle Columbia disintegrated during reentry due to wing damage encountered during liftoff two weeks prior. The Columbia Accident Investigation Board (CAIB) issued its report in August 2003, identifying many findings, recommendations, and areas for improvement within the NASA culture and organization. The CAIB Report Chapter 8 makes the following statement: "Leaders create culture. It is their responsibility to change it. Top administrators must take responsibility for risk, failure, and safety by remaining alert to the effects their decisions have on the system" (NASA, 2003a, p. 203).

In February 2004, NASA hired Behavioral Science Technology of Ojai, California to assess the agency's culture. The company subsequently released a 145-page report, which included a 5-year plan for change. These recommendations include one-on-one "coaching" and evaluation of NASA's senior administrators and middle managers (USA Today, 2004).

**Historical Overview**

Before considering the NASA organization from a leadership and cultural perspective, it is appropriate to briefly review the organizational features that make it unique. NASA is one of the smallest federal agencies, even though it employs over 18,000 people throughout its centers and controls a budget on the order of $15 billion (Hall, 2003). NASA often is described as an engineering culture, meaning both its workers and management usually are engineers by training. Typically, this infers that there is a common educational background that values engineering creativity and skill; conversely, the occupation of management is devalued because of its "non-technical" nature. Furthermore, often the social or "soft" skills are lacking even where teamwork and communication are prevalent. This is especially true when complex systems such as the space shuttle are operated (Johnson, 2003).

The year 2009 celebrated the 40th anniversary of Apollo 11's moon landing, considered by most the height of NASA's engineering excellence. Given a challenge by President Kennedy of landing a man on the moon by the end of the decade of the 1960s, NASA's organization made a total commitment to excellence and achieved this historic feat. The Apollo program was not without it trials and tribulations. A fire aboard the AS-204 (later named Apollo 1) capsule killed three astronauts in January 1967. The

subsequent investigation pointed to an electrical arc exposed in a 100% oxygen environment that doomed the crew (NASA, 1967). A poor spacecraft design, schedule pressure, and an intense desire to overcome all technical obstacles led to this accident; while some may point to this as a first sign of organizational strife, the NASA team recovered to put men on the moon 2.5 years later. The remainder of the Apollo program brought many technical challenges to the team, but they always were overcome with resulting mission success.

Apollo 13, immortalized by astronaut Jim Lovell in his autobiography, *The Lost Moon* (Kluger & Lovell, 1994), was stranded in route to the moon after an on-board fuel cell explosion. The crew returned safely using the lunar module as a lifeboat, primarily due to the ingenuity and expertise of the NASA team. This work ethic came to be known admirably as the "can-do" spirit and would shape the organization's culture for decades to come. No technical problem was insurmountable; no obstacle was too large to overcome.

While the Apollo program's errors could be expected in a developmental program, the 1986 Challenger Disaster with an "operational" shuttle was unexpected. The Roger's Commission quickly uncovered the technical reason for the failure—blow-by of a solid rocket booster o-ring due to cold temperatures; however, much has been written about the leadership failure and organizational issues that led to the poor decision to launch that day (Mark, 2002; McConnell, 1987; NASA, 1986).

The Columbia Accident Investigation Board began their investigation with two main questions regarding the Columbia Accident: Why did NASA continue to fly with known foam debris problems in the preceding years, and why did they conclude the foam

impact was not a safety issue over the objections of its engineers? This was so similar to the Challenger investigation, Dr. Sally Ride, America's first woman in space, stated there were "echoes" of Challenger in Columbia (NASA, 2003a, p. 195). In light of the Columbia Accident in 2003 and the investigation board findings quite similar to the Roger's Commission's, scholars continue to debate whether NASA's organizational culture or its leadership is to blame.

Today, NASA and its contractors face a new challenge sure to test leadership ability as well as validate a change in culture (Foust, 2009). NASA has begun to phase out the space shuttle program by a September 2010 presidential deadline, while bringing online the next generation of space vehicles to return to the moon by the year 2020. The new vehicle family, coined *Ares*, is part of a greater *Constellation* program whose architecture is designed ultimately to send a manned mission to the planet Mars. Due to the world's current economic crisis, congressional budget constraints, and the results of the 2008 election, the direction of the program is under great scrutiny. NASA's decision-making as well as the organization's ability to conceive, direct, and complete a project of this undertaking is under question by the President, the U.S. Congress, and the American public (Matthews & Block, 2009).

**Statement of Problem**

Block (2003) performed a study to examine the nature of the relationship between leadership and organizational culture. While much of the contemporary literature refers to the relationship between the two, Block cited a small number of studies that empirically examined the interconnection between the two (Brooks, 1996; Chodkowski, 1999;

Hennessey, 1998; Lok & Crawford, 1999; Ogbonna & Harris, 2000; Pillai & Meindl, 1998). Among the conclusions cited by Block (p. 318) are the following:

1. Specific leadership behaviors are associated with distinct cultural traits (Lok & Crawford, 1999).
2. Contextual factors such as organizational culture have an impact on the emergence of specific leadership styles (Pillai & Meindl, 1998).
3. The behaviors of leaders influence the follower's perceptions of organizational culture (Chodkowski, 1999).

**Purpose of Research**

The purpose of this study was to investigate the relationship between perceived leadership practices and organizational culture within NASA's space shuttle processing environment.

This research was important both due to its timing and its overall contribution to the literature. Both the 1986 Challenger Disaster and 2003 Columbia Accident investigations pointed towards a flawed NASA culture, with poor leadership and decision-making as root causes of the incidents (National Aeronautics and Space Administration, 2003). NASA's endeavor to overhaul its culture has had a dramatic effect on the cultures of all its contractors, including the prime shuttle operations contractor, United Space Alliance. This is a unique time in the history of the U.S. manned space program where organizational and cultural change must occur, or routine access to space will become a thing of the past. Leadership of the organization and its understanding and influence on organizational change must evolve as well for this to take place (Bergin, 2007; Guthrie & Shayo, 2005; Mason, 2004).

In addition, this research was unique in that an opportunity existed to study a still developing joint venture company culture, whose employees are the aggregate of several companies, all with a common goal and direction. Research on national and international firms suggests that culture can be viewed as a firm resource, which can influence the behavior and effectiveness of a joint venture (Barney, 1986; Hofstede, 1980; Kirkman, Lowe, & Gibson, 2006). United Space Alliance's viability as a company depends on its ability to capture the Exploration Ground Launch Services contract, which will provide services and operations for launch vehicles, spacecraft, and payloads in support of the *Constellation*, International Space Station and launch services programs. The company's leadership and its ability to convey its mission to their employees was essential in retaining key personnel to complete the shuttle program and compete for the future services contract (United States Government Accountability Office, 2005; Walsh, 2009). Adaptability in the ever-changing political and technical environment was the key. Due to the nature and evolution of the shuttle processing contract, this study proposed the population sample could be considered "national" in nature; therefore the findings of this research are generalizable to the industry as a whole.

Finally, the selection of instruments for this research proposal was also unique. While many instruments are available for the gathering of leadership and cultural data, neither the Leadership Practices Inventory–Other (LPI–O) nor the Denison Organization Culture (DOCS) surveys had been utilized in a technical operations environment such as Kennedy Space Center's shuttle processing arena.

## Significance of the Study

This study hopes to contribute to the current leadership and culture literature in the follow manner:

1. First, the context of the study was unique due to the environment in which it was performed; a joint venture company consisting of the merger of several distinctive company cultures, united in a strong common mission. Had the perceived leadership practices of this organization created a culture that could be competitive and viable in the future?
2. Uses of the LPI–O and DOCS instruments in the same study had not been uncovered by the researcher. This study provided the opportunity to examine leadership and its affect on culture in a unique framework, ultimately allowing the practitioner to gauge potential organizational performance.
3. Findings of this study have implications for the selection, development, and training of management personnel within the aerospace industry.

## Research Question

The following statement comprised the framework for the research (see Figure 1 for research model):

Is there a relationship between employee perceived leadership practices and organizational culture in the space shuttle processing environment?

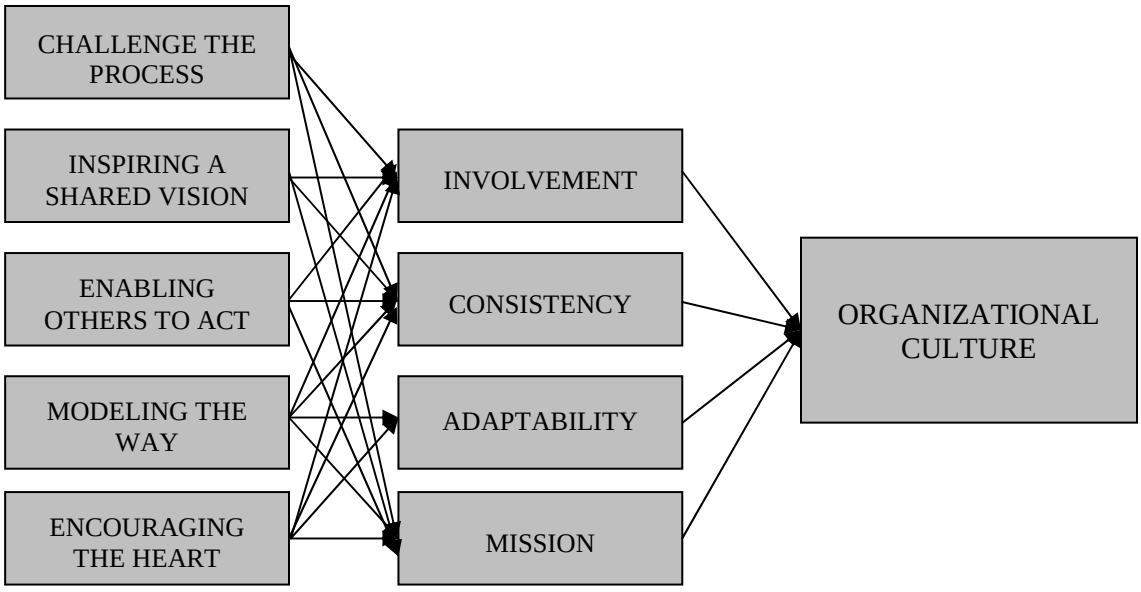
## Definition of Terms

1. Leadership Practices—As measured by Kouzes and Posner's (1988) Leadership Practices Inventory–Observer and includes the following Five

Practices of Exemplary Leadership: Challenge the Process, Inspire a Shared Vision, Enable Others to Act, Model the Way, and Encourage the Heart.

2. Culture—A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way you perceive, think, and feel in relation to those problems (Schein, 1992).
3. Cultural Traits—As measured by the Denison Organizational Culture Survey (DOCS) and includes the following cultural traits: Involvement, Consistency, Adaptability, and Mission.
4. Involvement—Building human capability, ownership, and responsibility (Denison, 1990).
5. Consistency—Defining the values and systems that are the basis of a strong culture (Denison, 1990).
6. Adaptability—Translating the demands of the business environment into action (Denison, 1990).
7. Mission—Defining a meaningful, long-term direction for the organization (Denison, 1990).

**Research Model**




Yukl, Gordon, and Taber (2002) developed a hierarchical taxonomy of leadership behavior analyzing over 50 years of research, believing there is a lack of agreement among researchers on which behavior categories are meaningful to leaders. They further argue with this confusion comes the inability to determine which behavior is most important in a given situation or environment. Kouzes and Posner's (1988) model defines five leadership practices or behaviors that have been empirically supported through their research and the work of others. Since the rank order of these practices can change (least observed practice to most observed practice), each should be examined individually as to their impact on total culture. The Denison Model reviews culture from the aspect of four cultural traits, all existing under and subject to a set of trade-offs or tensions that must be

balanced (see Chapter III). Due to these dynamics, it was proposed that the relationship of each leadership practice on all four cultural traits also be examined.

**Hypotheses**

The present day literature provides limited empirical evidence linking leadership practices to organizational culture. Considering the parameters of the instruments selected and the objectives of this study, the following hypotheses were proposed to be tested. In each instance, the statement of the alternative hypothesis ($H_a$) follows the statement of the null hypothesis ($H_0$):

Hypothesis 1

$H_0$1: There is no relationship between Modeling the Way and the cultural trait Involvement.

$H_a$1: There is a relationship between Modeling the Way and the cultural trait Involvement.

Hypothesis 2

$H_0$2: There is no relationship between Inspiring a Shared Vision and the cultural trait Involvement.

$H_a$2: There is a relationship between Inspiring a Shared Vision and the cultural trait Involvement.

Hypothesis 3

$H_0$3: There is no relationship between Challenging the Process and the cultural trait Involvement.

$H_a$3: There is a relationship between Challenging the Process and the cultural trait Involvement.

Hypothesis 4

$H_0$4: There is no relationship between Enabling Others to Act and the cultural trait Involvement.

$H_a$4: There is a relationship between Enabling Others to Act and the cultural trait Involvement.

Hypothesis 5

$H_0$5: There is no relationship between Encouraging the Heart and the cultural trait Involvement.

$H_a$5: There is a relationship between Encouraging the Heart and the cultural trait Involvement.

Hypothesis 6

$H_0$6: There is no relationship between Modeling the Way and the cultural trait Consistency.

$H_a$6: There is a relationship between Modeling the Way and the cultural trait Consistency.

Hypothesis 7

$H_0$7: There is no relationship between Inspiring a Shared Vision and the cultural trait Consistency.

$H_a$7: There is a relationship between Inspiring a Shared Vision and the cultural trait Consistency.

Hypothesis 8

$H_0$8: There is no relationship between Challenging the Process and the cultural trait Consistency.

$H_a$8: There is a relationship between Challenging the Process and the cultural trait Consistency.

Hypothesis 9

$H_0$9: There is no relationship between Enabling Others to Act and the cultural trait Consistency.

$H_a$9: There is a relationship between Enabling Others to Act and the cultural trait Consistency.

Hypothesis 10

$H_0$10: There is no relationship between Encouraging the Heart and the cultural trait Consistency.

$H_a$10: There is a relationship between Encouraging the Heart and the cultural trait Consistency.

Hypothesis 11

$H_0$11: There is no relationship between Modeling the Way and the cultural trait Adaptability.

$H_a$11: There is a relationship between Modeling the Way and the cultural trait Adaptability.

Hypothesis 12

$H_0$12: There is no relationship between Inspiring a Shared Vision and the cultural trait Adaptability.

$H_a12$: There is a relationship between Inspiring a Shared Vision and the cultural trait Adaptability.

Hypothesis 13

$H_013$: There is no relationship between Challenging the Process and the cultural trait Adaptability.

$H_a13$: There is a relationship between Challenging the Process and the cultural trait Adaptability.

Hypothesis 14

$H_014$: There is no relationship between Enabling Others to Act and the cultural trait Adaptability.

$H_a14$: There is a relationship between Enabling Others to Act and the cultural trait Adaptability.

Hypothesis 15

$H_015$: There is no relationship between Encouraging the Heart and the cultural trait Adaptability.

$H_a15$: There is a relationship between Encouraging the Heart and the cultural trait Adaptability.

Hypothesis 16

$H_016$: There is no relationship between Modeling the Way and the cultural trait Mission.

$H_a16$: There is a relationship between Modeling the Way and the cultural trait Mission.

Hypothesis 17

$H_0$17: There is no relationship between Inspiring a Shared Vision and the cultural trait Mission.

$H_a$17: There is a relationship between Inspiring a Shared Vision and the cultural trait Mission.

Hypothesis 18

$H_0$18: There is no relationship between Challenging the Process and the cultural trait Mission.

$H_a$18: There is a relationship between Challenging the Process and the cultural trait Mission.

Hypothesis 19

$H_0$19: There is no relationship between Enabling Others to Act and the cultural trait Mission.

$H_a$19: There is a relationship between Enabling Others to Act and the cultural trait Mission.

Hypothesis 20

$H_0$20: There is no relationship between Encouraging the Heart and the cultural trait Mission.

$H_a$20: There is a relationship between Encouraging the Heart and the cultural trait Mission.

**Summary**

Chapter I introduced the industrial setting and statement of the problem, purpose of the study, the research question, the research model, and corresponding study

hypotheses. Chapter II will review the core theories and literature in the leadership and culture fields as well as postulated relationships between the two variables.

Chapter III presents a discussion concerning this research study's methodology, including research design, sample description, the hypotheses tested, measures used, data collection procedures, and the statistical techniques to analyze the data.

# Chapter II

## Review of Literature

The intent of this study was to collect empirical data to determine if there was a relationship between employee perceived leadership practices and organizational culture within the aerospace industry. This chapter reviews the core theories and literature in the leadership and culture fields as well as postulated connections between the two.

### Leadership

Behavior and organizational scientists have spent their lives trying to understand and predict the characteristics of a successful leader. Theorist James MacGregor Burns (1978) in his insightful book on leadership is often quoted stating, "leadership is one of the most observed and least understood phenomena on earth" (p. 2). Burns defines leadership as "the reciprocal process of mobilizing, by persons with certain motives and values, various economic, political, and other resources, in a context of competition and conflict, in order to realize goals independently or mutually held by both leaders and followers" (p. 425). Hersey (1992) takes a much broader view, defining leadership as "any attempt to influence the behavior of another individual or group" (p. 16).

### Historical Leadership Literature

**Trait and skills approach**. Early theorists of the 20th century concentrated on trait and skills approach to leadership. These approaches centered on certain characteristics or abilities that were vital to being a good leader. Scholars such as Northouse (2004), as well as Hersey, Blanchard, and Johnson (2001) in their text *Management of Organizational Behavior*, do an excellent job of laying out the theoretical framework for almost a century of motivation and behavior studies that form the

foundation for this field of study. Hersey et al. (2001) cite Ralph Stogdill's work in the 1940s, including the Ohio State Studies of 1948 as early significant leadership theories. The Ohio State Studies, the Coch-French Michigan Studies, and subsequent Blake and Mouton Managerial Grid spawn the origination of the so-called attitudinal studies of leadership (Hersey et al., 2001). These studies used pen-and-paper surveys to measure attitudes toward leadership behavior.

**Contingency theories of leadership**. While trait theories studied the possibility of certain characteristics being required for effective leadership, behavior theories postulated that leaders could be trained. However, when it became apparent that leadership styles were not being fully explained by the existing behavioral models, the Contingency Theories of Leadership arose. Hersey et al. (2001) and Northouse (2004) highlight the Tannebaum-Schmidt Continuum of Leader Behavior, Fiedler's Contingency Model, the House-Mitchell Path-Goal Theory (House & Mitchell, 1974), and the Vroom-Yetten Contingency Model along with the Hersey-Blanchard Tridimensional Leader Effectiveness Model as having received great attention by researchers.

The Path-Goal Theory (House, 1971, 1977) is built upon Vroom's Expectancy Theory of Motivation and asserts that felt needs cause human behavior. If true, this motivated behavior in the workplace will be increased if a person perceives a positive relationship between reward and performance (Hersey et al., 2001, Northouse, 2004). The ability to which a leader can clarify this relationship depends on situational factors. House (1971) performed two empirical studies to research dimensions of leader behavior, such as leader initiating structure, consideration, authoritarianism, hierarchical influence, and closeness of supervision. These so-called "situational" approaches to leadership

focus on the observed behavior of leaders and their followers in their environment, postulating improvement in leadership effectiveness by training and education. Hersey et al. (2001) cited House-Mitchell's explanation of the theory's major concern as "how the leader influences the [followers'] perceptions of their work goals, personal goals and paths to goal attainment" (p. 111). This approach identifies situational factors, such as a subordinate's personality (locus of control and self-perceived ability) and characteristics of the environment as drivers for varying situational leadership styles. These styles can be directive, supportive, participative, or achievement-oriented in nature (Bass, 1990).

Fiedler's (1967) Contingency Theory proposes that leadership style is best described in terms of task and relationship motivation, and there are three major situational variables which determine whether a situation is favorable to a leader. The variables are as follows: (1) Leader-member relations—personal relations between members of their group, (2) Task structure—the extent to which a task's goals and procedures are defined, and (3) Position power—the power and authority their position genders (Hersey et al., 2001).

Fiedler (1967) suggests a single continuum of leadership behavior, with high levels of these three variables yielding favorable situations and low levels resulting in unfavorable situations. Style is measured by the Least Preferred Coworker (LPC) scale, which maintains that everybody's LPC is, on average, equally bad. Leaders who tend to be relationship-oriented describe their co-workers in a more positive light and will have a high LPC score. Leaders who score a low LPC tend to be more negative and are more task-oriented. Fiedler contends that task-oriented leaders do better in favorable situations and in very unfavorable ones, with relationship-oriented leaders doing well in the middle

(Bass, 1990). Leader performance depends on matching situational favorableness and leader style. If there is a mismatch, either change the leader through training or change the situation (organizational engineering).

The basic concept of Situational Leadership is that there is no best way to influence people, and that leadership styles should be matched to the maturity of the followers. In contrast to Fiedler's (1967) Contingency Theory, Hersey and Blanchard (1969) felt that leader behavior must be plotted on two separate axes rather than one single continuum. The implication being that any combination of task-oriented or relationship-oriented behavior is possible. Similar in thought, though, was the recognition that the success of either theory was dependent on training a leader to effectively diagnose their individual leadership style and other situational variables.

Hersey (1992) defines task behavior as

> the extent to which the leader engages in spelling out the duties and responsibilities of an individual or group. The behaviors include telling people what to do, how to do it, when to do it, where to do it and who's to do it. (p. 31)

Task behavior is considered directive and is characterized by one-way communication from the leader to the follower. Relationship behavior is considered supportive and is defined as "the extent to which the leader engages in two-way or multi-way communication if there is more than one person. The behaviors include listening, encouraging, facilitating, providing clarification, and giving socio-emotional support" (Hersey, 1992, p. 32).

The key to the Hersey-Blanchard model is the determination of the follower's readiness, with readiness described as a function of a person's ability (task maturity) and

willingness (psychological maturity) to perform a task or function. Ability is defined as whether an individual is presently demonstrating the knowledge, experience, and skill in doing specific tasks, while willingness is a person's confidence, commitment, and motivation to perform the same task or function.

According to Hersey (1992), leadership style is the pattern of behavior of the leader *as perceived* by others. A leader's self-perceived style could be much different than that of the follower. As the maturity of the follower changes (up or down), the selection of the matching leadership style optimizes the chances of success. A comprehensive version of the model can be reviewed in Hersey et al. (2001, p. 189, Figure 8-12).

Hersey (1992) states that when researching leadership and influence, the concept of power must be reviewed because "power is influence potential" (p. 77). Green (1999) cited Gary Yukl's research considering whether effective leaders have more power or different sources of power than ineffective leaders. Yukl (as cited in Green, 1999) found that most research classified five different types of leader power, based on the 1959 French and Raven power taxonomy in their book, *Studies of Social Power*. These types were termed reward, coercive, legitimate, expert, and referent powers. Yukl's research suggests that effective leaders rely more on personal power than position power, with the amount of position power necessary dependent on the nature of the organization and task. Hersey et al. (2001) state that position power tends to drive task behavior, while personal power tends to drive relationship behavior.

Most theorists recognize the Situational Leadership model has intuitive appeal. It is a practical set of guidelines that have proven effective for thousands of managers in

over 130 countries. Yet what does the empirical evidence reveal? Hambleton and Gumpert (1982) examined the use and validity of what was then known as the Situational Leadership Theory (SLT). A group of 310 managers, subordinates, and supervisors were surveyed, with Hambleton and Gumpert finding that when the model was applied correctly the gain in subordinate job performance was practical and statistically significant. Graeff (1983) cited perceived problems with the Leadership Effectiveness and Adaptability Description (LEAD) instrument, claiming certain regimes (low task-low relationship) were underrepresented and maturity definitions ambiguous.

While traditional leadership theories offered up follower characteristics as dependent variables that can be shaped by leadership behavior, a more focused effort to research follower behaviors was accomplished by these situational theories (Dvir & Shamir, 2003).

**Transformational Leadership Theories**

Charismatic-transformational leadership was introduced into the literature in the late 1970s and early 1980s (Bass, 1985; Bennis & Nanus, 1985; Burns, 1978; Conger & Kanungo, 1987; House, 1977; Kouzes & Posner, 1987). A social-scientific study of leadership termed these theories and others of a similar genre as “neocharismatic theory” (House & Aditya, 1997), which Yukl and Van Fleet (1992) deem hybrid theories; that is, they contain many of the same traits, attributes, and elements of other leadership theories.

German Sociologist Max Weber (1947) in his book, *The Theory of Social and Economic Organizations*, first defined “charisma” as a personality characteristic. Yukl (1989) cited Weber in stating “charismatic leadership is defined more narrowly and refers to perception that a leader possesses a divinely inspired gift and is somehow unique and

larger than life" (p. 269). This unique personality characteristic gives a leader superhuman power and only is possible within a select group. Weber identified three types of leader/follower relations, consisting of (1) feudal/traditional, (2) bureaucratic/transactional, and (3) charismatic/transformational. Weber postulated that none of the three types existed in pure form, and there were gradual transitions between the three that could occur. While Weber may have been one of the first to define a charismatic leader, Yammarino, Dionne, Chun, and Dansereau (2005) cite the works of House (1977); Conger and Kanungo (1987); and Shamir, House, and Arthur (1993) as the basis of charismatic leadership theory today. These works all define charismatic leadership in terms of the leader's effect on the followers and their subsequent relationship.

House (1977) proposed a charismatic leadership theory consisting of how leaders behaved, including traits most likely seen as charismatic by their followers. House suggested there were four personality characteristics a charismatic leader possessed, including being dominant, having a desire to influence others, being self-confident, and having a strong sense of one's own morals and values. These characteristics led to the demonstration of certain behaviors that had a meaningful effect on their followers. For example, a dominant personality led to a behavior in which the leader exhibited the characteristics of a good role model; this in turn led to the follower trusting the leader's course of action (Northouse, 2004).

Conger and Kanungo (1987) found Weber's conceptualization of charismatic leadership to be limited by its lack of specificity, stating his description of individual leaders qualities were general in nature. They felt to further understand the concept of

charismatic leadership, it had to be studied as a behavioral process that could be described in terms of a formal model. Conger and Kanungo's behavior framework viewed charisma as both "a set of dispositional attributions by followers and as a set of leaders' manifest behaviors . . . linked in the sense that the leaders' behaviors form the basis of the follower' attributions" (p. 645). Conger and Kanungo postulated key behaviors, such as communicating a strategic vision, displaying unconventional behaviors at high personal risk, and engaging in realistic assessments of environmental resources and constraints. Yammarino et al. (2005) concur, discussing leader behaviors such as inspiring a meaningful vision, displaying self-confidence, performing as a role model, and expressing confidence in a follower's abilities as key to establishing individual identity. These behaviors ultimately mold and establish the follower's view of and relationship with a leader.

Burns (1978) first introduced the concepts of transactional and transformational leadership in his qualitative analysis of the biographies of political leaders. Transactional public leaders work within the framework of their constituents, effectively exchanging promises of future action for a particular cause or activity in exchange for votes in future elections. Conversely, transformational public leaders hope to change the framework by motivating their constituents and/or followers to look beyond their own personal interests for the greater good of the community, organization, or society. Bass (1990) observes in the third edition of *Bass & Stogdill's Handbook of Leadership* that "most experimental research, unfortunately, has focused on transactional leadership, whereas the real movers and shakers of the world are transformational leaders" (p. 23). Bass goes on to state that

while both types of leaders are tending to the needs of their followers, it is the transformational leader that has the ability to raise the consciousness level of the whole.

Bass (1985) extended Burn's work with his Theory of Transformational Leadership that further detailed research within an organization's transformational processes. However, unlike Burns, Bass did not view transactional and transformational leadership as opposite ends of a continuum. Instead, they were viewed as distinctive but viable behaviors that may be employed in different situations (Bass, 1999; Bass & Avolio, 1990; Yukl, 1989).

Northouse (2004) cited Bass when arguing that transformational leaders motivates followers to exceed expectations by

> (a) raising followers' level of consciousness about the importance and value of specified and idealized goals, (b) getting followers to transcend their own self-interest for the sake of the team or organization, and (c) moving followers to address higher levels needs. (p. 20)

Bass subsequently developed the full range of leadership model as measured by his Multifactor Leadership Questionnaire (MLQ), which implied that leaders demonstrated both transformational and transactional leadership behavior, but those leaders most acceptable to their followers demonstrated more transformational leadership behavior (Bass, 1999; Bass & Avolio, 1990).

Judge and Piccolo (2004) discuss the four dimensions of transformational leadership in the current version of Bass's theory, which include idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Bass (1999) defines these dimensions as follows: Idealized influence and inspirational

motivation occur when a leader sets a vision and means of achieving same, sets a good example, and is confident in his abilities to lead (Bass & Avolio, 1990, 1993). Followers want to identify with these behaviors. Intellectual stimulation occurs when the leader enables, empowers, and fosters an environment of creativeness and innovation (Gumusluoglu & Ilsev, 2009). Individual consideration occurs when the leader considers the growth and developmental needs of the follower and supports those activities.

Transformational leadership behaviors have been reviewed and discussed in the writings of many researchers (Bass, 1985; Conger & Kanungo, 1987; Howell & Avolio, 1993; Kouzes & Posner, 1987; Tichey & Devanna, 1986). Bass (1999), in a review of 20 years of research in this field, believes more work should be done in how leadership is affected by the context in which it is observed. Bass (1999) argues that transformational leadership is universally applicable, and that a transformational leader inspires their follower to transcend their own self-interests for the good of the organization.

Yukl et al. (2002) developed a hierarchical taxonomy of over 50 years of leadership behavior in which they highlighted the lack of agreement among scholars on which behaviors were pertinent. Their literature review led to three meta-categories of leader behavior, which included the following (with short descriptions):

1. Task behavior—plan short-term activities, clarify objectives, monitor performance.
2. Relations behavior—provides support & recognition; develop and empower members.
3. Change behavior—visioning, innovative thinking, risk-taking, and external monitoring.

Two field studies were performed, the first among 174 consulting company middle managers and the second among 101 MBA students who attend management night classes. The results supported these behaviors were relevant for effective leadership, but Yukl et al. (2002) did not assume they were equally relevant in all situations.

Meta-analyses have been performed (Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996), which support the proposition that transformational leadership is associated positively with organizational effectiveness as seen through the perception of their followers. The validity of transformational leadership appears to be generalizable across several types of study settings. Also, tests suggest that transformational leadership may be more important than previously thought at lower levels of management.

Bennis and Thomas (2002) struggle with the concept of what makes a leader. Their research leads them to conclude that a leader's ability to learn from difficult situations aids in the development of the skills required for extraordinary leadership. Bennis and Thomas believe leadership behaviors often are the result of "unplanned experiences that had transformed them and had become the sources of their distinctive leadership abilities" (p. 40). They coined these experiences "crucibles of leadership," a concept which originated almost 20 years earlier in the work of Kouzes and Posner (1983).

**The Leadership Challenge**

The Leadership Practices Inventory is the culmination of Kouzes and Posner's 1983 research project on people's "personal best." The premise was that they would ask ordinary people to describe extraordinary experiences, subsequently looking for patterns of success (Kouzes & Posner, 2002). This was a much different approach than Peters and

Waterman (1982), who researched high-profile CEOs at successful companies. Kouzes and Posner developed a personal-best leadership experience survey consisting of 38 open-ended questions, such as the following:

1. Who initiated the project?
2. How were you prepared for the experience?
3. What special techniques and strategies did you use to get other people involved in the project?
4. What did you learn about leadership from this experience (LPI-Online, 2009)?

A combination of case studies, personal interviews, and more than 550 surveys resulted in what Kouzes and Posner (2002) termed the Five Practices of Exemplary Leadership. These practices were common to personal-best leadership experiences, and they report the process and experiences have remained consistent over 20 years (Kouzes & Posner, 2002).

**Review of the Leadership Practice Model**

These practices consist of challenging the process, inspiring a shared vision, enabling others to act, modeling the way, and encouraging the heart. In challenging the process, leaders venture out and search for ways to change the status quo. They do not wait for things to "fall their way." Kouzes and Posner (2002) report that every single personal-best case collected involved a challenge. This practice is comparable to Bass's (1985, 1999) dimension of intellectual stimulation, where an environment of innovation is promoted. Other researchers (Judge & Piccolo, 2004; Liden, Wayne, Zhao, & Henderson, 2008) have also noted the overlap in literature between the intellectual

stimulation and idealized influence dimensions and Greenleaf's (1977) theory of servant leadership.

Leaders inspire a shared vision, thinking and envisioning of the way things *could* be. Specifically, "leaders have a desire to make something happen, to change the way things are, to create something that no one else has ever created before" (Kouzes & Posner, 2002, p. 15). They enable others to act and foster teamwork and collaboration. This practice is supported by Bass's (1985) individualized consideration dimension, where follower self-confidence is raised in order to empower decision making (Conger, 1999; Gumusluoglu & Ilsev, 2009).

Kouzes and Posner (2002) suggest that in order to model the behavior expected of others ("walk the talk"), a leader must be sure of their own guiding principles. More succinctly, Truth Eight in their latest book, *The Truth About Leadership* (Kouzes & Posner, 2010), is stated, "You either lead by example or you don't lead at all" (p. 105). Once again associating this practice to a leader's credibility, Kouzes and Posner's (2010) research indicates the statements made and associated actions are visual cues as to what one deems important. They further cite Deutschman's (2009) *Walk the Talk*: "Leaders have only two tools at their disposal: what they say and how they act. What they say might be interesting, but how they act is always crucial" (p. xii).

Finally, leaders encourage the heart of their followers; they recognize them when things go right and provide encouragement when they become frustrated or stymied. They feel it is important to show that one cares, and that reward and recognition must be an active process (Kouzes & Posner, 2002, 2003a, 2003b, 2010).

Within the Five Practices of Exemplary Leadership are the behaviors that are at the crux for those wanting to lead. Kouzes and Posner (2002) term these behaviors as the Ten Commitments of Leadership. In Model the Way, a leader must find his or her voice by clarifying personal values, then aligning his or her actions with these shared values. Within Inspiring a Shared Vision, one must be forward-looking, envisioning the future with infinite possibilities. One must enlist others toward a common purpose, finding the common ground. In Challenge the Process, a leader must look for innovative ways to grow and improve, allowing risks to be taken while learning from his or her mistakes. The practice of Enabling Others to Act involves creating an atmosphere of collaboration within a climate of trust, strengthening others through job enrichment and education. Finally, the practice of Encourage the Heart is discussed. Here the leader must show creativity in recognizing the contributions of their constituents, creating a spirit of community within their organization.

Kouzes and Posner (2002) believe leadership is a relationship between those wanting to lead and those choosing to follow. Yet, what the follower wants (needs) in a leader is very important and must be met for a successful relationship. Kouzes and Posner's (2003a) research points to credibility as this need, stating

> *Credibility* is about how leaders earn the trust and confidence of their constituents. It's about what people demand of their leaders as a prerequisite to willingly contributing their hearts, minds, bodies and souls. It's about the actions leaders must take in order to intensify their constituents' commitment to a common cause. (p. xiii)

Kouzes and Posner (2003a) posit that organizations do not act (individuals do), but they do create culture. Feeling that culture is the organization's equivalent of character, Kouzes and Posner (2003a) maintain what one believes in as a leader, the behavior one exhibits, ultimately affects an organization's culture and performance.

**Summary of Leadership Literature Review**

This literature review was performed to establish a foundation for the study of the nature of leadership and its relationship to organizational culture. A brief historical review indicates early theories focused on those traits and skills seen as being innate to being a good leader. Behavior theories subsequently emerged, postulating that leaders could be trained to be effective; however, as leadership styles arose that did not fit these behavioral models, so-called contingency theories of leadership received great attention by researchers. House's (1971) Path-Goal Theory, Fiedler's (1967) Contingency Theory, and Hersey and Blanchard's (1969) Situational Leadership Theory all provided the groundwork for supportive leadership affecting follower behavior. It was during this development period that the idea that a leader should encourage and support their followers arose, that a leader's observed behavior did affect a follower, and that a leader's adaptability in their environment evoked different leadership styles. These varying styles forged different leader-follower relationships, reinforcing the link between task and relationship behavior.

Neo-charismatic theories were introduced in the late 1970s and early 1980s. These theories were labeled by Yukl and Van Fleet (1992) as hybrid theories, in the belief they contained many of the traits and elements evidenced in prior leadership theories. Bass's (1985) Transformational Leadership Theory built upon the works of

Weber (1947), House (1977), Burns (1978), and others to argue transactional and transformational leadership as distinctive behaviors employable in different situations. Bass's research indicated that the transformational leadership style was most acceptable to their followers and had the ability to raise the consciousness of the organization as a whole.

In summary, there exists a common thread of leadership research that theorizes the dynamic between leadership behavior and their follower is essential in encouraging employees to perform beyond expectations, thereby increasing an organization's effectiveness. Kouzes and Posner (1983, 2002) and Bennis and Thomas (2002) believe these leadership behaviors are the results of extraordinary experiences encountered during their successes as well as their failures. These "crucibles of leadership" are common among great leaders. Kouzes and Posner maintain what one believes in as a leader and the behavior one exhibits ultimately affects an organization's culture and performance.

**Organizational Culture**

In order to provide a framework for the culture literature review and subsequent application to the shuttle processing organization, it was important to review the research model and study environment in order to properly focus the research. This evaluation led to the following subsidiary questions:

1. What is culture?
2. What are the theories of organizational culture?
3. What are the effects of culture on an organization's performance?

A relationship between leadership and organizational culture is discussed throughout current literature, but there are few empirical studies which have been performed validating this assertion (Denison & Mishra, 1995; Trice & Beyer, 1991). Block (2003) maintains that while there is a large amount of independent literature in existence, the interconnectivity between the two remains more implied theory than empirically proven fact.

**Culture Emergence**

Pettigrew's (1979) *On Studying Organizational Cultures* was one of the first long-term longitudinal studies performed with the explicit purpose to study the emergence and development of an organization's culture. Pettigrew's research design centered about a series of social dramas in a private British boarding school, and how the aggregation of its founder's rites and rituals compose what is now termed *organizational culture*. Pettigrew also encouraged the use of softer concepts (anthropology and sociology) in the study of the organization.

The decade of the early 1980s marked the onslaught of development in the debate and discussion of organizational culture. While work had been accomplished on human relations within the company, as well as organizational studies in a generic sense, the following books are recognized as integral to bringing the concept to the forefront (Denison & Mishra, 1995; Hofstede, Neuijen, Ohayv, & Sanders, 1990):

1. Ouchi's (1981) *Theory Z: How American Business can Meet the Japanese Challenge.*
2. Pascale and Athos's (1981) *The Art of Japanese Management: Applications for American Executives.*

3. Deal and Kennedy's (1982) *Corporate Culture: The Rites and Rituals of Corporate Life.*
4. Peters and Waterman's (1982) *In Search of Excellence: Lesson's from America's Best Run Companies.*

The first two books implied that the success of Japanese firms over Western firms was predominantly due to Japanese culture. Ouchi's (1981) Theory Z organizational study made comparisons of American, Japanese, and American firms with "Japanese management" features (Company Z) to show the Theory Z organization's atmosphere was more conducive to teamwork. This and follow-on research (Wilkins & Ouchi, 1983) discuss the effect of organizational culture on performance. Supporting this theory, Pascale and Athos (1981) are credited with introducing the Japanese style of consensus management to the attention of the West. They asserted Japanese managerial skills were better than in the West, with superior marks in skills, staff, shared values, and management style (Pascale & Athos, 1981).

Deal and Kennedy (1982) provided another classic text of the subject with the introduction of their model. It consisted of five elements that defined the socio-anthropological and psychological perspectives within the organization. These elements were the following: (1) the business environment (orientation within the environment), (2) values (key beliefs and concepts shared within the organization), (3) heroes (roles models for success within the company), (4) rites and rituals (routine behavior rituals and ceremonies), and (5) the cultural network (stories and gossip that carry information about valued behavior throughout the organization).

One of the seminal books credited with introducing the idea of *culture* in the corporate environment is *In Search of Excellence*. Written by Tom Peters and Robert Waterman in 1982, it remains today one of the most widely read business books ever. Peters and Waterman were employed by McKinsey, and in 1977 they embarked upon a project to look at an organization's structure and people. Here the concept of looking at organizations as cultures was first introduced (Bogner, 2003).

Peters and Waterman (1982) reviewed 43 of the Fortune 500's top performing companies, developing eight themes that successful companies did right: (1) They get things done; (2) they stay close to the customer; (3) they encourage autonomy and leadership; (4) they "live" a people orientation; (5) they are hands-on, value driven; (6) they stick to their "knitting" (stay with the business they know); (7) they have simple forms and lean staffs; and (8) they live by the discipline of values. While a later article by Peters (Peters, 2001) surfaced potential methodological issues with the research, its impact on organizational study is unquestioned.

**Culture Definition**

If Peters and Waterman (1982) were one of the first to apply the term culture to an organization, Schein (1992) was one of the first to define and clarify the concept while tying it to leadership. Schein (1992) states, "culture and leadership are two sides of the same coin in that leaders first create cultures when they create groups and organizations" (p. 15). Schein (1992) describes how leaders create organizational cultures, believing a culture originates from the beliefs, values, and assumptions of its founders, from group learning experiences and new beliefs and from values and assumptions brought by new

members. Schein (1992) further describes mechanisms by which leaders embed the assumptions they hold, thereby creating cultures.

Schein (1992) believes there are three levels at which culture can be analyzed. At the top are the level of artifacts. These are the visible products of an organization, the processes and characteristics that are easily observed but often difficult to interpret. Schein (1992) cautions that it is dangerous to try and decipher deeper meaning from these observations, feeling they may ultimately be manifestations of one's own biases and feelings.

Next, the level of espoused values is reached. This level contains the shared beliefs that have evolved into shared assumptions, based on social validation within the group. Schein (1992) states that values at this level predict only the observable behavior, citing Argyris and Schön's (1978) premise that if not based on prior learning, they "predict well enough what people will *say* in a variety of situations but which may be out of line with what they will actually *do* in situations where those values should, in fact, be operating" (p. 21).

Lastly, the level of basic underlying assumptions is encountered. In defining basic assumptions, Schein (1992) describes them as ". . . like theories-in-use, tend to be those we neither confront nor debate and hence are extremely difficult to change" (p. 22). Schein (1992) looks at this from a psychological perspective, postulating that it is within this context that culture has the most effect. People tend to view the world around them based on their own personal assumptions, often distorting reality to fit their perception of a situation. This often leads to misinterpretation of the actions of others. When assumptions are shared, the organizational behavior becomes reinforced over time.

According to Howard (1998), anthropologists have proposed over 164 definitions of culture. In one of the earliest formal declaration of the term "organizational culture," Pettigrew (1979) defines culture as "the system of such publicly and collectively accepted meanings operating for a given group at a given time," with the system interpreting a person's own situation. Perhaps one of the most often cited definitions of culture in today's literature is from Edgar Schein (1992):

> A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way you perceive, think, and feel in relation to those problems. (p. 12)

Schein asserts that a leader embeds the assumptions they hold, thereby creating culture.

Cooke and Rousseau (1988) discuss the general nature of culture, positing that if culture is the shared environment within an organization, then that environment can be characterized by not only a dominant culture, but one or more subcultures. They then reason that it is possible to not only have conflicting subcultures but counter cultures within an organization as well. They provide a framework for use of their Organizational Culture Inventory (Cooke & Lafferty, 1983) survey instrument to look at behavioral norms and expectations across organizations.

The Organizational Culture Inventory utilizes 12 scales to determine cultural styles, representing a combination of task and interpersonal relationships. These cultural styles are as follows: (1) a humanistic-helpful culture, (2) an affiliative culture, (3) an approval culture, (4) a conventional culture, (5) a dependent culture, (6) an avoidance culture, (7) an oppositional culture, (8) a power culture, (9) a competitive culture, (10) a

competence/perfectionistic culture, (11) an achievement culture, and (12) a self-actualization culture. Cooke and Rousseau (1988) found evidence that there are differences across organizations with respect to their cultural content, and that the differences were consistent with the organization's management style.

Cameron and Quinn (1999) provide a framework to help managers understand their environment and help facilitate a change in their organizational culture. They believe the broadness of organizational culture has aided in the development of an overwhelming amount of dimensions in scholarly research (Deal & Kennedy, 1982; Hofstede, 1980; Kotter & Heskett, 1992; Trice & Beyer, 1991). A list of 39 indicators defining organizational effectiveness was analyzed, with two major dimensions dividing the indicators into four clusters (quadrants). These clusters represent the core values upon which organizations are judged.

Cameron and Quinn (1999, 2006) note that these four clusters represented competing assumptions: those of flexibility and discretion versus stability and control and those of internal focus and integration versus external focus and differentiation. These four quadrants were labeled to exemplify their most prominent characteristics and are the following:

1. Clan (family style organization)
2. Adhocracy (dynamic, entrepreneurial, and creative)
3. Hierarchy (formalized and structured environment)
4. Market (results-oriented workplace)

The Organizational Culture Assessment Instrument (OCAI) was developed to help interpret an organization's cultural profile in order to assist the culture change process.

This instrument is comprised of six organizational cultural dimensions (dominant characteristics, dominant leadership style, approach taken when dealing with employees, the organizational "glue" that holds the organization together, strategy orientation, and success criteria and rewards) (Cameron & Quinn, 2006).

Geert Hofstede (1980) defines culture as "the collective programming of the mind that distinguishes the members of one category of people from those of another" (p. 25). His cultural values framework was developed using data from over 88,000 employees from 72 countries. This led to the initial identification of four cultural dimensions, which later were expanded to five. The cultural dimensions are as follows:

1. Individualism-collectivism—relates to the integration of individuals into primary groups, and the degree upon which individuals look after themselves while in the group
2. Power distance—the extent in which people accept inequality in power among its institutions and people
3. Uncertainty avoidance—the levels at which society feels uncomfortable with lack of structure and ambiguity
4. Masculinity and femininity—the extent within a society that the dominant values are considered "masculine" in nature
5. Long-term orientation and short-term organization—the development of value where deferred gratification is accepted and order is observed versus a society where immediate satisfaction is desired and results are expected quickly (Ergeneli, Gohar, & Temirbekova, 2007; Hofstede et al., 1990; Kirkman et al., 2006).

These five dimension constructs are measured using the Values Survey Module and have been found to influence transformational leadership aspects (Ergeneli et al., 2007).

**Summary of Culture Emergence and Definition**

The emergence of culture in the 1980s as a research variable was a result of efforts to determine why some organizations were effective and productive while others were not. The international success of the Japanese car manufacturer Toyota made many wonder if there was something unique in their culture that increased effectiveness.

Schein (1992) cautions leaders to note that culture is ". . . deep, wide, and complex. They should avoid the temptation to stereotype organizational phenomena . . ." (p. 143). While there are many frameworks from which an organization's culture may be evaluated, at the center are the basic underlying assumptions and beliefs that often are difficult to uncover or measure. All consider an understanding of the shared environment as essential in organizational behavior. These models look at many different dimensions and traits in order compare and assess culture; Cameron and Quinn (1999), Cooke and Rousseau (1988), and Schein (1990) all suppose a concept of competing values within an organization. This is consistent with Schein's (1990) observation that "culture is developed as an organization learns to cope with the dual problems of external adaptation and internal integration" (p. 111). The struggle to establish linkages between cultural constructs and organizational performance while maintaining stability and focus was the genesis for the Denison Organizational Culture Model.

**Denison Organization Culture Survey**

The framework for the Denison Cultural Model was first published in 1984 by Dr. Daniel Denison (1984). Gathering data from 34 companies by survey (indication of

leadership style) and industry performance indicators (Standard and Poor's financial ratios), Denison's research indicated that cultural behavior had an effect on firm performance (Denison, 1984). Subsequently, Denison performed research on the cultures of high and low performing companies, finding four cultural traits that could affect an organization's performance measures (i.e., profitability, innovation, sales growth, and market share). The Denison Organizational Culture Survey measures each of these traits in three indexes through a set of 60 statements describing different aspects of an organization's culture (Denison & Mishra, 1995).

**Review of the Denison Model**

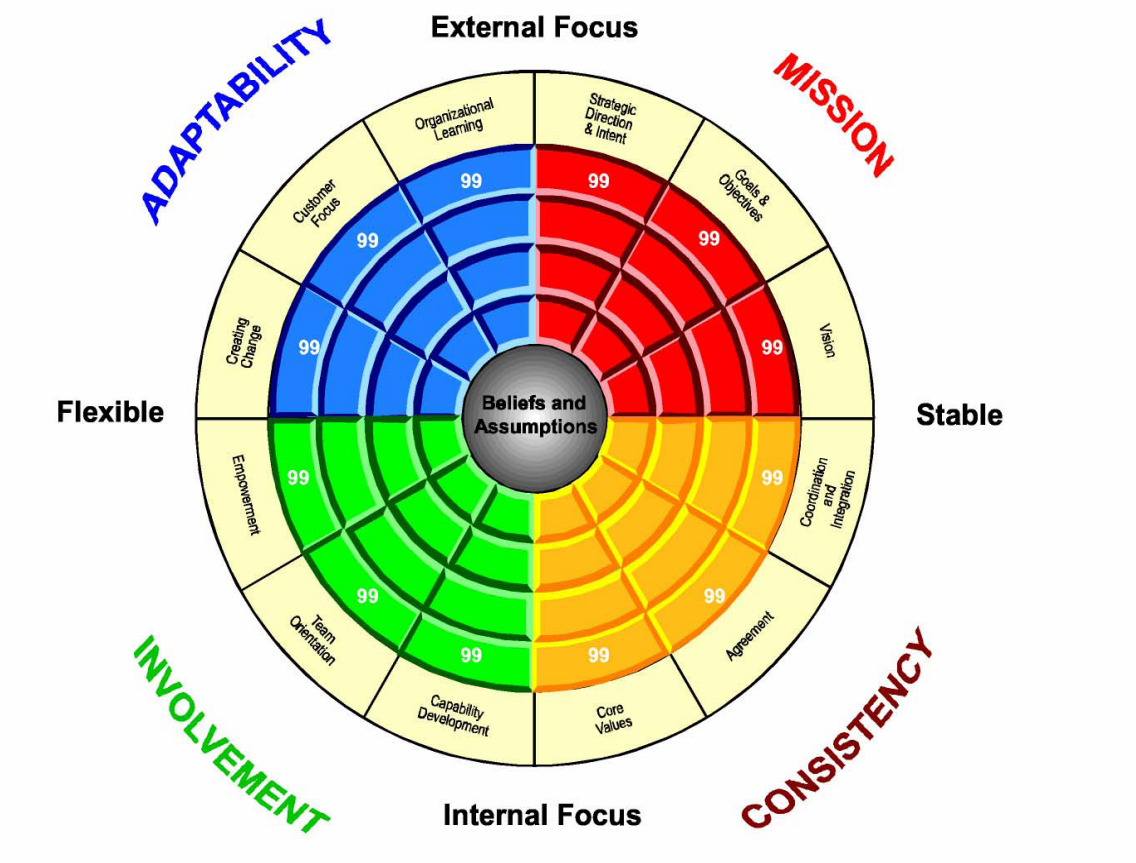



*Figure 2*. Denison Model circumplex. Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. Copyright 2006 by Denison Consulting. Adapted with permission.

The Denison Model surrounds the beliefs and assumptions (culture) of a given organization. Each of the four cultural traits is measured by the following twelve indexes: (1) Adaptability (creating change, customer focus, and organizational learning), (2) Mission (vision, strategic direction and intent, and goals and objectives), (3) Involvement

(empowerment, team orientation, and capability development), and (4) Consistency (core values, agreement, coordination and integration). By ranking a particular company against the norms of prior participants, it is possible to measure a company's progress toward that of a high-performance culture (Denison, Janovics, Young, & Cho, 2006).

According to the theoretical framework underlying the Denison model and represented in the circumplex depicted in Figure 2, there exists a set of trade-offs or contradictions that must be balanced. For instance, the traits Involvement and Consistency represent the internal focus of the organization in constant tension with the external focus represented by the traits Adaptability and Mission. There is a similar dynamic between organizational flexibility and stability. Denison et al. (2006) cited Lawrence and Lorsch's organizational theory as a well-known tension example (internal Consistency and external Adaptability). At the center of the model are the organization's basic beliefs and assumptions.

**Adaptability.** Wilkins and Ouchi (1983) and Denison (2000) explore the relationship between culture and organizational performance, arguing that cultures are more adaptive and more easily developed than previously thought. Anand and Ward (2004) discuss the idea of environmental fit and manufacturing flexibility in a study of U.S. manufacturers. Their research indicates the environment (or culture) plays a crucial role in the type of required flexibility to best fit the firm and impact performance.

Kotter and Heskett (1992) and Schein (1990, 1992) make arguments for the need for organizations to be more adaptive to the changing workplace and assert the need for effective leadership to lead the change. In general, the literature supports the notion that culture and performance are connected but presents a weak case that leadership is able to

affect a cultural shift (organizational change) to drive the goal. Yet, researchers do note that culture can remain linked with performance only if they are capable of adapting to the changing environment (Ogbonna & Harris, 2000). Strategic management researchers postulate organizational behavior (flexibility and speed) is a reflection of this environmental change (Eisenhardt & Brown, 1998; Lamberg, Tikkanen, Nokelainen, & Suur-Inkeroinen, 2009), and fully adaptive firms will mimic its pace.

**Mission.** According to Bohn and Grafton (2002), despite the numerous writings about leadership in organizations, the influence of leadership on organization efficacy has not been explored. Organizational efficacy or confidence is defined by Bohn and Grafton as the combined judgment of its members about "(1) their sense of collective capacity, (2) sense of mission or purpose, and (3) a sense of resilience" (p. 66). Their research indicates there is a strong correlation between leadership and the three listed factors. Yet when an organization's mission changes, so may its culture.

Morgeson, DeRue and Karam (2010) perform a functional approach to team leadership, within which defining the mission in a clear and compelling manner is essential to team performance; only by providing a clear vision can goals and objectives be accomplished. Research indicates that organizations lacking a clear mission experience poor financial outcomes (Jarnigan & Slocum, 2007; Yilmaz & Ergun, 2008).

**Involvement.** Cameron and Quinn (1999) developed a theoretical model entitled the *Competing Values Framework*, which "define the core values on which judgments about organizations are made" (p. 31). The "clan culture" is seen as one which is family-oriented, with a common set of goals and ideas. Denison (2000) describes this environment as having the participation or involvement of all its employees.

Riordan, Vandenberg, and Richardson (2005) performed an empirical study among a sample of insurance companies to examine the relationship between the perceived employee involvement climate and organizational effectiveness. Employee involvement was defined as an environment where workers are empowered to make decisions, information is shared within the team, employee development through training occurs, and a performance-based reward system is utilized. The study provided support that organizations and their employees benefit by such a climate, through both employee satisfaction and financial performance. Yilmaz and Ergun (2008) found similar results in their examination of Denison's cultural traits on organizational effectiveness among Turkish manufacturing firms.

**Consistency.** Again, members of the organization share a common set of goals accompanied by a clear set of expectations (Denison, 2000). This is once again illustrated by Cameron and Quinn's (1999) clan culture of the Competing Values Framework model. Organizational boundaries do not inhibit the organization from achieving these goals. Fey and Denison (2003) cite Senge stating, "consistency is a source of stability and internal integration resulting from a common mindset" (p. 5). Lamberg et al. (2009) propose a theoretical framework linking levels of strategic consistency with an organization's survival, summing up this relationship as follows: "Over time, the optimal level of strategic consistency means a balance between being fully consistent with the past on one hand, and being fully adaptive with environmental change on the other" (p. 49).

## Summary of Denison Model Review

The Denison Organizational Culture Model is based on four cultural traits that research has indicated influences an organization's effectiveness and performance. These cultural traits are Adaptability, Mission, Involvement, and Consistency. At the center of the model are an organization's deep beliefs and assumptions, which are difficult to measure and compare. Denison et al. (2006) link values and behavioral norms to the underlying assumptions and subsequently make generalizations about organizational culture at that level. The Denison model provides a framework for integrating these concepts, accompanied by an instrument to obtain measures for comparison. Ultimately, research indicates these cultural traits correlate well with traditional performance measures, such as profitability, sales growth, and market share.

## Leadership and Culture

A relationship between leadership and organizational culture is discussed throughout current literature, but there are few empirical studies that have been performed validating this assertion (Denison & Mishra, 1995; Trice & Beyer, 1991). Block (2003) maintains that while there is a large amount of independent literature in existence, the interconnectivity between the two remains more implied theory than empirically proven fact.

Trice and Beyer (1991) present hypothesized links between nine different elements of leadership and culture consequences; they surmise that many exhibit traits associated with charismatic leadership. One of the implications cited is that cultural leadership can occur in a variety of ways, each with its own unique ramifications. By

training managers in the basics of cultural leadership, one may be able to match personnel with specific situations.

Pillai and Meindl (1998) support this typology in their study of 596 managers from 101 work units within a large government health service industry. Their results indicated that collectivistic cultural orientation were positively related with the emergence of charismatic relationship, stating “that the more organic the structure and/or collectivistic the culture, the greater the perceptions of work unit performance . . . and leadership effectiveness” (Pillai & Meindl, 1998, p. 666).

Hennessey (1998) used an organizational climate survey in nine federal government offices to investigate the relationship between organization culture and reinvention (leader found to be critical) and later found that leaders influenced the outcome in reinvention (most likely through organizational culture). However, the role of the leader in each case was less than 3 years in duration, so the effects of long-term leadership are not captured in this research.

An investigation of the relationship of organizational culture and subculture with commitment and leadership style was performed by Lok and Crawford (1999) via a survey of nurses in a number of hospitals. This study indicated that organizational culture and subcultures had an effect on commitment and leadership style, with a larger association with the subculture. This would indicate the potential for groups or departments within a large organization to need a different leadership style based on their particular local ideals and beliefs.

Hofstede et al. (1990) presents the study of 20 units from 10 different organizational cultures in Denmark and the Netherlands. This study uses qualitative and

quantitative data obtained through surveys to characterize and compare the different organizations. Hofstede et al. acknowledges that culture is being treated as a variable for a specific research purpose, stating it is a “collective characteristic” (p. 298). This study empirically supports the theory that shared perceptions of daily practice are the root of an organization’s culture.

Casida and Pinto-Zipp (2008) explored the leadership-organizational culture relationship between nurse managers and nurses within acute care hospitals. Bass’s (2004) MLQ questionnaire in conjunction with the Denison’s (2005) Organizational Culture Survey instrument were used to gather evidence from four acute care hospitals of the largest health care system in New Jersey. Transformational leadership was found to have a moderately strong correlation ($r = 0.60$, $p = 0.00$) with organizational culture. The researcher concluded that the transformational leadership style of a nurse manager was likely to form an effective organizational culture, as measured by the four Denison cultural traits (Mission, Adaptability, Involvement, and Consistency).

**Summary of Literature Review**

This literature review was performed in order to provide a theoretical foundation for research in examining the relationship between employee perceived leadership practices and culture within the aerospace industry. Core theories and literature in the leadership and culture fields were examined as well as recent research postulating linkages between the two.

The leadership review began with a brief historical review of trait, skill, and behavioral approaches to leadership and subsequently migrated to contingency theories. Theories such as Fiedler’s (1967) Contingency Theory, House’s (1971) Path-Goal

Theory, and Hersey and Blanchard's (1969) Situational Leadership Theory provided the groundwork for studying follower behavior, including such ideas as examining task-relationship behavior, leaders empowering their subordinates, and leaders recognizing the need to encourage and support followers. Charismatic and transformational leadership studies arose through the works of Bass (1985), Burns (1978), House (1977), and Weber (1947). Bass's (1985) four dimensions of transformational leadership were shown to positively affect organizational effectiveness and supported Kouzes and Posner's (1983) research on people's "personal best" leadership experience. Their Five Practices of Exemplary Leadership provided the explanatory constructs for this research.

Culture literature really became established in the early 1980s as a result of increasing international competition in the marketplace. Did an organization's culture have a direct influence on their performance? Researcher's such as Schein (1990) cautioned that culture was not a variable easily measured and compared; subsequent frameworks established by such researchers as Cameron and Quinn (1999), Cooke and Rousseau (1988), Denison (1984), and Hofstede (1980) focused on cultural dimensions, cultural traits, organizational behaviors, and norms and cultural characteristics as comparable measures. These constructs all were linked back to the basic beliefs and assumptions at the very center of every organization: If shared by everyone, they yielded a strong culture not easily changed; if not shared by all, they led to subcultures and poor organizational effectiveness.

Finally, the relationship between leadership and culture was examined. Research indicates charismatic and transformational leadership correlates well with organizational culture, but the number of empirical studies is few. Kouzes and Posner (2002) maintain

that organizations do not act (individuals do) but they do create culture. Therefore, a leader's behavior can and does affect organizational performance. Schein (2004) states that culture initially creates leadership, but that it is leadership's duty to step outside the organizational culture to initiate changes (by their behavior) when warranted. The concept of leadership practices and organizational culture as explanatory constructs to organizational performance is justified.

# Chapter III

# Methodology

## Introduction

The following section discusses the research design and methodology used within this study. Specifically, the research model will be briefed, the population and sample will be defined and justified, and a review of the instruments used and procedure followed will be presented.

## Research Model

The literature reviewed in Chapter II reviewed the core literature in both the leadership and culture research fields and suggested relationships between the two constructs. A brief historical review of trait and behavior theory was performed, followed by the development of the leader-follower research stream. Contingency Theories set forth by Fiedler (1967), Hersey and Blanchard (1969), House (1971), House and Mitchell, (1974), and others focused on the leader's obligation to support the follower through various means and highlighted the influence a leader's behavior held on the leader-follower relationship. Subsequently, the charismatic-transformational leadership theories introduced by Bass (1985), Burns (1978), Conger and Kanungo (1987), Kouzes and Posner (1987), and others were discussed. Current research generally supports the theory that leadership behavior has a positive effect on an organization's effectiveness and performance.

Kouzes and Posner's (1987) Five Practices of Exemplary Leadership consists of those behaviors that were common to personal-best leadership experiences from a combination of case studies, surveys, and personal interviews across multiple industries.

From their research efforts, Kouzes and Posner (1987) maintain the behavior a leader exhibits ultimately affects a company's culture and performance.

The discussion of organizational culture originated in the 1980s through the publication of several classics, including Peters and Waterman's (1982) *In Search of Excellence.* Researchers such as Cameron and Quinn (1999), Denison (1984), Hofstede (1980), Kotter and Heskett (1992), and Schein (1992) have contributed to the literature in attempts to define culture and determine under what context it should be studied, while attempting to model it within an organization. Organizational culture as it relates to financial performance has been a large focus of this activity and is an area of research that Denison (1984), Denison et al. (2006), Denison and Mishra (1995), and Denison and Neale (1996) have focused on for over 25 years.

Block (2003), Denison and Mishra (1995), and Trice and Beyer (1991) all have performed empirical studies trying to establish the link between leadership and organizational culture. Block even states that much of this research is implied theory more than proven fact.

Accordingly, the following research question drove the framework for this research (see Figure 3 for the research model): Is there a relationship between employee perceived leadership practices and organizational culture in the space shuttle processing environment?

Kouzes and Posner's (2003) Leadership Practices Inventory–Other (LPI-O) instrument was utilized along with Denison and Neale's (1996) Organization Culture Survey (DOCS) instrument to study the effect of five perceived leadership practices on cultural traits identified by Denison.

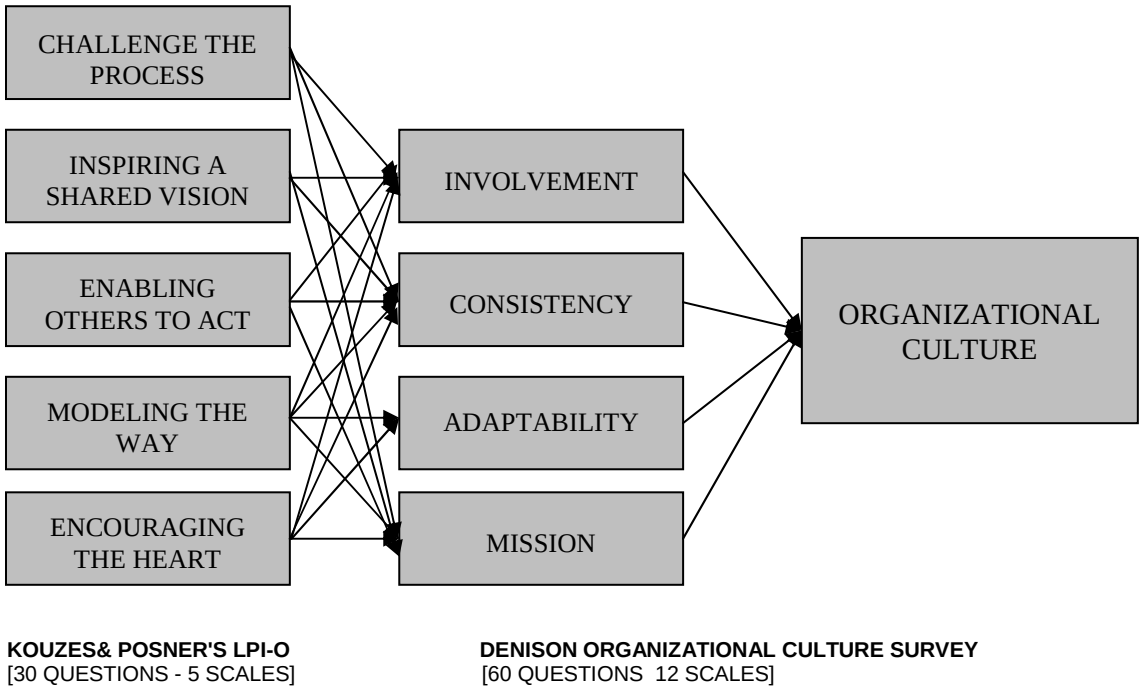



*Figure 3*. Relationship between perceived leadership practices and organizational culture—research model.

The research model depicts the five exemplary practices captured by the LPI–O scale, postulating a relationship to each of the four cultural traits identified by the DOCS. These four traits were developed by Daniel Denison (1984a) and link corporate culture to financial performance. The Denison Model and corresponding cultural traits existing under and are subject to a set of trade-offs or tensions that must be balanced. As such, it was the intent of this study to examine the leadership-culture relationship at the individual practice and cultural trait levels.

**Research Design**

Runkel and McGrath (1972) discuss research methods in performing behavioral science research, describing the tools (instruments, statistical techniques, and procedures)

as both opportunities and limitations to research. When gathering research evidence, one tries and maximizes three criteria: generalizability, precision, and context (of the gathered information). They present a research strategy circumplex consisting of four quadrants (field, experimental, respondent, and theoretical) and eight strategies, each trying to maximize one or more of these criteria. Unfortunately, this is unlikely to occur; therefore the choice of one's research method is essential in gathering the desired data.

This research utilized a respondent strategy and employed a sample survey within the selected population. This was performed in order to determine whether a relationship existed between the independent variable, leadership, and the dependent variable, culture, within the aerospace industry. Use of this strategy and sample surveys to investigate leadership behavior has been extensively utilized in the field (Bass, 1985, 1999; Bass & Avolio, 1990; Block, 2003; Ergeneli et al., 2007; Hambleton & Gumpert, 1982; Hersey et al., 2001; House & Aditya, 1997; Judge & Piccolo, 2004; Phillips & Lord, 1986; Trice & Beyer, 1991; Yukl et al., 2002) and is consistent with Friedrich, Byrne, and Mumford's (2009) methodological and theoretical considerations.

Use of a sample survey within culture research also is consistent within this field of study (Athena & Maria, 2006; Calori & Sarnin, 1991; Cameron & Quinn, 1999; Cooke & Rousseau, 1988; Denison, 1984; Denison, Haaland, & Goelzer, 2004; Earley, 2006; Hofstede et al., 1990; Kirkman et al., 2006; O'Reilly, Chatman, & Caldwell, 1991), with Denison (1984) identifying the key advantage as the results provide a basis for comparison and generalization. Cooke and Rousseau (1988) echo this belief, postulating that these methods provide the capability for comparisons across individuals,

organizations, the ability for replication of studies, and a common frame of reference for interpreting the data.

**Variables**

This study explored the impacts of the five leadership practices developed by Kouzes and Posner (1987) on the four cultural traits identified by Denison (1984a). The independent variable in the study was perceived leadership practices while the dependent variable was organizational culture. Two instruments were administered to the sample population in order to measure these variables. The five practices were measured using the Leadership Practices Inventory–Other instrument (see Table 1 for a summary of The Five Practices of Exemplary Leadership® model).

Table 1

*Summary of Kouzes and Posner's Five Practices of Exemplary Leadership® Model*

| Leadership practices | Definitions |
|---|---|
| Modeling the Way | Leaders establish principles concerning the way people (constituents, peers, colleagues, and customers alike) should be treated and the way goals should be pursued. They create standards of excellence and then set an example for others to follow. They create opportunities for victory. |
| Inspiring a Shared Vision | Leaders passionately believe that they can make a difference. They envision the future, creating an ideal and unique image of what the organization can become. They enlist others in their dreams. They breathe life into their visions and get people to see exciting possibilities for the future. |

| Leadership practices | Definitions |
|---|---|
| Challenging the Process | Leaders search for opportunities to change the status quo. They look for innovative ways to improve the organization. They experiment and take educated risks, accepting disappointments as learning opportunities. |
| Enabling Others to Act | Leaders foster collaboration and build spirited teams. They actively involve others. They strive to create an atmosphere of trust and human dignity. They strengthen others, making each person feel capable and powerful. |
| Encouraging the Heart | Leaders recognize contributions that individuals make. In every winning team, the members need to share in the rewards of their efforts, so leaders celebrate accomplishments. They make people feel like heroes. |

*Note.* Adapted from *About the Leadership Challenge: Approach*, 2009, The Leadership Challenge. Retrieved from http://www.leadershipchallenge.com/WileyCDA/Section/id-131055.html

The LPI–O instrument was chosen because of its intuitive appeal to followers (Northouse, 2004) and because it had been field tested and proven reliable in identifying behaviors that affect a leader's performance (Elkins & Keller, 2003). Internal reliability was strong (see Table 4), and the instrument has been found to be valid across multiple industries and a broad range of organizational disciplines (Posner, 2008).

The four cultural traits identified by Denison were measured by the Denison Organizational Culture Survey (DOCS) (Denison & Neale, 1996). The DOCS instrument was chosen because it specifically and quantitatively looked at cultural traits that directly impacted a firm's financial performance, as well as it having strong reliability and validity across a large population (see Table 2 for a summary of Denison's Organizational Culture Model).

Table 2

*Summary of Denison's Organizational Culture Model*

| Culture traits | Definitions |
|---|---|
| Adaptability | Organizational capacity to change in response to market needs. |
| Mission | The organization knows why it exists and where it is headed. Sets clear goals and direction for their employees. |
| Involvement | Focuses on employees' commitment and sense of ownership, involvement in decisions that affect them, and team-orientation. |
| Consistency | Existence of organizational systems and processes that promote real alignment and efficiency over time. Open flow of communication. |

*Note.* Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. 

**Population**

For the purposes of this study, the target population was defined as the U.S. space shuttle program aerospace manufacturing and production operations personnel. U.S. Department of Commerce International Trade Association data (ITA, 2009) indicates there were 504,000 aerospace workers in the U.S. as of June 2009, with over 301,500 being considered manufacturing and production workers per the NAICS 33641 code (Aerospace Products and Parts). This population was chosen because of the following reasons: (1) Few empirical studies examining leadership and/or culture have been performed in this industry; and (2) the U.S. aerospace industry has been in a steady decline over the past 19 years, from a peak over 1.1 million workers in 1990 to 504,000 in 2009. This industry is critical to the U.S. from an economic as well as a world leadership perspective (Sadeh, 2009). Insight into existing culture and organizational leadership is essential to reverse this trend.

Survey data was obtained from employees of United Space Alliance (USA), a Southern aerospace company headquartered in Houston, Texas with personnel at Kennedy Space Center, Florida. USA employs over 8,000 people as NASA's prime space shuttle contractor for launch and landing operations. Florida operations consist chiefly of the Launch and Recovery Systems and Logistics directorates. USA is a limited liability joint venture between Lockheed-Martin and Boeing Company (two of the largest aerospace defense contractors in the world). When formed in 1996, it took over employees from several major companies; these "heritage" companies included Lockheed, Martin Marietta, Boeing, USBI, and ATK (Behrens, 2006).

**Sample**

The population (N = 1793) consisted of degreed and non-degreed management, engineers, technicians, operations and processing staff and other support personnel. This cross-section of worker skills is common throughout the aerospace industry, specifically, in aircraft, missile, and satellite as well as spacecraft manufacturing and processing operations (ITA, 2009). This study employed a census (convenience) sample of the entire manufacturing and processing division; since the population was well known to the researcher, any obvious abnormalities within the sample data would be readily identifiable.

**Measures**

For a survey instrument to be valid, it must gather the researcher's information as precisely as possible, be composed of questions that mean the same thing to all respondents with an interview schedule convenient to the respondents, and be engaging enough that misleading responses will not occur (Nesbary, 2000). Yukl (1998) discusses the limitations of behavior questionnaires when performing survey research, citing various researchers' determination of biases and error (use of ambiguous items, response biases, etc.) and maintains that retroactive behavior description questionnaires are not highly accurate. Schein (1992) criticizes culture researchers for utilizing questionnaire data and inferring cultural assumptions from them. He terms survey results such as these as "artifacts of the culture, subject to the same interpretation problems as other artifacts" (Schein, 1992, p. 186). However, Kouzes and Posner's (2000) LPI–Observer (LPI–O) and the Denison Organizational Culture Survey (DOCS) (Denison et al., 2006) research indicate adequate reliability and validity in studies such as these. Since both instruments

are copyrighted, permissions were sought and obtained for research use from Denison Consulting and Kouzes Posner International (see Appendix A).

**Leadership Practices Inventory–Other (LPI–O)**

The LPI–O Instrument has been administered to over 350,000 managers and non-managers across many organizational disciplines and demographics. It consists of 30 items: six each which measure the Five Practices of Exemplary Leadership. LPI company validation studies as well as various researchers have confirmed the reliability and validity of the Leadership Practices Inventory and the Five Practices of Exemplary Leadership (Posner, 2008; Posner & Kouzes, 2000, 2002). See Table 3 for the Leadership Practices Inventory–Other internal scales.

Table 3

*Leadership Practices Inventory–Observer (LPI–O) Internal Scales*

| Scale | Item # | Behavior statement |
|---|---|---|
| Challenge the Process | 3 | Seeks out challenging opportunities that test his/her own skills and abilities. |
| | 8 | Challenges people to try out new and innovative ways to do their work. |
| | 13 | Searches outside the formal boundaries of his/her organization for innovative ways to improve what we do. |
| | 18 | Asks “What can we learn?” when things don’t go as expected. |
| | 23 | Makes certain that we set achievable goals, makes concrete plans, and establishes measurable milestones for the projects and programs we work on. |
| | 28 | Experiments and take risks, even when there is a chance of failure. |
| Inspired a Shared Vision | 2 | Talks about future trends that will influence how our work gets done. |
| | 7 | Describes a compelling image of what our future could be like. |

| Scale | Item # | Behavior statement |
|---|---|---|
| | 12 | Appeals to others to share an exciting dream of the future. |
| | 17 | Shows others how their long-term interests can be realized by enlisting in a common vision. |
| | 22 | Paints the “big picture” of what we aspire to accomplish. |
| | 27 | Speaks with genuine conviction about the higher meaning and purpose of our work. |
| Enable Others to Act | 4 | Develops cooperative relationships among the people he/she works with. |
| | 9 | Actively listens to diverse points of view. |
| | 14 | Makes it a point to let people know about his/her confidence in their abilities. |
| | 19 | Supports the decisions that people make on their own. |
| | 24 | Gives people a great deal of freedom and choice in deciding how to do their work. |
| | 29 | Ensures that people grow in their jobs by learning new skills and developing themselves. |
| Model the Way | 1 | Sets a personal example of what he/she expects of others. |

| Scale | Item # | Behavior statement |
|---|---|---|
| | 6 | Spends time and energy making certain that the people he/she works with adhere to the principles and standards that we have agreed on. |
| | 11 | Follows through on promises and commitments he/she makes. |
| | 16 | Asks for feedback on how his/her actions affect other people's performance. |
| | 21 | Builds consensus around a common set of values for running our organization. |
| | 26 | Is clear about his/her philosophy of leadership. |
| Encourage the Heart | 5 | Praises people for a job well done. |
| | 10 | Treats others with dignity and respect. |
| | 15 | Makes sure that people are creatively rewarded for their contributions to the success of projects. |
| | 20 | Publicly recognizes people who exemplify commitment to shared values. |
| | 25 | Finds ways to celebrate accomplishments. |
| | 30 | Gives the members of the team lots of appreciation and support for their contributions. |

*Note.* Adapted from *LPI Data Analysis*, by B. Z. Posner, 2008. Retrieved from http://media.wiley.com/assets/1554/74/LPIDataAnalysisSEP08.pdf. Copyright 2003 by James M. Kouzes and Barry Z. Posner. Adapted with permission.

**Challenge the process.** Leaders seize the initiative, becoming innovative and creative. They look for opportunities by seeking innovative ways to improve. They experiment and take risks and learn from their mistakes (Kouzes & Posner, 2002). Each respondent perception was assessed using a 10-item Likert scale, and respondents were instructed to read each statement carefully before recording the rating that best described how frequently their manager engages in the prescribed behavior (e.g., "Seeks out challenging opportunities that test his or her own skills and abilities;" 1 = "Almost Never" and 10 = "Almost Always").

**Inspiring a shared vision.** Leaders envision the future and are able to share that common vision with others. They believe they can make a difference and infuse others with their vision (Kouzes & Posner, 2002). Each respondent perception was assessed using a 10-item Likert scale as described previously (e.g., "Talks about future trends that will influence how our work gets done;" 1 = "Almost Never" and 10 = "Almost Always).

**Enabling others to act.** Leaders create a climate of trust and foster collaboration among others. They strengthen those around them, empowering them to act (Kouzes & Posner, 2002). Each respondent perception was assessed using a 10-item Likert scale as described previously (e.g., "Develops cooperative relationships among the people he or she works with;" 1 = "Almost Never" and 10 = "Almost Always").

**Modeling the way.** The extent to which the leader establishes principles concerning the manner in which people are treated and the way goals should be pursued is modeling the way. They are able to set the example by aligning their actions with shared values (Kouzes & Posner, 2002). Each respondent perception was assessed using a

10-item Likert scale as described previously (e.g., “Sets a personal example of what he or she expects from others;” 1 = “Almost Never” and 10 = “Almost Always”).

**Encouraging the heart.** The leader recognizes the contribution of the individual within the organization, establishing a spirit of community and celebrating victories. They focus on clear standards and expect the best (Kouzes & Posner, 2002, 2003b). Each respondent perception was assessed using a 10-item Likert scale as described previously (e.g., “Praises people for a job well done:” 1 = “Almost Never” and 10 = “Almost Always”).

**LPI–O Reliability**

Table 4 reports the reliability coefficients of the LPI by respondent category. The LPI-Self data is enclosed for reference only. By review of the coefficients in Table 4, the Cronbach alphas ranged from an average of .84 for the Modeling the Way practices to .92 for both Encouraging the Heart and Inspiring a Shared Vision. Hair, Anderson, Tatham, and Black (1998) describe the Cronbach alpha as the reliability coefficient that measures the reliability of the total scale, with the generally accepted lower limit cited as 0.70. Since there is a positive relationship between the numbers of items on the scale (increasing the reliability value), Hair et al. urge researchers to adopt tight requirements. The .84 to .92 reported values for this instrument were adequate for this study.

Table 4

*Reliability (Cronbach Alpha) Coefficients for the LPI by Respondent Category*

| Leadership practice | All respondents | Self only | Observers only |
|---|---|---|---|
| Challenge the Process | .86 | .79 | .86 |
| Inspire a Shared Vision | .91 | .88 | .92 |
| Enable Others to Act | .86 | .73 | .86 |
| Model the Way | .84 | .74 | .84 |
| Encourage the Heart | .91 | .86 | .84 |

*Note.* Adapted from *LPI Data Analysis*, by B. Z. Posner, 2008. Retrieved from http://media.wiley.com/assets/1554/74/LPIDataAnalysisSEP08.pdf. Copyright 2003 by James M. Kouzes and Barry Z. Posner. Adapted with permission.

**Denison Organizational Culture Survey (DOCS)**

The Denison Organizational Culture Survey consists of 60 questions designed to measure four cultural indexes (or traits) via 12 scales. The four cultural traits served as the dependent variables for this study. The traits and associated indices are as follows:

1. Involvement (empowerment, team orientation, capability development)
2. Consistency (core values, agreement, coordination, and integration)
3. Adaptability (creating change, customer focus, organizational learning)
4. Mission (strategic direction and intent, goals and objectives, vision)

**Involvement.** Each respondent perception was assessed using a 5-item Likert scale (extracted from three sub scales) and asked to record the responses they felt best describe their organization (e.g., “IN THIS ORGANIZATION…most employees are highly involved in their work;” 1 = “Strongly Disagree” and 5 = “Strongly Agree”).

**Consistency.** Each respondent perception was assessed using a 5-item Likert scale (extracted from three sub scales) and asked to record the responses they felt best describe their organization (e.g., “IN THIS ORGANIZATION…the leaders and managers practice what they preach;” 1 = “Strongly Disagree” and 5 = “Strongly Agree”).

**Adaptability.** Each respondent perception was assessed using a 5-item Likert scale (extracted from three sub scales) and asked to record the responses they felt best describe their organization (e.g., “IN THIS ORGANIZATION…the way things are done is very flexible and easy to change;” 1 = “Strongly Disagree” and 5 = “Strongly Agree”).

**Mission.** Each respondent perception was assessed using a 5-item Likert scale (extracted from three sub scales) and asked to record the responses they felt best describe their organization (e.g., “IN THIS ORGANIZATION…there is a clear mission that gives meaning and direction to our work:” 1 = “Strongly Disagree” and 5 = “Strongly Agree”). See Tables 5–8 for Denison Organizational Culture Survey internal scales.

Table 5

*Denison Organizational Culture Survey (DOCS)—Involvement Scale*

| Scale | Item # | Definitions |
|---|---|---|
| Involvement | 1 | Most employees are highly involved in their work. |
| | 2 | Decisions are usually made at the level where the best information is available. |
| | 3 | Information is widely shared so that everyone can get the information he or she needs when it is needed. |
| | 4 | Everyone believes that he or she can have a positive impact. |
| | 5 | Business planning is ongoing and involves everyone in the process to some degree. |
| | 6 | Cooperation across different parts of the organization is actively encouraged. |
| | 7 | People work like they are part of a team. |
| | 8 | Teamwork is used to get work done, rather than hierarchy. |
| | 9 | Teams are our primary building blocks. |
| | 10 | Work is organized so that each person can see the relationship between his or her job and the goals of the organization. |
| | 11 | Authority is delegated so that people can act on their own. |

| Scale | Item # | Definitions |
|---|---|---|
| | 12 | The "bench strength" (capability of people) is constantly improving. |
| | 13 | There is continuous investment in the skills of employees. |
| | 14 | The capabilities of people are viewed as an important source of competitive advantage. |
| | 15 | Problems often arise because we do not have the skills necessary to do the job. |

*Note.* Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. 

Table 6

*Denison Organizational Culture Survey (DOCS)—Consistency Scale*

| Scale | Item # | Definitions |
|---|---|---|
| Consistency | 16 | The leaders and managers "practice what they preach". |
| | 17 | There is a characteristic management style and a distinct set of management practices. |
| | 18 | There is a clear and consistent set of values that governs the way we do business. |
| | 19 | Ignoring core values will get you in trouble. |
| | 20 | There is an ethical code that guides our behavior and tells us right from wrong. |
| | 21 | When disagreements occur, we work hard to achieve "win-win" solutions. |
| | 22 | There is a "strong" culture. |
| | 23 | It is easy to reach consensus, even on difficult issues. |
| | 24 | We often have trouble reaching agreement on key issues. |
| | 25 | There is a clear agreement about the right way and the wrong way to do things. |

| Scale | Item # | Definitions |
|---|---|---|
| | 26 | Our approach to doing business is very consistent and predictable. |
| | 27 | People from different parts of the organization share a common perspective. |
| | 28 | It is easy to coordinate projects across different parts of the organization. |
| | 29 | Working with someone from another part of this organization is like working with someone from a different organization. |
| | 30 | There is a good alignment of goals across levels. |

*Note.* Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. 

Table 7

*Denison Organizational Culture Survey (DOCS)—Adaptability Scale*

| Scale | Item # | Definitions |
|---|---|---|
| Adaptability | 31 | The way things are done is very flexible and easy to change. |
| | 32 | We respond well to competitors and other changes in the business environment. |
| | 33 | New and improved ways to do work are continually adopted. |
| | 34 | Attempts to create change usually meet with resistance. |
| | 35 | Different parts of the organization often cooperate to create change. |
| | 36 | Customer comments and recommendations often lead to changes. |
| | 37 | Customer input directly influences our decisions. |
| | 38 | All members have a deep understanding of customer wants and needs. |
| | 39 | The interests of the customer often get ignored in our decisions. |
| | 40 | We encourage direct contact with customers by our people. |
| | 41 | We view failure as an opportunity for learning and improvement. |

| Scale | Item # | Definitions |
|---|---|---|
| | 42 | Innovation and risk-taking are encouraged and rewarded. |
| | 43 | Lots of things “fall between the cracks”. |
| | 44 | Learning is an important objective in our day-to-day work. |
| | 45 | We make certain that the “right hand knows what the left hand is doing.” |

*Note.* Adapted from “Diagnosing Organizational Cultures: Validating a Model and Method,” by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. 

Table 8

*Denison Organizational Culture Survey (DOCS)—Mission Scale*

| Scale | Item # | Definitions |
|---|---|---|
| Mission | 46 | There is a long-term purpose and direction. |
| | 47 | Our strategy leads other organizations to change the way they compete in the industry. |
| | 48 | There is a clear mission that gives meaning and direction to our work. |
| | 49 | There is a clear strategy for our future. |
| | 50 | Our strategic direction is unclear to me. |
| | 51 | There is widespread agreement about goals. |
| | 52 | Leaders set goals that are ambitious but realistic. |
| | 53 | The leadership has “gone on record” about the objectives we are trying to meet. |
| | 54 | We continuously track our progress against out stated goals. |
| | 55 | People understand what needs to be done for us to succeed in the long run. |
| | 56 | We have a shared vision of what the organization will be like in the future. |
| | 57 | Leaders have a long-tem viewpoint. |
| | 58 | Short-term thinking often compromises our long-term vision. |

| Scale | Item # | Definitions |
|---|---|---|
| | 59 | Our vision creates excitement and motivation for our employees. |
| | 60 | We are able to meet short-term demands without compromising our long-term vision. |

*Note.* Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. Copyright 2006 by Denison Consulting. Adapted with permission.

**DOCS Reliability**

The DOCS Instrument's validity and reliability has been extensively reviewed (Denison et al., 2006). Denison et al. present measurement models, including dimensionality, independent sample replication, discriminate validity, and an item-level statistical analysis for the DOCS. Table 9 describes the alpha coefficients for the DOCS four indexes and 12 scales (N = 35,474) from 160 organizations. Responses were either in paper or electronic form.

Table 9

*Cronbach Coefficients for the Denison Organization Culture Survey*

| Index and scales | Alpha coefficients for inter-items | Alpha coefficient from 15 inter-items |
|---|---|---|
| Involvement | | .89 |
| Empowerment | .76 | |
| Team Orientation | .82 | |
| Capability development | .70 | |
| Consistency | | .88 |
| Core Values | .71 | |
| Agreement | .74 | |
| Coordination/Integration | .78 | |
| Adaptability | | .87 |
| Creating Change | .76 | |
| Customer Focus | .74 | |
| Organizational Learning | .78 | |
| Mission | | .92 |
| Strategic Direction & Intent | .86 | |
| Goals & Objectives | .80 | |
| Vision | .79 | |

*Note.* Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. 

## Procedure

**Data collection**. Access to this organization was obtained following discussions with the Ground Operations Functional Director and the Vice-president of Human Resources. Prior to data collection, an Institutional Review Board for Research with Human Subjects (IRB) Submission Form was completed and approved pursuant to Nova Southeastern University's policy.

This study deployed a web-based survey using a reputable online survey company (Survey-Monkey). By avoiding hosting on the company website, it was hoped response rate issues (anonymity issues, pressure to respond, etc.) would be avoided. A company e-mail was sent announcing the survey and senior mgmt permission, rules of company computer usage, and that participation was voluntary. In addition, the correspondence explained the purpose of the study was to assess their perceived (observed) leadership practices correlated with organizational cultural traits, and provided a statement guaranteeing anonymity. All further correspondence was linked back to the survey website.

A 10-day response period timeline was initially enacted, with an email reminder 7 days into the process (comparing the early/late responders as a non-response strategy). However, a slip in the space shuttle launch schedule blacked out two days where employees were unable to complete the survey if desired. Accordingly, a two day extension was provided to the original end date. It should be noted that this organization has a paperless work environment; all employees are familiar with desktop computers, PC-tablets, and web-based applications, therefore hosting of this survey on a web application should not have affected response rate. In addition to the two instruments

already discussed, the survey also included demographic data on gender, age, education, work experience and organizational function (job category), and hierarchical level. The respondents' former heritage company (if applicable) was used as a control variable to evaluate the potential of subcultures within the organization. The demographic variables selected are consistent with both the Leadership Practices Inventory normative data analysis (Posner, 2008; Posner & Kouzes, 2002) as well as the Denison Organizational Culture Survey (Denison et al., 2006). In the case of the LPI data analysis, this study excluded country location, industry, and organizational size as they were identical for all respondents. Denison et al. sample characteristics are exact.

Respondents' surveys were obtained by the researcher from the host website for subsequent coding and data analysis.

**Data analysis plan.** The primary data analysis techniques employed in this study included Summary Descriptive Statistics, Item Analysis, T-test and Analysis of Variance (ANOVA), Regression analysis, Factor analysis and Correlation analysis. All statistics were run using the NCSS 2007 statistical software package, except for ANOVA and factor analysis which was accomplished using SPSS Version 16. Both the dependent and independent variables were measured with Likert-type scales and were considered as continuous variables. Discussion of the analysis strategy is as follows:

1. Summary descriptive statistics: First, data screening occurred of the data set, ensuring missing data and outliers were evaluated and data validity assured. Parametric statistics assume data is normally distributed with equal variances; therefore, histograms and normal probability were reviewed and Shapiro-Wilk and Anderson-Darling tests formally run to test the data set for a normal

distribution (Note: NCSS runs seven tests for normality, including the Kolmogorov-Smirnov test. The two mentioned generally are considered the most powerful). Means, standard deviation, and variances were evaluated and compared against the published normative database for both instruments.

2. Item analysis: The internal consistency method was utilized to determine Cronbach's alpha for both the LPI and DOCS instruments. A value of at least .07 was expected to assure the reliability of the instruments.
3. Analysis of Variance/T-test: The one-way analysis of variance compared the means of two or more groups to determine if at least one group mean is different from the others. The F-ratio was used to determine statistical significance. Breakdown of the LPI and DOCS by demographic variables was performed. Education, job category, and hierarchical level are categorical, no value limit variables and were analyzed using ANOVA. Age and job experience are continuous variables and are usually analyzed using correlation; in this study, job experience was set up in artificial categories. As such, ANOVA was the appropriate technique for that variable as well. Gender is a categorical two value limit variable and was analyzed using a two-sample t-test. Finally, respondent heritage company (categorical no value limit) was compared to a total culture aggregate culture score using ANOVA.
4. Regression: Regression analysis was used to determine if variances in leadership practices or cultural traits could be accounted for by demographic differences in respondents. In addition, hierarchical forward regression was performed of the study variables with total aggregate culture as the dependant

variable and the five leadership practices as the independent variables. When specifying a regression model, one should first think about and determine the expected signs of the regression parameters. In this case, the expected signs of each parameter were (+); that is, all leadership practices were expected to have a positive effect on the dependent variable. This model took the form of the following equation:

$$Y_i = \beta_0 + \beta_1 X_{I,1} + \beta_2 X_{i,2} + \beta_3 X_{i,3} + \beta_4 X_{i,4} + \beta_5 X_{i,5} + E \quad (1)$$

Where Y = aggregate culture, $X_{i,1}$ through $X_{i,5}$ represent the five leadership practices, $\beta_1$ through $\beta_5$ represent coefficients, $\beta_0$ represents a constant, and E = error term.

5. Correlation analysis: Pearson product-moment correlation matrix was used to test Hypotheses 1 through 20, testing for correlation between the independent variable (leadership) and dependent variable (culture). Factor analysis is an exploratory technique applied to a set of observed variables that seeks to find underlying factors from which the observed variables were generated. Factor analysis was carried out on the correlation matrix of the observed variables, using Principal component analysis with VARIMAX rotation.

It should be noted that aggregating individual responses to the group level was consistent with Denison's (2006) and Kouzes and Posner's (2002) research: A common rule of thumb is within-group indices of at least .70 are required (J. M. George & Bettenhausen, 1990; Judge & Bono, 2000).

**Bias Control**

Survey studies remain the dominant methodology used in leadership research (Hunter, Bedell-Avers, & Mumford, 2007). Accounting for common method bias and control measures are frequent issues in survey studies. Common method bias is where the variance observed is a result of the data collection method rather that what the instrument was meant to test; also, usually all measures are taken at the same time, in the same context, and from a single source. Post-hoc analysis was intended to isolate any common method bias through the use of exploratory factor analysis (Harmon's single-factor test), determining whether all factors loaded on a single variable.

In addition, the researcher had no contact with regard to this study with any of the possible respondents. All possible respondents were directed to a secure, online website link ensuring anonymous and voluntary responses. Each instrument was identical to its original state without modifications.

**Summary**

A relationship between leadership and organizational culture is discussed throughout current literature, but empirical studies validating this assertion have been lacking (Denison & Mishra, 1995; Trice & Beyer, 1991). This research study design offered an opportunity to gather evidence in a unique organization and situational context, using a highly reliable and valid combination of instruments, which should be generalizable across the aerospace industry.

# Chapter IV

## Analysis and Presentation of Findings

### Introduction

The previous chapter discussed the research design and methodology used in this study. The research model was briefed, the hypotheses were restated, and the population and sample were defined and justified. This chapter will present the results obtained through statistical analysis of the survey data collected.

The purpose of this study was to investigate the relationship between perceived leadership practices and organizational culture within NASA's space shuttle processing environment. This is a unique time in the history of the U.S. manned space program where organizational and cultural change must occur, or routine access to space will become a thing of the past. Leadership of the organization and its understanding and influence on organizational change must evolve as well for this to take place (Bergin, 2007; Guthrie & Shayo, 2005; Mason, 2004).

The independent variable in the study was perceived leadership practices, with the dependent variable being organizational culture. Two instruments were administered to the sample population in order to measure these variables. Five leadership practices were measured using the Leadership Practices Inventory–Other (LPI-O) instrument (Kouzes & Posner, 2002). The LPI–O instrument was chosen because it has been field tested and proven reliable in identifying behaviors that affect a leader's performance (Elkins & Keller, 2003). In addition, internal reliability is strong and the instrument has been found to be valid across multiple industries and a broad range of organizational disciplines (Posner, 2008).

Four cultural traits were measured by the Denison Organizational Culture Survey (DOCS) (Denison & Neale, 1996). The DOCS instrument was chosen because it specifically and quantitatively looks at cultural traits that directly affect a firm's financial performance (Fey & Denison, 2003), and because it has strong reliability and validity across a large population (Denison et al., 2006).

**Organization of Data Analysis**

The following is an overview of the three phases of data analysis. First, results of the data screening are presented, with an evaluation of missing data and outliers. A determination of dataset normality is reviewed. Descriptive statistics of the study variables are presented, with raw score comparisons of both LPI–O and DOCS item responses compared to published normative databases. Item analysis is also presented to confirm the expected reliability of both the LPI–O and DOCS instruments (Cronbach's alpha of .07 minimum desired).

The second phase of the analysis consisted of the determination of statistical significance of demographic variables for each instrument, using Analysis of Variance (ANOVA), correlation, and t-test techniques. Regression analysis is presented to determine whether variances in the five leadership practices or four cultural traits are accounted for by demographic differences in respondents. In addition, multiple regression analysis was performed in order to examine the predictive power of the independent variables. A hierarchical forward regression model was used to determine the main effects model only, assessing the magnitude and direction of each leadership practice in relationship to the dependent variable, total culture.

Factor analysis was performed in order to determine the underlying structure of the data. The Principal Component method (total variance) was used to obtain the factor solutions, using a VARIMAX (orthogonal) rotation method. The Kaiser-Meyer-Olkin measure of sampling accuracy (MSA) and Bartlett test of sphericity was employed to test the degree of correlations among the variables. Factor matrices for each instrument were examined to determine if significant loadings were found, and whether communalities were sufficient. It was anticipated that the LPI–O would provide for a 5-factor solution around the five leadership practices, with the DOCS rendering a 12-factor solution around the 12 cultural indices.

Lastly, Pearson's Product-Moment correlation analysis of hypotheses 1–20 was presented, determining if a linear relationship existed between the independent variable, leadership, and dependent variable, culture. Proposed bivariate relationships with each of the five leadership practices and four cultural traits are presented. Pairwise deletion was used to handle missing values issues. Since correlation coefficients are a measure of the linear association between two variables, they, accompanied with measures of statistical significance, determined if the data supports an association between the variables.

All procedures described in this data analysis were performed using NCSS 2007 statistical software, except ANOVA, which was accomplished using SPSS Version 16.

**Sample Overview & Descriptive Statistics**

This research was performed on survey data collected from the Manufacturing & Operations directorate of United Space Alliance, LLC, which consisted of 1,793 employees of varying job classifications. All members of the directorate were invited to participate over a 2-week period. The survey was web-based and hosted through

SurveyMonkey.com, as described in Chapter III. A total of 367 surveys were completed, for an initial response rate of 20.47%. Griffis, Goldsby, and Cooper (2003) comment about the decline in web-based survey responses, stating “the traditional benchmark of 20% usable responses seems less common today than ever before” (p. 237). Larson and Poist (2004) echo Griffis et al.’s concerns on the declining response rates. Wright and Schwager (2008) performed online survey research in an effort to improve response factors. Their sampling frame of N = 1,696 resulted in a total of 280 usable responses, or approximately 16.5%. Accordingly, the response rate for this survey is not unexpected. For a population size of 1,793, Aczel and Sounderpandian (2009) suggest a sample size of 317 respondents to assure a 95% confidence level. Based on the cited literature review, the sample size can be characterized as adequate for this study.

**Sample Overview**

Database screening was performed reporting on the type of data, normality of each variable, missing value patterns, and the presence of outliers. Graphical examination of the data was performed to characterize the shape of the distribution. In general, the individual instrument questions were not normally distributed. As cited in Chapter III, this research proposed relationships between the five leadership practices measured by the LPI–O (aggregate scores) and the four cultural traits measured by the DOCS (average indices). The normality of these variables will be discussed later in this chapter.

**Missing data.** Hair et al. (1998) discussed missing data and recommended the researcher look for patterns that could characterize the missing data process. The number of missing data can vary, both cases and variables, possibly affecting the generalizability of the results. One type of missing data process observed is omission due to procedural

factors. Of the initial 367 responses, eight cases were identified as a failure to complete the entire questionnaire and were eliminated from this study. Upon review of a graphical display of missing values, an additional five cases were eliminated that displayed distinct and identifiable patterns. Furthermore, there were 46 cases where the respondent completed the LPI–O instrument and not the DOCS (and one vice-versa). The first remedy considered was to keep this data intact, as each variable would be treated separately during analysis; however, in none of these cases were any demographic data supplied by the respondent. Since there was no avenue of assuring nonresponse bias, these 46 cases were eliminated.

**Outliers.** The NCSS screening report also tests each observation to determine if it is a multivariate outlier. The program uses a *T*2 test based on the Mahalanobis distance of each point from the variable means (mean center of the observations). A *T*2 probability of less than .05 was used as the threshold value for determining an outlier. Initially, there were 11 outliers identified, all related to the DOCS variables response issues remedied in the preceding paragraph. Elimination of these cases as described eliminated these initial outliers. However, removal of the 46 cases previously described altered the screening to highlight additional outliers to the new dataset. These are reviewed under the normality discussion that follows.

**Nonresponse.** A pattern of nonresponse was noted in some of the demographic questions, specifically when asked about age, level of education, or gender. Nonresponse in sensitive areas such as these was not unexpected. No other cases had a disproportionate number of missing values. No further patterns occurred with a frequency that suggested an underlying missing data process. Therefore, no further case or set of

cases with a missing data pattern could be eliminated that would improve the missing data problem. Since the extent of missing data is small, the resulting sample size of 308 respondents (17.2%) was adequate.

**Normality.** It previously was reported that, generally speaking, neither the LPI–O or DOCS question responses exhibited normal distribution behavior. However, this research focused on the aggregate total scores of the cultural traits and leadership scales in its design. Seven tests for normality were performed for these variables, including the (a) Shapiro-Wilk, (b) Anderson-Darling, (c) Martinez-Iglewicz, (d) Kolmogorov-Smirnov, (e) D'Agostino Skewness, (f) D'Agostino Kurtosis, and (g) D'Agostino Omnibus. Conflicting results were obtained for all variables, except for the Adaptability and Mission traits and total culture scores. Most variables tested well on the Martinez-Iglewicz test for normality, which is based on the median and a robust estimator of dispersion. This test is considered very powerful for heavy-tailed symmetric distributions as well as a variety of other situations. Validation that the nonnormalities were not data entry errors or missing data values was performed.

Normality tests often are inconclusive and can be sensitive to sample sizes. Statisticians (Aczel & Sounderpandian, 2009; Hair et al., 1998) recommend graphical examination of one's data to better understand issues such as these. Appendices B and C contain variable histogram and normal probability plots for the aforementioned variables. By examining the histograms, the shape of the distributions could be observed. Encourage the Heart, Model the Way, and Challenge the Process variables as well as Total Leadership indicated a left-skew (negative) distribution. Normal probability plots depict the inverse of the standard normal cumulative versus the ordered observations. If

the underlying distribution of the data is normal, the points will fall along a straight line. Deviations from this line correspond to various types of nonnormality. Outliers were noted at both ends of the normal probability plot, confirming prior data screening testing.

A scatterplot matrix was generated (see Appendix D) containing the scatterplots for all the metric variables in this study. Blue confidence bands (alpha = .05) serve as a visual reference for departures from normality, and also confirm the presence of outliers. A regression line in red depicts linearity. This examination did not reveal any nonlinear relationships.

**Transformations.** Since the examination of the raw data showed strong asymmetry as well as outliers, data transformations were performed in an attempt to alter the shape of the distribution curves. Square-root, logarithmic, and inverse transformations are the most commonly used for right-side (positive) skewness, with power transformations usually attempted for left-side (negative) skewness (Tan, Gan, & Chang, 2004). Slight data distribution improvements for Total Lead, Challenge the Process, and Encourage Others to Act variables were made through the use of power transformations, which can be seen in Appendix C. Improvements were not seen in the remaining variables, likely due to the outliers present. Accordingly, these variables were used in their original form.

Consideration was given to deletion of the outliers, but this was ultimately rejected. It was felt they likely represented real data from the respondents, and therefore no valid reason for deletion existed. The departures from normality were not to such a level as to invalidate the findings of this research.

**Data recoding.** Each of the Denison Organizational Culture Survey 12 indices was measured by five line items or questions from the survey. Each index was a raw average of the five items. The index and item scored for all respondents were averaged to get an overall score for the organization. Percentile scores were determined for each index by comparing this average against the norm for all organizations for the same index. Questions 15, 24, 29, 34, 39, 43, 50, and 58 were negative questions in the DOCS, therefore respondent scores were reversed for this research (Denison et al., 2006). All scores of 1 were recoded to 5, scores of 2 were recoded to 4, with scores of 3 remaining the same.

Each of the five key practices of exemplary leaders in the Leadership Practices Inventory–Other were measured by six statements from the survey. Mean scores were scored for each statement for all respondents, and averaged to get an overall score for the organization. In addition, mean scores were then converted to percentiles (benchmarking numbers) and compared against the LPI database. Kouzes and Posner (2003a, 2003b) studies indicate that a “high” score is one at the 70th percentile or above, with a “low” score classified as at the 30th percentile or below. A score that falls between 31% and 69% would be considered “moderate.”

In summary, a thorough examination of this dataset was performed. Data transformations were accomplished per standard literature recommendations, with some improvement noted in data distribution. Data recoding for the DOCS was accomplished per prior research, assuring negatively-worded questions scores were reversed. A valid dataset exists and the variable relationship was sufficient to use the statistical techniques discussed in Chapter III.

## Descriptive Statistics

**Population comparison.** Summary demographic information for the population was made available by the organization in order to determine if the sample obtained was representative. Categories differ slightly than those reported in the survey responses, and have been noted in their respective tables. However, it is often observed that refusal to answer certain demographic questions is common in survey research (Hair et al., 1998).

Table 10 characterizes the respondent sample results versus population by job category.

Table 10

*Summary of Responses by Respondent Job Category*

| Job category | Population (%)<br>N = 1,793 | Sample (%)<br>n = 265 |
|---|---|---|
| Management | 6.1 | 12.8 |
| Professional | 11.4 | 16.3 |
| Engineering | 24.7 | 41.1 |
| Technician | 50.6 | 27.9 |
| Clerical | 7.2 | 1.9 |

*Note*. Organization supplied reporting categories. Professional category consists of Operations & Processing Staff responses. Technician category is comprised of Technical Operations Staff responses. Clerical category consists of Administrative Staff responses.

Table 11 characterizes the respondent sample results versus population by gender.

Table 11

*Summary of Responses by Respondent Gender*

| Gender | Population (%) | Sample (%) |
|---|---|---|
| Male | 83.9 | 82.3 |
| Female | 16.1 | 17.7 |

Table 12 characterizes the respondent sample results versus population by education, age, and years of service categories.

Table 12

*Summary of Responses by Respondent Education, Average Age, Average Years of Service*

| Category | Population (%) | Sample (%) |
|---|---|---|
| Degree >= Bachelors | 37.19 | 67.6 |
| Average age (years) | 47.5 | 46.3 |
| Average years of service | 17.0 | 20+ |

*Note.* Organization supplied reporting categories. *Degree >= Bachelors* consists of those personnel having attained a bachelor's, master's, or doctorate level degree.

**Other demographic data.** Tables 13 and 14 depict remaining demographic data that describe the sample but were unable to be compared to the organization population. This demographic data is used later in this chapter for LPI–O and DOCS analysis.

Table 13 shows a summary of respondent self-reported data on their hierarchical position within the organization.

Table 13

*Summary of Responses by Respondent Hierarchical Level*

| Hierarchical level | Count | % |
|---|---|---|
| Nonmanagement | 229 | 87.1 |
| First-line management | 25 | 9.5 |
| Middle management | 7 | 2.7 |
| Senior management | 2 | 0.7 |

*Note*. n = 263.

Table 14 characterizes self-reported data on a respondent's heritage company, if applicable.

Table 14

*Summary of Responses by Respondent Heritage Company*

| Heritage Company | Count | % |
|---|---|---|
| Rockwell | 17 | 6.5 |
| Martin Marietta | 5 | 1.9 |
| Boeing | 3 | 1.2 |
| Lockheed | 123 | 47.3 |
| USBI | 16 | 6.2 |
| ATK | 16 | 6.2 |
| Not applicable | 80 | 30.7 |

Note. *Heritage Company* would be one of the six major aerospace contractors involved in the space shuttle program processing prior to February 1984 and the follow on Space Flight Operations Contract won by Lockheed Space Operations Company.

Based on the self-reported demographic data, it is concluded that this sample is representative of the targeted population.

**Study variables.** Descriptive statistics for all study variables are shown in Table 15.

Table 15

*Descriptive Statistics for Study Variables*

| Variable | Mean | Standard deviation | Standard error |
|---|---|---|---|
| Total Culture | 198.6331 | 35.81956 | 2.041009 |
| Total Leadership | 200.1656 | 55.08916 | 3.138997 |
| Involvement Trait | 3.540476 | 0.7165533 | 4.082941E-02 |
| Consistency Trait | 3.373052 | 0.6941334 | 3.955192E-02 |
| Adaptability Trait | 3.263799 | 0.5912193 | 3.368784E-02 |
| Mission Trait | 3.106331 | 0.7043995 | 4.013688E-02 |
| Challenge the Process | 6.141234 | 1.999332 | 0.1139225 |
| Inspire a Shared Vision | 6.194913 | 2.038019 | 0.1161269 |
| Enable Others to Act | 7.439827 | 2.017642 | 0.1149658 |
| Model the Way | 6.829221 | 1.913282 | 0.1090194 |
| Encourage the Heart | 6.849621 | 2.171469 | 0.123731 |

*Note*. n = 308.

Table 16 compares the respondent raw scores for each of the Five Practices of Exemplary Leadership with the published Leadership Practices Inventory, third edition percentile rankings (Posner & Kouzes, 2002). Four of five practices were reported to be in the low percentile rankings based on mean scores (N = 603,189), with only the Enable

Others to Act practice considered having a moderate impact on respondents. Appendix E contains the rank order of the 30 leadership statements from least to most frequent used for all respondents.

Table 16

*Leadership Practices Percentile Rankings – Sample Raw Scores*

| Variable | Mean | Median | Standard deviation | % |
|---|---|---|---|---|
| Model the Way | | | | |
| Norm | 47.016 | 48.000 | 7.09851 | |
| Sample | 40.792 | 42.500 | 11.5444 | 20 (L) |
| Inspire a Shared Vision | | | | |
| Norm | 44.342 | 45.000 | 8.79206 | |
| Sample | 37.062 | 39.000 | 12.1521 | 20 (L) |
| Challenge the Process | | | | |
| Norm | 46.1146 | 47.000 | 7.21505 | |
| Sample | 36.7273 | 38.000 | 12.0354 | 10 (L) |
| Enable Others to Act | | | | |
| Norm | 49.3973 | 50.000 | 6.41827 | |
| Sample | 44.5584 | 48.000 | 12.0981 | 40 (M) |
| Encourage the Heart | | | | |
| Norm | 47.0553 | 48.000 | 8.19911 | |
| Sample | 41.0260 | 44.000 | 13.0394 | 20 (L) |

*Note*. n=308

Comparisons of the 12 mean average indices for the study sample with Denison's 2004 normative database (Denison Consulting, 2005) were performed in Table 17. The published database displays rankings for the mean ratings needed to score in the 20th, 50th, and 80th percentile. The norm score referenced is the 50th percentile, meaning 50%

of organizations in the benchmark database with the cited score had lower index averages than the study organization. Accordingly, the mean scores of the samples placed them above the percentile noted. See Figure 4 for a representation of the Denison circumplex for this organization.

Table 17

*Denison Organizational Culture Survey Indices—2004 Normative Database Comparison*

| Index | Norm Mean (N = 280,000) | Sample Mean (n = 308) | Percentile |
|---|---|---|---|
| Empowerment | 3.36 | 3.39 | 50th |
| Team Orientation | 3.43 | 3.62 | 50th |
| Capability Development | 3.43 | 3.62 | 50th |
| Core Values | 3.52 | 3.72 | 50th |
| Agreement | 3.23 | 3.36 | 50th |
| Coordination & Integration | 3.07 | 3.04 | 20th |
| Creating Change | 3.13 | 2.71 | 20th |
| Customer Focus | 3.45 | 3.89 | 80th |
| Organizational Learning | 3.18 | 3.19 | 50th |
| Strategic Direction & Intent | 3.39 | 2.96 | 5th |
| Goals & Objectives | 3.48 | 3.49 | 50th |
| Vision | 3.07 | 2.87 | 20th |

Customer focus was the highest reported index in this study well above the 80th percentile, but the team orientation, capability development, core values, and agreement indices were just below their respective 80% thresholds. Strategic direction and intent was the lowest at approximately the 5th percentile, with the vision index low at 20% as well.

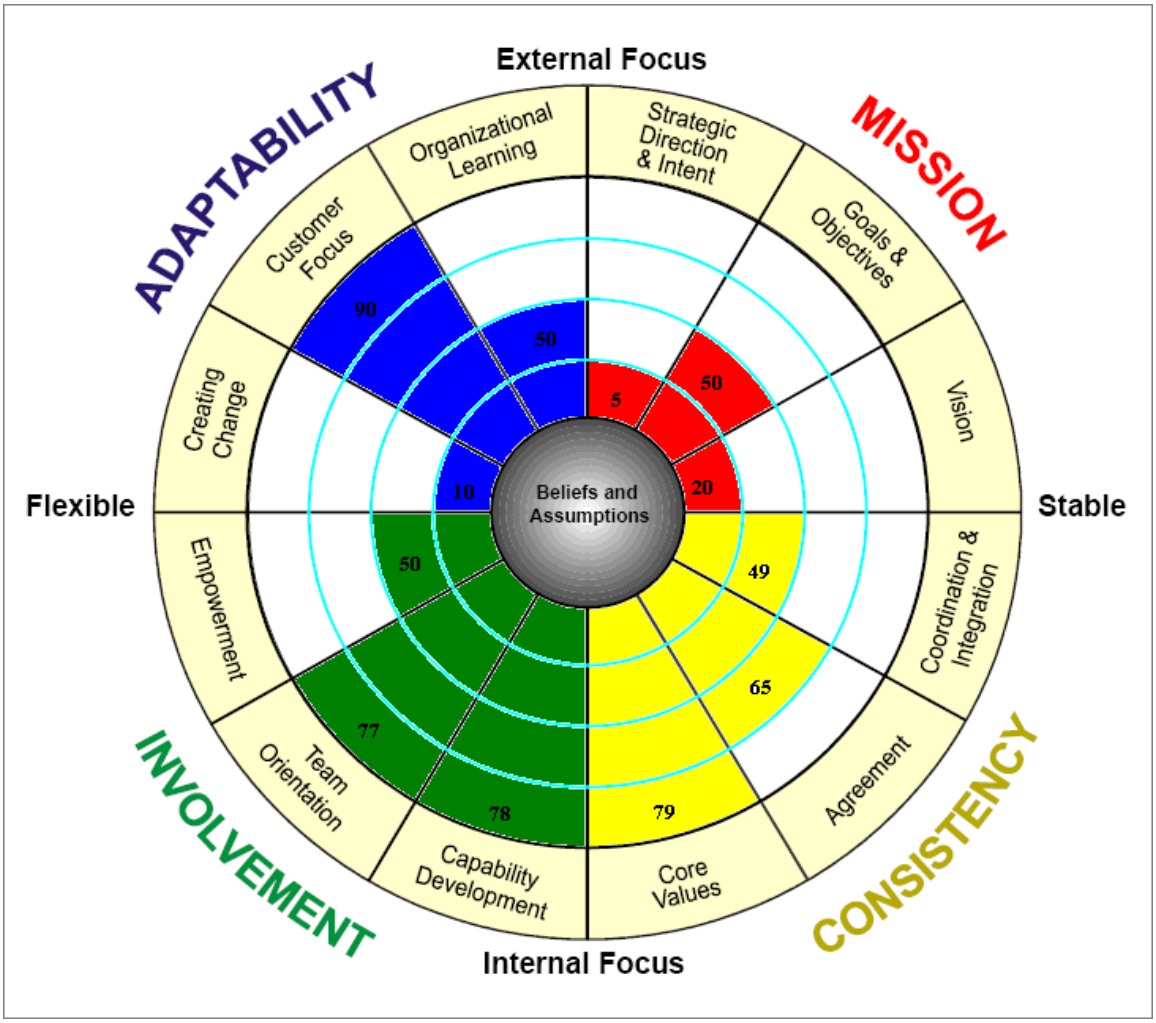



*Figure 4*. Denison Model circumplex—Sample organization. Adapted from "Diagnosing Organizational Cultures: Validating a Model and Method," by D. R. Denison, J. Janovics, J. Young, and H. J. Cho, 2006, retrieved from http://www.denisonconsulting.com/Libraries/Resources/Denison-2006-Validity.sflb.ashx. Copyright 2006 by Denison Consulting. Adapted with permission.

A review of Figure 4 depicts an organization that has an inward-looking focus (high quartile rankings on indices comprising the Involvement and Consistency traits), as opposed to the upper horizontal half of the circumplex depicting a poor focus on the relationship between the organization and the environment (low quartile rankings on Adaptability and Mission traits). Further inspection of the vertical circumplex profile reveals an organization oriented toward Adaptability and Involvement traits, with a decreased emphasis on control and stability (Mission and Consistency traits).

## Reliability

**LPI–Observer.** Cronbach's alpha coefficients were computed for all of the scale data (see Appendices F and G). Table 18 reports the values of the coefficients evaluated with the findings reported by Posner (2008). The coefficients for this study ranged from .88–.94, as compared to Posner's range of .84–.92. Hair et al. (1998) reported the generally accepted lower limit as 0.70. The values computed for this study greatly exceed this limit, assuring reliability of the instrument for this research.

Table 18

*Reliability (Cronbach's Alpha) Coefficients for the LPI–O—Sample*

| Leadership practice | Observers (Posner, 2008) | Observers (Sample) |
|---|---|---|
| Challenge the Process | .86 | .88 |
| Inspire a Shared Vision | .92 | .91 |
| Enable Others to Act | .86 | .92 |
| Model the Way | .84 | .90 |
| Encourage the Heart | .84 | .94 |

*Note.* Adapted from *LPI Data Analysis*, by B. Z. Posner, 2008. Retrieved from http://media.wiley.com/assets/1554/74/LPIDataAnalysisSEP08.pdf. Copyright 2003 by James M. Kouzes and Barry Z. Posner. Adapted with permission.

**Denison Organizational Culture Survey.** Cronbach's alpha coefficients were computed for all of the scale data (see Appendix G). Table 19 reports the values of the coefficients, which compare favorably with the findings reported by Denison et al. (2006) (see Table 9). The coefficients for this study ranged from .66–.83 for the 12 indices, as compared to Denison et al.'s (2006) range of .70–.86. Hair et al. (1998) report the generally accepted lower limit as 0.70, and Table 19 reports a value of .66 for the five items representing the customer focus scale. A review of the reliability matrix in Appendix G indicates the internal Consistency of the scale cannot be improved by omitting any of the five items.

While the alpha coefficient for customer focus scale is questionable by rule of thumb (D. George & Mallery, 2003), the 15 inter-item alpha coefficient for the Adaptability index indicates great internal Consistency (alpha = 0.83). In addition, Table 20 reports the Cronbach Coefficient for the four cultural traits and overall culture. All

meet the previously described lower limit of .70, including the Adaptability trait computed at 0.72. Accordingly, the alpha coefficients for this study are acceptable.

Table 19

*Cronbach Coefficients for the Denison Organization Culture Survey—Sample*

| Index and scales | Alpha coefficients for inter-items | Alpha coefficient from 15 inter-items |
|---|---|---|
| Involvement | | .90 |
| Empowerment | .78 | |
| Team Orientation | .83 | |
| Capability development | .70 | |
| Consistency | | .89 |
| Core Values | .74 | |
| Agreement | .77 | |
| Coordination/Integration | .81 | |
| Adaptability | | .83 |
| Creating Change | .72 | |
| Customer Focus | .66 | |
| Organizational Learning | .74 | |
| Mission | | .89 |
| Strategic Direction & Intent | .75 | |
| Goals & Objectives | .83 | |
| Vision | .71 | |

*Note*. n = 308.

Table 20

*Cronbach Coefficients for the Denison Organization Culture Survey—Sample*

| Traits and overall culture | Alpha coefficients for inter-items |
|---|---|
| Involvement trait | .86 |
| Consistency trait | .83 |
| Adaptability trait | .72 |
| Mission trait | .84 |
| Overall culture | .91 |

**Demographic Variables Group Analysis**

**LPI–O.** The following is a presentation of the supporting data pertaining to the comparison of each of the five leadership practices (LPI–O subscales as the response variable grouped by categorical variable) with the collected demographic variables. Gender is a categorical 2 value limit variable and was analyzed using a t-test. Education, work experience, job category, and hierarchical level are categorical no value limit variables and were analyzed using ANOVA. Age is a continuous variable and was analyzed using the correlation technique.

Comparison (t-test) of respondents by gender for all five leadership practices was performed, looking at differences between male and female respondents. The results indicate that gender was not statistically significant with four of five practices; Enable Others to Act was found statistically different ($\rho < .05$), with males scoring higher ($\mu$ = 45.51 years) than females ($\mu$ = 42.04 years). This result contradicts prior research, which

found no evidence to support that leadership practices were different for males and females (Posner, 2008) (see Table 21).

Table 21

*Leadership Practices by Respondent Gender*

| Leadership practice | Male | Female | t | ρ |
|---|---|---|---|---|
| Model the Way | | | | |
| Mean | 41.5 | 38.83 | -1.2744 | 0.202519 |
| S.D. | 11.37 | 12.5 | | |
| Sample Size | 218 | 47 | | |
| Inspire a Shared Vision | | | | |
| Mean | 38.14 | 35.30 | -1.0865 | 0.277276 |
| S.D. | 11.61 | 13.74 | | |
| Sample Size | 218 | 47 | | |
| Challenge the Process | | | | |
| Mean | 37.32 | 35.93617 | -0.5878 | 0.556689 |
| S.D. | 11.76 | 12.92 | | |
| Sample Size | 218 | 47 | | |
| Enable Others to Act | | | | |
| Mean | 45.51 | 42.04 | -2.0602 | 0.039381 * |
| S.D. | 11.77 | 13.19 | | |
| Sample Size | 218 | 47 | | |

* $\rho < .05$.

Correlation was performed to determine if there was a relationship between respondents' age and leadership practices. The results indicate there was not a significant relationship between the two, supporting earlier research findings (Posner, 2008) (see Table 22 for coefficients and probabilities).

Table 22

*Correlations of Age with Leadership Practices*

| | MTW | ISV | CTP | EOA | ETH |
|---|---|---|---|---|---|
| Correlation | -0.034387 | 0.043359 | 0.022306 | -0.109365 | -0.010551 |
| ρ | 0.552316 | 0.453575 | 0.699922 | 0.058064 | 0.855345 |

*Note*. n = 301. None of the variables were significant at the .05 level (ρ < .05). MTW = Model the Way practice; ISV = Inspire a Shared Vision practice; CTP = Challenge the Process practice; EOA = Enable Others to Act practice; ETH = Encourage the Heart practice

Analysis of variance was used to factor respondent education level (see Table 23), work experience (see Table 24), job category (see Table 25) and hierarchical level (see Table 26) with leadership practices (dependent variable). The results of the ANOVA indicate there were no significant group differences on the dependent variables for either education level or work experience at a .05 probability level. Significant between-group differences were noted on both the job category and hierarchical level factors on the Inspire a Shared Vision practice. Post-hoc Tukey-Kramer analysis was performed in order to provide multiple comparison tests for all pairwise differences between the means (within group's comparisons). There were no significant group-to-group differences noted.

Table 23

*ANOVA of Education with Leadership Practices*

| Leadership practice | | Squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| MTW | Between Groups | 131.814 | 3 | 43.938 | .323 | .808 |
| | Within Groups | 35042.725 | 258 | 135.825 | | |
| | Total | 35174.538 | 261 | | | |
| ISV | Between Groups | 102.903 | 3 | 34.301 | .234 | .872 |
| | Within Groups | 37742.410 | 258 | 146.288 | | |
| | Total | 37845.313 | 261 | | | |
| CTP | Between Groups | 50.569 | 3 | 16.856 | .117 | .950 |
| | Within Groups | 37303.293 | 258 | 144.586 | | |
| | Total | 37353.863 | 261 | | | |
| EOA | Between Groups | 431.546 | 3 | 143.849 | .980 | .403 |
| | Within Groups | 37855.065 | 258 | 146.725 | | |
| | Total | 38286.611 | 261 | | | |
| ETH | Between Groups | 260.052 | 3 | 86.684 | .511 | .675 |
| | Within Groups | 43740.559 | 258 | 169.537 | | |
| | Total | 44000.611 | 261 | | | |

*Note*. MTW = Model the Way practice; ISV = Inspire a Shared Vision practice; CTP = Challenge the Process practice; EOA = Enable Others to Act practice; ETH = Encourage the Heart practice

Table 24

*ANOVA of Work Experience with Leadership Practices*

| Leadership practice | | Squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| MTW | Between Groups | 342.389 | 6 | 57.065 | .417 | .868 |
| | Within Groups | 34917.829 | 255 | 136.933 | | |
| | Total | 35260.218 | 261 | | | |
| ISV | Between Groups | 282.454 | 6 | 46.909 | .317 | .928 |
| | Within Groups | 37684.916 | 255 | 147.784 | | |
| | Total | 37966.370 | 261 | | | |
| CTP | Between Groups | 475.033 | 6 | 79.172 | .543 | .775 |
| | Within Groups | 37194.757 | 255 | 145.862 | | |
| | Total | 37669.790 | 261 | | | |
| EOA | Between Groups | 758.660 | 6 | 126.443 | .862 | .523 |
| | Within Groups | 37405.340 | 255 | 146.688 | | |
| | Total | 38164.000 | 261 | | | |
| ETH | Between Groups | 359.181 | 6 | 59.863 | .348 | .911 |
| | Within Groups | 43845.934 | 255 | 171.945 | | |
| | Total | 44205.115 | 261 | | | |

*Note*. MTW = Model the Way practice; ISV = Inspire a Shared Vision practice; CTP = Challenge the Process practice; EOA = Enable Others to Act practice; ETH = Encourage the Heart practice

Table 25

*ANOVA of Job Category with Leadership Practices*

| Leadership practice | | Squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| MTW | Between Groups | 1164.719 | 4 | 292.180 | 2.205 | .069 |
| | Within Groups | 34335.040 | 260 | 132.058 | | |
| | Total | 35499.758 | 264 | | | |
| ISV | Between Groups | 1479.882 | 4 | 369.970 | 2.616 | .036* |
| | Within Groups | 36765.341 | 260 | 141.405 | | |
| | Total | 38245.223 | 264 | | | |
| CTP | Between Groups | 1118.765 | 4 | 279.691 | 1.986 | .097 |
| | Within Groups | 36614.873 | 260 | 140.826 | | |
| | Total | 37733.638 | 264 | | | |
| EOA | Between Groups | 1048.810 | 4 | 262.203 | 1.819 | .125 |
| | Within Groups | 37702.247 | 260 | 144.569 | | |
| | Total | 37945.452 | 264 | | | |
| ETH | Between Groups | 819.676 | 4 | 204.919 | 1.217 | .304 |
| | Within Groups | 43766.060 | 260 | 168.331 | | |
| | Total | 43921.080 | 264 | | | |

*Note*. MTW = Model the Way practice; ISV = Inspire a Shared Vision practice; CTP = Challenge the Process practice; EOA = Enable Others to Act practice; ETH = Encourage the Heart practice
* $\rho < .05$

Table 26

*ANOVA of Hierarchical Level with Leadership Practices*

| Leadership practice | | Squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| MTW | Between Groups | 454.174 | 3 | 151.391 | 1.135 | .336 |
| | Within Groups | 34557.628 | 259 | 133.427 | | |
| | Total | 35011.802 | 262 | | | |
| ISV | Between Groups | 1601.22 | 3 | 533.739 | 3.777 | .011* |
| | Within Groups | 36601.44 | 259 | 141.318 | | |
| | Total | 38202.66 | 262 | | | |
| CTP | Between Groups | 921.308 | 3 | 307.103 | 2.162 | .093 |
| | Within Groups | 36785.681 | 259 | 142.030 | | |
| | Total | 37706.989 | 262 | | | |
| EOA | Between Groups | 243.205 | 3 | 81.068 | .557 | .664 |
| | Within Groups | 37702.247 | 259 | 144.569 | | |
| | Total | 37945.452 | 262 | | | |
| ETH | Between Groups | 786.288 | 3 | 262.096 | 1.574 | .196 |
| | Within Groups | 43134.792 | 259 | 166.544 | | |
| | Total | 43921.080 | 262 | | | |

*Note*. MTW = Model the Way practice; ISV = Inspire a Shared Vision practice; CTP = Challenge the Process practice; EOA = Enable Others to Act practice; ETH = Encourage the Heart practice
$\rho < .05$.

**DOCS.** The following is a presentation of the supporting data pertaining to the comparison of each of the four cultural traits (DOCS subscales as the response variable grouped by categorical variable) with the collected demographic variables. Gender is a categorical 2 value limit variable and was analyzed using a t-test. Education, work experience, job category, and hierarchical level are categorical no value limit variables

and were analyzed using ANOVA. Age is a continuous variable and was analyzed using the correlation technique.

Comparison (t-test) of respondents by gender for all four cultural traits was performed. The results indicate that gender was not statistically significant ($\rho < .05$) with any of the cultural traits (see Table 27).

Table 27

*Cultural Trait by Respondent Gender*

| Cultural trait | Male | Female | t | ρ |
|---|---|---|---|---|
| Involvement | | | | |
| Mean | 53.28 | 52.09 | -0.3401 | 0.733768 |
| S.D. | 10.19 | 11.78 | | |
| Sample Size | 218 | 47 | | |
| Consistency | | | | |
| Mean | 50.50 | 49.60 | -0.1470 | 0.883160 |
| S.D. | 9.92 | 11.43 | | |
| Sample Size | 218 | 47 | | |
| Adaptability | | | | |
| Mean | 48.28 | 49.85 | 1.4572 | 0.145067 |
| S.D. | 9.07 | 8.84 | | |
| Sample Size | 218 | 47 | | |
| Mission | | | | |
| Mean | 46.55 | 45.55 | -0.4188 | 0.675337 |
| S.D. | 10.66 | 9.79 | | |
| Sample Size | 218 | 47 | | |

Correlation was performed to determine if there was a relationship between respondents' age and the four cultural traits. The results indicate there was not a significant relationship between the two (see Table 28 for coefficients and probabilities).

Table 28

*Correlations of Age with Cultural Traits*

| | Involvement | Consistency | Adaptability | Mission |
|---|---|---|---|---|
| Correlation | 0.106064 | 0.090999 | 0.038498 | 0.089660 |
| ρ | 0.066112 | 0.115147 | 0.505808 | 0.120614 |

*Note*. n=301. None of the variables were significant at the .05 level ($\rho < .05$)

Analysis of variance was used to factor respondent education level (see Table 29), work experience (see Table 30), job category (see Table 31) and hierarchical level (see Table 32) with the four cultural traits (dependent variable). The results of the ANOVA indicate there were no significant group differences on the dependent variables for any of the demographic factors (.05 probability level). F-statistics and probabilities can be found in the listed tables.

Table 29

*ANOVA of Education with Cultural Traits*

| Cultural trait | | Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| INV | Between Groups | 224.088 | 3 | 74.696 | .673 | .569 |
| | Within Groups | 28619.164 | 258 | 110.927 | | |
| | Total | 35011.802 | 262 | | | |
| CON | Between Groups | 617.311 | 3 | 205.770 | 2.002 | .114 |
| | Within Groups | 26514.449 | 258 | 102.769 | | |
| | Total | 27131.760 | 261 | | | |
| ADA | Between Groups | 153.231 | 3 | 51.077 | .619 | .604 |
| | Within Groups | 21305.291 | 258 | 82.579 | | |
| | Total | 21458.523 | 263 | | | |
| MIS | Between Groups | 119.000 | 3 | 39.667 | .355 | .785 |
| | Within Groups | 28802.068 | 258 | 111.636 | | |
| | Total | 28921.069 | 261 | | | |

*Note*. INV = Involvement trait; CON = Consistency trait; ADA = Adaptability trait; MIS = Mission trait.

Table 30

*ANOVA of Work Experience with Cultural Traits*

| Cultural trait | | Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| INV | Between Groups | 949.432 | 6 | 158.239 | 1.473 | .188 |
| | Within Groups | 27389.106 | 255 | 107.408 | | |
| | Total | 28338.538 | 261 | | | |
| CON | Between Groups | 597.653 | 6 | 99.609 | .956 | .456 |
| | Within Groups | 26581.527 | 255 | 104.241 | | |
| | Total | 27179.179 | 261 | | | |
| ADA | Between Groups | 636.419 | 6 | 106.070 | 1.325 | .246 |
| | Within Groups | 20411.020 | 255 | 80.043 | | |
| | Total | 21047.439 | 261 | | | |
| MIS | Between Groups | 864.691 | 6 | 144.115 | 1.335 | .242 |
| | Within Groups | 27528.733 | 255 | 107.956 | | |
| | Total | 28393.424 | 261 | | | |

*Note*. INV = Involvement trait; CON = Consistency trait; ADA = Adaptability trait; MIS = Mission trait.

Table 31

*ANOVA of Job Category with Cultural Traits*

| Cultural trait | | Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| INV | Between Groups | 651.523 | 4 | 162.881 | 1.495 | .204 |
| | Within Groups | 28327.254 | 260 | 108.951 | | |
| | Total | 28978.777 | 264 | | | |
| CON | Between Groups | 497.076 | 4 | 124.269 | 1.201 | .311 |
| | Within Groups | 26896.358 | 260 | 103.448 | | |
| | Total | 27393.434 | 264 | | | |
| ADA | Between Groups | 108.971 | 4 | 27.243 | .331 | .857 |
| | Within Groups | 21430.372 | 260 | 82.425 | | |
| | Total | 21539.343 | 264 | | | |
| MIS | Between Groups | 598.625 | 4 | 149.656 | 1.336 | .246 |
| | Within Groups | 28491.390 | 260 | 109.582 | | |
| | Total | 29090.015 | 264 | | | |

*Note*. INV = Involvement trait; CON = Consistency trait; ADA = Adaptability trait; MIS = Mission trait.

Table 32

*ANOVA of Hierarchical Level with Cultural Traits*

| Cultural trait | | Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| INV | Between Groups | 600.567 | 3 | 200.189 | 1.831 | .142 |
| | Within Groups | 28314.125 | 259 | 109.321 | | |
| | Total | 28914.692 | 262 | | | |
| CON | Between Groups | 263.048 | 3 | 87.683 | .844 | .471 |
| | Within Groups | 26892.320 | 259 | 103.831 | | |
| | Total | 27155.369 | 262 | | | |
| ADA | Between Groups | 544.879 | 3 | 181.626 | 2.246 | .083 |
| | Within Groups | 20942.398 | 259 | 80.859 | | |
| | Total | 21487.278 | 262 | | | |
| MIS | Between Groups | 469.048 | 3 | 156.349 | 1.423 | .237 |
| | Within Groups | 28460.481 | 259 | 109.886 | | |
| | Total | 28929.529 | 262 | | | |

*Note*. INV = Involvement trait; CON = Consistency trait; ADA = Adaptability trait; MIS = Mission trait.

## Regression Analysis of Demographic Variables

**LPI–O.** Regression analysis of leadership practices by demographic variables was performed in order to examine whether variances in either could be explained by differences in respondents. The following six demographic variables were entered into the regression equation for each of the five leadership practices: age, education, gender, job category, hierarchical level, and length of time with the organization. The results of the regression analysis are displayed in Table 33. As Table 33 demonstrates, the variances for each of the leadership practices are quite low. In fact, these various demographic variables (in total) account for only 2.4% of the variance. This data supports

previous research finding demographic variables account for little variance in leadership (Posner, 2008).

Table 33

*Regression Analysis of Leadership Practices by Demographic Variables*

| Leadership practice | R | $R^2$ |
|---|---|---|
| Model the Way | .195 | .038 |
| Inspire a Shared Vision | .239 | .057 |
| Challenge the Process | .184 | .034 |
| Enable Others to Act | .258 | .066 |
| Encourage the Heart | .211 | .045 |

**DOCS.** Regression analysis of cultural traits by demographic variables was performed in order to examine whether trait variances could be explained by differences in respondents. The following six demographic variables were entered into the regression equation for each of the four cultural traits: age, education, gender, job category, hierarchical level, and length of time with the organization. The results of the regression analysis are displayed in Table 34. As Table 34 illustrates, the variances for each of the cultural traits are quite low. In fact, these various demographic variables (in total) account for only 1.15% of the variance. This data supports previous research finding demographic variables (or diversity) account for little variance in cultural traits (Guidroz & Kotrba, 2008).

Table 34

*Regression Analysis of Cultural Traits by Demographic Variables*

| Leadership practice | R | $R^2$ |
|---|---|---|
| Involvement | .210 | .044 |
| Consistency | .161 | .026 |
| Adaptability | .160 | .026 |
| Mission | .137 | .019 |

**Regression Analysis of Study Variables**

Multiple regression analysis using a hierarchical forward model was performed using total culture as the dependent variable and the five leadership practices as independent variables. Hierarchical forward regression finds the best variable and enters it as an independent variable. Subsequently, the routine finds the next variable that increases the likelihood and enters that variable, continuing until the algorithm is complete. The Up to 1-Way option was taken to determine the main effects model only. This option ensured that only the variables that were specified would be used (no other terms generated through cross products or interactive terms).

The results of the regression are listed in Table 35. The variables are listed in the order the terms were entered into the model. The initial $R^2$ after the Challenge the Process term was entered (Step1) was 0.2212. A final $R^2$ of 0.2436 was observed after the Inspire a Shared Vision term was added (Step 5), for a $\Delta R^2$ of 0.0224. Alternatively, the five leadership practices account for 24% of the variance in the dependent variable total

culture, with the Challenge the Process practice having the greatest effect. Additional information on this procedure may be found in Appendix H.

Table 35

*Summary of Hierarchical Regression Analysis for Total Culture on LPI–O Leadership Practices*

| Variable | *B* | *SE B* |
|---|---|---|
| Challenge the Process | 0.7458 | 0.3182 |
| Model the Way | 0.5071 | 0.3762 |
| Enable Others to Act | 0.3877 | 0.2954 |
| Encourage the Heart | -0.1291 | 0.2773 |
| Inspire a Shared Vision | 0.0914 | 0.3235 |

*Note: B* = the unstandardized coefficient; *SE B* = the standard error of the coefficient. F-ratio for model is 19.448, with a $\rho < .05$.

**Factor Analysis**

**LPI–O.** SPSS Version 16 was used to analyze the scale data for the Leadership Practices Inventory–Other instrument (see Appendix I). Since all 30 questions comprised the five scales for the corresponding five leadership practices, it was anticipated that five factors would be extracted. However, a three-factor solution for the LPI was generated by a factor analysis (68.3% of total variance), using Principal Component analysis with Varimax rotation and Kaiser normalization. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy statistic was .967, indicating that a factor analysis would be useful with the data. Bartlett's Test of Sphericity produced a significance level of < .001,

indicating there were significant relationships among the variables. Average communality was .683.

Review of the Rotated Component Matrix revealed some statements loaded on more than one factor, with the highest loading generally with other statements conceptualized as comprising the factor (scale). Factor 1 was comprised strongly of Encouraging the Heart statements (ETH30, ETH5, ETH15, ETH25, ETH20), accompanied with Enabling Others to Act (EOA19). Factor 2 was loaded equally on Inspiring a Shared Vision (ISV17, ISV12,) and Challenging the Process (CTP8, CTP13, CTP28) statements, with factor 3 loaded heavily on Modeling the Way (MTW1, MTW6, MTW26, MTW11) statements. These results provide empirical support for these leadership behaviors to be characterized within five practices.

**DOCS.** SPSS Version 16 was used to analyze the scale data for the Denison Organizational Culture Survey instrument (see Appendix J). Since all 60 questions comprised the 12 indices and their corresponding four cultural traits, it was anticipated that 12 factors would be extracted. However, a 13-factor solution for the DOCS was generated by a factor analysis (63.28% of total variance), using Principal Component analysis with Varimax rotation and Kaiser normalization. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy statistic was .933, indicating that a factor analysis would be useful with the data. Bartlett's Test of Sphericity produced a significance level of < .001, indicating there were significant relationships among the variables. Average communality was .630.

Review of the Rotated Component Matrix revealed some clustered statements that generally supported the expected scale relationships (although loaded on more than one

factor). Factor 1 was composed of strong terms of Questions 1–15, which measured the Involvement trait. Factor 2 tends to consist highly of strong statements corresponding to the Mission trait, questions 45–60. Factors 3 and 4 consisted of those statements comprising the Consistency trait, questions 15–30, with Factor 5 composed of those items corresponding to the Adaptability trait, questions 30–45.

These results provide moderate empirical support for the cultural trait relationships.

**Research Question and Associated Hypotheses**

The following statement comprises the framework for the research performed in this study (see Chapter III for research model):

> Is there a relationship between employee perceived leadership practices and organizational culture in the space shuttle processing environment?

In Chapter III, 20 hypotheses were formulated and presented relative to the relationship between the LPI–O leadership practices and the DOCS cultural traits. In each instance, the statement of the alternative hypothesis ($H_a$) follows the statement of the null hypothesis ($H_0$):

Hypothesis 1

$H_0 1_:$ There is no relationship between Modeling the Way and the cultural trait Involvement.

$H_a 1_:$ There is a relationship between Modeling the Way and the cultural trait Involvement.

Hypothesis 2

$H_0$2: There is no relationship between Inspiring a Shared Vision and the cultural trait Involvement.

$H_a$2: There is a relationship between Inspiring a Shared Vision and the cultural trait Involvement.

Hypothesis 3

$H_0$3: There is no relationship between Challenging the Process and the cultural trait Involvement.

$H_a$3: There is a relationship between Challenging the Process and the cultural trait Involvement.

Hypothesis 4

$H_0$4: There is no relationship between Enabling Others to Act and the cultural trait Involvement.

$H_a$4: There is a relationship between Enabling Others to Act and the cultural trait Involvement.

Hypothesis 5

$H_0$5: There is no relationship between Encouraging the Heart and the cultural trait Involvement.

$H_a$5: There is a relationship between Encouraging the Heart and the cultural trait Involvement.

Hypothesis 6

$H_0$6: There is no relationship between Modeling the Way and the cultural trait Consistency.

$H_a6$: There is a relationship between Modeling the Way and the cultural trait Consistency.

Hypothesis 7

$H_07$: There is no relationship between Inspiring a Shared Vision and the cultural trait Consistency.

$H_a7$: There is a relationship between Inspiring a Shared Vision and the cultural trait Consistency.

Hypothesis 8

$H_08$: There is no relationship between Challenging the Process and the cultural trait Consistency.

$H_a8$: There is a relationship between Challenging the Process and the cultural trait Consistency.

Hypothesis 9

$H_09$: There is no relationship between Enabling Others to Act and the cultural trait Consistency.

$H_a9$: There is a relationship between Enabling Others to Act and the cultural trait Consistency.

Hypothesis 10

$H_010$: There is no relationship between Encouraging the Heart and the cultural trait Consistency.

$H_a10$: There is a relationship between Encouraging the Heart and the cultural trait Consistency.

Hypothesis 11

$H_0$11: There is no relationship between Modeling the Way and the cultural trait Adaptability.

$H_a$11: There is a relationship between Modeling the Way and the cultural trait Adaptability.

Hypothesis 12

$H_0$12: There is no relationship between Inspiring a Shared Vision and the cultural trait Adaptability.

$H_a$12: There is a relationship between Inspiring a Shared Vision and the cultural trait Adaptability.

Hypothesis 13

$H_0$13: There is no relationship between Challenging the Process and the cultural trait Adaptability.

$H_a$13: There is a relationship between Challenging the Process and the cultural trait Adaptability.

Hypothesis 14

$H_0$14: There is no relationship between Enabling Others to Act and the cultural trait Adaptability.

$H_a$14: There is a relationship between Enabling Others to Act and the cultural trait Adaptability.

Hypothesis 15

$H_0$15: There is no relationship between Encouraging the Heart and the cultural trait Adaptability.

$H_a$15: There is a relationship between Encouraging the Heart and the cultural trait Adaptability.

Hypothesis 16

$H_0$16: There is no relationship between Modeling the Way and the cultural trait Mission.

$H_a$16: There is a relationship between Modeling the Way and the cultural trait Mission.

Hypothesis 17

$H_0$17: There is no relationship between Inspiring a Shared Vision and the cultural trait Mission.

$H_a$17: There is a relationship between Inspiring a Shared Vision and the cultural trait Mission.

Hypothesis 18

$H_0$18: There is no relationship between Challenging the Process and the cultural trait Mission.

$H_a$18: There is a relationship between Challenging the Process and the cultural trait Mission.

Hypothesis 19

$H_0$19: There is no relationship between Enabling Others to Act and the cultural trait Mission.

$H_a$19: There is a relationship between Enabling Others to Act and the cultural trait Mission.

Hypothesis 20

$H_0$20: There is no relationship between Encouraging the Heart and the cultural trait Mission.

$H_a$20: There is a relationship between Encouraging the Heart and the cultural trait Mission.

**Analysis of Data**

Pearson product-moment correlation matrix was used to test hypotheses 1–20, testing for pair-wise correlation between the independent variable (leadership) and dependent variable (culture). Correlation is a parameter of the bivariate distribution, and is used to describe the association between two variables. Both dependent and independent variables are assumed to be random in this statistical technique. The magnitude of the correlation and statistical significance are used to examine and quantify these relationships.

The independent variable was composed of five leadership practices: Modeling the Way (MTW), Inspiring a Shared Vision (ISV), Challenging the Process (CTP), Enabling Others to Act (EOA), and Encouraging the Heart (ETH). The dependent variable was composed of four cultural traits: Involvement, Consistency, Adaptability, and Mission. Tables 36–39 report the results of these tests. The complete correlation matrix may be found in Appendix K.

Table 36

*Pearson Correlation—Involvement with Leadership Practices*

| | MTW | ISV | CTP | EOA | ETH |
|---|---|---|---|---|---|
| Involvement | | | | | |
| Correlation (r) | .420 | .412 | .435 | .400 | .350 |
| Significance (ρ) | .000* | .000* | .000* | .000* | .000* |

*Note*. n=308.
*Correlation is significant at the .05 level (two-tailed)

Hypothesis 1 suggests there is a relationship between Modeling the Way and the cultural trait Involvement. Table 36 indicates a correlation (r) of .420 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 1$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Modeling the Way and the cultural trait Involvement.

Hypothesis 2 suggests there is a relationship between Inspiring a Shared Vision and the cultural trait Involvement. Table 36 indicates a correlation (r) of .412 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 2$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Inspiring a Shared Vision and the cultural trait Involvement.

Hypothesis 3 suggests there is a relationship between Challenging the Process and the cultural trait Involvement. Table 36 indicates a correlation (r) of .435 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 3$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Challenging the Process and the cultural trait Involvement.

Hypothesis 4 suggests there is a relationship between Enabling Others to Act and the cultural trait Involvement. Table 36 indicates a correlation (r) of .400 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 4$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Enabling Others to Act and the cultural trait Involvement.

Hypothesis 5 suggests there is a relationship between Encouraging the Heart and the cultural trait Involvement. Table 36 indicates a correlation (r) of .350 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 5$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Encouraging the Heart and the cultural trait Involvement.

Table 37

*Pearson Correlation—Consistency with Leadership Practices*

| | MTW | ISV | CTP | EOA | ETH |
|---|---|---|---|---|---|
| Consistency | | | | | |
| Correlation (r) | .430 | .387 | .424 | .365 | .356 |
| Significance (ρ) | .000* | .000* | .000* | .000* | .000* |

*Note*. n=308.
*Correlation is significant at the .05 level (two-tailed)

Hypothesis 6 suggests there is a relationship between Modeling the Way and the cultural trait Consistency. Table 37 indicates a correlation (r) of .430 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 6$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Modeling the Way and the cultural trait Consistency.

Hypothesis 7 suggests there is a relationship between Inspiring a Shared Vision and the cultural trait Consistency. Table 37 indicates a correlation (r) of .387 with $\alpha <$ .01. Since the significance is less than the alpha (.05), $H_0$7 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Inspiring a Shared Vision and the cultural trait Consistency

Hypothesis 8 suggests there is a relationship between Challenging the Process and the cultural trait Consistency. Table 37 indicates a correlation (r) of .424 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$8 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Challenging the Process and the cultural trait Consistency

Hypothesis 9 suggests there is a relationship between Enabling Others to Act and the cultural trait Consistency. Table 37 indicates a correlation (r) of .365 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$9 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Enabling Others to Act and the cultural trait Consistency

Hypothesis 10 suggests there is a relationship between Encouraging the Heart and the cultural trait Consistency. Table 37 indicates a correlation (r) of .356 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$10 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Encouraging the Heart and the cultural trait Consistency

Table 38

*Pearson Correlation - Adaptability with Leadership Practices*

| | MTW | ISV | CTP | EOA | ETH |
|---|---|---|---|---|---|
| Adaptability | | | | | |
| Correlation (r) | .415 | .373 | .444 | .394 | .370 |
| Significance (ρ) | .000* | .000* | .000* | .000* | .000* |

*Note*. n=308.
*Correlation is significant at the .05 level (two-tailed)

Hypothesis 11 suggests there is a relationship between Modeling the Way and the cultural trait Adaptability. Table 38 indicates a correlation (r) of .415 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 11$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Modeling the Way and the cultural trait Adaptability.

Hypothesis 12 suggests there is a relationship between Inspiring a Shared Vision and the cultural trait Adaptability. Table 38 indicates a correlation (r) of .373 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 12$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Inspiring a Shared Vision and the cultural trait Adaptability.

Hypothesis 13 suggests there is a relationship between Challenging the Process and the cultural trait Adaptability. Table 38 indicates a correlation (r) of .444 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0 13$ is rejected. Therefore, there is support for the hypothesis that there is a relationship between Challenging the Process and the cultural trait Adaptability.

Hypothesis 14 suggests there is a relationship between Enabling Others to Act and the cultural trait Adaptability. Table 38 indicates a correlation (r) of .394 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$14 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Enabling Others to Act and the cultural trait Adaptability.

Hypothesis 15 suggests there is a relationship between Encouraging the Heart and the cultural trait Adaptability. Table 38 indicates a correlation (r) of .370 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$15 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Encouraging the Heart and the cultural trait Adaptability.

Table 39

*Pearson Correlation—Mission with Leadership Practices*

| | MTW | ISV | CTP | EOA | ETH |
|---|---|---|---|---|---|
| Mission | | | | | |
| Correlation (r) | .373 | .365 | .363 | .323 | .313 |
| Significance (ρ) | .000* | .000* | .000* | .000* | .000* |

*Note*. n=308.
*Correlation is significant at the .05 level (two-tailed)

Hypothesis 16 suggests there is a relationship between Modeling the Way and the cultural trait Mission. Table 39 indicates a correlation (r) of .373 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$16 is rejected. Therefore, there is support for

the hypothesis that there is a relationship between Modeling the Way and the cultural trait Mission.

Hypothesis 17 suggests there is a relationship between Inspiring a Shared Vision and the cultural trait Mission. Table 39 indicates a correlation (r) of .365 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$17 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Inspiring a Shared Vision and the cultural trait Mission.

Hypothesis 18 suggests there is a relationship between Challenging the Process and the cultural trait Mission. Table 39 indicates a correlation (r) of .363 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$18 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Challenging the Process and the cultural trait Mission.

Hypothesis 19 suggests there is a relationship between Enabling Others to Act and the cultural trait Mission. Table 39 indicates a correlation (r) of .323 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$19 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Enabling Others to Act and the cultural trait Mission.

Hypothesis 20 suggests there is a relationship between Encouraging the Heart and the cultural trait Mission. Table 39 indicates a correlation (r) of .313 with $\alpha < .01$. Since the significance is less than the alpha (.05), $H_0$20 is rejected. Therefore, there is support for the hypothesis that there is a relationship between Encouraging the Heart and the cultural trait Mission.

**Summary of Hypothesis Testing Results**

A summary of the hypothesis testing accomplished during this study is represented in Table 40:

Table 40

*Summary of Hypothesis Test Results*

| Hypothesis | Variables | Statistical test performed | Results |
|---|---|---|---|
| H1 | Modeling the Way & Involvement | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H2 | Inspiring a Shared Vision & Involvement | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H3 | Challenging the Process & Involvement | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H4 | Enabling Others to Act & Involvement | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H5 | Encouraging the Heart & Involvement | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H6 | Modeling the Way & Consistency | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H7 | Inspiring a Shared Vision & Consistency | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H8 | Challenging the Process & Consistency | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H9 | Enabling Others to Act & Consistency | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H10 | Encouraging the Heart & Consistency | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H11 | Modeling the Way & Adaptability | Pearson's Product Moment Correlation | Rejected null hypothesis |

| Hypothesis | Variables | Statistical test performed | Results |
|---|---|---|---|
| H12 | Inspiring a Shared Vision & Adaptability | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H13 | Challenging the Process & Adaptability | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H14 | Enabling Others to Act & Adaptability | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H15 | Encouraging the Heart & Adaptability | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H16 | Modeling the Way & Mission | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H17 | Inspiring a Shared Vision & Mission | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H18 | Challenging the Process & Mission | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H19 | Enabling Others to Act & Mission | Pearson's Product Moment Correlation | Rejected null hypothesis |
| H20 | Encouraging the Heart & Mission | Pearson's Product Moment Correlation | Rejected null hypothesis |

**Post Hoc Analysis**

**Respondent Heritage Company.** Respondent Heritage Company was used as a control variable in this study to evaluate the potential of subcultures within the organization based on prior employment. It is a categorical, no value limit variable and was compared to an aggregate total culture score using ANOVA. Table 41 provides the results of the ANOVA, which indicate no group differences between the respondent heritage companies ($F = .312$; $\rho = .931$).

Table 41

*ANOVA of Total Culture with Respondent Heritage Company*

| | Squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Between groups | 2317.231 | 6 | 386.205 | .312 | .931 |
| Within groups | 313359.1 | 253 | 1238.573 | | |
| Total | 315676.3 | 259 | | | |

*Note*. Total Culture is the aggregate sum of the raw scores of each of the individual cultural traits: Involvement, Consistency, Adaptability, and Mission.

**Summary**

This chapter presented the findings of this study designed to answer the following research question: Is there a relationship between employee perceived leadership practices and organizational culture within the space shuttle processing environment? Twenty hypotheses were formulated and proposed in Chapter III relative to the relationship between LPI–O leadership practices and DOCS cultural traits. A web-based survey was deployed and data were collected to measure these relationships through the use of statistical screening methods and procedures.

Demographic effects were considered and analyzed for their effect on the dependent and independent variables. In addition, responses for each instrument were compared with normalized databases to determine relative strength for the organization. Based on these analyses, significant support was found for all 20 hypotheses.

Chapter V will present a summary of the study, a review of all findings from the statistical analysis, conclusions, implications, and suggestions for future research.

# Chapter V

## Summary and Conclusions

This chapter will present a summary of the overall study of employee perceived leadership practices and their effect on culture within the aerospace industry. A brief review of the research problem and germane literature will be performed, and findings resulting from statistical analyses will be provided. Conclusions derived from this empirical study will be stated and discussed. Finally, implications for management will be discussed, as well as recommendations for future research.

### Summary of the Study

The purpose of this study was to investigate the relationship between perceived leadership practices and organizational culture within the aerospace industry. The research question and guiding framework for this study is as follows: Is there a relationship between employee perceived leadership practices and organizational culture in the space shuttle processing environment?

This research addresses the current dilemma in NASA's manned spaceflight program and their contractors with regard to its future: Organizational and cultural change must occur or routine access to space for the United States will become a capability of the past (Bergin, 2007; Guthrie & Shayo, 2005; Mason, 2004). There is a common thread of leadership research that theorizes the dynamic between leadership behavior and their follower is essential in encouraging employees to exceed expectations, thereby increasing organizational effectiveness (Bass, 1985; Bennis & Thomas, 2002; House, 1977; Kouzes & Posner, 1983).

The emergence of culture as a research variable in the 1980s was a result of efforts to determine why some organizations were more effective than others (Deal & Kennedy, 1982; Ouchi, 1981; Peters & Waterman, 1982). Subsequent frameworks and models focused on such constructs as cultural dimensions, cultural traits, organizational behavior, and characteristics as being linked back to the basic beliefs and assumptions at the center of every organization (Cameron & Quinn, 1999; Cooke & Rousseau, 1988; Denison, 1984; Hofstede, 1980; Schein, 1992). If shared by everyone, a strong culture existed that was not easily changed. If not shared by all, subcultures and weak organizational effectiveness were noted.

The concepts of leadership practices and organizational structure as explanatory constructs to organizational performance were justified in this study's literature review. Accordingly, this study was performed to determine if support existed for the hypothesized relationships. The independent variable perceived leadership practices was measured by Kouzes and Posner's (2002) Leadership Practice Inventory – Other instrument, with the dependent variable culture measured by Denison and Neale's (1996) Organizational Culture Survey instrument.

This research was performed on survey data collected from the Manufacturing & Operations directorate of United Space Alliance, LLC, which consisted of 1,793 employees of varying job classifications. All members of the directorate were invited to participate over a 2-week period. The survey was web-based and hosted through Survey Monkey.com, as described in Chapter III. A total of 367 surveys were completed, for an initial response rate of 20.47%. After examination of the responses for missing data, outliers, and nonresponse patterns, the resulting sample size of 308 respondents (17.2%)

was obtained. Subsequently, statistical analyses were performed on this dataset to examine these relationships.

**Summary of Findings**

Initially, self-reported demographic data from the sample was compared against the organization-supplied population demographics to determine if the sample represented the targeted population. Job category, gender, education level, respondent age, and years of service were reviewed, with a conclusion that the response data was representative of the population.

**Study variable analysis.** Comparisons of the raw mean scores for each of the Five Practices of Exemplary Leadership with the published *Leadership Practices Inventory,* 3rd edition, percentile rankings (Posner & Kouzes, 2002) were performed. Four of five practices were reported to be in the low percentile rankings based on mean scores (N = 603,189), with only the Enable Others to Act practice considered having a moderate impact on respondents. When reviewing the LPI statement rankings in Appendix E, five of six statements comprising this scale were in the top eight ranking. The data supports the picture of leadership that sets a personal example of what he or she expects of others (MTW1), praises people for a job well done (ETH5), while treating others with dignity and respect (EOA14). Perceived weaknesses would be a failure to ask for feedback on performance (MTW16), a reluctance to take risks (CTP28), accompanied by an inability to enlist a common vision (ISV17) or compel an image of the future (ISV17).

Comparisons of the 12 mean average indexes for the study sample with Denison's 2004 normative database (Denison Consulting, 2005) were performed. The published

database displays rankings for the mean ratings needed to score in the 20th, 50th, and 80th percentile. Figure 4 depicts a representation of the Denison circumplex for this organization. Reviewing Figure 4, several observations regarding the model immediately can be made:

1. The organization has an internal versus an external focus (high Consistency and Involvement traits).
2. The organization tends to be more flexible than stable.
3. The Goals & Objective index is average at 50, but the remaining Mission indices are very low.
4. Customer Focus index is extremely high at 90, but the Creating Change index is very low in the Adaptability trait.

Denison and Neale (1999) provide a guide for understanding and interpreting an organization's profile. When Goals and Objectives are higher than Strategic Direction & Intent and Vision, this may indicate that the organization is good at execution, but has little sense of direction or purpose. The focus is usually short-term, and not looking out into the marketplace.

When Capability Development is higher than Empowerment, this may indicate the organization does not trust capable employees of making important decisions that impact their work. When Customer Focus is higher than Creating Change and Organizational Learning, the organization may be excellent at meeting customer needs today, but probably are not preparing for what the customer may need in the future.

With such an imbalance between internal and external focus, the organization tends to focus on internal competition rather than the external marketplace. Coupled with

a high score in Goals & Objectives, this profile may depict an organization that has become complacent and wants to keep the status quo (resting on its laurels and past reputation).

One probable explanation for these results could be the uncertainty within the organization over the impending release of the 2011 presidential budget. Health care crises, costs incurred due to wars in Iraq and Afghanistan, and bailouts of U.S. financial institutions all were exerting forces on the U.S. market at the time of data gathering for this study. This uncertainty could have been so great as to overcome the attempts by leadership to influence their actions. In fact, the FY2011 budget did ultimately cancel the Constellation program without extending space shuttle operations (Office of Management and Budget, 2010); in effect, leaving an agency without a mission or purpose. Since this study is a snapshot in time, it may be reflecting the uncertainty that was prevalent within this community.

**Demographic variable group analysis.** Demographic variable group analysis was performed, with the following results noted:

1. Gender was not found statistically significant with four of five leadership practices, with Enabling Others to Act found significant at the .05 level (males scoring higher). This contradicts prior research, which found no evidence to support that leadership practices were different for males and females (Posner, 2008). There was not a significant relationship among age, education level, or work experience at the .05 probability level. Significant between-group differences were noted on both the job category and hierarchical levels factors

with the Inspire a Shared Vision practice, but no significant group-to-group differences were noted.

2. The data did not support statistically significant findings for the demographic variables (gender, age, education level, work experience, job category, and hierarchical level) with any of the four cultural traits measured by the DOCS instrument.

The results of these analyses were predominantly as expected given the literature (Denison, Janovics, Young, & Cho, 2006; Guidroz & Kotrba, 2008; Kouzes & Posner, 2002; Posner, 2008). The finding that gender was statistically significant at the .05 level (males scoring higher) with the Enabling Others to Act leadership practice may be due to self-reporting omissions on the survey, or a true perception in weakness with regard to the promotion of cooperative goals and gaining trust. Significant between-group differences were noted on both the job category and hierarchical levels factors with the Inspire a Shared Vision practice. In the case of job category, the self-reported responses did indicate a higher percentage of engineering respondents than the population. The small number of management respondents may leave the hierarchical level finding questionable, but no significant group-to-group differences were noted in either category. The lack of significance of any demographic variable with the four cultural traits was expected.

**Regression analysis.** Regression analysis of leadership practices by demographic variables was performed to examine whether variances could be explained by differences in respondents. Results indicated demographic variables (in total) accounted for only 2.4% of the variance, supporting previous research findings (Posner, 2008). Regression

analysis of cultural traits by demographic variables was performed as well, with demographic variables (in total) accounting for only 1.15% of the variance. This data supported previous research findings that diversity accounted for little variance in cultural traits (Guidroz & Kotrba, 2008).

Hierarchical regression analysis for Total Culture (an aggregate of the four cultural trait raw scores) on the Five Practices of Exemplary Leadership as measured by the LPI–O was performed in an effort to determine the effects of the main model only. The five leadership practices accounted for 24% of the variance, with the Challenge the Process and Modeling the Way practices having the greatest effect on the model ($\rho <$ .05). Surprisingly, the Encourage the Heart practice had a negative $\beta$ (beta) coefficient of −0.1291. Kouzes and Posner (2002, 2003b) speak emphatically over the importance of this practice, but maintain its effectiveness is tied to a match among the person, the organization, and its mission.

Appendix E lists the rank order of LPI statements by mean scores from this research. Questions 5, 10, 15, 20, 25, and 30 comprise the Encourage the Heart (ETH) scale. ETH5 is actually the 4th highest statement reportedly observed by respondents, with leaders praising workers for a job well done. ETH30 is the next highest, observing team appreciation and recognition for their support. However, low responses are seen on ETH15 and ETH25, publically recognizing workers for their support and, lastly, finding ways to celebrate their accomplishments.

Factor analysis using Principal Component analysis with VARIMAX orthogonal rotation was performed for both the LPI–O and DOCS scale data. For the LPI–O, a 3-factor solution was generated, accounting for 68.3% of the total variance. Review of the

factor matrix revealed some statements that loaded on more than one factor, with Factor 1 comprised strongly of Encouraging the Heart statements, and with Factor 2 loading on Challenging the Process and Inspiring a Shared Vision statements. Factor 3 loaded heavily on four of five Modeling the Way statements. For the DOCS, a 13-factor solution was generated, accounting for 63.28% of the total variance. Review of the factor matrix revealed clustered statements generally associated with one of the four cultural traits measured by the scale. Factor 1 was comprised mainly of Questions 1–15 (Involvement), Factor 2 composed primarily of Questions 45–60 (Mission), Factors 3 and 4 consisted of Questions 15–30 (Consistency), and Factor 5 consisted of Questions 30–45 (Adaptability). Generally, the factor analysis results were as expected (Denison, Janovic, Young, &Cho, 2006).

Finally, Pearson's Product-Moment correlation using pair-wise deletion was used to examine the strength of linear association between hypothesized relationships of leadership practices and cultural traits. Accordingly, the results can be summarized as follows:

**Summary of hypotheses 1–5.** Hypotheses 1–5 suggested a relationship between each of the five leadership practices and the cultural trait Involvement. The results of the correlation (see Table 36) indicate the following:

1. There is a significant positive correlation coefficient ($r = 0.420$; $\rho = .000$) between the Modeling the Way practice and the cultural trait Involvement.
2. There is a significant positive correlation coefficient ($r = 0.412$; $\rho = .000$) between the Inspiring a Shared Vision practice and the cultural trait Involvement.

3. There is a significant positive correlation coefficient ($r = 0.435$; $\rho = .000$) between the Challenging the Process practice and the cultural trait Involvement.
4. There is a significant positive correlation coefficient ($r = 0.400$; $\rho = .000$) between the Enabling Others to Act practice and the cultural trait Involvement.
5. There is a significant positive correlation coefficient ($r = 0.350$; $\rho = .000$) between the Encouraging the Heart practice and the cultural trait Involvement.

These results were anticipated. The three indices that comprise the Involvement trait are Empowerment, Team Orientation, and Capability Development. As discussed in Chapter II, Denison (2000) describes this environment as having the participation or involvement of all its employees. Individuals have the authority and ability to manage their work. They work within a team toward common goals. The organization works toward developing it employees.

Kouzes and Posner (2002) provide commitments for exemplary leadership that support their five practices: Inspire a Shared Vision discusses enlisting others in a common vision, with Challenging the Process tasking leaders to find innovative ways to grow and mature. Enabling Others to Act promotes cooperative goals and trust within the team. The Denison Circumplex (see Figure 4) depicts the organization's high index scores for these indices; the weak correlation for the Encourage the Heart practice highlights an area for improvement, which could raise the sense of Empowerment within the organization. The hierarchical regression analysis detailed in Table 35 supports this interpretation of the results.

**Summary of hypotheses 6–10.** Hypotheses 6–10 suggested a relationship between each of the five leadership practices and the cultural trait Consistency. The results of the correlation (see Table 37) indicate the following:

1. There is a significant positive correlation coefficient ($r = 0.430$; $\rho = .000$) between the Modeling the Way practice and the cultural trait Consistency.
2. There is a significant positive correlation coefficient ($r = 0.387$; $\rho = .000$) between the Inspiring a Shared Vision practice and the cultural trait Consistency.
3. There is a significant positive correlation coefficient ($r = 0.424$; $\rho = .000$) between the Challenging the Process practice and the cultural trait Consistency.
4. There is a significant positive correlation coefficient ($r = 0.365$; $\rho = .000$) between the Enabling Others to Act practice and the cultural trait Consistency.
5. There is a significant positive correlation coefficient ($r = 0.356$; $\rho = .000$) between the Encouraging the Heart practice and the cultural trait Consistency.

These results were anticipated. The three indices that comprise the Consistency trait are Core Values, Agreement, and Coordination and Integration. Denison et al. (2006) point out that organizations must have a set of core values to be effective, with leadership and followers aligned toward common goals and objectives. In addition, consistent organizations maintain a strong governance system supported by its members.

Kouzes and Posner (2002) provide commitments for exemplary leadership that support their five practices: Inspire a Shared Vision discusses enlisting others in a common vision, while Modeling the Way sets an example for the organization by

affirming shared values and aligning those values with their actions. Encouraging the Heart recognizes these values with positive personal recognition and by celebrating victories to create a spirit of community. Challenging the Process engenders commitment, with Enabling Others to Act fostering collaboration and agreement within.

The Denison Circumplex (see Figure 4) depicts the organization's high index scores for these indices, which is supported by the hierarchical regression analysis detailed in Table 35. The negative β (beta) coefficient for the Encourage the Heart practice indicates a weakness within the model with regard to the total culture attribute. It should be noted that recent research (Schmidt, Gillespie, Kotrba, Ritchie, & Denison, 2009) provides an empirical demonstration of the importance of the interaction among cultural traits. The researchers offer evidence that an organization needs strong Mission, Adaptability, and Involvement traits in order for Consistency to have a positive impact on one aspect of performance (market-to-book ratio). The weak leadership practices correlation coefficients noted may be evidence of this interaction, as the Mission trait scored very low in their indexed scores.

**Summary of hypotheses 11–15.** Hypotheses 11–15 suggested a relationship between each of the five leadership practices and the cultural trait Adaptability. The results of the correlation (see Table 38) indicate the following:

1. There is a significant positive correlation coefficient ($r = 0.415$; $\rho = .000$) between the Modeling the Way practice and the cultural trait Adaptability.
2. There is a significant positive correlation coefficient ($r = 0.373$; $\rho = .000$) between the Inspiring a Shared Vision practice and the cultural trait Adaptability.

3. There is a significant positive correlation coefficient ($r = 0.444$; $\rho = .000$) between the Challenging the Process practice and the cultural trait Adaptability.
4. There is a significant positive correlation coefficient ($r = 0.394$; $\rho = .000$) between the Enabling Others to Act practice and the cultural trait Adaptability.
5. There is a significant positive correlation coefficient ($r = 0.370$; $\rho = .000$) between the Encouraging the Heart practice and the cultural trait Adaptability.

These results were anticipated. The three indices that comprise the Adaptability trait are Creating Change, Customer Focus, and Organizational Learning. Denison et al. (2006) highlight that organizations must evaluate signals from the external environment and be innovative in order to react to trends and future changes. This capacity for internal change in response to external conditions is positively related to effectiveness (Denison & Mishra, 1995). Their work supports that of previous researchers (Denison & Mishra, 1995; Kotter & Heskett, 1992; Schein, 1992).

Kouzes and Posner (2002) provide commitments for exemplary leadership that support their five practices: Inspire a Shared Vision discusses enlisting others in a common vision, while Modeling the Way sets an example for the organization by affirming shared values and aligning those values with their actions. Encouraging the Heart recognizes these values with positive personal recognition and by celebrating victories to create a spirit of community. Challenging the Process engenders commitment, with Enabling Others to Act fostering collaboration and agreement within.

The Denison Circumplex (see Figure 4) depicts the organization's high index scores for Customer Focus and Organizational Learning, but highlights the great need for improvement in the Creating Change index. Denison and Mishra (1995) describe this change as the ability to improve abilities, thereby increasing value for the organization. Since the Challenge the Process practice had a moderately strong correlation coefficient, this may be indication that respondents perceive changes as being internally difficult or providing little value to the customer.

**Summary of hypotheses 16–20.** Hypotheses 16–20 suggested a relationship between each of the five leadership practices and the cultural trait Mission. The results of the correlation (see Table 39) indicate the following:

1. There is a significant positive correlation coefficient ($r = 0.373$; $\rho = .000$) between the Modeling the Way practice and the cultural trait Mission.
2. There is a significant positive correlation coefficient ($r = 0.365$; $\rho = .000$) between the Inspiring a Shared Vision practice and the cultural trait Mission.
3. There is a significant positive correlation coefficient ($r = 0.363$; $\rho = .000$) between the Challenging the Process practice and the cultural trait Mission.
4. There is a significant positive correlation coefficient ($r = 0.323$; $\rho = .000$) between the Enabling Others to Act practice and the cultural trait Mission.
5. There is a significant positive correlation coefficient ($r = 0.313$; $\rho = .000$) between the Encouraging the Heart practice and the cultural trait Mission.

The significant positive correlation coefficients were expected with these hypotheses, but their relative weakness in strength is surprising when reviewing the literature. The three indices that comprise the Mission trait are Strategic Direction and

Intent, Goals and Objectives, and Vision. The Mission trait reflects the degree to which an organization understands its existence and long-term direction. The ability to identify with this direction is what engenders commitment to an organization (Denison & Mishra, 1995). The Denison Circumplex (see Figure 4) depicts the organization's average score of 50 for Goals and Objectives; an organization that by and large meets it short-term goals. However, Strategic Direction and Intent and Vision indexed scores are extremely low, depicting an organization without a long-term purpose.

Kouzes and Posner's (2002) research would indicate all five leadership practices should have strong influences on this trait, but these results indicate significant but weak correlation coefficients. Modeling the Way and Inspiring a Shared Vision deal directly with envisioning the future, enlisting others in this vision, and aligning leaders' actions to the values that promote the common direction. However, the hierarchical regression analysis (see Table 35) supports the results, indicating a weak $\beta$ (beta) coefficient of .0914 for the Inspiring a Shared Vision practice. As discussed in Chapter IV, ANOVA results did indicate significant between-group differences on both job category and hierarchical level on the Inspiring a Shared Vision practice. Yet, post-hoc Tukey-Kramer analysis did not note significant group-to-group difference.

Post-hoc analysis used Respondent Heritage Company (see Table 41) to evaluate the potential of subcultures within the company based on prior employment. No statistically significant group differences were noted, indicating a potential blending of cultures has occurred.

**Conclusions**

Management researchers have suggested for decades that an organization's leadership behaviors have a direct effect on their followers and, ultimately, an effect on the performance of the organization itself. While various models of leadership were investigated over the years (Bass, 1985; Bennis & Nanus, 1985; Burns, 1978; Conger & Kanungo, 1987; Fiedler, 1967; House, 1971; House & Mitchell, 1974; Kouzes & Posner, 1987; Tichey & Devanna, 1986), it was Burns (1978) that first introduced the concepts of transactional and transformational leadership behaviors. Bass (1985) extended Burn's research with his own Theory of Transformational Leadership that viewed these behaviors as distinctive and employable in various situations. It was in this climate that Kouzes and Posner's (1987) work resulted in the identification of their Five Practices of Exemplary Leadership.

Bass (1999) ultimately promulgates that transformational leadership is universally applicable; the dimensions of his model, which include idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, are demonstrated behaviors with which followers can identify. Meta-analyses performed by Judge and Piccolo (2004) and Lowe et al. (1996) support the proposition that transformational leadership is associated positively by followers with organizational effectiveness.

Simultaneously in the 1980s and 1990s, investigations into the concept of organizational culture were initiated (Deal & Kennedy, 1982; Ouchi, 1981; Pascale & Athos, 1981; Peters & Waterman, 1982), with the ultimate goal of determining why some organizations were more effective and successful than others. It was Schein (1992, 2004) that postulated that leaders create organizational culture. First, leaders convey their own

beliefs, values, and assumptions to group members through primary culture embedding mechanisms, such as what they pay attention to and measure, how they react in crises, and follower observations of their behavior. Next, leaders sustain culture by implementing reinforcement mechanisms, such as organizational design, policies, procedures, rites, and rituals. It would follow that if leadership behavior can affect follower performance, it may also affect organizational culture and firm performance (Block, 2003; Denison, 1984; Ogbonna & Harris, 2000).

**Research environment.** The context of this study is unique due to the environment in which it was performed. This research is the first to investigate the effects of leadership practices on culture traits within the space shuttle processing arena. United Space Alliance is a joint venture between Lockheed Martin and Boeing Company, formed through a merger of several distinctive company cultures (Behrens, 2006). Schein (1992) discussed problems with mergers, acquisitions, joint ventures, and strategic alliances, citing the lack of a shared history, the existence of subcultures, and potential clash of assumptions as potential issues that ultimately could result in failure. Recently, Waldman and Javidan (2009) conceptualized a research model postulating how alternative leadership forms can affect merger and acquisition implementation. Accordingly, it is important leadership understands the culture of their organization and the effect their behavior has on their followers.

This research has provided an opportunity to study a cross section of aerospace manufacturing and production workers in a single location. The U.S. aerospace industry has been in a state of decline since 1990, having lost over 500,000 workers, according to

the Department of Commerce (ITA, 2009). It is important to gain insight into leadership behavior and cultural trends in order to understand and reverse this trend (Sadeh, 2009).

In particular, the opportunity to study a contractor organization within the context and influence of the NASA culture was exciting. Much has been written about the success of NASA and the human spaceflight program (Cernan & Davis, 1999; Hurt, 1988; Kranz, 2000), but the highlights of this "can-do" culture must be tempered with the accidents and loss of life encountered with the Apollo I Fire (NASA, 1967), the Challenger Disaster (NASA, 1986), and the 2003 Columbia Accident (NASA, 2003a). The Columbia Accident Investigation Board (NASA, 2003a) reported that this "can-do" attitude bolstered poor decision making and ultimately created an environment that personnel became reluctant to say something could not be done. The board noted that the Apollo era research and design culture had been replaced in the successful pre-*Challenger* shuttle era by a cultural belief that ". . . the Shuttle Program's many structures, rigorous procedures, and detailed systems of rules were responsible for those successes" (NASA, 2003a, p. 199).

**Leadership practices.** The review of the data suggests some important conclusions with regard to theoretical contributions to the existing literature. First, all suggested relationships between Kouzes and Posner's (1987) five leadership practices and Denison's four cultural traits were found to have a significant positive correlation. This finding supports and adds to the existing leadership literature that posits leadership behavior of varying constructs can and will promote change within an organization (Bass, 1985; Bass & Avolio, 1993; Brooks, 1996; Ergeneli et al., 2007; Kouzes & Posner, 1987, 2002; Schein, 2004). This leads to broader implications for both leaders and their

organizations. In a market environment that has an evolving landscape, an organization's leadership must constantly monitor their behavior and its corresponding effect on workplace beliefs and assumptions. Ergeneli et al. believe this culture-specific approach is critical for leaders in today's world, and they must master the skill of adapting to the cultural environment. As each of the highly visible human spaceflight failures have shown, unintended consequences can have devastating effects.

Another important finding obtained from this study is that when the Encourage the Heart leadership practice score increased, the value of the total culture score decreased (beta coefficient indicated a negative relationship between the two). This is especially counterintuitive, as United Space Alliance and NASA have a very expansive reward allocation system. Kouzes and Posner (1987, 2002, 2003b) feel that leaders must ensure followers share in the reward of their efforts, fulfilling a basic human need to be appreciated as individuals and for the work they perform. Griffeth and Hom (2001) discuss maintaining a fair reward system in their book, *Retaining Valued Employees*. While the organization may have policies and procedures for distributing rewards and recognition fairly, the perception may be that leaders are not administering those procedures in an equitable manner. Another potential explanation is that high performers may be recognized more often, giving the perception of favoritism. Or, a lack of alignment between the respondent and organizational mission may render the practice ineffective.

Next, comparisons of each study variable with national, normalized databases intuitively provided insight and a benchmark to the actions of successful, high performance organizations. Since support for the positive correlation of leadership

practices with cultural traits had been provided, the results of the Denison profile linking these behaviors with company financial performance was a natural progression. Not surprisingly, the United Space Alliance (USA) organization's highest performance index was that of Customer Focus. This result is defined by Denison and Neale (1999) as reflecting "the degree to which the organization is driven by a concern to satisfy their customer" (p. 30). In addition, the Mission trait of communicating long-term strategic direction and vision scored the lowest performance indices.

**Organizational culture.** These results are strikingly similar to workplace environments previously described and criticized by the Columbia Accident Board. The cultural profile depicted in Figure 4 reveals an organization striving to please the customer, with policies, procedures, and rules that maintain a high internal consistency. However, the follower perceptions are that there is minimal strategy or vision being communicated. Jarnigan and Slocum (2007) believe leadership must set the company mission and values, allowing the bonding of employees to these goals and further guiding of their future actions. Schein (2004) maintains that an organization's espoused values align culture with its core mission. This data supports a theory that absent of a clearly defined Mission, internal core values and overall Consistency must be above average to keep an organization functional.

However, Denison (2009) points out that having a strong Consistency trait might not be ideal if interacting with a low Mission index. It implies a strong focus on systems and processes, but little direction. Repetition provides for great internal stability, but leaves an organization susceptible to a changing external market. In a high-risk organizational field, such as human spaceflight, processes are intended to be stable.

Performing tests and procedures exactly as planned is at the root of engineering practice. However, by engaging in this behavior it becomes difficult to adapt, innovate, and grow when affected by market influences.

More broadly, organizations need to maintain a balance of cultural traits, assuring adequate flexibility and adaptability for changing market environments (Denison et al., 2006; Lawrence & Lorsch, 1967; Yukl, 2008). It is important to capture the lessons learned from the past and seek out these imbalances to prepare for the future. Cameron and Quinn (2006) speak of an organization's cultural congruence, where a company's strategy, leadership style, and management systems all emphasize the same set of cultural values. In this environment, the appearance of cultural incongruence drives the need for cultural change. This study improves one's understanding of the dynamics of this change.

**Implications for Management**

These study results provide several implications for management practice. First, the results support and indicate that Kouzes and Posner's (2002) model of Five Practices of Exemplary Leadership are significantly and positively correlated to cultural traits identified by the Denison Organizational Culture Survey. Kouzes and Posner (2002) believe leadership to be an observable set of skills and abilities, available to all and which can be learned. Schein (1992) posits that leaders initially start the formation of culture by imposing their own assumptions over a group or organization. Through primary and secondary embedding mechanisms, such as what they pay attention to and measure, observations over who they recruit, reward, promote, and so forth, create the climate of an organization, and ultimately the culture. Continued success creates strong beliefs and

assumptions, and therefore a strong culture. Denison (1984, 1990) has empirically tied cultural traits to an organization's bottom-line financial indicators.

Leadership training has a prominent role in most leadership development programs, but how much is focused on an understanding of individual behavior practices and company culture? Kouzes and Posner (2006) state that "leadership is a relationship between those who aspire to lead and those who choose to follow" (p. 52). The transformational leadership practices contained within Kouzes and Posner's (2006) research can be taught to those leaders who want to be part of a learning organization. Elkins and Keller (2003) believe transformational leadership to be an effective style for R&D organizations, such as the population sampled for this research. Accordingly, organizations should select leaders interested in exploring these types of relationships. Above all, Kouzes and Posner (1987, 2002, 2003a, 2006) maintain that leadership is personal and that leadership is about relationships.

Second, this study found as the Encourage the Heart leadership practice score increased, the value of the total culture score decreased (multiple regression beta coefficient indicated a negative relationship between the two). This was a surprising finding and contrary to Kouzes and Posner's (1987, 2002, 2003b, 2006) decades of research. Obvious implications to practice involve a company's implementation of employee performance recognition programs. Korsgaard, Roberson, and Rymph's (1998) research indicates that while a company may have fair reward system policies intact, individual managers may not be implementing them in a personal and convincing manner. Thus, it is possible to degrade the trust and credibility of the leader in the short run, with detrimental effects on an organization's culture over time (Kouzes & Posner,

2003a). Management should be educated and informed with regard to their constituents' possible perception of this process.

Third, organizational leadership has to understand the culture of their organization. Perhaps a simple declaration to state, but what does this mean? Schein (1992) maintains that for an organization to understand its strengths and weaknesses, it must at some point understand its own culture. However, he states that one is at risk in doing so. Either the analysis of the culture may be wrong, or the organization may not be ready to hear it. He cautions that initiating an effort to change culture should not be done lightly.

This study presented a cultural profile indicative of one that has strongly conformed to the expectations of the customer. It is unknown whether earlier organizational leadership assumptions reinforced these assumptions, or if the culture iteratively changed over time. Schein (2004) poses an interesting paradox of perpetual learning in the context of cultural understanding. As reviewed in Chapter II, a strong culture is seen as essential in raising the performance level of a company. Leaders are expected to reinforce those basic beliefs and assumptions that create a strong, stable organization over time. Schein (2004) describes this paradox as follows:

> Culture is a stabilizer, a conservative force, a way of making things meaningful and predictable. Many management consultants and theorists have asserted that "strong" cultures are desirable as a basis for effective and lasting performance. But strong cultures are by definition stable and hard to change. If the world is becoming more turbulent, requiring more flexibility and learning, does this not imply that strong cultures will increasingly become a liability? . . . Or is it

possible to imagine a culture that, by its very nature, is learning oriented, adaptive and flexible? (p. 393)

It would appear that USA organizational leadership has paid attention to what was measured and controlled. NASA's cost plus award fee incentive contracts may have subconsciously reinforced a customer-focus-at-all-cost mentality, resulting in outstanding award fee scores but little innovation or growth. The result in comparison with the Denison Culture Model is an organization potentially incapable of fully competing in the external marketplace, without changes in specific cultural traits.

Thus, it is imperative organizational management first understand their existing culture, and how leadership assumptions, behaviors, and practices have played a role in its development. Subsequently, leaders must be forward-thinking and proactive toward changes in their respective environments. They must be flexible and adaptable (Yukl, 2008). Studies to measure cultural shifts over a period of time should be part of an overall corporate strategy. In this manner, an organization can engage in a process of cultural change to meet future expectations.

**Limitations of the Study**

Some potential limitations of this study should be noted. Hunter et al. (2007) explore the assumptions made in the typical leadership study, and discuss problems which may occur with them. This study has some of these same limitations:

1. This study required respondents to respond via a survey questionnaire on observed leadership practices; the assumption is that observers actually witness the leadership behaviors in question. It assumes all employees require and/or need leadership, and the same level of leadership affects them

identically. This research does not explore the effects of situational moderators on leadership behaviors (Villa et al., 2003).

2. This research uses the same source and same method for both dependent and independent variables, which could lead to an inflated or deflated correlational relationship between the two (Bass, 1990; Lowe et al., 1996). Hunter et al. (2007) are critical of survey studies due to common method bias. While this was evaluated in this research post hoc, Friedrich et al. (2009) urge the use of different methods of data collection and multiple sources as a remedy in initial study design.
3. An assumption was made that the observed variables are not time-dependent. While the hypotheses suggest causal relationships, and the current theory supports these relationships, the direction of causality cannot be determined.

**Future Research**

The limitations of this study provide additional opportunities for future research. First, this study was performed within one manufacturing and processing organization, which was a joint venture consisting of several aerospace companies. Many unique skills and job categories formed the make-up of this organization. Accordingly, the results of this study should be generalizable to the industry. However, future replication studies should strive to sample a larger cross section of aerospace companies to validate the results.

This study used a hosted web-based survey form for the sample population. This was justified due to the population working in a highly technical, “paperless,” work environment. However, alternative methods such as written surveys, questionnaires, or

personal interviews may have helped improve the response rate as well as alleviate some concerns with common method bias.

In addition, future research should use longitudinal studies over a period of time to clarify the leadership-culture relationship. Ployhardt and Vandenberg (2010) present a host of concerns to consider when designing a long-term longitudinal research study. Understanding issues such as the number of observations to be made and the understanding and handling of attrition is essential to the design of a follow-on study. Friedrich et al. (2009) suggest testing alternative plausible models based on pertinent research. In this way, causal ordering of the relationships potentially can be confirmed. This is important because this research took place over one time interval. It did not consider the political, economic, or corporate climate in determining the effect of leadership practices on culture. Leadership succession was not addressed in this research.

Finally, this research study looked strictly at how perceived leadership practices affected the four cultural traits in the Denison model. It did not look at the interaction of the cultural traits on each other in combination with those practices. Future studies should attempt to explore the relationships of these interrelations with corporate performance. In addition, all analyses performed in this study were at the aggregate level; further research at the group and/or individual level is warranted.

**Summary**

This chapter presented a summary of the overall study of employee perceived leadership practices and their effect on culture within the aerospace industry. A brief review of the research problem and germane literature was performed, and findings resulting from statistical analyses were presented. Conclusions derived from this

empirical study were discussed. Finally, implications for management, limitations of the study, and recommendations for future research were also presented.

This study was unique due to the context in which it was performed. United Space Alliance is the prime contractor for space shuttle processing for NASA at Kennedy Space Center, FL. A joint venture between Lockheed-Martin and Boeing Company, it was formed in 1996 as a merger of several companies under the Space Flight Operations Contract (United Space Alliance, 2010). Much history has been written with regard to NASA's "can-do" culture, epitomized by the Manned Spaceflight Program and Apollo 11's landing on the moon in 1969 (Cernan & Davis, 1999; Hurt, 1988; Kranz, 2000). However, the last two decades have seen the image tarnished with the accidents of the space shuttle's Challenger and Columbia in 1988 and 2003, respectively. Each of these accidents has surfaced questions with regard to the cultural environment that existed and the leadership practices that were displayed (Guthrie & Shayo, 2005; Hall, 2003; Mark, 2002; McConnell, 1987; NASA, 1986, 2003a).

NASA has begun retirement activities of the space shuttle, which are scheduled for completion in the September 2010 presidential budget deadline. The follow-on replacement program, *Constellation*, is potentially scheduled to be terminated as well. NASA's credibility has been questioned with regard to completing a project of this magnitude on time and within budget (Matthews & Block, 2009). Leadership of the organization and its understanding and influence on culture must evolve in order for the U.S. human spaceflight world leadership to be maintained (Bergin, 2007; Guthrie & Shayo, 2005; Mason, 2004).

This research is the first to investigate the effects of contractor leadership practices on cultural traits within the space shuttle operations context. In addition, use of the LPI–O in conjunction with the DOCS survey instrument has not been used concurrently in such a study.

Study results provide support that Kouzes and Posner's (2002) Five Practices of Exemplary Leadership (Model the Way, Challenge the Process, Inspire a Shared Vision, Enable Others to Act, and Encourage the Heart) are significantly and positively correlated to cultural traits (Adaptability, Involvement, Consistency, and Mission) identified by the Denison Organizational Culture Survey (Denison & Neale, 1996). These findings add to the existing base of literature that purports that leadership behaviors of varying constructs influence organizational behavior (Bass, 1985; Kouzes & Posner, 1987, 2002; Schein, 1992, 2004).

Regression analysis of leadership practices and cultural traits by demographic variables indicated very little of the observed variances could be explained by differences in respondent, supporting prior research by Posner (2008) and Guidroz and Kotrba (2008), respectively. Hierarchical regression analysis for Total Culture on the five leadership practices measured by the LPI–O was performed. The five leadership practices accounted for 24% of the variance, with Challenge the Process and Modeling the Way practices having the greatest effect on the model. In addition, a significant finding that the Encourage the Heart leadership practice had a negative effect on Total Culture was observed. This finding contradicted prior research by Kouzes and Posner (1987, 2002, 2003b, 2006).

Comparisons of each study variable with national, normalized databases brought forward interesting observations. Leadership practices' raw scores were in the low to middle percentiles, indicating perceived use of each of these practices were at best "average" when compared to other respondents. The Denison indexed cultural traits revealed an organization strong on the Involvement and Consistency traits, but extremely weak observations on the Mission trait. The Customer Focus index (part of the Adaptability trait) was extremely high, indicating great attention to the NASA customer satisfaction. The correlational analysis performed did not establish the direction of causality; therefore, it is unknown whether the observed leadership practices have affected the culture of the organization, or have the embedded assumptions of prior leadership over time created so strong a culture that leadership has minimal effect. United Space Alliance and the shuttle processing team exist in the context of a high-risk organization, but one that has become risk-adverse due to the Challenger and Columbia accidents.

There were three implications for management practice. First, Kouzes and Posner's (1987, 2002) research and the findings of this study indicate that leadership is a relationship. It is a purposeful connection at a personal level with a constituent. Organizations should select leaders who are interested in working at that level, and teach these skills as part of their overall leadership development plan. Second, it is important that managers be educated on the implications and implementation of informal and formal employee performance reward systems. Otherwise, the trust and credibility of a leader may erode over time, ultimately affecting organizational culture as well (Korsgarrd et al., 1998; Kouzes & Posner, 2006).

Finally, organizations must educate their management on the importance of understanding their own culture in the present, and how their assumptions and actions have played a role in its development. The need to be forward focused should be driven home, as an organizational is required to be flexible and adaptable to compete in a changing marketplace (Schein, 2004; Yukl, 2008).

A question was posed at the beginning of this study regarding environmental context: Have the perceived leadership practices of this organization helped create a culture that can be competitive and viable in the future? The data supports the supposition that Kouzes and Posner's (1987) leadership model has a moderate effect on United Space Alliance's Manufacturing and Operations directorate cultural traits. It is currently focused internally, due to a lack of strategic direction and vision by the NASA Agency. It is currently focused heavily on achieving customer satisfaction, which it has done quite successfully. Denison's (1990) and Denison et al.'s (2006) research would indicate a cultural model that is out of balance and in need of change to compete in a new, different, and just emerging environment. If leaders strive to understand their current behavior and its effect on existing culture, the cultural change process may be used to try and adapt to this new marketplace.

The Columbia Accident Investigation Board Report, Volume V Appendix G.9 (NASA, 2003b) discusses the effectiveness of contractual obligations entered into by the government with their contractors. Their belief was there is no evidence that these arrangements actually motivate contractors or improve performance; it is their belief that "the people and facilities at NASA sites, not corporate logos, are critical to program requirements" (NASA, 2003b, p. 469). In essence, the culture is what leads to safety and

technical excellence. The empirical data collected on leadership practices and cultural traits would support this notion.

# Appendix A

## Correspondence

**KOUZES POSNER INTERNATIONAL**
15419 Banyan Lane
Monte Sereno, California 95030
FAX: (408) 354-9170

October 29, 2004

Mr. Bradley McCain
839 Trailwood Avenue
Titusville, Florida 32796

Dear Bradley:

Thank you for your request to use the Leadership Practices Inventory (LPI) in your research project. We are willing to allow you to reproduce the instrument as outlined in your request, at no charge, with the following understandings:

(1) That the LPI is used only for research purposes and is not sold or used in conjunction with any compensated management development activities;
(2) That copyright of the LPI, or any derivation of the instrument, is retained by Kouzes Posner International, and that the following copyright statement is included on all copies of the instrument: "Copyright © 2003 James M. Kouzes and Barry Z. Posner. All rights reserved. Used with permission.";
(3) That one (1) copy of **all** manuscripts, papers, reports, articles, and the like which make use of the LPI data be sent **promptly** to our attention; and,
(4) That you agree to allow us to include an abstract of your study and any other published papers utilizing the LPI on our various websites.

If the terms outlined above are acceptable, would you indicate so by signing one (1) copy of this letter and returning it to us. Best wishes for every success with your research project.

Cordially,

Barry Z. Posner, Ph.D.
Managing Partner

I understand and agree to abide by these conditions:

(Signed) Bradley M. McCain Date: 11-7-04

Dear Brad -

Since we are a research-based organization, we are always pleased to support academic research. I have attached a document that describes our "Terms of Use" for researchers. The main point is that the survey not be used for commercial purposes.

Your research sounds interesting. Since we also have a leadership survey, we are very interested in the link between culture and leadership. Please send us a copy when it is done.

You have our permission to use one or more of the scales of the Denison Organizational Culture Survey for your project, according to the terms described in the Terms of Use document.

Good luck!

Ann W. Howell, PhD
Director of Research and Development
Denison Consulting
ahowell@denisonculture.com
www.denisonculture.com
(734) 302-4002

-----Original Message-----
From: Jay Richards [mailto:jrichards@denisonculture.com]
Sent: Tuesday, November 09, 2004 10:23 AM
To: ahowell@denisonculture.com
Subject: FW: Denison OCS

-----Original Message-----
From: mccain@nova.edu [mailto:mccain@nova.edu]
Sent: Monday, November 08, 2004 10:06 PM
To: jrichards@denisonculture.com
Subject: Denison OCS

Mr. Richards:

I'm a doctoral student with Nova Southeastern University in Ft. Lauderdale, FL working towards my Doctorate In Business Administration with a Management specialty. I am interested in performing research on the relationship of employee perceived leadership practices with an organization's ability to adapt. I have received permission to copy Kouzes & Posner's Leadership Practice Inventory instrument, and would like to use the OCS scale for adaptability as well.
Do you permit portions or all of the OCS to be reproduced for research

purposes? While I plan to perform my research in a corporate setting (NASA subcontractor), it would not be used for any compensated management development activity and I would be sure to provide proper copyright credit.

As I have explored the different cultural models and scales, I keep returning to the Dension OCS; the emphasis on performance I feel best measures my organizations attitudes and trends.

Thank you for your consideration.

Brad McCain
839 Trailwood Avenue
Titusville, FL 32796

email: mccain@nova.edu

Denison

Bringing Organizational Culture & Leadership to the Bottom Line

## Terms of Use for Researchers

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4. Use of the materials must be properly acknowledged in the manuscript and any resulting publications and presentations.
5. Denison Consulting will receive a copy of any research done on the data (papers, dissertation, presentations, follow-up publications, etc.). The researchers will provide us copies of the raw data.
6. Denison Consulting will have an opportunity to review any manuscripts based on the data prior to submission for publication or presentation.
7. This agreement to share items or other materials does not require that Denison Consulting will contribute resources for data analysis, norming, report generation or processing. If any additional work is required, Denison Consulting will charge for the time in completing the project.
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9. Use of the research for commercial purposes is a violation of this agreement. Commercial rights can be negotiated, but that requires a separate agreement.

To acknowledge receipt and understanding of these terms, please do one of the following. 1. Sign and date a copy of this agreement and mail to Denison Consulting. 2. Send an email to Ann Howell, PhD. (ahowell@denisonculture.com) with this original agreement attached. State in the email that you received and understand the terms.

Thank you for protecting our intellectual property and good luck with your research!

Bradley M. McCain

Signature

11-9-04

Date

121 W. Washington
Suite 201
Ann Arbor, MI 48104
734.302.4002
www.DenisonCulture.com

**McCain, Bradley M**

**From:** Cawby, James J (JIM)
**Sent:** Thursday, November 12, 2009 11:20 AM
**To:** 94-ALL
**Cc:** Claus, Roger S; Records, Patricia L (Trish); McCain, Bradley M
**Subject:** Leadership Practices and Organizational Culture Survey

USA employee Brad McCain is currently conducting university-sponsored research with Nova Southeastern University under the supervision of Dr. Joseph Heinzman of Hodges University. This research investigates the relationship between employee perceived leadership practices and organizational culture within the aerospace industry.

Due to the applicability of this research to United Space Alliance, you are being provided the opportunity to complete the survey. **The survey will be available beginning November 12 with completion by COB November 23.** It is entirely your choice whether or not to participate in the survey.

Should you elect to participate in survey, please note:

- Survey completion will take less than 30 minutes.
- You may use your work computer to complete the survey.
- Direct and IM employees charge time to F06PROS131. Indirect employees charge to their normal PID.
- At any point during the survey you have the right of refusal or to opt out.
- All responses will be kept confidential and individual responses will not be identified.
- An independent company, Survey Monkey, will collect all raw data and transmit it to the appropriate party for analysis.

To reach the survey instruments, CTRL + click on the following link:
http://www.surveymonkey.com/s.aspx?sm=1QaiLGxjhnYN2fs9DkAf9g_3d_3d

*Jim*
Director, Manufacturing & Processing Operations
Office: 861-3555
Cell: 536-0981
Fax: 861-5196

**McCain, Bradley M**

**From:** Cawby, James J (JIM)
**Sent:** Thursday, November 19, 2009 7:42 AM
**To:** 94-ALL
**Cc:** McCain, Bradley M
**Subject:** Leadership Practices and Organizational Culture Survey

There is still time for you to participate in USA employee Brad McCain's university-sponsored research investigating the relationship between employee perceived leadership practices and organizational culture within the aerospace industry.

Due to the applicability of this research to United Space Alliance, you are being provided the opportunity to complete the survey (please see email dated 11/12/2009). **The survey opened November 12 and will close November 23.** It is entirely your choice whether or not to participate in the survey.

Should you elect to participate in survey, please note:

- Survey completion will take less than 30 minutes.
- You may use your work computer to complete the survey.
- Direct and IM employees charge time to F06PROS131. Indirect employees charge to their normal PID.
- At any point during the survey you have the right of refusal or to opt out.
- All responses will be kept confidential and individual responses will not be identified.
- An independent company, Survey Monkey, will collect all raw data and transmit it to the appropriate party for analysis.

To reach the survey instruments, click on the following link:
http://www.surveymonkey.com/s.aspx?sm=1QaiLGxjhnYN2fs9DkAf9g_3d_3d

*Jim*
Director, Manufacturing & Processing Operations
Office: 861-3555
Cell: 536-0981
Fax: 861-5196

**McCain, Bradley M**

**From:** Cawby, James J (JIM)
**Sent:** Monday, November 23, 2009 6:49 AM
**To:** 94-ALL
**Cc:** McCain, Bradley M
**Subject:** Leadership Practices and Organizational Culture Survey

Your opportunity to participate in USA employee Brad McCain's university-sponsored research investigating the relationship between employee perceived leadership practices and organizational culture within the aerospace industry is closing.

Due to the applicability of this research to United Space Alliance, you are being provided the opportunity to complete the survey (please see email dated 11/12/2009). **The survey opened November 12 and has been extended to November 25.** It is entirely your choice whether or not to participate in the survey.

Should you elect to participate in survey, please note:

- Survey completion will take less than 30 minutes.
- You may use your work computer to complete the survey.
- Direct and IM employees charge time to F06PROS131. Indirect employees charge to their normal PID.
- At any point during the survey you have the right of refusal or to opt out.
- All responses will be kept confidential and individual responses will not be identified.
- An independent company, Survey Monkey, will collect all raw data and transmit it to the appropriate party for analysis.

To reach the survey instruments, click on the following link:
http://www.surveymonkey.com/s.aspx?sm=1QaiLGxjhnYN2fs9DkAf9g_3d_3d

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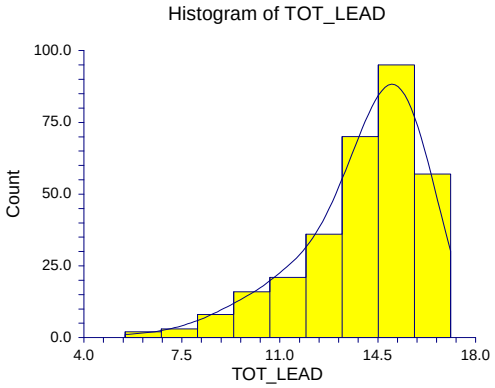
Fax: 861-5196

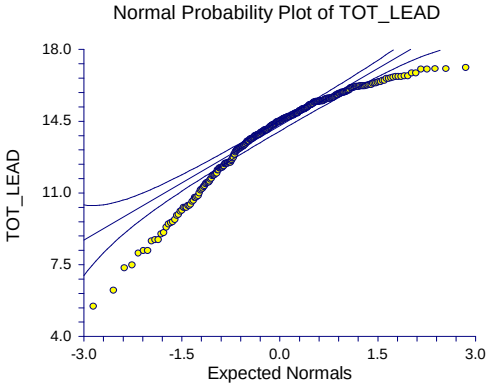
# Appendix B

## Variable Histogram and Normal Probability Plots—Prior to Data Transformations

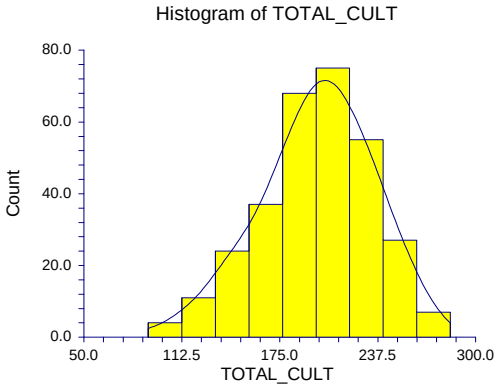
# Initial Plots Prior to Data Transformation

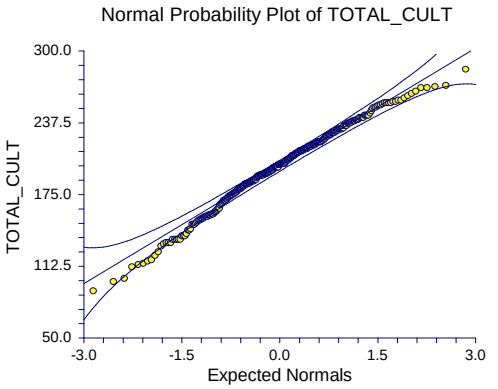
## Plots Section of TOT_LEAD



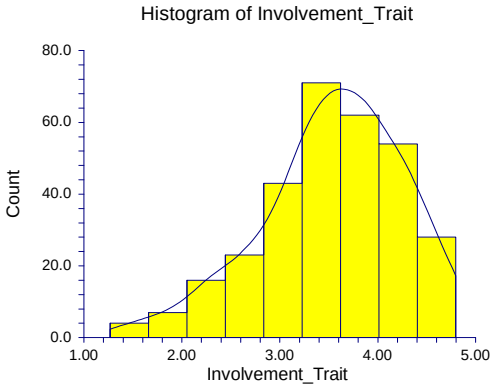



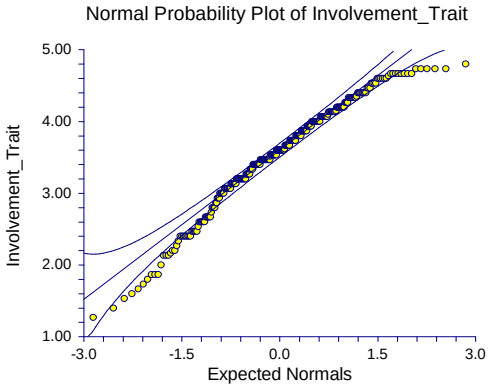
**Plots Section of TOTAL_CULT**



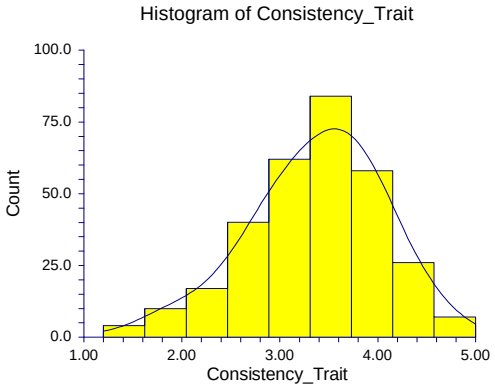



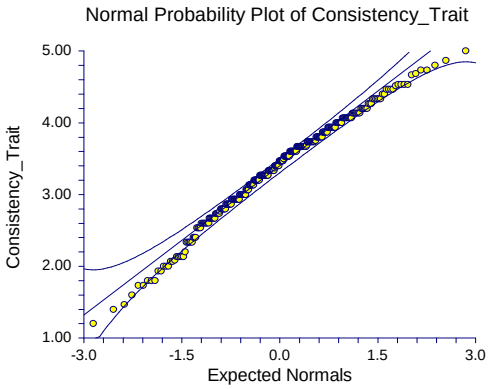
**Plots Section of Involvement_Trait**



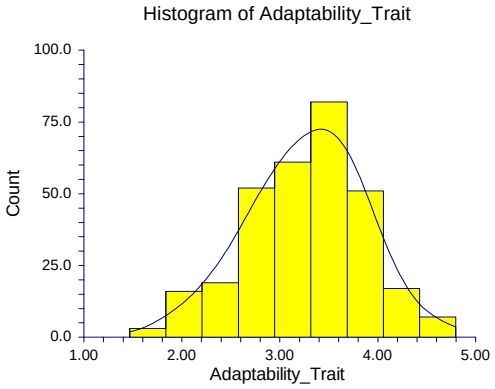



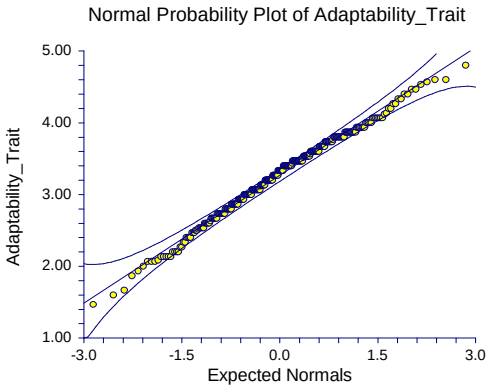
## Plots Section of Consistency_Trait



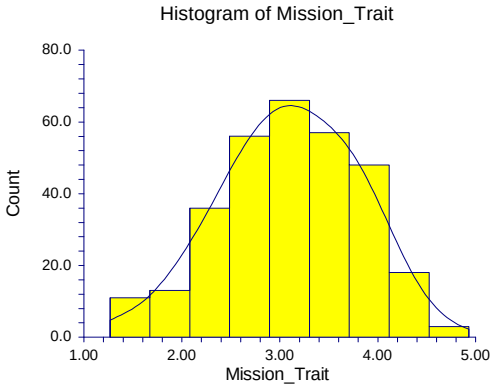



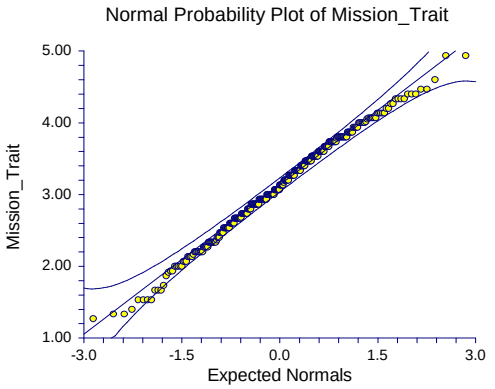
## Plots Section of Adaptability_Trait



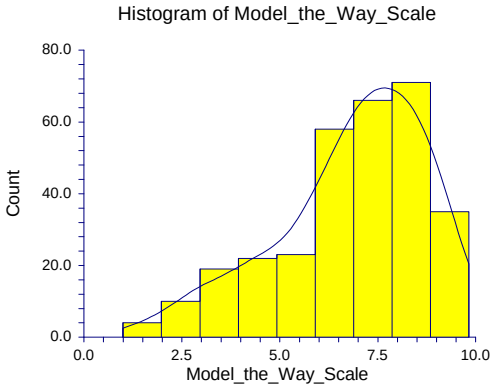



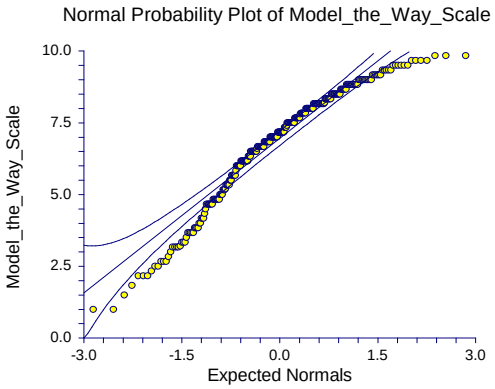
**Plots Section of Mission_Trait**



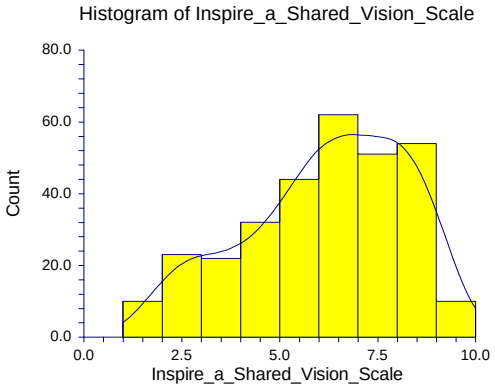



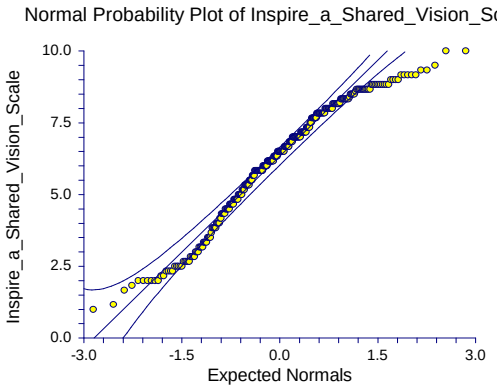
## Plots Section of Model_the_Way_Scale



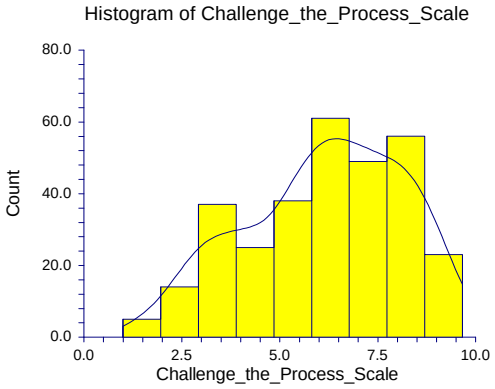



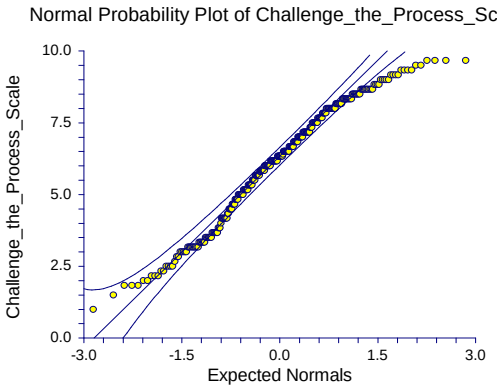
## Plots Section of Inspire_a_Shared_Vision_Scale



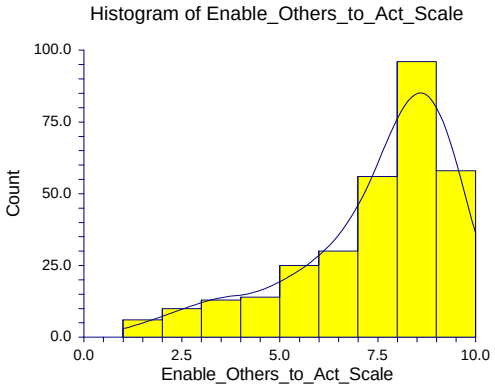



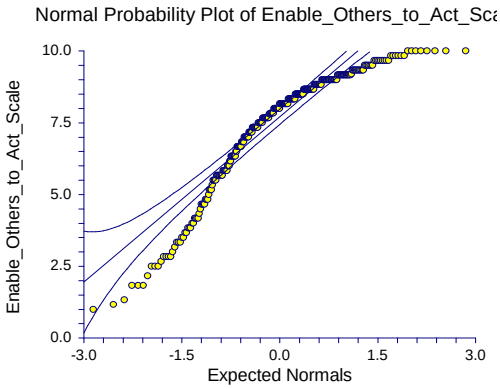
## Plots Section of Challenge_the_Process_Scale



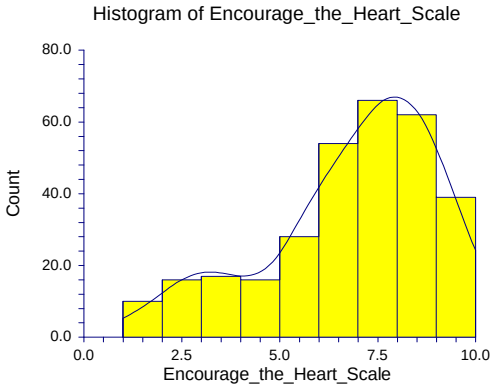



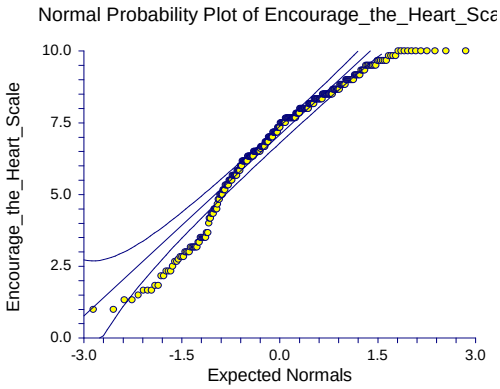
## Plots Section of Enable_Others_to_Act_Scale



## Plots Section of Encourage_the_Heart_Scale



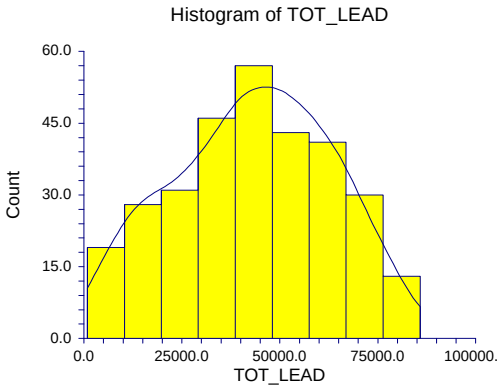



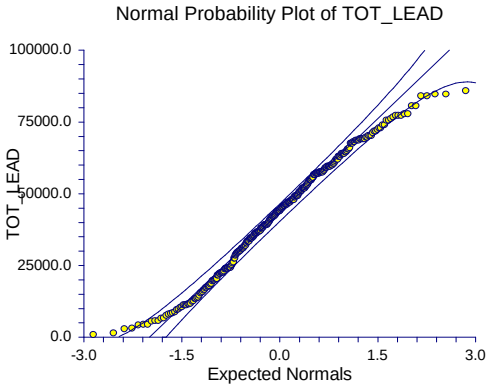
# Appendix C

## Variable Histogram and Normal Probability Plots—Post Data Transformations

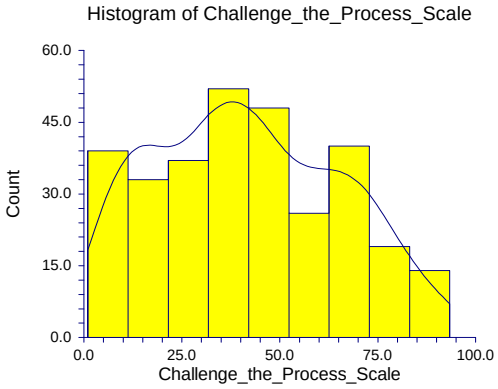
**Post Data Transformations—Total Leadership (^2), Challenge the Process (^2), Encourage Others to Act (^3) Variables**

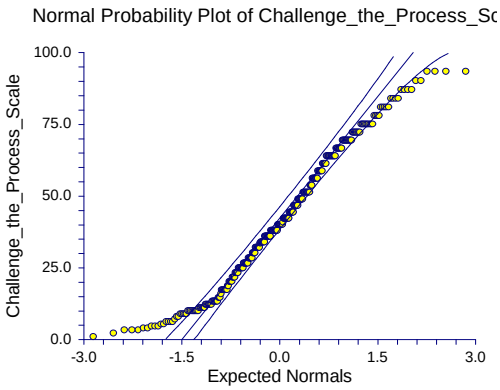
**Plots Section of TOT_LEAD**



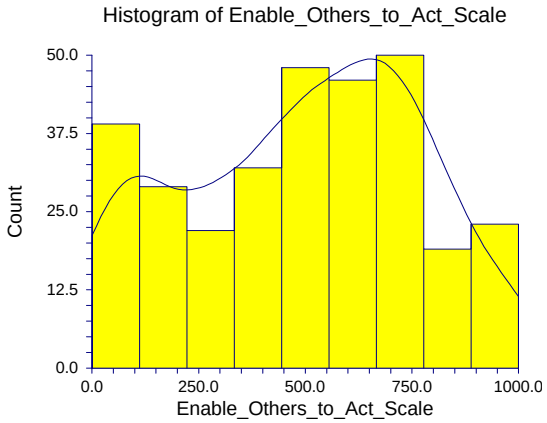



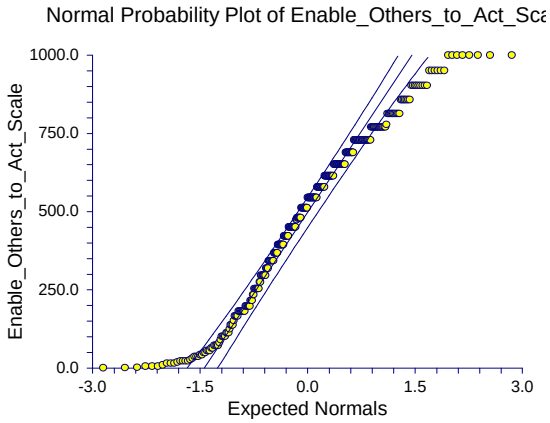

**Plots Section of Challenge_the_Process_Scale**




**Plots Section of Enable_Others_to_Act_Scale**

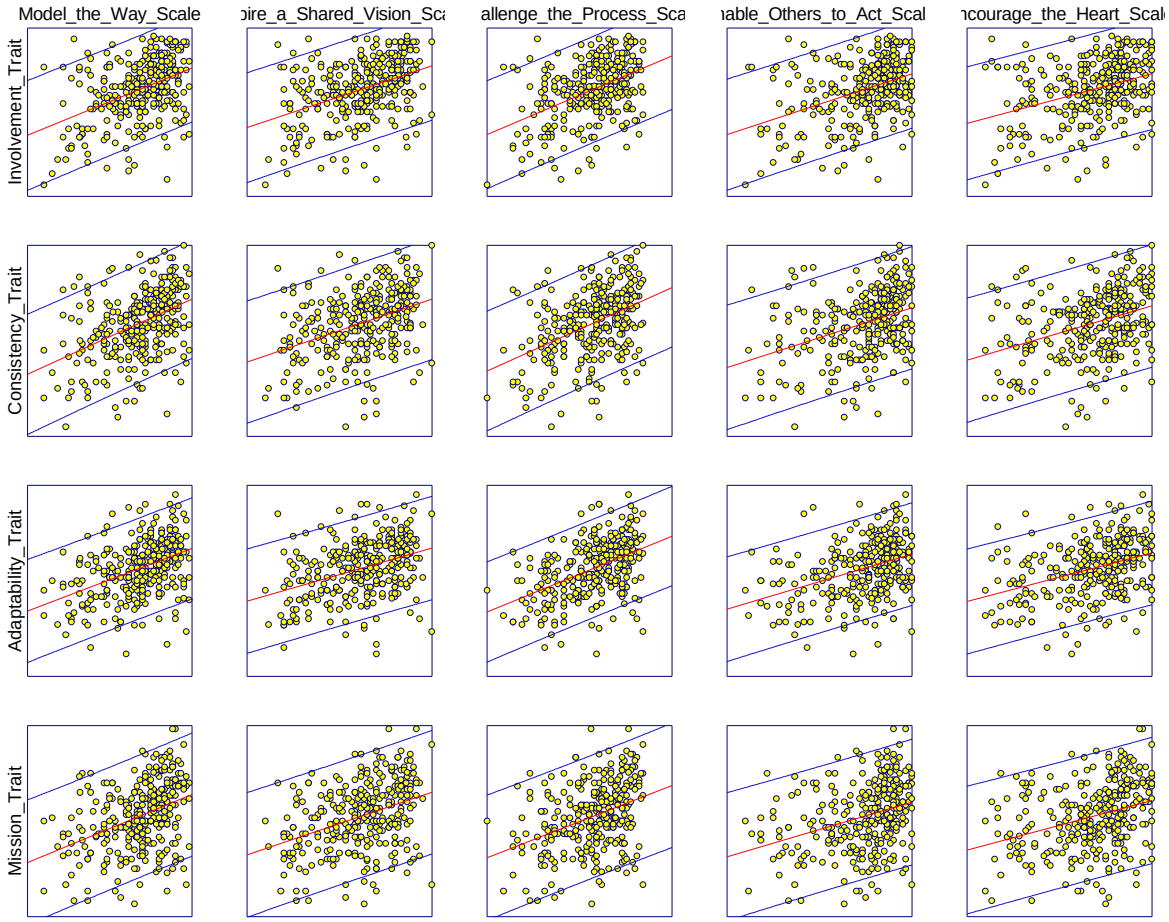

Histogram of Enable_Others_to_Act_Scale
Count
50.0
37.5
25.0
12.5
0.0
0.0
250.0
500.0
750.0
1000.0
Enable_Others_to_Act_Scale


Normal Probability Plot of Enable_Others_to_Act_Sca
Enable_Others_to_Act_Scale
1000.0
750.0
500.0
250.0
0.0
-3.0
-1.5
0.0
1.5
3.0
Expected Normals

# Appendix D

## Scatterplot Matrix

## Plot Section



# Appendix E

## Rank Order of LPI Statements

**Rank Order of LPI Statements—Lowest to Highest**

| Variables | Mean | Standard deviation |
|---|---|---|
| **MTW16** | **5.107492** | **2.770911** |
| **CTP28** | **5.248366** | **2.740781** |
| **ISV12** | **5.322475** | **2.53284** |
| **ISV17** | **5.422078** | **2.624819** |
| CTP13 | 5.821429 | 2.498976 |
| CTP8 | 5.918567 | 2.487199 |
| ISV7 | 5.951299 | 2.424273 |
| CTP3 | 6.068404 | 2.461178 |
| ETH25 | 6.539216 | 2.476135 |
| ETH15 | 6.542208 | 2.527021 |
| MTW21 | 6.602606 | 2.516299 |
| ISV2 | 6.616883 | 2.24899 |
| ETH20 | 6.762987 | 2.51361 |
| EOA29 | 6.762987 | 2.65601 |
| ETH10 | 6.794788 | 2.426752 |
| CTP18 | 6.869707 | 2.504107 |
| ISV22 | 6.90228 | 2.368826 |
| CTP23 | 6.918567 | 2.416558 |
| ISV27 | 6.931373 | 2.569403 |
| ETH30 | 6.973941 | 2.544886 |
| MTW26 | 7.114754 | 2.438037 |
| MTW6 | 7.214286 | 2.113904 |
| EOA4 | 7.247557 | 2.308825 |
| EOA9 | 7.275974 | 2.411659 |
| EOA19 | 7.296417 | 2.338947 |
| MTW1 | 7.398693 | 2.05766 |
| **ETH5** | **7.5** | **2.323229** |
| **MTW11** | **7.558824** | **2.24663** |
| **EOA24** | **7.843648** | **2.417593** |
| **EOA14** | **8.204545** | **2.186808** |

# Appendix F

## Item Analysis Report—LPI–O Reliability Section

## LPI–O Reliability Section

**(Model the Way)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| MTW1 | 7.397993 | 2.059223 | 33.67893 | 9.905116 | 0.8750 | 0.7386 | 0.5844 |
| MTW6 | 7.247492 | 2.091599 | 33.82943 | 9.813411 | 0.8697 | 0.7747 | 0.6215 |
| MTW11 | 7.558528 | 2.256776 | 33.51839 | 9.81518 | 0.8791 | 0.7009 | 0.5269 |
| MTW16 | 5.160535 | 2.762582 | 35.91639 | 9.604758 | 0.8971 | 0.6143 | 0.4191 |
| MTW21 | 6.625418 | 2.51842 | 34.4515 | 9.398352 | 0.8632 | 0.7987 | 0.6392 |
| MTW26 | 7.086957 | 2.447941 | 33.98997 | 9.605467 | 0.8750 | 0.7277 | 0.5376 |
| Total | | | 41.07692 | 11.51002 | 0.8950 | | |

**Cronbach's Alpha 0.894975** Std. Cronbach's Alpha 0.899864

**(Inspire A Shared Vision)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| ISV2 | 6.598684 | 2.256665 | 30.40461 | 10.53162 | 0.8960 | 0.7013 | 0.5254 |
| ISV7 | 5.917763 | 2.421673 | 31.08553 | 10.32408 | 0.8907 | 0.7378 | 0.5685 |
| ISV12 | 5.299342 | 2.534097 | 31.70395 | 10.17396 | 0.8867 | 0.7643 | 0.6189 |
| ISV17 | 5.388158 | 2.623955 | 31.61513 | 10.08217 | 0.8858 | 0.7713 | 0.6258 |
| ISV22 | 6.881579 | 2.371264 | 30.12171 | 10.29956 | 0.8861 | 0.7706 | 0.6042 |
| ISV27 | 6.917763 | 2.572349 | 30.08553 | 10.25352 | 0.8947 | 0.7126 | 0.5326 |
| Total | | | 37.00329 | 12.22061 | 0.9067 | | |

**Cronbach's Alpha 0.906686** Std. Cronbach's Alpha 0.907087

**(Challenge the Process)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| CTP3 | 6.072607 | 2.476648 | 30.77888 | 10.27828 | 0.8674 | 0.6768 | 0.4795 |
| CTP8 | 5.917492 | 2.498302 | 30.93399 | 10.09076 | 0.8544 | 0.7570 | 0.5996 |
| CTP13 | 5.808581 | 2.514131 | 31.0429 | 10.00868 | 0.8488 | 0.7896 | 0.6341 |
| CTP18 | 6.871287 | 2.51879 | 29.9802 | 10.34694 | 0.8749 | 0.6298 | 0.4429 |
| CTP23 | 6.917492 | 2.431129 | 29.93399 | 10.31406 | 0.8674 | 0.6768 | 0.4899 |
| CTP28 | 5.264026 | 2.742164 | 31.58746 | 10.11546 | 0.8719 | 0.6560 | 0.4709 |
| Total | | | 36.85149 | 12.09268 | 0.8843 | | |

**Cronbach's Alpha 0.884309** Std. Cronbach's Alpha 0.885045

**Reliability Section (Enable Others to Act)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| EOA4 | 7.239344 | 2.313809 | 37.35082 | 10.31183 | 0.9095 | 0.7525 | 0.6010 |
| EOA9 | 7.265574 | 2.415335 | 37.32459 | 10.13119 | 0.9031 | 0.7994 | 0.6612 |
| EOA14 | 8.2 | 2.193591 | 36.39016 | 10.28261 | 0.9012 | 0.8214 | 0.6891 |
| EOA19 | 7.281967 | 2.339415 | 37.3082 | 10.08827 | 0.8957 | 0.8549 | 0.7599 |
| EOA24 | 7.832787 | 2.421445 | 36.75738 | 10.28733 | 0.9139 | 0.7207 | 0.6037 |
| EOA29 | 6.770492 | 2.641978 | 37.81967 | 10.1192 | 0.9163 | 0.7148 | 0.5325 |
| Total | | | 44.59016 | 12.14899 | 0.9210 | | |

**Cronbach's Alpha 0.921007** Std. Cronbach's Alpha 0.922743

**Reliability Section (Encourage the Heart)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| ETH5 | 7.514754 | 2.307157 | 33.60656 | 11.03058 | 0.9303 | 0.8105 | 0.7008 |
| ETH10 | 6.790164 | 2.425584 | 34.33115 | 11.13635 | 0.9420 | 0.7099 | 0.5293 |
| ETH15 | 6.537705 | 2.52215 | 34.58361 | 10.75415 | 0.9249 | 0.8524 | 0.7514 |
| ETH20 | 6.760656 | 2.508884 | 34.36066 | 10.80271 | 0.9271 | 0.8349 | 0.7253 |
| ETH25 | 6.527869 | 2.472223 | 34.59344 | 10.85848 | 0.9285 | 0.8239 | 0.7129 |
| ETH30 | 6.990164 | 2.542384 | 34.13115 | 10.65345 | 0.9199 | 0.8915 | 0.8074 |
| Total | | | 41.12131 | 12.97119 | 0.9401 | | |

**Cronbach's Alpha 0.940120** Std. Cronbach's Alpha 0.939981

# Appendix G

## Item Analysis Report—DOCS Reliability Section

## DOCS Reliability Section

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| EMP1 | 4.062295 | 0.9421008 | 12.83607 | 3.49238 | 0.7632 | 0.4610 | 0.2930 |
| EMP2 | 3.157377 | 1.16196 | 13.74098 | 3.200811 | 0.7149 | 0.6080 | 0.4074 |
| EMP3 | 3.383607 | 1.164324 | 13.51475 | 3.207815 | 0.7183 | 0.5987 | 0.4186 |
| EMP4 | 3.439344 | 1.113801 | 13.45902 | 3.21578 | 0.7065 | 0.6332 | 0.4370 |
| EMP5 | 2.855738 | 1.126319 | 14.04262 | 3.373877 | 0.7671 | 0.4561 | 0.2248 |
| Total | | | 16.89836 | 4.014714 | 0.7767 | | |

**Cronbach's Alpha 0.776730** Std. Cronbach's Alpha 0.775566 **(Empowerment)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| TEAM6 | 3.55814 | 1.191963 | 14.47508 | 3.526596 | 0.8094 | 0.5830 | 0.3465 |
| TEAM7 | 3.754153 | 1.125178 | 14.27907 | 3.473979 | 0.7763 | 0.6939 | 0.5597 |
| TEAM8 | 3.757475 | 1.190652 | 14.27575 | 3.414729 | 0.7742 | 0.6986 | 0.5874 |
| TEAM9 | 3.730897 | 1.057044 | 14.30233 | 3.542828 | 0.7820 | 0.6796 | 0.4731 |
| TEAM10 | 3.232558 | 1.041987 | 14.80066 | 3.723815 | 0.8312 | 0.4905 | 0.2643 |
| Total | | | 18.03322 | 4.331154 | 0.8297 | | |

**Cronbach's Alpha 0.829697** Std. Cronbach's Alpha 0.829491 (**Team Orientation)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| CAP11 | 3.42671 | 1.12764 | 14.68404 | 3.218793 | 0.6754 | 0.4019 | 0.2023 |
| CAP12 | 3.482085 | 1.036351 | 14.62866 | 3.122587 | 0.6072 | 0.5756 | 0.3664 |
| CAP13 | 3.612378 | 1.121497 | 14.49837 | 3.037214 | 0.5924 | 0.5970 | 0.4523 |
| CAP14 | 3.840391 | 1.11317 | 14.27036 | 3.064961 | 0.6031 | 0.5740 | 0.3865 |
| CAP15 | 3.749186 | 1.241556 | 14.36156 | 3.362066 | 0.7621 | 0.2042 | 0.0613 |
| Total | | | 18.11075 | 3.814418 | 0.7015 | | |

**Cronbach's Alpha 0.701542** Std. Cronbach's Alpha 0.711775 (**Capability Development)**

| --------- Item Values ---------- | | | ---------- If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| VALUE16 | 3.213816 | 1.1215 | 15.42434 | 3.025884 | 0.6826 | 0.5382 | 0.3412 |
| VALUE17 | 3.289474 | 1.087775 | 15.34868 | 3.141881 | 0.7197 | 0.4407 | 0.2385 |
| VALUE18 | 3.707237 | 1.130063 | 14.93092 | 2.954858 | 0.6539 | 0.6077 | 0.4162 |
| VALUE19 | 4.134869 | 1.030028 | 14.50329 | 3.272042 | 0.7524 | 0.3411 | 0.2142 |
| VALUE20 | 4.292763 | 0.9731445 | 14.3454 | 3.075901 | 0.6598 | 0.6111 | 0.4437 |
| Total | | | 18.63816 | 3.750554 | 0.7412 | | |

**Cronbach's Alpha 0.741170** Std. Cronbach's Alpha 0.741792 **(Core Values)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| AGR21 | 3.537954 | 1.09077 | 13.25413 | 3.174522 | 0.7004 | 0.6240 | 0.3979 |
| AGR22 | 3.877888 | 0.9874743 | 12.91419 | 3.380784 | 0.7503 | 0.4769 | 0.2934 |
| AGR23 | 2.874588 | 1.11764 | 13.91749 | 3.148077 | 0.6978 | 0.6295 | 0.4134 |
| AGR24 | 3.056106 | 1.124746 | 13.73597 | 3.335976 | 0.7692 | 0.4258 | 0.2498 |
| AGR25 | 3.445544 | 1.137634 | 13.34653 | 3.192818 | 0.7213 | 0.5645 | 0.3471 |
| Total | | | 16.79208 | 3.9483 | 0.7710 | | |

**Cronbach's Alpha 0.771037** Std. Cronbach's Alpha 0.770906 **(Agreement)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| COI26 | 3.504918 | 1.085555 | 11.68197 | 3.522555 | 0.7848 | 0.5781 | 0.3567 |
| COI27 | 2.990164 | 1.212558 | 12.19672 | 3.337485 | 0.7572 | 0.6670 | 0.4863 |
| COI28 | 2.822951 | 1.100896 | 12.36393 | 3.399208 | 0.7481 | 0.7003 | 0.5092 |
| COI29 | 2.593443 | 1.205234 | 12.59344 | 3.561299 | 0.8255 | 0.4511 | 0.2170 |
| COI30 | 3.27541 | 0.9848617 | 11.91148 | 3.538607 | 0.7676 | 0.6479 | 0.4311 |
| Total | | | 15.18688 | 4.243551 | 0.8139 | | |

**Cronbach's Alpha 0.813851** Std. Cronbach's Alpha 0.817906 (**Coordination & Integration)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| CC31 | 2.2 | 1.097275 | 11.36 | 2.96305 | 0.6574 | 0.5302 | 0.3190 |
| CC32 | 2.88 | 1.046862 | 10.68 | 2.92108 | 0.6210 | 0.6217 | 0.4283 |
| CC33 | 3.093333 | 1.093285 | 10.46667 | 2.894272 | 0.6236 | 0.6098 | 0.4172 |
| CC34 | 2.25 | 1.088477 | 11.31 | 3.209606 | 0.7548 | 0.2783 | 0.0811 |
| CC35 | 3.136667 | 0.9872035 | 10.42333 | 3.155521 | 0.7067 | 0.4012 | 0.1902 |
| Total | | | 13.56 | 3.664856 | 0.7237 | | |

**Cronbach's Alpha 0.723747** Std. Cronbach's Alpha 0.723523 **(Creating Change)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| CF36 | 3.950658 | 0.9051737 | 15.54605 | 2.725842 | 0.5667 | 0.5192 | 0.4776 |
| CF37 | 4.259869 | 0.8133993 | 15.23684 | 2.771226 | 0.5642 | 0.5480 | 0.4944 |
| CF38 | 3.605263 | 1.022247 | 15.89145 | 2.766739 | 0.6285 | 0.3734 | 0.1775 |
| CF39 | 4.12171 | 1.034865 | 15.375 | 2.790395 | 0.6448 | 0.3384 | 0.1365 |
| CF40 | 3.559211 | 1.222633 | 15.9375 | 2.641265 | 0.6459 | 0.3624 | 0.1641 |
| Total | | | 19.49671 | 3.288141 | 0.6613 | | |

**Cronbach's Alpha 0.661327** Std. Cronbach's Alpha 0.682335 **(Customer Focus)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| OL41 | 3.480132 | 1.095719 | 12.46358 | 3.338639 | 0.6853 | 0.5420 | 0.3257 |
| OL42 | 2.602649 | 1.109185 | 13.34106 | 3.432245 | 0.7235 | 0.4337 | 0.2285 |
| OL43 | 3.281457 | 1.269468 | 12.66225 | 3.359694 | 0.7419 | 0.4002 | 0.2087 |
| OL44 | 3.63245 | 1.084781 | 12.31126 | 3.307467 | 0.6701 | 0.5848 | 0.3485 |
| OL45 | 2.94702 | 1.182868 | 12.99669 | 3.22521 | 0.6643 | 0.5913 | 0.3567 |
| Total | | | 15.94371 | 4.038866 | 0.7428 | | |

**Cronbach's Alpha 0.742843** Std. Cronbach's Alpha 0.746793 **(Organizational Learning)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| STR46 | 3.157895 | 1.282558 | 11.66118 | 3.373407 | 0.6551 | 0.6310 | 0.4476 |
| STR47 | 2.947368 | 1.032728 | 11.87171 | 3.727516 | 0.7223 | 0.4578 | 0.2507 |
| STR48 | 3.674342 | 1.178408 | 11.14474 | 3.535595 | 0.6885 | 0.5516 | 0.3831 |
| STR49 | 2.381579 | 1.245105 | 12.4375 | 3.483489 | 0.6868 | 0.5534 | 0.3250 |
| STR50 | 2.657895 | 1.335503 | 12.16118 | 3.602851 | 0.7529 | 0.3867 | 0.2065 |
| Total | | | 14.81908 | 4.299455 | 0.7473 | | |

**Cronbach's Alpha 0.747305** Std. Cronbach's Alpha 0.749798 (**Strategic Direction & Intent)**

| --------- Item Values ---------- | | | If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| GOA51 | 3.128713 | 1.088745 | 14.28053 | 3.255741 | 0.7943 | 0.6362 | 0.4214 |
| GOA52 | 3.376238 | 1.018226 | 14.033 | 3.326429 | 0.7991 | 0.6191 | 0.4069 |
| GOA53 | 3.69637 | 1.019781 | 13.71287 | 3.278477 | 0.7837 | 0.6741 | 0.4808 |
| GOA54 | 3.732673 | 0.9338139 | 13.67657 | 3.382025 | 0.7973 | 0.6310 | 0.4307 |
| GOA55 | 3.475248 | 1.155987 | 13.93399 | 3.241229 | 0.8086 | 0.5943 | 0.3584 |
| Total | | | 17.40924 | 4.036774 | 0.8304 | | |

**Cronbach's Alpha 0.830375** Std. Cronbach's Alpha 0.832819 **(Goals & Objectives)**

| --------- Item Values ---------- | | | If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| VIS56 | 2.504951 | 1.203943 | 11.80198 | 2.931965 | 0.6221 | 0.5640 | 0.3970 |
| VIS57 | 2.963696 | 1.148856 | 11.34323 | 2.92868 | 0.6003 | 0.6139 | 0.4027 |
| VIS58 | 2.729373 | 1.041854 | 11.57756 | 3.431413 | 0.7728 | 0.1633 | 0.0571 |
| VIS59 | 2.627063 | 1.114115 | 11.67987 | 2.999971 | 0.6231 | 0.5665 | 0.3909 |
| VIS60 | 3.481848 | 0.9691434 | 10.82508 | 3.189246 | 0.6653 | 0.4720 | 0.2619 |
| Total | | | 14.30693 | 3.745397 | 0.7122 | | |

**Cronbach's Alpha 0.712210** Std. Cronbach's Alpha 0.706931 **(Vision)**

| --------- Item Values ---------- | | | If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| Empowerment | 16.88636 | 3.998788 | 36.08117 | 7.434178 | 0.7971 | 0.7280 | 0.5423 |
| Team_ Orientation | 17.99675 | 4.304 | 34.97078 | 7.02734 | 0.7564 | 0.7709 | 0.5964 |
| Capability_ development | 18.08442 | 3.836141 | 34.88312 | 7.688943 | 0.8324 | 0.6900 | 0.4806 |
| Total | | | 52.96753 | 10.70232 | 0.8553 | | |

**Cronbach's Alpha 0.855280** Std. Cronbach's Alpha 0.855418 **(Involvement)**

| --------- Item Values ---------- | | | If This Item is Omitted ---------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| Core_values | 18.57467 | 3.79923 | 31.89286 | 7.55899 | 0.8203 | 0.6403 | 0.4169 |
| Agreement | 16.72403 | 3.969568 | 33.74351 | 7.103409 | 0.7166 | 0.7471 | 0.5618 |
| Coord_and_ Integ | 15.16883 | 4.236195 | 35.2987 | 6.991973 | 0.7649 | 0.7008 | 0.5129 |
| Total | | | 50.46753 | 10.40901 | 0.8336 | | |

**Cronbach's Alpha 0.833575** Std. Cronbach's Alpha **0.833990 (Consistency)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| Creating_Change | 13.48052 | 3.680605 | 35.28571 | 6.419346 | 0.6404 | 0.5325 | 0.3599 |
| Customer_Focus | 19.38961 | 3.431625 | 29.37662 | 6.897649 | 0.7480 | 0.4344 | 0.2277 |
| Organizational_ Learning | 15.8961 | 4.029482 | 32.87013 | 5.717795 | 0.4509 | 0.6725 | 0.4596 |
| Total | | | 48.76624 | 8.93975 | 0.7200 | | |

**Cronbach's Alpha 0.719968** Std. Cronbach's Alpha 0.715698 (**Adaptability)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| Strat_Direction | 14.77273 | 4.306684 | 31.65909 | 7.126408 | 0.8095 | 0.6789 | 0.4610 |
| Goals_and_Obj | 17.38312 | 4.037605 | 29.0487 | 7.239115 | 0.7606 | 0.7236 | 0.5318 |
| Vision | 14.27597 | 3.731869 | 32.15585 | 7.522933 | 0.7684 | 0.7211 | 0.5268 |
| Total | | | 46.43182 | 10.53605 | 0.8409 | | |

**Cronbach's Alpha 0.840906** Std. Cronbach's Alpha 0.843531 **(Mission)**

| --------- Item Values ---------- | | | ------------------- If This Item is Omitted ------------------- | | | | R2 |
|---|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Total Mean | Total Std.Dev. | Coef Alpha | Corr Total | Other Items |
| Involvement_Trait | 3.540476 | 0.7165533 | 9.743182 | 1.782226 | 0.8731 | 0.7977 | 0.7025 |
| Consistency_Trait | 3.373052 | 0.6941334 | 9.910606 | 1.772548 | 0.8511 | 0.8547 | 0.7531 |
| Adaptability_Trait | 3.263799 | 0.5912193 | 10.01986 | 1.901937 | 0.8815 | 0.7827 | 0.6129 |
| Mission_Trait | 3.106331 | 0.7043995 | 10.17733 | 1.832904 | 0.8996 | 0.7247 | 0.5506 |
| Total | | | 13.28366 | 2.393133 | 0.9047 | | |

**Cronbach's Alpha 0.904729** Std. Cronbach's Alpha 0.906780 **(Total Culture)**

# Appendix H

## Multiple Regressions of Study Variables

**Multiple Regression Report**

| | |
|---|---|
| Page/Date/Time | 1 3/1/2010 3:45:50 PM |
| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

**Run Summary Section**

| Parameter | Value | Parameter | Value |
|---|---|---|---|
| Dependent Variable | TOTAL_CULT | Rows Processed | 359 |
| Number Ind. Variables | 5 | Rows Filtered Out | 0 |
| Weight Variable | None | Rows with X's Missing | 51 |
| R2 | 0.2436 | Rows with Weight Missing | 0 |
| Adj R2 | 0.2310 | Rows with Y Missing | 0 |
| Coefficient of Variation | 0.1581 | Rows Used in Estimation | 308 |
| Mean Square Error | 986.6121 | Sum of Weights | 308.000 |
| Square Root of MSE | 31.41038 | Completion Status | Normal Completion |
| Ave Abs Pct Error | 13.356 | | |

**Descriptive Statistics Section**

| Variable | Count | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| CTP | 308 | 36.72727 | 12.03538 | 6 | 58 |
| EOA | 308 | 44.55844 | 12.09813 | 6 | 60 |
| ETH | 308 | 41.02597 | 13.03938 | 6 | 60 |
| ISV | 308 | 37.06169 | 12.15211 | 6 | 60 |
| MTW | 308 | 40.79221 | 11.54438 | 6 | 59 |
| TOTAL_CULT | 308 | 198.6331 | 35.81956 | 91 | 284 |

**Correlation Matrix Section**

| | CTP | EOA | ETH | ISV |
|---|---|---|---|---|
| CTP | 1.0000 | 0.6969 | 0.7023 | 0.8591 |
| EOA | 0.6969 | 1.0000 | 0.8316 | 0.6672 |
| ETH | 0.7023 | 0.8316 | 1.0000 | 0.7168 |
| ISV | 0.8591 | 0.6672 | 0.7168 | 1.0000 |
| MTW | 0.8253 | 0.8062 | 0.8106 | 0.8328 |
| TOTAL_CULT | 0.4704 | 0.4189 | 0.3926 | 0.4361 |

**Correlation Matrix Section**

| | MTW | TOTAL_CULT |
|---|---|---|
| CTP | 0.8253 | 0.4704 |
| EOA | 0.8062 | 0.4189 |
| ETH | 0.8106 | 0.3926 |
| ISV | 0.8328 | 0.4361 |
| MTW | 1.0000 | 0.4636 |
| TOTAL_CULT | 0.4636 | 1.0000 |

**Multiple Regression Report**

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| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

**Subset Selection Summary Section**

| No. Terms | No. X's | R-Squared Value | R-Squared Change |
|---|---|---|---|
| 1 | 1 | 0.2212 | 0.2212 |
| 2 | 2 | 0.2390 | 0.0178 |
| 3 | 3 | 0.2429 | 0.0039 |
| 4 | 4 | 0.2434 | 0.0005 |
| 5 | 5 | 0.2436 | 0.0002 |
| 0 | 0 | 0.0000 | -0.2436 |

**Subset Selection Detail Section**

| Step | Action | No. of Terms | No. of X's | R2 | Term Entered | Term Removed |
|---|---|---|---|---|---|---|
| 0 | Add | 0 | 0 | 0.0000 | Intercept | |
| 1 | Add | 1 | 1 | 0.2212 | CTP | |
| 2 | Add | 2 | 2 | 0.2390 | MTW | |
| 3 | Add | 3 | 3 | 0.2429 | EOA | |
| 4 | Add | 4 | 4 | 0.2434 | ETH | |
| 5 | Add | 5 | 5 | 0.2436 | ISV | |

**Regression Equation Section**

| Independent Variable | Regression Coefficient b(i) | Standard Error Sb(i) | T-Value to test H0:B(i)=0 | Prob Level | Reject H0 at 5%? | Power of Test at 5% |
|---|---|---|---|---|---|---|
| Intercept | 135.190 | 7.085 | 19.081 | 0.0000 | Yes | 1.0000 |
| CTP | 0.746 | 0.318 | 2.344 | 0.0197 | Yes | 0.6466 |
| EOA | 0.388 | 0.295 | 1.312 | 0.1904 | No | 0.2578 |
| ETH | -0.129 | 0.277 | -0.466 | 0.6419 | No | 0.0750 |
| ISV | 0.091 | 0.324 | 0.283 | 0.7777 | No | 0.0591 |
| MTW | 0.507 | 0.376 | 1.348 | 0.1787 | No | 0.2693 |

**Estimated Model**

135.190216936318+ .745821878687139*CTP+ .387655728289267*EOA-
.129098926384725*ETH+ 9.14256581151164E-02*ISV+ .507096388353767*MTW

**Multiple Regression Report**

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| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

**Regression Coefficient Section**

| Independent Variable | Regression Coefficient | Standard Error | Lower 95% C.L. | Upper 95% C.L. | Standardized Coefficient |
|---|---|---|---|---|---|
| Intercept | 135.190 | 7.085 | 121.248 | 149.132 | 0.000 |
| CTP | 0.746 | 0.318 | 0.120 | 1.372 | 0.251 |
| EOA | 0.388 | 0.295 | -0.194 | 0.969 | 0.131 |
| ETH | -0.129 | 0.277 | -0.675 | 0.417 | -0.047 |
| ISV | 0.091 | 0.324 | -0.545 | 0.728 | 0.031 |
| MTW | 0.507 | 0.376 | -0.233 | 1.247 | 0.163 |

Note: The T-Value used to calculate these confidence limits was 1.968.

**Analysis of Variance Section**

| Source | DF | R2 | Sum of Squares | Mean Square | F-Ratio | Prob Level | Power (5%) |
|---|---|---|---|---|---|---|---|
| Intercept | 1 | | 1.215218E+07 | 1.215218E+07 | | | |
| Model | 5 | 0.2436 | 95936.69 | 19187.34 | 19.448 | 0.0000 | 1.0000 |
| Error | 302 | 0.7564 | 297956.8 | 986.6121 | | | |
| Total(Adjusted) | 307 | 1.0000 | 393893.5 | 1283.041 | | | |

**Analysis of Variance Detail Section**

| Model Term | DF | R2 | Sum of Squares | Mean Square | F-Ratio | Prob Level | Power (5%) |
|---|---|---|---|---|---|---|---|
| Intercept | 1 | | 1.215218E+07 | 1.215218E+07 | | | |
| Model | 5 | 0.2436 | 95936.69 | 19187.34 | 19.448 | 0.0000 | 1.0000 |
| CTP | 1 | 0.0138 | 5419.106 | 5419.106 | 5.493 | 0.0197 | 0.6466 |
| EOA | 1 | 0.0043 | 1699.503 | 1699.503 | 1.723 | 0.1904 | 0.2578 |
| ETH | 1 | 0.0005 | 213.8487 | 213.8487 | 0.217 | 0.6419 | 0.0750 |
| ISV | 1 | 0.0002 | 78.78286 | 78.78286 | 0.080 | 0.7777 | 0.0591 |
| MTW | 1 | 0.0046 | 1792.264 | 1792.264 | 1.817 | 0.1787 | 0.2693 |
| Error | 302 | 0.7564 | 297956.8 | 986.6121 | | | |
| Total(Adjusted) | 307 | 1.0000 | 393893.5 | 1283.041 | | | |

**PRESS Section**

| Parameter | From PRESS Residuals | From Regular Residuals |
|---|---|---|
| Sum of Squared Residuals | 311330.1 | 297956.8 |
| Sum of \|Residuals\| | 7571.646 | 7415.535 |
| R2 | 0.2096 | 0.2436 |

**Multiple Regression Report**

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| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

**Normality Tests Section**

| Test Name | Test Value | Prob Level | Reject H0 At Alpha = 20%? |
|---|---|---|---|
| Shapiro Wilk | 0.9836 | 0.001340 | Yes |
| Anderson Darling | 1.1045 | 0.006810 | Yes |
| D'Agostino Skewness | -3.3614 | 0.000775 | Yes |
| D'Agostino Kurtosis | 1.7737 | 0.076109 | Yes |
| D'Agostino Omnibus | 14.4454 | 0.000730 | Yes |

**Serial Correlation of Residuals Section**

| Lag | Serial Correlation | Lag | Serial Correlation | Lag | Serial Correlation |
|---|---|---|---|---|---|
| 1 | 0.0418 | 9 | -0.0263 | 17 | 0.0306 |
| 2 | -0.0283 | 10 | -0.0039 | 18 | 0.0275 |
| 3 | 0.0026 | 11 | -0.0046 | 19 | -0.0114 |
| 4 | -0.0550 | 12 | -0.0114 | 20 | 0.0403 |
| 5 | 0.0344 | 13 | -0.0355 | 21 | 0.0200 |
| 6 | 0.0311 | 14 | 0.0745 | 22 | 0.1856 |
| 7 | 0.0051 | 15 | -0.0435 | 23 | -0.0244 |
| 8 | -0.0147 | 16 | -0.0505 | 24 | 0.0789 |

Above serial correlations significant if their absolute values are greater than 0.113961

**Durbin-Watson Test For Serial Correlation**

| Parameter | Value | Did the Test Reject H0: Rho(1) = 0? |
|---|---|---|
| Durbin-Watson Value | 1.8674 | |
| Prob. Level: Positive Serial Correlation | 0.1212 | Yes |
| Prob. Level: Negative Serial Correlation | 0.8769 | No |

**R-Squared Section**

| Independent Variable | Total R2 for This I.V. And Those Above | R2 Increase When This I.V. Added To Those Above | R2 Decrease When This I.V. Is Removed | R2 When This I.V. Is Fit Alone | Partial R2 Adjusted For All Other I.V.'s |
|---|---|---|---|---|---|
| CTP | 0.2212 | 0.2212 | 0.0138 | 0.2212 | 0.0179 |
| EOA | 0.2374 | 0.0162 | 0.0043 | 0.1755 | 0.0057 |
| ETH | 0.2374 | 0.0000 | 0.0005 | 0.1541 | 0.0007 |
| ISV | 0.2390 | 0.0016 | 0.0002 | 0.1902 | 0.0003 |
| MTW | 0.2436 | 0.0046 | 0.0046 | 0.2149 | 0.0060 |

**Multiple Regression Report**

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| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

**Variable Omission Section**

| Independent Variable | R2 When I.V. Omitted | MSE When I.V. Omitted | Mallow's Cp When I.V. Omitted | H0: B=0 Prob Level | R2 Of Regress. Of This I.V. On Other I.V.'s |
|---|---|---|---|---|---|
| Full Model | 0.2436 | 986.6121 | | | |
| CTP | 0.2298 | 1001.241 | 9.4926 | 0.0197 | 0.7809 |
| EOA | 0.2392 | 988.9649 | 5.7226 | 0.1904 | 0.7483 |
| ETH | 0.2430 | 984.0617 | 4.2168 | 0.6419 | 0.7542 |
| ISV | 0.2434 | 983.616 | 4.0799 | 0.7777 | 0.7921 |
| MTW | 0.2390 | 989.271 | 5.8166 | 0.1787 | 0.8297 |

**Sum of Squares and Correlation Section**

| Independent Variable | Sequential Sum of Squares | Incremental Sum of Squares | Last Sum of Squares | Simple Correlation | Partial Correlation |
|---|---|---|---|---|---|
| CTP | 87146.69 | 87146.69 | 5419.106 | 0.4704 | 0.1337 |
| EOA | 93509.67 | 6362.98 | 1699.503 | 0.4189 | 0.0753 |
| ETH | 93513.35 | 3.677416 | 213.8487 | 0.3926 | -0.0268 |
| ISV | 94144.42 | 631.0724 | 78.78286 | 0.4361 | 0.0163 |
| MTW | 95936.69 | 1792.264 | 1792.264 | 0.4636 | 0.0773 |

**Sequential Models Section**

| Independent Variable | Included R2 | Omitted R2 | Included F-Ratio | Included Prob>F | Omitted F-Ratio | Omitted Prob>F |
|---|---|---|---|---|---|---|
| CTP | 0.2212 | 0.0223 | 86.935 | 0.0000 | 2.227 | 0.0660 |
| EOA | 0.2374 | 0.0062 | 47.473 | 0.0000 | 0.820 | 0.4837 |
| ETH | 0.2374 | 0.0062 | 31.547 | 0.0000 | 1.228 | 0.2943 |
| ISV | 0.2390 | 0.0046 | 23.791 | 0.0000 | 1.817 | 0.1787 |
| MTW | 0.2436 | 0.0000 | 19.448 | 0.0000 | | |

Notes
1. INCLUDED variables are those listed from current row up (includes current row).
2. OMITTED variables are those listed below (but not including) this row.

**Multicollinearity Section**

| Independent Variable | Variance Inflation Factor | R2 Versus Other I.V.'s | Tolerance | Diagonal of X'X Inverse |
|---|---|---|---|---|
| CTP | 4.5646 | 0.7809 | 0.2191 | 1.026461E-04 |
| EOA | 3.9732 | 0.7483 | 0.2517 | 8.842406E-05 |
| ETH | 4.0681 | 0.7542 | 0.2458 | 7.793609E-05 |
| ISV | 4.8100 | 0.7921 | 0.2079 | 1.060973E-04 |
| MTW | 5.8703 | 0.8297 | 0.1703 | 1.434759E-04 |

**Multiple Regression Report**

| | |
|---|---|
| Page/Date/Time | 6 3/1/2010 3:45:51 PM |
| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

**Eigenvalues of Centered Correlations**

| No. | Eigenvalue | Incremental Percent | Cumulative Percent | Condition Number |
|---|---|---|---|---|
| 1 | 4.1017 | 82.034 | 82.034 | 1.000 |
| 2 | 0.4555 | 9.109 | 91.143 | 9.006 |
| 3 | 0.1794 | 3.589 | 94.732 | 22.859 |
| 4 | 0.1417 | 2.835 | 97.566 | 28.939 |
| 5 | 0.1217 | 2.434 | 100.000 | 33.709 |

All Condition Numbers less than 100. Multicollinearity is NOT a problem.

**Eigenvector Percent of Regression-Coefficent-Variance using Centered Correlations**

| No. | Eigenvalue | CTP | EOA | ETH |
|---|---|---|---|---|
| 1 | 4.1017 | 1.0602 | 1.1652 | 1.1736 |
| 2 | 0.4555 | 10.6767 | 17.1921 | 11.4888 |
| 3 | 0.1794 | 15.7208 | 45.4378 | 60.5982 |
| 4 | 0.1417 | 52.2860 | 0.0117 | 20.3467 |
| 5 | 0.1217 | 20.2563 | 36.1932 | 6.3927 |

**Eigenvector Percent of Regression-Coefficent-Variance using Centered Correlations**

| No. | Eigenvalue | ISV | MTW |
|---|---|---|---|
| 1 | 4.1017 | 1.0026 | 0.9053 |
| 2 | 0.4555 | 11.5577 | 0.0314 |
| 3 | 0.1794 | 11.7418 | 0.3417 |
| 4 | 0.1417 | 4.7702 | 61.5158 |
| 5 | 0.1217 | 70.9276 | 37.2059 |

**Eigenvalues of Uncentered Correlations**

| No. | Eigenvalue | Incremental Percent | Cumulative Percent | Condition Number |
|---|---|---|---|---|
| 1 | 5.8616 | 97.693 | 97.693 | 1.000 |
| 2 | 0.0636 | 1.059 | 98.752 | 92.215 |
| 3 | 0.0379 | 0.632 | 99.384 | 154.512 |
| 4 | 0.0152 | 0.254 | 99.638 | 385.150 |
| 5 | 0.0121 | 0.201 | 99.839 | 485.473 |
| 6 | 0.0096 | 0.161 | 100.000 | 607.858 |

Some Condition Numbers greater than 100. Multicollinearity is a MILD problem.

**Multiple Regression Report**

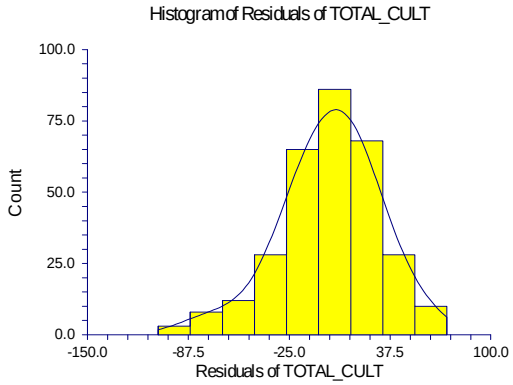
| | |
|---|---|
| Page/Date/Time | 7 3/1/2010 3:45:51 PM |
| Database | C:\DOCUMENTS AND SETTINGS\BR ... CASES DELETED_TRANSFORMED.S0 |
| Dependent | TOTAL_CULT |

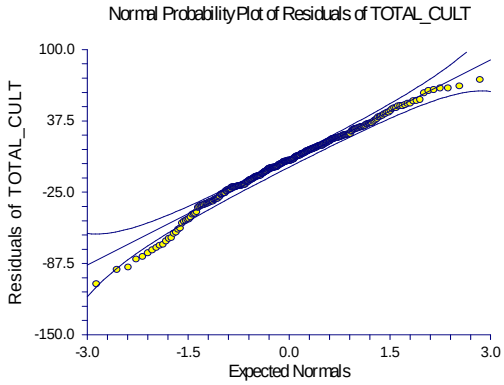
**Eigenvector Percent of Regression-Coefficent-Variance using Uncentered Correlations**

| No. | Eigenvalue | CTP | EOA | ETH |
|---|---|---|---|---|
| 1 | 5.8616 | 0.0604 | 0.0493 | 0.0641 |
| 2 | 0.0636 | 3.8181 | 0.1973 | 0.4671 |
| 3 | 0.0379 | 9.1686 | 9.5575 | 21.7663 |
| 4 | 0.0152 | 39.8324 | 25.8771 | 26.9211 |
| 5 | 0.0121 | 46.6289 | 18.2577 | 48.6282 |
| 6 | 0.0096 | 0.4916 | 46.0610 | 2.1532 |

**Eigenvector Percent of Regression-Coefficent-Variance using Uncentered Correlations**

| No. | Eigenvalue | ISV | MTW | Intercept |
|---|---|---|---|---|
| 1 | 5.8616 | 0.0573 | 0.0363 | 0.1765 |
| 2 | 0.0636 | 3.8385 | 0.3047 | 73.1181 |
| 3 | 0.0379 | 9.1792 | 0.0521 | 14.0475 |
| 4 | 0.0152 | 38.2384 | 0.2344 | 4.6035 |
| 5 | 0.0121 | 13.4184 | 26.0866 | 7.6863 |
| 6 | 0.0096 | 35.2681 | 73.2859 | 0.3681 |



# Appendix I

## LPI–O Factor Analysis

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .967 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 8301.202 |
| | df | 435 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| MTW1 | 1.000 | .714 |
| ISV2 | 1.000 | .593 |
| CTP3 | 1.000 | .608 |
| EOA4 | 1.000 | .649 |
| ETH5 | 1.000 | .713 |
| MTW6 | 1.000 | .692 |
| ISV7 | 1.000 | .616 |
| CTP8 | 1.000 | .687 |
| EOA9 | 1.000 | .716 |
| ETH10 | 1.000 | .609 |
| MTW11 | 1.000 | .662 |
| ISV12 | 1.000 | .716 |
| CTP13 | 1.000 | .681 |
| EOA14 | 1.000 | .767 |
| ETH15 | 1.000 | .763 |
| MTW16 | 1.000 | .708 |
| ISV17 | 1.000 | .757 |
| CTP18 | 1.000 | .645 |
| EOA19 | 1.000 | .767 |
| ETH20 | 1.000 | .746 |
| MTW21 | 1.000 | .733 |
| ISV22 | 1.000 | .682 |
| CTP23 | 1.000 | .648 |
| EOA24 | 1.000 | .595 |
| ETH25 | 1.000 | .764 |
| MTW26 | 1.000 | .619 |
| ISV27 | 1.000 | .637 |
| CTP28 | 1.000 | .528 |
| EOA29 | 1.000 | .637 |
| ETH30 | 1.000 | .840 |

Extraction Method: Principal Component Analysis.

**Total Variance Explained**

| | Initial Eigenvalues | | | action Sums of Squared Load | | | ation Sums of Squared Loadi | | |
|---|---|---|---|---|---|---|---|---|---|
| Compon | Total | of Varianc | umulative % | Total | of Varianc | umulative % | Total | of Varianc | umulative % |
| 1 | 17.075 | 56.917 | 56.917 | 17.075 | 56.917 | 56.917 | 8.166 | 27.221 | 27.221 |
| 2 | 2.213 | 7.378 | 64.295 | 2.213 | 7.378 | 64.295 | 7.303 | 24.343 | 51.565 |
| 3 | 1.204 | 4.012 | 68.307 | 1.204 | 4.012 | 68.307 | 5.023 | 16.742 | 68.307 |
| 4 | .929 | 3.097 | 71.404 | | | | | | |
| 5 | .789 | 2.631 | 74.035 | | | | | | |
| 6 | .634 | 2.112 | 76.148 | | | | | | |
| 7 | .611 | 2.037 | 78.184 | | | | | | |
| 8 | .568 | 1.893 | 80.077 | | | | | | |
| 9 | .503 | 1.678 | 81.755 | | | | | | |
| 10 | .433 | 1.442 | 83.197 | | | | | | |
| 11 | .428 | 1.428 | 84.626 | | | | | | |
| 12 | .384 | 1.280 | 85.906 | | | | | | |
| 13 | .370 | 1.233 | 87.138 | | | | | | |
| 14 | .353 | 1.177 | 88.315 | | | | | | |
| 15 | .322 | 1.074 | 89.389 | | | | | | |
| 16 | .317 | 1.058 | 90.446 | | | | | | |
| 17 | .312 | 1.041 | 91.487 | | | | | | |
| 18 | .299 | .995 | 92.483 | | | | | | |
| 19 | .266 | .888 | 93.371 | | | | | | |
| 20 | .258 | .861 | 94.232 | | | | | | |
| 21 | .238 | .793 | 95.025 | | | | | | |
| 22 | .235 | .784 | 95.809 | | | | | | |
| 23 | .201 | .670 | 96.478 | | | | | | |
| 24 | .192 | .639 | 97.117 | | | | | | |
| 25 | .167 | .556 | 97.673 | | | | | | |
| 26 | .161 | .537 | 98.210 | | | | | | |
| 27 | .150 | .498 | 98.708 | | | | | | |
| 28 | .140 | .467 | 99.175 | | | | | | |
| 29 | .133 | .443 | 99.618 | | | | | | |
| 30 | .115 | .382 | 100.000 | | | | | | |

Extraction Method: Principal Component Analysis.

**Rotated Component Matrix[a]**

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| MTW1 | .328 | .290 | .723 |
| ISV2 | .177 | .594 | .457 |
| CTP3 | 8.301E-02 | .672 | .387 |
| EOA4 | .580 | .277 | .486 |
| ETH5 | .756 | .253 | .278 |
| MTW6 | .318 | .394 | .660 |
| ISV7 | .120 | .673 | .387 |
| CTP8 | .306 | .735 | .230 |
| EOA9 | .706 | .184 | .430 |
| ETH10 | .630 | .402 | .224 |
| MTW11 | .539 | .187 | .580 |
| ISV12 | .284 | .762 | .234 |
| CTP13 | .258 | .731 | .282 |
| EOA14 | .701 | .114 | .513 |
| ETH15 | .755 | .418 | .140 |
| MTW16 | .439 | .712 | 8.916E-02 |
| ISV17 | .315 | .778 | .230 |
| CTP18 | .495 | .414 | .478 |
| EOA19 | .732 | .177 | .446 |
| ETH20 | .732 | .427 | .165 |
| MTW21 | .515 | .485 | .482 |
| ISV22 | .335 | .533 | .534 |
| CTP23 | .318 | .497 | .547 |
| EOA24 | .691 | 4.540E-02 | .340 |
| ETH25 | .750 | .434 | .114 |
| MTW26 | .376 | .371 | .583 |
| ISV27 | .355 | .481 | .529 |
| CTP28 | .250 | .677 | 8.342E-02 |
| EOA29 | .615 | .432 | .269 |
| ETH30 | .821 | .352 | .206 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 13 iterations.

# Appendix J

## DOCS Factor Analysis

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .933 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 9488.467 |
| | df | 1770 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| EMP1 | 1.000 | .637 |
| EMP2 | 1.000 | .577 |
| EMP3 | 1.000 | .607 |
| EMP4 | 1.000 | .573 |
| EMP5 | 1.000 | .540 |
| TEAM6 | 1.000 | .611 |
| TEAM7 | 1.000 | .759 |
| TEAM8 | 1.000 | .740 |
| TEAM9 | 1.000 | .588 |
| TEAM10 | 1.000 | .540 |
| CAP11 | 1.000 | .453 |
| CAP12 | 1.000 | .589 |
| CAP13 | 1.000 | .716 |
| CAP14 | 1.000 | .654 |
| CAP15 | 1.000 | .690 |
| VALUE16 | 1.000 | .654 |
| VALUE17 | 1.000 | .517 |
| VALUE18 | 1.000 | .658 |
| VALUE19 | 1.000 | .720 |
| VALUE20 | 1.000 | .692 |
| AGR21 | 1.000 | .663 |
| AGR22 | 1.000 | .623 |
| AGR23 | 1.000 | .568 |
| AGR24 | 1.000 | .603 |
| AGR25 | 1.000 | .645 |
| COI26 | 1.000 | .627 |
| COI27 | 1.000 | .722 |
| COI28 | 1.000 | .683 |
| COI29 | 1.000 | .623 |
| COI30 | 1.000 | .665 |
| CC31 | 1.000 | .675 |
| CC32 | 1.000 | .700 |
| CC33 | 1.000 | .688 |
| CC34 | 1.000 | .636 |
| CC35 | 1.000 | .614 |
| CF36 | 1.000 | .746 |
| CF37 | 1.000 | .739 |
| CF38 | 1.000 | .588 |
| CF39 | 1.000 | .645 |
| CF40 | 1.000 | .544 |
| OL41 | 1.000 | .590 |
| OL42 | 1.000 | .547 |
| OL43 | 1.000 | .619 |
| OL44 | 1.000 | .687 |
| OL45 | 1.000 | .606 |
| STR46 | 1.000 | .649 |
| STR47 | 1.000 | .585 |
| STR48 | 1.000 | .691 |
| STR49 | 1.000 | .623 |
| STR50 | 1.000 | .663 |
| GOA51 | 1.000 | .610 |
| GOA52 | 1.000 | .617 |
| GOA53 | 1.000 | .702 |
| GOA54 | 1.000 | .586 |
| GOA55 | 1.000 | .553 |
| VIS56 | 1.000 | .653 |
| VIS57 | 1.000 | .658 |
| VIS58 | 1.000 | .564 |
| VIS59 | 1.000 | .703 |
| VIS60 | 1.000 | .548 |

Extraction Method: Principal Component Analysis

**Total Variance Explained**

| | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| Component | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 18.698 | 31.163 | 31.163 | 18.698 | 31.163 | 31.163 | 5.853 | 9.755 | 9.755 |
| 2 | 3.182 | 5.304 | 36.466 | 3.182 | 5.304 | 36.466 | 4.923 | 8.205 | 17.960 |
| 3 | 2.582 | 4.303 | 40.769 | 2.582 | 4.303 | 40.769 | 4.577 | 7.628 | 25.588 |
| 4 | 2.299 | 3.832 | 44.601 | 2.299 | 3.832 | 44.601 | 3.414 | 5.691 | 31.279 |
| 5 | 1.775 | 2.959 | 47.560 | 1.775 | 2.959 | 47.560 | 2.947 | 4.911 | 36.190 |
| 6 | 1.433 | 2.389 | 49.949 | 1.433 | 2.389 | 49.949 | 2.681 | 4.469 | 40.660 |
| 7 | 1.365 | 2.275 | 52.223 | 1.365 | 2.275 | 52.223 | 2.643 | 4.406 | 45.065 |
| 8 | 1.241 | 2.068 | 54.291 | 1.241 | 2.068 | 54.291 | 2.450 | 4.083 | 49.148 |
| 9 | 1.163 | 1.939 | 56.230 | 1.163 | 1.939 | 56.230 | 2.242 | 3.737 | 52.885 |
| 10 | 1.090 | 1.816 | 58.046 | 1.090 | 1.816 | 58.046 | 1.961 | 3.269 | 56.154 |
| 11 | 1.066 | 1.777 | 59.823 | 1.066 | 1.777 | 59.823 | 1.632 | 2.721 | 58.874 |
| 12 | 1.052 | 1.754 | 61.576 | 1.052 | 1.754 | 61.576 | 1.439 | 2.398 | 61.273 |
| 13 | 1.023 | 1.705 | 63.282 | 1.023 | 1.705 | 63.282 | 1.205 | 2.009 | 63.282 |
| 14 | .997 | 1.662 | 64.944 | | | | | | |
| 15 | .938 | 1.564 | 66.507 | | | | | | |
| 16 | .893 | 1.489 | 67.996 | | | | | | |
| 17 | .870 | 1.450 | 69.446 | | | | | | |
| 18 | .859 | 1.432 | 70.878 | | | | | | |
| 19 | .819 | 1.365 | 72.243 | | | | | | |
| 20 | .775 | 1.292 | 73.535 | | | | | | |
| 21 | .770 | 1.284 | 74.819 | | | | | | |
| 22 | .732 | 1.220 | 76.038 | | | | | | |
| 23 | .700 | 1.167 | 77.205 | | | | | | |
| 24 | .653 | 1.089 | 78.293 | | | | | | |
| 25 | .642 | 1.070 | 79.364 | | | | | | |
| 26 | .619 | 1.032 | 80.395 | | | | | | |
| 27 | .594 | .991 | 81.386 | | | | | | |
| 28 | .575 | .958 | 82.344 | | | | | | |
| 29 | .560 | .934 | 83.277 | | | | | | |
| 30 | .539 | .899 | 84.176 | | | | | | |
| 31 | .518 | .864 | 85.040 | | | | | | |
| 32 | .491 | .819 | 85.859 | | | | | | |
| 33 | .478 | .797 | 86.656 | | | | | | |
| 34 | .474 | .790 | 87.445 | | | | | | |
| 35 | .446 | .743 | 88.189 | | | | | | |
| 36 | .421 | .702 | 88.891 | | | | | | |
| 37 | .418 | .696 | 89.587 | | | | | | |
| 38 | .403 | .672 | 90.260 | | | | | | |
| 39 | .378 | .629 | 90.889 | | | | | | |
| 40 | .372 | .619 | 91.508 | | | | | | |
| 41 | .361 | .601 | 92.110 | | | | | | |
| 42 | .344 | .573 | 92.683 | | | | | | |
| 43 | .332 | .553 | 93.236 | | | | | | |
| 44 | .317 | .528 | 93.764 | | | | | | |
| 45 | .313 | .521 | 94.285 | | | | | | |
| 46 | .303 | .505 | 94.790 | | | | | | |
| 47 | .288 | .481 | 95.271 | | | | | | |
| 48 | .281 | .469 | 95.740 | | | | | | |
| 49 | .275 | .459 | 96.198 | | | | | | |
| 50 | .266 | .443 | 96.642 | | | | | | |
| 51 | .250 | .417 | 97.059 | | | | | | |
| 52 | .241 | .401 | 97.460 | | | | | | |
| 53 | .232 | .386 | 97.846 | | | | | | |
| 54 | .209 | .348 | 98.195 | | | | | | |
| 55 | .195 | .326 | 98.520 | | | | | | |
| 56 | .193 | .321 | 98.842 | | | | | | |
| 57 | .190 | .317 | 99.159 | | | | | | |
| 58 | .179 | .298 | 99.457 | | | | | | |
| 59 | .167 | .278 | 99.735 | | | | | | |
| 60 | .159 | .265 | 100.000 | | | | | | |

Extraction Method: Principal Component Analysis.

## Rotated Component Matrix

**Rotated Component Matrix** [a]

| | Component | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| EMP1 | .516 | .145 | .210 | 1.550E-02 | -5.23E-02 | 4.962E-02 | .259 | .108 | .145 | .369 | -4.15E-02 | -.231 | -9.18E-02 |
| EMP2 | .481 | .263 | .251 | .229 | .143 | .175 | -5.00E-02 | .106 | .170 | 4.960E-02 | -.177 | .181 | 1.442E-02 |
| EMP3 | .487 | .197 | .108 | .153 | 6.019E-02 | .364 | .102 | 5.714E-02 | 9.710E-02 | -5.43E-02 | -.172 | .323 | 8.883E-03 |
| EMP4 | .570 | .139 | .290 | 8.636E-02 | 9.595E-02 | .291 | 8.269E-02 | 4.660E-03 | .118 | 2.895E-02 | -.101 | -2.42E-02 | -.109 |
| EMP5 | .252 | .101 | .252 | 2.920E-02 | .282 | .427 | -9.51E-02 | .184 | 2.857E-02 | 4.893E-02 | -.255 | 2.463E-03 | .170 |
| TEAM6 | .429 | 6.755E-02 | .377 | 9.027E-02 | 7.181E-02 | .388 | 9.486E-02 | .134 | .137 | -3.38E-02 | 2.803E-02 | -6.33E-02 | .254 |
| TEAM7 | .800 | .135 | .156 | 6.451E-02 | -2.63E-03 | 7.176E-02 | 9.773E-02 | .127 | .128 | 9.586E-02 | .103 | -5.34E-02 | -4.66E-02 |
| TEAM8 | .810 | .105 | .104 | .169 | 4.169E-02 | 6.241E-02 | 9.271E-03 | 6.396E-02 | 8.033E-02 | 4.877E-02 | .102 | 5.502E-02 | 4.753E-02 |
| TEAM9 | .617 | 8.152E-02 | .201 | .158 | .200 | .226 | 7.689E-02 | 7.956E-03 | 6.691E-02 | .136 | 9.259E-02 | -5.38E-02 | -5.98E-02 |
| TEAM10 | .267 | .178 | .322 | .259 | .152 | .409 | -2.15E-02 | 5.759E-02 | .199 | 2.973E-02 | -.143 | -7.67E-02 | 7.016E-02 |
| CAP11 | .295 | .180 | .273 | .283 | .182 | .322 | -1.87E-02 | -.152 | 8.482E-02 | -1.97E-02 | -1.39E-02 | -4.71E-02 | 9.228E-02 |
| CAP12 | .396 | .248 | 8.046E-02 | .106 | .169 | .451 | 4.320E-02 | .122 | 7.849E-02 | .242 | .130 | -5.67E-02 | -.139 |
| CAP13 | .257 | .145 | .205 | .111 | .197 | .683 | .137 | 8.376E-02 | -8.18E-03 | 4.752E-02 | .181 | 6.213E-02 | -6.10E-02 |
| CAP14 | .426 | .105 | .190 | .265 | .203 | .382 | -2.42E-03 | 7.567E-02 | -.162 | .146 | .272 | .135 | -.153 |
| CAP15 | .137 | 1.224E-02 | 6.181E-02 | 5.328E-02 | -8.04E-02 | 5.997E-02 | 7.953E-02 | 1.852E-02 | .184 | 1.787E-02 | .778 | 7.543E-02 | 3.692E-02 |
| VALUE16 | .354 | .273 | .226 | .349 | -7.20E-03 | .278 | .244 | -1.55E-02 | .300 | .130 | -.160 | 7.680E-02 | 7.697E-02 |
| VALUE17 | .210 | 7.989E-02 | .248 | .521 | 5.151E-02 | 2.525E-02 | 2.641E-02 | 1.981E-02 | -1.26E-02 | .224 | -.212 | -5.49E-02 | .173 |
| VALUE18 | .300 | .305 | .328 | .277 | .133 | .201 | .219 | -2.55E-02 | -7.74E-03 | .311 | .182 | .129 | .192 |
| VALUE19 | .145 | 3.848E-02 | -1.78E-03 | 7.386E-02 | -1.82E-02 | 1.623E-02 | -6.35E-02 | .126 | 9.373E-03 | .814 | -4.91E-02 | 2.890E-02 | -6.88E-02 |
| VALUE20 | .380 | .152 | .139 | .194 | 6.854E-02 | .159 | .198 | 4.769E-02 | 1.031E-02 | .573 | .180 | 1.278E-02 | .187 |
| AGR21 | .479 | .147 | .313 | .444 | .227 | 1.651E-02 | 6.972E-02 | .142 | 9.183E-02 | .106 | 9.306E-02 | 8.729E-02 | 5.866E-02 |
| AGR22 | .490 | .126 | .154 | .197 | .218 | -5.50E-02 | .194 | .130 | -.169 | .177 | 9.031E-02 | 5.699E-03 | .363 |
| AGR23 | .391 | .199 | .417 | .118 | .162 | .141 | -.212 | .158 | 8.816E-02 | 4.079E-02 | -9.89E-02 | .160 | .161 |
| AGR24 | .267 | .102 | .176 | 9.737E-02 | 8.855E-02 | 8.193E-02 | -.201 | .222 | .410 | -.102 | .315 | .285 | .134 |
| AGR25 | .375 | .248 | .454 | 4.060E-02 | .210 | 8.053E-02 | 9.076E-02 | 1.135E-02 | -9.42E-02 | .263 | 9.219E-02 | .255 | .156 |
| COI26 | .376 | .305 | .488 | 6.975E-02 | 9.977E-02 | 8.366E-02 | .119 | .142 | 7.132E-02 | .201 | .108 | .151 | .135 |
| COI27 | .216 | 8.971E-02 | .761 | .120 | .102 | .171 | -5.12E-02 | .121 | 4.332E-02 | 9.071E-03 | 4.863E-02 | .105 | -4.34E-02 |
| COI28 | .265 | .162 | .651 | 7.494E-02 | .188 | .187 | -6.46E-02 | .136 | .174 | -6.83E-02 | -7.81E-02 | .107 | -.106 |
| COI29 | .131 | .245 | .319 | 8.103E-02 | -5.89E-02 | .136 | -4.35E-02 | 7.652E-03 | .630 | 1.836E-02 | .108 | 6.310E-02 | 3.021E-02 |
| COI30 | .142 | .288 | .646 | .202 | .199 | 8.755E-02 | .116 | .106 | .132 | 6.349E-02 | 4.430E-02 | -5.21E-02 | 8.238E-02 |
| CC31 | .114 | .103 | .233 | 8.117E-02 | .629 | .133 | -5.01E-02 | .168 | 9.188E-02 | -.116 | -.328 | 5.368E-02 | .118 |
| CC32 | 5.727E-02 | .171 | .188 | .217 | .732 | .111 | -1.10E-02 | 6.734E-02 | .119 | 7.106E-02 | 9.370E-02 | -2.55E-02 | 6.259E-02 |
| CC33 | .167 | .234 | .136 | .128 | .687 | .217 | .177 | 3.861E-02 | 6.779E-02 | 6.902E-02 | -1.63E-02 | -5.49E-02 | -7.67E-02 |
| CC34 | .104 | 9.170E-02 | 3.249E-02 | 6.197E-02 | .283 | -.105 | -.163 | 3.547E-02 | .691 | -3.05E-02 | 7.183E-03 | .116 | -1.07E-02 |
| CC35 | .254 | 2.284E-02 | .484 | 9.670E-02 | .360 | -9.54E-02 | .173 | 8.782E-02 | .130 | 6.322E-02 | 9.642E-02 | -.247 | -.193 |
| CF36 | .133 | .152 | 4.110E-02 | .150 | 7.540E-02 | -6.63E-02 | .808 | 6.293E-02 | -6.00E-02 | 6.569E-03 | -4.69E-03 | 8.504E-02 | -5.48E-02 |
| CF37 | .126 | -1.66E-02 | 4.325E-02 | .106 | -3.33E-02 | 8.811E-02 | .820 | 9.631E-02 | -.124 | -3.35E-02 | 1.350E-02 | -2.93E-02 | 4.397E-02 |
| CF38 | .175 | .123 | .465 | .245 | -4.03E-02 | .213 | .207 | .383 | .126 | 4.435E-02 | -3.47E-02 | -9.07E-02 | -4.93E-02 |
| CF39 | -8.12E-02 | -3.30E-02 | -4.66E-02 | 3.088E-02 | 2.000E-02 | .226 | .523 | -4.14E-02 | .374 | .288 | .278 | 7.075E-02 | 5.743E-02 |
| CF40 | .168 | 2.418E-02 | -1.30E-02 | .588 | .117 | .125 | .233 | .182 | .117 | -3.72E-03 | 3.355E-02 | -.189 | -3.50E-02 |
| OL41 | .129 | .180 | .159 | .637 | .208 | 2.825E-02 | 6.699E-02 | 5.929E-02 | .102 | 5.199E-02 | .124 | .162 | -5.79E-02 |
| OL42 | .101 | .267 | 6.963E-02 | .363 | .437 | .113 | -.110 | .170 | 2.146E-03 | -.106 | -5.70E-02 | .127 | -.231 |
| OL43 | .298 | 7.421E-03 | .129 | .154 | 7.822E-02 | .161 | .256 | .102 | .529 | .134 | .152 | .213 | -.124 |
| OL44 | 9.066E-02 | .167 | .128 | .473 | .249 | .374 | 3.258E-02 | .262 | 8.262E-02 | .219 | .110 | 1.719E-02 | -.268 |
| OL45 | .284 | .239 | .327 | .287 | .166 | .190 | .105 | .215 | .106 | -3.85E-02 | -4.08E-02 | .365 | -.104 |
| STR46 | 9.255E-02 | .352 | .215 | .124 | 6.640E-02 | 4.195E-02 | 6.330E-02 | .654 | 9.208E-02 | 8.160E-02 | -8.91E-03 | 2.581E-02 | 3.573E-02 |
| STR47 | .111 | .230 | .110 | 7.623E-02 | .355 | 6.341E-02 | 1.963E-02 | .573 | -2.61E-02 | 5.385E-02 | -3.66E-02 | .123 | -.153 |
| STR48 | .119 | .254 | .151 | .269 | 8.403E-02 | 9.981E-02 | .229 | .633 | 1.733E-02 | .181 | 8.605E-02 | 1.690E-02 | 7.938E-02 |
| STR49 | 4.424E-02 | .630 | .110 | -6.34E-02 | .110 | 2.798E-03 | -7.38E-02 | .374 | 7.394E-02 | -1.19E-02 | -.119 | 9.717E-02 | .145 |
| STR50 | 4.886E-02 | .360 | -2.75E-03 | -3.66E-02 | -6.31E-02 | 3.542E-02 | -.116 | .360 | .333 | -.270 | .201 | 1.053E-02 | .397 |
| GOA51 | .159 | .541 | .316 | .246 | .101 | 8.296E-02 | 8.044E-02 | .168 | 5.104E-02 | .143 | 8.125E-02 | .200 | -.100 |
| GOA52 | .171 | .572 | .297 | .257 | .188 | 2.846E-02 | .201 | -5.51E-02 | 3.985E-02 | 6.898E-02 | .122 | 7.714E-02 | 1.352E-02 |
| GOA53 | .201 | .582 | .101 | .327 | 1.324E-03 | .325 | .208 | .104 | 3.146E-02 | -1.22E-02 | 7.854E-02 | -.182 | 7.724E-02 |
| GOA54 | .202 | .343 | .192 | .482 | 7.544E-02 | .227 | .242 | .187 | -8.35E-03 | 3.228E-02 | 7.320E-02 | -2.78E-02 | 3.201E-02 |
| GOA55 | .204 | .472 | .267 | .257 | 1.462E-02 | .141 | -4.38E-02 | .323 | 9.262E-02 | .116 | 1.553E-02 | -4.00E-02 | 3.742E-02 |
| VIS56 | .184 | .694 | 8.375E-02 | -2.19E-02 | .287 | 8.151E-02 | -8.67E-02 | 8.753E-02 | 9.866E-02 | 5.408E-02 | -6.78E-02 | 8.163E-02 | 4.808E-02 |
| VIS57 | 7.700E-02 | .757 | 4.921E-02 | 9.744E-02 | 8.931E-02 | 9.576E-02 | 8.648E-02 | .131 | .115 | 5.891E-02 | -1.18E-02 | 8.924E-02 | -9.26E-03 |
| VIS58 | -3.48E-02 | .119 | 5.266E-02 | -6.77E-02 | -4.38E-02 | -4.06E-02 | 5.808E-02 | 4.534E-02 | .253 | 3.855E-02 | .105 | .675 | 2.562E-03 |
| VIS59 | .203 | .596 | .173 | .190 | .108 | 7.978E-02 | 4.390E-04 | .201 | 1.808E-02 | -4.65E-02 | 2.763E-02 | -3.84E-02 | -.420 |
| VIS60 | .109 | .354 | .339 | .318 | .193 | 8.629E-02 | .213 | .169 | 1.052E-02 | .105 | .181 | -1.18E-02 | -.180 |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 17 iterations.

# Appendix K

## Correlation Matrix

**Correlation Report**
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**Pearson Correlations Section (Row-Wise Deletion)**

| | MTW | ISV | CTP | EOA | ETH | INVOLVEMENT |
|---|---|---|---|---|---|---|
| MTW | 1.000000 | 0.832810 | 0.825334 | 0.806202 | 0.810606 | 0.419636 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| ISV | 0.832810 | 1.000000 | 0.859084 | 0.667193 | 0.716822 | 0.411941 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| CTP | 0.825334 | 0.859084 | 1.000000 | 0.696874 | 0.702326 | 0.435349 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| EOA | 0.806202 | 0.667193 | 0.696874 | 1.000000 | 0.831564 | 0.400445 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| ETH | 0.810606 | 0.716822 | 0.702326 | 0.831564 | 1.000000 | 0.350127 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| INVOLVEMENT | 0.419636 | 0.411941 | 0.435349 | 0.400445 | 0.350127 | 1.000000 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| CONSISTENCY | 0.430105 | 0.386866 | 0.423566 | 0.364600 | 0.356441 | 0.822711 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| ADAPTABILITY | 0.414885 | 0.373310 | 0.443502 | 0.394153 | 0.370135 | 0.696421 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| MISSION | 0.372743 | 0.365148 | 0.362125 | 0.322873 | 0.312863 | 0.611667 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |

Cronbach’s Alpha = 0.915790 Standardized Cronbach’s Alpha = 0.915680

**Correlation Report**

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**Pearson Correlations Section (Row-Wise Deletion)**

| | CONSISTENCY | ADAPTABILITY | MISSION |
|---|---|---|---|
| MTW | 0.430105 | 0.414885 | 0.372743 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| ISV | 0.386866 | 0.373310 | 0.365148 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| CTP | 0.423566 | 0.443502 | 0.362125 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| EOA | 0.364600 | 0.394153 | 0.322873 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| ETH | 0.356441 | 0.370135 | 0.312863 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| INVOLVEMENT | 0.822711 | 0.696421 | 0.611667 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| CONSISTENCY | 1.000000 | 0.721331 | 0.700498 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| ADAPTABILITY | 0.721331 | 1.000000 | 0.673258 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| MISSION | 0.700498 | 0.673258 | 1.000000 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |

Cronbach's Alpha = 0.915790 Standardized Cronbach's Alpha = 0.915680

**Correlation Report**

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**Spearman Correlations Section (Row-Wise Deletion)**

| | MTW | ISV | CTP | EOA | ETH | INVOLVEMENT |
|---|---|---|---|---|---|---|
| MTW | 1.000000 | 0.823323 | 0.811625 | 0.757464 | 0.792820 | 0.392737 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| ISV | 0.823323 | 1.000000 | 0.849459 | 0.653209 | 0.707153 | 0.401739 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| CTP | 0.811625 | 0.849459 | 1.000000 | 0.670752 | 0.696677 | 0.402777 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| EOA | 0.757464 | 0.653209 | 0.670752 | 1.000000 | 0.780899 | 0.374230 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| ETH | 0.792820 | 0.707153 | 0.696677 | 0.780899 | 1.000000 | 0.330601 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| INVOLVEMENT | 0.392737 | 0.401739 | 0.402777 | 0.374230 | 0.330601 | 1.000000 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| CONSISTENCY | 0.432895 | 0.387791 | 0.405678 | 0.367787 | 0.354206 | 0.808424 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| ADAPTABILITY | 0.423534 | 0.376589 | 0.444523 | 0.399339 | 0.368495 | 0.704003 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |
| MISSION | 0.383791 | 0.366940 | 0.358849 | 0.357384 | 0.344270 | 0.616390 |
| | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 | 308.000000 |

**Correlation Report**

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**Spearman Correlations Section (Row-Wise Deletion)**

| | CONSISTENCY | ADAPTABILITY | MISSION |
|---|---|---|---|
| MTW | 0.432895 | 0.423534 | 0.383791 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| ISV | 0.387791 | 0.376589 | 0.366940 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| CTP | 0.405678 | 0.444523 | 0.358849 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| EOA | 0.367787 | 0.399339 | 0.357384 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| ETH | 0.354206 | 0.368495 | 0.344270 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| INVOLVEMENT | 0.808424 | 0.704003 | 0.616390 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| CONSISTENCY | 1.000000 | 0.701490 | 0.691225 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| ADAPTABILITY | 0.701490 | 1.000000 | 0.652093 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |
| MISSION | 0.691225 | 0.652093 | 1.000000 |
| | 0.000000 | 0.000000 | 0.000000 |
| | 308.000000 | 308.000000 | 308.000000 |

**Difference Between Pearson and Spearmean Correlations Section (Row-Wise Deletion)**

| | MTW | ISV | CTP | EOA | ETH | INVOLVEMENT |
|---|---|---|---|---|---|---|
| MTW | 0.000000 | 0.009487 | 0.013709 | 0.048738 | 0.017786 | 0.026899 |
| ISV | 0.009487 | 0.000000 | 0.009625 | 0.013984 | 0.009669 | 0.010202 |
| CTP | 0.013709 | 0.009625 | 0.000000 | 0.026122 | 0.005649 | 0.032572 |
| EOA | 0.048738 | 0.013984 | 0.026122 | 0.000000 | 0.050665 | 0.026215 |
| ETH | 0.017786 | 0.009669 | 0.005649 | 0.050665 | 0.000000 | 0.019526 |
| INVOLVEMENT | 0.026899 | 0.010202 | 0.032572 | 0.026215 | 0.019526 | 0.000000 |
| CONSISTENCY | -0.002790 | -0.000924 | 0.017888 | -0.003186 | 0.002236 | 0.014287 |
| ADAPTABILITY | -0.008649 | -0.003279 | -0.001022 | -0.005186 | 0.001640 | -0.007582 |
| MISSION | -0.011048 | -0.001792 | 0.003276 | -0.034511 | -0.031407 | -0.004723 |

**Correlation Report**

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**Difference Between Pearson and Spearmean Correlations Section (Row-Wise Deletion)**

| | CONSISTENCY | ADAPTABILITY | MISSION |
|---|---|---|---|
| MTW | -0.002790 | -0.008649 | -0.011048 |
| ISV | -0.000924 | -0.003279 | -0.001792 |
| CTP | 0.017888 | -0.001022 | 0.003276 |
| EOA | -0.003186 | -0.005186 | -0.034511 |
| ETH | 0.002236 | 0.001640 | -0.031407 |
| INVOLVEMENT | 0.014287 | -0.007582 | -0.004723 |
| CONSISTENCY | 0.000000 | 0.019841 | 0.009273 |
| ADAPTABILITY | 0.019841 | 0.000000 | 0.021166 |
| MISSION | 0.009273 | 0.021166 | 0.000000 |

# Appendix L

## Survey Instruments

# Leadership Practices and Organizational Culture Survey

## 1. Introduction

WELCOME!

I am in the process of conducting a doctoral research study with the H. Wayne Huizenga School of Business and Entrepreneurship at Nova Southeastern University. This study will investigate the relationship between employee perceived leadership practices and organizational culture within the aerospace industry, and is being supervised by Dr. Joseph Heinzman, Chair Business Administration Program at the Kenneth Oscar Johnson School of Business, Hodges University.

I ask your participation in this research which should take no longer than 30 minutes to complete. The survey consists of the completion of the *Leadership Practices Inventory – Other*, the *Denison Organizational Culture Survey* and seven demographic questions. This research focuses on perceived leadership practices and their relationship to aspects of an organization's culture that have a direct link to business performance.

An independent company, Survey Monkey, will collect all raw data and transmit to the researcher for analysis. Complete confidentiality is assured, and your responses will never be identified or reported individually. Surveys will not be tied to individual IP addresses, and there will be no attempt to match respondents to their manager. Leadership and culture will be viewed only from an overall organizational profile.

You may choose not to participate in this study without fear of reprisal, and you may opt out at any time. I appreciate your time and participation, and thank you in advance for your support of me in this effort.

Please contact Brad McCain at (321) 861-3362 or Dr. Joseph Heinzman at (239) 598-6137 if you have any questions concerning this research.

## 2. Leadership Pratices Inventory

**INSTRUCTIONS**

You are being asked to assess the leadership behaviors of your manager. In this section you will find thirty statements describing various leadership behaviors. Please read each statement carefully, and using the RATING SCALE ask yourself:

**"How frequently does this person engage in the behavior described?"**

---

When selecting your response to each statement:

- Be realistic about the extent the person *actually* engages in the behavior.
- Be as honest and accurate as you can be.
- Do NOT answer in terms of how you would like to see this person behave or in terms of how you

## Leadership Practices and Organizational Culture Survey

think her or she should behave.

- DO answer in terms of how this person typically behaves on most days, on most projects, and with most people.
- Be thoughtful about your responses. For example, giving this person 10s on all items is most likely not an accurate description of his or her behavior. Similarly, giving someone all 1s or 5s is most likely not an accurate description either. Most people will do some things more or less often than they do other things.
- If you feel that a statement does not apply, it's probably because you don't see or experience the behavior. That means this person does not frequently engage in the behavior, at least around you. In that case, assign the rating a 3 or lower.

For each statement, decide on a response and then choose the corresponding rating at the right of the statement. After you have responded to all thirty statements, go back through to make sure you have responded to each statement.
*Every* statement *must* have a rating.

The **RATING SCALE** runs from 1 to 10. Choose the number that best applies to each statement.

---

**1** = Almost Never
**2** = Rarely
**3** = Seldom
**4** = Once in a While
**5** = Occasionally
**6** = Sometimes
**7** = Fairly Often
**8** = Usually
**9** = Very Frequently
**10** = Almost Always

## Leadership Practices and Organizational Culture Survey

**To what extent does this person typically engage in the following behaviors?** Choose the rating that best applies to each statement and select it at the right of the statement.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Sets a personal example of what he/she expects of others. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2. Talks about future trends that will influence how our work gets done. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 3. Seeks out challenging opportunities that test his/her own skills and abilities. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4. Develops cooperative relationships among the people he/she works with. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5. Praises people for a job well done. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6. Spends time and energy making certain that the people he/she works with adhere to the principles and standards the we have agreed on. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 7. Describes a compelling image of what our future could be like. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8. Challenges people to try out new and innovative ways to do their work. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9. Actively listens to diverse points of view. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10. Makes it a point to let people know about his/her confidence in their abilities. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11. Follows through on promises and commitments he/she makes. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12. Appeals to others to share an exciting dream of the future. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 13. Searches outside the formal boundaries of his/her organization for innovative ways to improve what we do. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 14. Treats others with dignity and respect. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15. Makes sure that people are creatively rewarded for their contributions to the success of projects. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 16. Asks for feedback on how his/her actions affect other people's performance. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17. Shows others how their long-term interests can be realized by enlisting in a common vision. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 18. Asks "What can we learn?" when things don't go as expected. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 19. Supports the decisions that people make on their own. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 20. Publicly recognizes people who exemplify commitment to shared values. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 21. Builds consensus around a common set of values for running our organization. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Leadership Practices and Organizational Culture Survey

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22. Paints the "big picture" of what we aspire to accomplish. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 23. Makes certain that we set achievable goals, make concrete plans, and establish measurable milestones for the projects and programs that we work on. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 24. Gives people a great deal of freedom and choice in deciding how to do their work. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 25. Finds ways to celebrate accomplishments. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 26. Is clear about his/her philosophy of leadership. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 27. Speaks with genuine conviction about the higher meaning and purpose of our work. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 28. Experiments and takes risks, even when there is a chance of failure. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 29. Ensures that people grow in their jobs by learning new skills and developing themselves. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 30. Gives the members of the team lots of appreciation and support for their contributions. | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |



### 3. Denison Organizational Culture

**INSTRUCTIONS:**

Management practices and organizational strategies are rooted in the underlying beliefs, values, and assumptions held by the members of an organization. The approach that underlies the **Denison Organizational Culture Survey** is based on a model of four cultural traits of organizations. These traits have been linked by research to specific aspects of performance and effectiveness such as return on assets, quality, sales growth, and employee satisfaction.

This survey presents a set of 60 statements that describe different aspects of an organization's culture and ways that organizations operate. To complete the survey, just indicate how much you agree or disagree with each of the statements. When you are responding to the statements, think of your organization as a whole and the way that things are usually done. If the statement is a good description of the way that things are typically done in your organization, then you should indicate that you agree with that statement. If the statement is not a good description of the way things typically work in your organization, then indicate that you disagree.

Using the response categories on the five-point scale below, please select the number next to each statement to indicate the extent to which you agree with that statement.

## Leadership Practices and Organizational Culture Survey

The **RATING SCALE** for the following statements:

1 = Strongly Disagree
2 = Somewhat Disagree
3 = Neutral
4 = Somewhat Agree
5 = Strongly Agree

**In this organization...**

| | 1 Strongly Disagree | 2 Somewhat Disagree | 3 Neutral | 4 Somewhat Agree | 5 Strongly Agree |
|---|---|---|---|---|---|
| 1. Most employees are highly involved in their work. | ○ | ○ | ○ | ○ | ○ |
| 2. Decisions are usually made at the level where the best information is available. | ○ | ○ | ○ | ○ | ○ |
| 3. Information is widely shared so that everyone can get the information he or she needs when it's needed. | ○ | ○ | ○ | ○ | ○ |
| 4. Everyone believes that he or she can have a positive impact. | ○ | ○ | ○ | ○ | ○ |
| 5. Business planning is ongoing and involves everyone in the process to some degree. | ○ | ○ | ○ | ○ | ○ |
| 6. Cooperation across different parts of the organization is actively encouraged. | ○ | ○ | ○ | ○ | ○ |
| 7. People work like they are part of a team. | ○ | ○ | ○ | ○ | ○ |
| 8. Teamwork is used to get work done, rather than hierarchy. | ○ | ○ | ○ | ○ | ○ |
| 9. Teams are our primary building blocks. | ○ | ○ | ○ | ○ | ○ |
| 10. Work is organized so that each person can see the relationship between his or her job and the goals of the organization. | ○ | ○ | ○ | ○ | ○ |
| 11. Authority is delegated so that people can act on their own. | ○ | ○ | ○ | ○ | ○ |
| 12. The "bench strength" (capability of people) is constantly improving. | ○ | ○ | ○ | ○ | ○ |
| 13. There is continuous investment in the skills of employees. | ○ | ○ | ○ | ○ | ○ |
| 14. The capabilities of people are viewed as an important source of competitive advantage. | ○ | ○ | ○ | ○ | ○ |
| 15. Problems often arise because we do not have the skills necessary to do the job. | ○ | ○ | ○ | ○ | ○ |
| 16. The leaders and managers "practice what they preach". | ○ | ○ | ○ | ○ | ○ |
| 17. There is a characteristic management style and a | ○ | ○ | ○ | ○ | ○ |

## Leadership Practices and Organizational Culture Survey

| | | | | | |
|---|---|---|---|---|---|
| distinct set of management practices. | | | | | |
| 18. There is a clear and consistent set of values that governs the way we do business. | ○ | ○ | ○ | ○ | ○ |
| 19. Ignoring core values will get you in trouble. | ○ | ○ | ○ | ○ | ○ |
| 20. There is an ethical code that guides our behavior and tells us right from wrong. | ○ | ○ | ○ | ○ | ○ |
| 21. When disagreements occur, we work hard to achieve "win-win" solutions. | ○ | ○ | ○ | ○ | ○ |
| 22. There is a "strong" culture. | ○ | ○ | ○ | ○ | ○ |
| 23. It is easy to reach consensus, even on difficult issues. | ○ | ○ | ○ | ○ | ○ |
| 24. We often have trouble reaching agreement on key issues. | ○ | ○ | ○ | ○ | ○ |
| 25. There is a clear agreement about the right way and the wrong way to do things. | ○ | ○ | ○ | ○ | ○ |
| 26. Our approach to doing business is very consistent and predictable. | ○ | ○ | ○ | ○ | ○ |
| 27. People from different parts of the organization share a common perspective. | ○ | ○ | ○ | ○ | ○ |
| 28. It is easy to coordinate projects across different parts of the organization. | ○ | ○ | ○ | ○ | ○ |
| 29. Working with someone from another part of this organization is like working with someone from a different organization. | ○ | ○ | ○ | ○ | ○ |
| 30. There is good alignment of goals across levels. | ○ | ○ | ○ | ○ | ○ |
| 31. The way things are done is very flexible and easy to change. | ○ | ○ | ○ | ○ | ○ |
| 32. We respond well to competitors and other changes in the business environment. | ○ | ○ | ○ | ○ | ○ |
| 33. New and improved ways to do work are continually adopted. | ○ | ○ | ○ | ○ | ○ |
| 34. Attempts to create change usually meet with resistance. | ○ | ○ | ○ | ○ | ○ |
| 35. Different parts of the organization often cooperate to create change. | ○ | ○ | ○ | ○ | ○ |
| 36. Customer comments and recommendations often lead to changes. | ○ | ○ | ○ | ○ | ○ |
| 37. Customer input directly influences our decisions. | ○ | ○ | ○ | ○ | ○ |
| 38. All members have a deep understanding of customer wants and needs. | ○ | ○ | ○ | ○ | ○ |
| 39. The interests of the customer often get ignored in our decisions. | ○ | ○ | ○ | ○ | ○ |
| 40. We encourage direct contact with customers by our people. | ○ | ○ | ○ | ○ | ○ |

## Leadership Practices and Organizational Culture Survey

| | | | | | |
|---|---|---|---|---|---|
| 41. We view failure as an opportunity for learning and improvement. | ○ | ○ | ○ | ○ | ○ |
| 42. Innovation and risk taking are encouraged and rewarded. | ○ | ○ | ○ | ○ | ○ |
| 43. Lots of things "fall between the cracks". | ○ | ○ | ○ | ○ | ○ |
| 44. Learning is an important objective in our day-to-day work. | ○ | ○ | ○ | ○ | ○ |
| 45. We make certain that the "right hand knows what the left hand is doing". | ○ | ○ | ○ | ○ | ○ |
| 46. There is a long-term purpose and direction. | ○ | ○ | ○ | ○ | ○ |
| 47. Our strategy leads other organizations to change the way they compete in the industry. | ○ | ○ | ○ | ○ | ○ |
| 48. There is a clear mission that gives meaning and direction to our work. | ○ | ○ | ○ | ○ | ○ |
| 49. There is a clear strategy for the future. | ○ | ○ | ○ | ○ | ○ |
| 50. Our strategic direction is unclear to me. | ○ | ○ | ○ | ○ | ○ |
| 51. There is widespread agreement about goals. | ○ | ○ | ○ | ○ | ○ |
| 52. Leaders set goals that are ambitious, but realistic. | ○ | ○ | ○ | ○ | ○ |
| 53. The leadership has "gone on record" about the objectives we are trying to meet. | ○ | ○ | ○ | ○ | ○ |
| 54. We continuously track our progress against our stated goals. | ○ | ○ | ○ | ○ | ○ |
| 55. People understand what needs to be done for us to succeed in the long run. | ○ | ○ | ○ | ○ | ○ |
| 56. We have a shared vision of what the organization will be like in the future. | ○ | ○ | ○ | ○ | ○ |
| 57. Leaders have a long-term viewpoint. | ○ | ○ | ○ | ○ | ○ |
| 58. Short-term thinking often compromises our long-term vision. | ○ | ○ | ○ | ○ | ○ |
| 59. Our vision creates excitement and motivation for our employees. | ○ | ○ | ○ | ○ | ○ |
| 60. We are able to meet short-term demands without compromising our long-term vision. | ○ | ○ | ○ | ○ | ○ |



### 4. Demographic Questions

1. Gender:

2. Age (years):

## Leadership Practices and Organizational Culture Survey

3. Education (highest level achieved):

4. Work Experience (years):

5. Job Category:

6. Hierarchical Level:

7. Former Heritage Company:

### 5. Conclusion

This completes the survey. Please note that all the information you provided is anonymous and confidential.

You may now click the Done button to submit your completed response.

# Appendix M

## Data Screening—Variable Descriptive Statistics

**Data Screening Report**

| | |
|---|---|
| Page/Date/Time | 1 2/01/2010 11:39:51 PM |
| Database | C:\DOCUMENTS AND SETTINGS\BR ... ON WITH ALL CASES DELETED.S0 |
| Imputation | Multivariate Normal |

**Descriptive Statistics Section**

| Data Type | Variable | Value Count | Missing Count | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|
| Continuous | MTW1 | 306 | 2 | 1 | 10 | 7.398693 | 2.05766 |
| Continuous | ISV2 | 308 | 0 | 1 | 10 | 6.616883 | 2.24899 |
| Continuous | CTP3 | 307 | 1 | 1 | 10 | 6.068404 | 2.461178 |
| Continuous | EOA4 | 307 | 1 | 1 | 10 | 7.247557 | 2.308825 |
| Continuous | ETH5 | 308 | 0 | 1 | 10 | 7.5 | 2.323229 |
| Continuous | MTW6 | 308 | 0 | 1 | 10 | 7.214286 | 2.113904 |
| Continuous | ISV7 | 308 | 0 | 1 | 10 | 5.951299 | 2.424273 |
| Continuous | CTP8 | 307 | 1 | 1 | 10 | 5.918567 | 2.487199 |
| Continuous | EOA9 | 308 | 0 | 1 | 10 | 7.275974 | 2.411659 |
| Continuous | ETH10 | 307 | 1 | 1 | 10 | 6.794788 | 2.426752 |
| Continuous | MTW11 | 306 | 2 | 1 | 10 | 7.558824 | 2.24663 |
| Continuous | ISV12 | 307 | 1 | 1 | 10 | 5.322475 | 2.53284 |
| Continuous | CTP13 | 308 | 0 | 1 | 10 | 5.821429 | 2.498976 |
| Continuous | EOA14 | 308 | 0 | 1 | 10 | 8.204545 | 2.186808 |
| Continuous | ETH15 | 308 | 0 | 1 | 10 | 6.542208 | 2.527021 |
| Continuous | MTW16 | 307 | 1 | 1 | 10 | 5.107492 | 2.770911 |
| Continuous | ISV17 | 308 | 0 | 1 | 10 | 5.422078 | 2.624819 |
| Continuous | CTP18 | 307 | 1 | 1 | 10 | 6.869707 | 2.504107 |
| Continuous | EOA19 | 307 | 1 | 1 | 10 | 7.296417 | 2.338947 |
| Continuous | ETH20 | 308 | 0 | 1 | 10 | 6.762987 | 2.51361 |
| Continuous | MTW21 | 307 | 1 | 1 | 10 | 6.602606 | 2.516299 |
| Continuous | ISV22 | 307 | 1 | 1 | 10 | 6.90228 | 2.368826 |
| Continuous | CTP23 | 307 | 1 | 1 | 10 | 6.918567 | 2.416558 |
| Continuous | EOA24 | 307 | 1 | 1 | 10 | 7.843648 | 2.417593 |
| Continuous | ETH25 | 306 | 2 | 1 | 10 | 6.539216 | 2.476135 |
| Continuous | MTW26 | 305 | 3 | 1 | 10 | 7.114754 | 2.438037 |
| Continuous | ISV27 | 306 | 2 | 1 | 10 | 6.931373 | 2.569403 |
| Continuous | CTP28 | 306 | 2 | 1 | 10 | 5.248366 | 2.740781 |
| Continuous | EOA29 | 308 | 0 | 1 | 10 | 6.762987 | 2.65601 |
| Continuous | ETH30 | 307 | 1 | 1 | 10 | 6.973941 | 2.544886 |
| Discrete | EMP1 | 308 | 0 | 1 | 5 | 4.061688 | 0.9409745 |
| Discrete | EMP2 | 308 | 0 | 1 | 5 | 3.162338 | 1.158291 |
| Discrete | EMP3 | 307 | 1 | 1 | 5 | 3.387622 | 1.164386 |
| Discrete | EMP4 | 308 | 0 | 1 | 5 | 3.444805 | 1.112648 |
| Discrete | EMP5 | 306 | 2 | 1 | 5 | 2.859477 | 1.126372 |
| Discrete | TEAM6 | 306 | 2 | 1 | 5 | 3.562092 | 1.186426 |
| Discrete | TEAM7 | 307 | 1 | 1 | 5 | 3.765472 | 1.121848 |
| Continuous | TEAM8 | 308 | 0 | 1 | 6 | 3.766234 | 1.182347 |
| Discrete | TEAM9 | 308 | 0 | 1 | 5 | 3.746753 | 1.055846 |
| Discrete | TEAM10 | 304 | 4 | 1 | 5 | 3.233553 | 1.037924 |
| Discrete | CAP11 | 308 | 0 | 1 | 5 | 3.431818 | 1.129365 |
| Discrete | CAP12 | 308 | 0 | 1 | 5 | 3.474026 | 1.044284 |
| Discrete | CAP13 | 308 | 0 | 1 | 5 | 3.607143 | 1.123432 |
| Discrete | CAP14 | 307 | 1 | 1 | 5 | 3.840391 | 1.11317 |
| Discrete | CAP15 | 308 | 0 | 1 | 5 | 3.743506 | 1.243533 |

**Data Screening Report**

| | |
|---|---|
| Page/Date/Time | 2 2/01/2010 11:39:51 PM |
| Database | C:\DOCUMENTS AND SETTINGS\BR ... ON WITH ALL CASES DELETED.S0 |
| Imputation | Multivariate Normal |

**Descriptive Statistics Section**

| Data Type | Variable | Value Count | Missing Count | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|
| Discrete | VALUE16 | 308 | 0 | 1 | 5 | 3.214286 | 1.124001 |
| Discrete | VALUE17 | 305 | 3 | 1 | 5 | 3.285246 | 1.088492 |
| Discrete | VALUE18 | 308 | 0 | 1 | 5 | 3.694805 | 1.140478 |
| Discrete | VALUE19 | 308 | 0 | 1 | 5 | 4.13961 | 1.025723 |
| Discrete | VALUE20 | 307 | 1 | 1 | 5 | 4.286645 | 0.9881243 |
| Discrete | AGR21 | 308 | 0 | 1 | 5 | 3.532468 | 1.086901 |
| Discrete | AGR22 | 306 | 2 | 1 | 5 | 3.872549 | 0.991818 |
| Discrete | AGR23 | 308 | 0 | 1 | 5 | 2.87987 | 1.11337 |
| Discrete | AGR24 | 306 | 2 | 1 | 5 | 3.058824 | 1.120511 |
| Discrete | AGR25 | 307 | 1 | 1 | 5 | 3.436482 | 1.142625 |
| Discrete | COI26 | 306 | 2 | 1 | 5 | 3.509804 | 1.087139 |
| Discrete | COI27 | 308 | 0 | 1 | 5 | 2.993506 | 1.213372 |
| Discrete | COI28 | 308 | 0 | 1 | 5 | 2.821429 | 1.102527 |
| Discrete | COI29 | 308 | 0 | 1 | 5 | 2.603896 | 1.210265 |
| Discrete | COI30 | 307 | 1 | 1 | 5 | 3.273616 | 0.9818888 |
| Discrete | CC31 | 308 | 0 | 1 | 5 | 2.220779 | 1.108138 |
| Discrete | CC32 | 306 | 2 | 1 | 5 | 2.866013 | 1.045688 |
| Discrete | CC33 | 308 | 0 | 1 | 5 | 3.081169 | 1.096293 |
| Discrete | CC34 | 305 | 3 | 1 | 5 | 2.24918 | 1.083765 |
| Discrete | CC35 | 305 | 3 | 1 | 5 | 3.134426 | 0.9825593 |
| Discrete | CF36 | 306 | 2 | 1 | 5 | 3.944444 | 0.9090719 |
| Discrete | CF37 | 307 | 1 | 1 | 5 | 4.254072 | 0.8208525 |
| Discrete | CF38 | 305 | 3 | 1 | 5 | 3.603279 | 1.021152 |
| Discrete | CF39 | 308 | 0 | 1 | 5 | 4.107143 | 1.045331 |
| Discrete | CF40 | 308 | 0 | 1 | 5 | 3.555195 | 1.216153 |
| Discrete | OL41 | 307 | 1 | 1 | 5 | 3.478827 | 1.09755 |
| Discrete | OL42 | 305 | 3 | 1 | 5 | 2.596721 | 1.105305 |
| Discrete | OL43 | 308 | 0 | 1 | 5 | 3.295455 | 1.271222 |
| Discrete | OL44 | 306 | 2 | 1 | 5 | 3.640523 | 1.08107 |
| Discrete | OL45 | 308 | 0 | 1 | 5 | 2.944805 | 1.175291 |
| Discrete | STR46 | 307 | 1 | 1 | 5 | 3.159609 | 1.277225 |
| Discrete | STR47 | 308 | 0 | 1 | 5 | 2.948052 | 1.029166 |
| Discrete | STR48 | 306 | 2 | 1 | 5 | 3.669935 | 1.178584 |
| Discrete | STR49 | 307 | 1 | 1 | 5 | 2.384365 | 1.242816 |
| Discrete | STR50 | 308 | 0 | 1 | 5 | 2.652597 | 1.333395 |
| Discrete | GOA51 | 305 | 3 | 1 | 5 | 3.131148 | 1.092369 |
| Discrete | GOA52 | 307 | 1 | 1 | 5 | 3.37785 | 1.016481 |
| Discrete | GOA53 | 307 | 1 | 1 | 5 | 3.70684 | 1.022006 |
| Discrete | GOA54 | 308 | 0 | 1 | 5 | 3.74026 | 0.9329662 |
| Discrete | GOA55 | 308 | 0 | 1 | 5 | 3.48052 | 1.162502 |
| Discrete | VIS56 | 306 | 2 | 1 | 5 | 2.5 | 1.201775 |
| Discrete | VIS57 | 306 | 2 | 1 | 5 | 2.977124 | 1.152104 |
| Discrete | VIS58 | 307 | 1 | 1 | 5 | 2.729642 | 1.036208 |
| Discrete | VIS59 | 307 | 1 | 1 | 5 | 2.638437 | 1.112711 |
| Discrete | VIS60 | 308 | 0 | 1 | 5 | 3.483766 | 0.9667414 |

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