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Character and Effective Leadership of the Knowledge Worker

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CHAPTER 1: INTRODUCTION

The increasing complexity and global competition of the 21st century puts renewed pressure on American corporations and institutions to innovate and change. To lead change in these challenging times, manager roles and responsibilities have expanded and have become more focused on leadership. Rather than concentrating primarily on balance and control, managers are being asked to seek new opportunities and inspire their work force to accomplish them. This requires a new type of manager - one who is comfortable with change and is focused on the people who make organizational goals achievable.

Managers today must be leader-managers responsible for perpetuating and strengthening existing structures and systems while seeking opportunities for innovation and change. Within this expanded role, leader-managers must inspire creativity and problem solving to achieve new levels of organizational results while managing the status quo.

The current literature on leadership discusses the behaviors, roles and personalities of effective leaders, and is beginning to address the attributes and character dimensions required for leadership success through the emotional intelligence work of Goleman (1995), The Center for Creative Leadership (McCauley, Moxley, & Van Velsor, 2004), and others (Branden, 1994, 1998; Goleman, Boyatzis, & McKee, 2002; Mayer, 1990; Salovey, 1997; Weisinger, 1998). As organizational effectiveness goals shifted from the modern industrial age paradigms of efficiency of manufacturing, mass-marketing, and rapid adoption of technology to the post-modern age paradigms of globalization, information, and rapid innovation and change, the character of our leaders

has become critical. Companies once primarily focused on the development and efficiency of systems, processes, and equipment/facilities are now increasing their focus on the intellectual or knowledge capital of the organization – their employees.

Products, processes, facilities, and service results can be managed but a work force inspired to generate intellectual capital to accomplish organizational objectives must be led. To inspire action to accomplish the goals of an organization, leaders must be able to engender “followership”, something which is no longer a guarantee just because one has a management title (Drucker, 1995). Post-modern leadership is a reciprocal relationship between those who choose to lead and those who choose to follow (Kouzes & Posner, 1993), and, as such, the character of leaders becomes paramount for leadership effectiveness and success.

Problem Framework

Corporate leadership scandals such as those exhibited by Enron, Arthur Andersen, Haliburton, Tyco International, and WorldCom, seem to demonstrate the need for credibility in leadership thinking and action. Immediate profit making at all costs, characteristic of the boom years of the mid 1900’s - to early 2000, is no longer the only key to corporate leadership success. Leadership ethics founded on character is emerging as an essential element to restore international, public, stockholder, and employee confidence and loyalty (Block, 1993; Bolman & Deal, 2001; Kouzes & Posner, 1993).

Rather than engineering and managing performance through process controls and job design, leaders must have the confidence and loyalty of their employees to inspire and partner with their workforce to shape company success. To lead and gain “followership”, leaders must re-evaluate their style and behaviors and look within

themselves to the characters dimensions that make effective leaders – herein proposed to be leadership credibility and self-efficacy.

Credibility inspires worker loyalty and direction and self-efficacy gives the leader the motivation and courage to lead against, at times, hostile and challenging forces. The hypotheses set forth and explored in this study were that successful leaders possess a higher degree of credibility and self-efficacy than do less effective leaders; and, that as leadership credibility and self-efficacy increases so does leadership effectiveness. Building on Dave Ulrich’s (1996) premise that the outcome of effective leadership is to turn aspiration into actions, the Figure 1 model illustrates these hypothesized relationships.

Figure 1. Leadership Effectiveness Model



Using the Figure 1 model to frame the problem and the study's hypothesized relationships, a successful leader was defined as one who could inspire others and turn that aspiration into results to accomplish organization objectives. According to the literature, this is accomplished through creating vision, building commitment, improving team learning and results, and developing and enabling others for success (Bass & Avolio, 1994). To accomplish these actions, leader-managers in the Figure 1 model were hypothesized to also need the "character" to cause people to follow their vision and direction. To fulfill the goal of turning aspiration into action, the leader-manager's "character", here defined to be leadership credibility and self-efficacy, was proposed to be the underlying basis.

The Figure 1 model was based on two assumptions. The first assumption was that credibility of action is a significant determinant of whether a leader-manager will be followed over time. Without credibility, a leader-manager cannot lead. Leaders motivate others to commit to change, while helping them overcome obstacles encountered along the way to realizing results (Paglis & Green, 2002).

The second assumption was that without a belief in oneself as a leader-manager, the roles and tasks of leadership become overwhelming and conviction for the task diminishes. The Figure 1 model indicates that as credibility and self-efficacy increase, leadership effectiveness also increases.

Implied in the Figure 1 model was also the belief that leadership is about "how to be". The "how to be" leader, the leader with character, holds forth the vision of the organization's future in compelling ways that ignites a workforce, builds capability, and

demonstrates a belief in the worth and dignity of the men and women who make up the enterprise (Hesselbein, 2002).

This study tested the Figure 1 model and resulting research hypotheses by exploring the contribution of “character” to leadership effectiveness.

Purpose of Study

The purpose of the study was twofold. The first purpose was to explore the proposed relationship between effective leadership and the two character dimensions - leadership credibility and self-efficacy - within an organization comprised primarily of knowledge workers. Little has been done to measure the relationship between leadership character dimensions and leadership effectiveness, particularly on the self-efficacy dimension.

The second purpose of this study was to propose a development model that applies the study’s findings to leadership development. To apply the findings of this study to leadership behaviors and actions, leader-managers need an explicit development and performance feedback path for improvement. Current leadership development programs often do not provide an explicit framework for developing the character dimensions needed by leader-managers for leadership success within their organizations.

To better understand the effect of character on leadership effectiveness, this study quantified two dimensions of leadership character – leadership credibility and self-efficacy – and determined their contribution to leadership effectiveness/success.

Although a variety of frameworks exist that explain leadership effectiveness, this study used a series of measurement instruments to determine leadership effectiveness based on a definition of leadership effectiveness derived from a literature review.

Research Questions

The research questions addressed by this study were the following.

1. To what extent do leader-managers within a knowledge-based organization exhibit leadership credibility?
2. To what extent do leader-managers within a knowledge-based organization exhibit self-efficacy?
3. To what extent do leader-managers within a knowledge-based organization, exhibit factors of leadership effectiveness?
4. To what extent do leader-managers within a knowledge-based organization that exhibited leadership credibility and self-efficacy also exhibit the factors of leadership effectiveness?
5. Based on the findings of Questions 1 - 4, what implications are there for developing current and future organizational leader-managers of knowledge workers?

Study Hypotheses

Study hypotheses were:

- Effective leader-managers exhibit higher leadership credibility scores according to self and other reports than do less effective leader-managers.
- Effective leader-managers exhibit higher self-efficacy scores than do less effective leader-managers.
- As leadership credibility and self-efficacy dimension scores increase, so does leadership effectiveness.

Conceptual Framework

The focus of this study was on leadership not management. Management is about coping with complexity; leadership is about coping with change (Kotter, 1996). Leaders shape ideas rather than respond to them and develop new options rather than balance conflicting forces (Zaleznik, 1998).

John Kotter (1996) in describing what leaders do, contrasts management and leadership practices by discussing actions to accomplish three tasks – decide what needs to be done, create the networks and relationships to accomplish agenda, and ensure that people do the job. Management accomplishes these tasks by planning and budgeting, organizing and staffing, and controlling and problem solving. Leadership accomplishes these tasks by setting direction, aligning people, and motivating and inspiring.

Processes, products, and services are managed but a work force, particularly in knowledge organizations, must be led. Process improvements, reengineering, and restructuring can only take a company so far. To be successful in today's competitive and changing world, it takes ideas and innovation that come from the people or intellectual capital of the organization. When the work force in addition to processes, equipment, and facilities becomes central to success, leadership becomes paramount.

Although a variety of frameworks exist that explain leadership effectiveness, most theories can be classified into one of four traditions: trait, behavioral, and situational theories, and a set of emerging theories here labeled complexity theory. Proponents of trait theory argue that leaders are born, not made, and possess certain innate qualities such as intelligence, social maturity and breadth, inner motivation, and human relations

attitudes (Fiedler, 1971). In contrast to the trait theory, the behavioral view of leadership focuses on the actual leadership behavior as opposed to innate qualities. Under this view effective leadership are characterized in terms of specific sets of observable activities that can then be used as a basis of comparison for leadership effectiveness (Kayworth & Leidner, Winter 2001/2002). Examples are Mintzberg's managerial roles (1973), Blake and Mouton's (1985) managerial grid, McGregor's Theory X and Theory Y (1960), and transactional versus transformational leaders (Burns, 1978; Bass & Avolio, 1994).

The underlying assumption of the situational theory of leadership effectiveness is that the best leadership is geared to situation specific contingencies, there is no one best leadership style (Fry, Kerr, & Lee, 1986; Hersey & Blanchard, 1982). Complexity theory focuses on leadership behaviors and actions that enable organizational effectiveness, as opposed to determining or guiding effectiveness (Marion & Uhl-Bien, 2001). Here the work of leaders is to create the social architecture capable of generating intellectual capital (Bennis, 1989).

This study focused on behavioral aspects that enabled effective leadership and related a set of behavioral and action factors to the underlying character dimensions – leadership credibility and self-efficacy – hypothesized as needed to demonstrate effective leadership. Leadership behaviors include creating vision, inspiring commitment, enabling and driving change, and developing and enabling others for success (Bass & Avolio, 1994; Kotter, 1996). To be able to accomplish these behaviors, leaders need to possess the ability to inspire action through the people they lead (Ulirich, 1996) thus realizing the capabilities of others in the achievement of organizational outcomes.

Research Design Overview

To explore the hypothesized contribution of leadership credibility and self-efficacy to leadership effectiveness, leader-managers at the Lawrence Livermore National Laboratory were used as the study sample. The Laboratory is a research and development institution comprised primarily of knowledge workers.

A survey research method was used to determine leadership credibility and self-efficacy. Specifically, the Leadership Practices Inventory (Kouzes & Posner, 1988, 1997) with the addition of a study developed technical competence factor was used to define leadership credibility. The Self-Efficacy Scale (Sherer & Muddux, 1982) and the Leadership Self-Efficacy Scale (Paglis, 1999) were used to define self-efficacy. A definition of leadership effectiveness was derived from the literature and derived criteria were matched to Laboratory documents and subordinate report data to determine and then measure leadership effectiveness.

Design Limitations

Given the decision to limit the study's sample to Lawrence Livermore National Laboratory leader-managers, caution should be exercised in generalizing the study's results to other populations. Additionally, the study's delimitation was that it was designed to determine the relationship between leadership effectiveness and character, yet the leader-manager sample studied was responsible for both management and leadership of their organization or sub-unit. They were leader-managers. Though both roles are important, the focus of this study was on the leadership role of these leader-managers.

Significance of the Study

Context of the Contribution

The link between self-efficacy and leadership effectiveness has not been established and is only recently being explored. Studies have established the correlation between self-efficacy and health related outcomes (Holden, 1991), parental self-efficacy and children's academic abilities (Seefeldt, Denton, Galper & Younoszai, 1999) and self-efficacy and academic achievement (Schunk, 1991; Torkzadeh, Pfougeoft, & Hall, 1999; Bandura, 1993). Recently, Paglis and Green (2002) developed a three-dimensional leadership self-efficacy (LSE) construct to reflect managers' self-perceived capability for successfully executing change.

The relationship between leadership effectiveness and leadership credibility has been explored and is being discussed in the research literature. Case study research has discussed the link between leadership effectiveness and credibility (Bennis, 1989; Drucker, 1995; Ulrich, 1996; Kouzes & Posner, 1995; Zand, 1992; Badarocco & Ellsworth, 1989). Quantitative studies based on survey research design have been conducted which address factors of credibility and leadership effectiveness and explore their relation (Arvonen & Pettersson, 2001; Finegan & Shamian, 2001; Parry & Proctor-Thomson, 2002; Walton & Dawson, 2001; Whitener, Brodt, Korsdaarg, & Werner, 1998). Most significantly, James Kouzes and Barry Posner (1988) established the relationship between subordinates' ratings of leadership effectiveness and leadership credibility as defined by the Leadership Practices Inventory (LPI).

The dimensions of effective leadership needed to lead knowledge workers have not been explored and the relationship between “character” and leadership success when the leading knowledge workers has not been studied.

Study Contribution

This study was significant because it:

1. *Used new designs for the measurement of leadership effectiveness:* Current instruments in the field assess behaviors of leader-managers such as the Management Development Questionnaire (Cameron, 1997) or base effectiveness on supervisor or subordinate report or on organization performance. This presents a one dimensional representation of leadership effectiveness. This study enhanced these current methods for measuring leadership effectiveness by using supervisor and subordinate report and organization performance metrics as recorded in official documents in an organization comprised primarily of knowledge workers.
2. *Applied a general measure of self-efficacy to leaders:* Instruments to measure self-efficacy have been primarily conceptualized as situation-specific rather than as a general measure and have not been applied to leadership. However, there is evidence that the experiences of personal mastery that contribute to efficacy expectancies generalize to actions other than the target behavior (Bandura, 1977). The Self-Efficacy Scale (Scherer and Maddux, 1982) used in this study as one of the measures of self-efficacy, is not tied to specific situations or behavior; and, had not been used to determine the self-efficacy of leaders prior to this study. This study examined the Self-Efficacy Scale as a

reliable and valid measure of leader-manager efficacy. Additionally, a situation specific scale, the Leadership Self-Efficacy Survey (Paglis, 1999), was used in this study and the general self-efficacy and situation specific self-efficacy results were compared and their relationship to leadership effectiveness explored.

3. *Tested for a relation between leadership effectiveness and leadership credibility:* The relationship between leadership effectiveness and leadership credibility has not been quantitatively established when measured by other than subordinate report (Kouzes & Posner, 1988). Other studies have used the LPI or other measures of credibility or integrity to explore the relationship between leadership behaviors related to cost and change effectiveness (Arvonen & Pettersson, 2001), employee satisfaction (Finegan & Shamian, 2001), transformational leadership (Parry & Proctor-Thomson, 2002), and managers perceptions of effectiveness (Walton & Dawson, 2001).
4. *Tested for a relationship between leadership effectiveness and self-efficacy:* The relationship between self-efficacy and leadership effectiveness had not been established. The literature focuses on emotional intelligence and effective leadership (Branden, 1998).
5. *Focused study on leader-managers of knowledge workers:* The leadership literature does not specifically explore the characteristics (e. g. competencies, behaviors, actions, character) of leader-managers of knowledge workers. This study explores some of the characteristics of leader-managers of knowledge

workers and tests the explored characteristics relationships to each other and to factors of leadership effectiveness.

6. *Proposed a model for leadership development that addresses the character dimensions of leadership credibility and leadership self-efficacy:* Current development programs focus on assessment and development of leadership competencies and do not explicitly address the development of the character dimensions of effective leaders. A leadership development model that proposes how to develop leadership credibility and self-efficacy, along with leadership competencies, does not exist.

Benefits of the research to the study sample, leader-managers at Lawrence Livermore National Laboratory, and to the Lawrence Livermore National Laboratory, are discussed in Chapter 3 – Methodology.

Definition of Terms

The following terms were used throughout the study.

Leader-Manager: Anyone with a management or supervisor title according to an organization's compensation classification system. Such classification includes any person in charge of an organization or sub-unit (Mintzberg, 1973).

Self-Efficacy: A belief an individual has about his/her ability to accomplish a task or achieve a desired end (Bandura, 1986). Decisions people make about whether or not to attempt certain courses of action and about how long to pursue them are determined by judgements of personal efficacy (Bandura, 1991).

Credibility: Behaviors and actions that demonstrate honesty, forward-looking, inspiring, and competent action to others (Kouzes & Posner, 1993, p. 15 - 18). Credibility is how leaders earn the trust and confidence of their constituents (Kouzes & Posner, 1993, xvii).

Character: Attributed and inherent qualities that make a person what he or she is (adapted from Oxford American Dictionary, 1980, p. 139).

Competence: Capable, productive, effective, technically able, able to get things done for the business unit (Kouzes & Posner, 1993, pp. 12 and 17).

Knowledge Worker: Individuals who perform symbolic-analytic services including problem solving, problem identifying, and strategic brokering services (Reich, 1994, p. 177). Examples of people who perform these services include but are not limited to the following – engineers, research scientists, lawyers, public relations executives, consultants, management information specialists, organizational development specialists, recruiters, journalists, university professors, etc. (Reich, 1994, p. 178).

CHAPTER 2: LITERATURE REVIEW

Scope of the Review

This study was designed to explore the relationship between leadership effectiveness and two “character” dimensions – leadership credibility and self-efficacy - based on the premise that leadership effectiveness is related to character. To better understand effective leadership and the contribution of “character” to leadership effectiveness, the following literature review was conducted.

The literature on leadership is profuse. Behaviors, roles, and personalities of effective leaders are discussed and assessment instruments proposed, but bottom-line effectiveness criteria are not explicitly defined and essential “character” dimensions needed for leadership success are only beginning to be explored. This chapter presents the relevant literature reviewed in this study to understand leadership effectiveness, the attribute leadership credibility, and, the belief system self-efficacy. The following areas reviewed include:

- The Emergence of the knowledge worker and leadership effectiveness implications.
- Definition of leadership in juxtaposition to management.
- Theoretical approaches to understanding leadership effectiveness and application to effective leadership of the knowledge worker.
- Derivation and description of leadership effectiveness criteria for leading knowledge workers.
- Leadership credibility.
- Self-efficacy.

The Emergence of the Knowledge Worker and Leadership Effectiveness Implications

In the modern industrial age – the time from 1920 to 1990 – several driving forces characterized company success. These included efficiency of manufacturing, effective mass marketing, rapid adoption of technology, financial acumen, and a set of elementary people skills which companies developed to move from Douglas McGregor’s “Theory X” to “Theory Y” (Senge, Klieiner, Roberts, Ross & Smith, 1994). In the traditional leadership model, employees were looked at as interchangeable parts in the organization in which jobs were engineered for maximum efficiency by management (Gilberth, 1914).

However, since the 1990’s, companies have experienced rapid change and globalization challenges and are finding the leadership paradigms of the modern industrial age to appear to be no longer effective. Rather than engineering and managing performance through process controls and job design, leaders now must inspire and partner with employees to shape company success. This requires a new and different type of leader. Rather than leading by command and control, leaders now must lead by inspiring “followership”, collegiality, creativity, and problem solving in an environment in which an organization must continually create its future rather than efficiently manage its status quo.

Thus the distinction between “leading” and “managing” becomes more pronounced. Though processes, products, and services must be managed, the workforce in the twenty-first century must be led. Process improvements, re-engineering and restructuring can only take a company so far. To be a prosperous, successful company or organization it takes ideas and invention. Warren Bennis (1989) quoted a statement by Michael Eisner, the Chairman and CEO of Disney, about his company - “our inventory

goes home at night” (p. xiii). Indeed it is the human capital that is the valuable organizational asset in the 21st century.

The emergence of the employee as the primary asset of a company is triggered by the change in the nature of work. Manufacturing and high-volume enterprises demanded routine and efficient production services in which work and worker actions were engineered. Now, to remain competitive, companies must innovate and change requiring work that is focused on knowledge and knowledge integration and generation.

As the work of organizations shifts, employees take on new and more important roles, and the role of leaders becomes more complex and founded on the leader’s ability to inspire a work force to accomplish organizational objectives rather than personal goals. Leaders must now engage the minds of their employees, not just control their hands.

In the post modern age Ulrich (1996) states “Leaders will be known less for what they say and more for what they deliver, less by what they control and more for what they shape, and less by goals they set and more for the minds they build” (p. 219). They must be able to engender the trust of their work force for “followership” is no longer a guarantee just because one has a management title (Drucker, 1995). Leadership is a reciprocal relationship between those who choose to lead and those who decide to follow (Kouzes & Posner, 1993).

Ulrich (1996) points out that effective leaders have the personal habits, values, traits, and competencies that engender trust and commitment from those who take their direction. Bureaucratic command and control leadership is no longer sufficiently effective as a means to release the brainpower of human capital to maximize contribution.

To attract and retain the knowledge worker, the opportunity to create something of lasting value, adding something special to the world, is key. Bolman and Deal (2001) contend that to create the work place in which employees feel a sense of meaning and purpose, a workplace that provides workers with opportunity to address their higher order needs, leaders need to lead with soul not just their heads and hands. Leading with soul implies that it is not leadership techniques, talents or knowledge that matters, it is ones being (Bolman & Deal, p. 64).

The ability of leaders to secure compliance with decisions is widely recognized as a central characteristic of leadership effectiveness (Tyler, 1990; Tyler & Lind, 1992). If leaders must continually explain and justify their decisions, their ability to lead is diminished. To lead the knowledge worker to accomplish business objectives, management becomes a social function in which relationships are key (Wheatley, 1992). Leadership is a relationship rooted in community (Bolman & Deal, 2001, p. 62).

Relationships are particularly important to engaging the minds of the knowledge worker. Knowledge workers need to connect with their leaders for a mind to mind relationship demands more than mind to hand control. It is this emphasis on relationship that elevates the primacy of personal attributes or the character of the leader into juxtaposition with leadership competencies.

To lead and gain “followership”, leaders must re-evaluate their style and behaviors and look within themselves to their implicit nature to those aspects that make effective leaders – herein proposed to be leadership credibility and self-efficacy.

Management vs. Leadership

Leadership is different than management and both sets of skills are required for leader-managers in the 21st century. Management practices emerged in response to the organizational needs of large organizations that characterized the mid and late 20th century. Leadership skills have become increasingly required in recent years as the world has become more competitive and volatile and the focus on human capital has surpassed the focus on processes, facilities, and equipment.

Management is about coping with complexity; leadership is about coping with change (Kotter, 1996). Zaleznik (1998) would say leaders shape ideas rather than respond to them and develop new options rather than balance conflicting forces. Henry Mintzberg (1973) describes a manager as that person in charge of an organization or sub-unit. In his seminal work on the nature of managerial work, he purports that there are three managerial roles – interpersonal, informational, and decisional. The interpersonal role includes figurehead, leader, and liaison. In describing the leader element of the interpersonal role Mintzberg discusses hiring and training of staff, motivating and encouraging employees, and approving work. The leadership role of vision and change is not mentioned. In later reflecting on his 1973 work and on his subsequent research into the roles of managers, Mintzberg (1998) states that “Now, however I believe that managers need more ways to convey the images and impressions they carry inside them. This explains the renewed interest in strategic vision, in culture, and in the roles of intuition and insight in management” (p. 31).

John Kotter (1996) in describing what leaders do, compares and contrasts management and leadership practices by discussing actions to accomplish three tasks -

decide what needs to be done, create the networks and relationships to accomplish the agenda, and ensure that people do the job. Management accomplishes these tasks by planning and budgeting, organizing and staffing, and controlling and problem solving. Leadership accomplishes these tasks by setting a direction, aligning people, and motivating and inspiring. Leaders produce change, often to a dynamic degree; managers produce a degree of predictability and order (Kotter, 1996). Managers seek order and control and are almost compulsively addicted to disposing of problems, while leaders tolerate chaos and lack of structure, often even encouraging it (Zalesnik, 1998).

With the advent of more sophisticated methods and computer tools to manage such as Lotus, Excel, project management software and techniques, and other data base tracking and control mechanisms, the role of managers has become more mechanized and skill based. However, since vision is the hallmark of leadership (Zalesnik, 1998), to which imagination and change are key, leadership skills are not so easily structured and taught.

In sum, managers are responsible for perpetuating and strengthening existing institutions while leaders seek opportunities for change. Today's business leaders need both management and leadership skills. This study's focus was on leadership and the behaviors and character dimensions necessary to be effective in leading knowledge workers.

Leadership Effectiveness Theory

Although a variety of frameworks exist that explain leadership effectiveness, most theories can be classified into one of four traditions: trait, behavioral, and situational theories and a set of emerging theories here labeled complexity theory.

Trait Theory

Proponents of trait theory argue that leaders are born not made and possess certain innate qualities such as intelligence, social maturity and breadth, inner motivation, and human relations attitudes (Fiedler, 1971). Fiedler's model postulates that the effectiveness of a group or organization depends on the leader's personality and the leader's power and influence over the group (Fiedler, 1967). Fiedler tested his theory of leadership effectiveness through quantitative research developing a scale to measure the personality attributes of motivation to accomplish the task or to develop good relations with others (least preferred co-worker scale) and scales to measure leadership influence and control. His contingency model was the most dominant leadership effectiveness theory from about 1967 to 1985 (Fiedler, 1995).

Despite its decline in popularity, theorists continue to study the trait theory of leadership effectiveness. Hogan et al. (1994) state that, by using personality trait measurement as a predictor, leadership can be enhanced. Bray and Howard (1983) reported that such personality traits as desire for advancement, energy, readiness to make decisions (urgency), resistance to stress and inner work standards were the best predictor of managerial advancement at AT&T. And, Silverthorne (2001) used the Goldberg (1993) five broad personality dimensions –urgency, emotional stability, agreeableness, conscientiousness, and intellect – to predict effective and non-effective leaders in a cross cultural context. The five-factor model of leadership personality dimensions was supported in the United States sample.

Behavioral Theory

In contrast to the trait theory, the behavioral view of leadership focuses on the actual leadership behavior as opposed to innate qualities. Under this view, effective leadership can be characterized in terms of specific sets of observable activities that can then be used as a basis of comparison for leadership effectiveness (Kayworth & Leidner, Winter 2001/2002). Additional examples are Mintzberg's managerial roles (1973), Blake and Mouton's (1985) managerial grid, McGregor's Theory X and Theory Y (1960), managers versus leaders (Zaleznik, 1998), and transactional versus transformational leaders (Burns, 1978; Bass & Avolio, 1994). This view is also evident in the current team leadership literature that focuses on identifying critical behaviors of successful team leaders (Katzenbach, 1993). According to Blake and Mouton (1985) the "high-high" leadership style – high in concern for production and high in concern for people – constitutes effective management behavior in all kinds of situations.

In 1978 James MacGregor Burns introduced the theory of transforming leadership. Burns identified transforming leadership as a process where, "one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality" (1978, p. 20). By such leadership the integrity of the organization is maintained and enhanced.

Bass and Avolio (1994) expanded Burns' theory describing transformational leaders as "those who motivate others to do more than they originally intended and set challenging expectations to achieve higher performance" (p. 3). According to Bass and Avolio, transformational leaders behave in ways to achieve superior results by employing

one or more of the “Four I’s” – idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration.

The dimensions of the “Four I’s” are as follows. *Idealized influence* defined as the leadership attributes of being a role model, admired, respected, and trusted. *Inspirational motivation* defined as the leadership behaviors that motivate and inspire, provide meaningful and challenging work, and clearly communicate expectations. *Intellectual stimulation* defined as a leadership behavior that questions assumptions, stimulates creativity, and encourages new ways of addressing problems. *Individualized consideration* defined by the leadership behaviors that pay attention to individual needs for achievement, and coach and mentor. Central to transformational leadership and the integration of each of the components contributing to it, is the notion of vision (Parry & Proctor-Thomson, 2002).

Transactional leadership, on the other hand, includes another four components – 1. Contingent reward, 2. Management by exception (active), 3. Management by exception (passive), and 4. Laissez-faire (Bass & Avolio, 1994). In contingent reward, leader and follower agree on what needs to be done and for what reward. In management by exception, the leader either actively monitors or passively waits for errors or mistakes. In Laissez-faire, the responsibilities of leadership are ignored. Here vision, inspiration, mentoring and coaching are not exhibited leadership behaviors.

Situational Leadership Theory

The underlying assumption of the situational theory of leadership effectiveness is that the best leadership is geared to situational contingencies. The contingency approach assumes that there is no one best leadership style and that effective leadership depends on

the fit between the leaders' variables and situational variables (Kayworth & Leidner, Winter 2001/2002). For example, situational leadership theory regards the maturity of the followers as the crucial situational factor (Hersey & Blanchard, 1982). Fry, Kerr, and Lee (1986) found that a given manager's leadership effectiveness is dependent on his or her particular style as applied to specific circumstances. For instance an autocratic manager might be perceived as highly effective under some circumstances (military organizations) and ineffective in others (academic institutions).

Recently, DeCremer and Van Vugt (2002) found that the effectiveness of leaders' solutions to social dilemmas depends on the fit between leader characteristics and member expectations. Mumford and Van Doorn (2001), in their study contrasting pragmatic, transformational and charismatic leaders, found that the effectiveness of these three leadership styles is contingent upon different types of circumstances. For example, they found that pragmatic leadership is most effective when goals are well defined and followers demonstrate substantive autonomy and expertise.

Complexity Theory

An emerging theory of leadership effectiveness is complexity theory. Complexity theory focuses leadership efforts on behaviors that enable organizational effectiveness, as opposed to leadership actions that determine or guide individual effectiveness (Marion & Uhl-Bien, 2001). Complex leadership involves creating the conditions that enable productive, but largely unspecified, future states. From the perspective of complexity theory, effective leadership is about learning to capitalize on interactive dynamics (correlation, randomness, and interaction) among and within organizational ensembles (defined as sets of individuals such as departments or other work groups). Thus

leadership effectiveness is focused on fostering interactive conditions that enable a productive future (Marion & Uhl-Bien, 2001, p. 394).

Organizational fitness for a productive future is a function of the organization's ability to foster emergent networks among people. Effective leaders, therefore, manage and develop networks and foster interdependencies within and without the organization. They think systematically (Senge, 1990) and create the conditions that enable the interactions through which future directions emerge (Marion & Uhl-Bien, 2001).

Closely linked to complexity theory is workforce empowerment and effective workforce management theories. Though proposed by Rosebeth Moss Kanter in the 1970's, workforce empowerment seems to be the predecessor to complexity theory in that it is based on the premise that work environments are created to provide access to information, resources and learning. Effective workforce management theory proposes that a unique pool of people or human capital be created to improve a firm's economic performance (Pfeffer, 1994; Richard & Johnson, 2001).

Like other complexity theories, federation thinking as described by O'Toole and Bennis (1992) also requires several things for those in leadership positions to create the social architecture required for organization success. According to O'Toole and Bennis (1992) these are: faith in the power of people to solve their problems locally; willingness to forgo the satisfaction of exercising command and control; and, understanding that, in complex systems and turbulent times, no one individual or group possesses enough knowledge to manage the jobs of everyone else in the organization.

As the leadership visionary Warren Bennis (1989) states, "the key to competitive advantage in the nineties and beyond will be the capacity of leadership to create the

social architecture capable of generating intellectual capital. Intellectual capital means ideas, know-how, innovation, brains, knowledge, and expertise” (p. xii). The social architecture that generates intellectual capital must be one that enables not manages knowledge (Von Krogh, Ichijo, & Nonaka, 2000). Additionally, this knowledge generation needs to happen in a caring atmosphere, one in which organizational members take an active interest in applying the insights provided by others, and in well-functioning, interdisciplinary teams (Von Krogh, Ichijo, & Nonaka, 2000).

Valuable, hard-to-replace knowledge, the key to competitive advantage in the 21st century, is forged in communities of practice (Stewart, 1997). The challenge of leadership is to create an environment in which there is employee commitment to voluntarily cede ownership of knowledge generated to the organization. In interviews conducted with corporate executives, Stewart found that,

Knowledge workers are likely to split their loyalty between their profession and peers on one hand, and their employing organization on the other. They stay committed to particular firms as long as they are working on interesting projects. To be effective, knowledge workers need to bond with their employing firms. (p. 101)

The complexity theory of leadership effectiveness involves building relationships and networks among knowledge workers that encourages innovation and change thus generating intellectual capital, not just managing it.

Application to the Knowledge Worker

The work of American employees can be categorized into three broad categories – routine production services, in-person services, and symbolic-analytic services (Reich,

1994). Routine production services involve repetitive tasks performed in high volume enterprises that are done over and over in a sequence of routine steps (Reich, 1994, p. 174). Examples of routine production services include data processors, assembly line workers, foreman enforcing standard operating procedures, etc. In-person services entail simple repetitive tasks that are closely supervised and are provided person-to-person (Reich, 1994, p. 176). Examples of in-person services include retail sales workers, waiters and waitresses, child-care workers, bank tellers, house cleaners, taxi drivers, secretaries, hairdressers, auto mechanics, security guards, etc. Typically, routine production services and in-person services do not require a college education for performance.

As Reich (1994) states, “symbolic-analytic services include problem-solving, problem-identifying, and strategic-brokering activities” (p. 177). These are the knowledge workers whose services cannot be codified and controlled. Examples of symbolic-analytic services include research scientists, design engineers, software engineers, investment bankers, lawyers, organizational development specialists, systems analysts, etc. Symbolic workers, who solve and identify and broker new problems, were the focus of this study and were herein defined as knowledge workers.

Organizations that rely on the symbolic-analytic services of knowledge workers are dependent on these services for competitive advantage. While facilities and equipment may be top notch, it is the capacity and capability of the intellectual capital of an organization requiring symbolic-analytic services that makes an organization succeed or fail. Rather than the employee needing the company for livelihood as is the case for the employees performing routine production services and in-person services, the

relationship is now reciprocal – the organization also needs the employee for its livelihood and competitive advantage. As such, leadership rather than management of the knowledge worker becomes primary. The challenge of leadership is to create a commitment to the work itself – to inspire a shared vision of organizational success and to mobilize motivation to achieve that vision rather than achievement of personal goals and objectives.

To lead an organization of knowledge workers, leaders face what O’Toole and Bennis (1992) consider Iceland’s dilemma: fierce pride in the nation’s Viking heritage (nationalism) vs. the benefits of participation in the global economy (globalism). Put in organizational terminology – individual interest, passion, and commitment vs. organizational priorities and parameters. The metaphor of the balloon seller, who holds a fist full of strings attached to countless units, each tugging away, often in different directions, because each is filled with the helium of creative spirit, vividly depicts the leadership challenge of leading the knowledge worker.

To attract and retain the knowledge worker, the opportunity to demonstrate creativity and contribution is paramount. Using Maslow’s (1968) hierarchy of human needs, organizations comprised of knowledge workers need to address the higher order need of employees – self-respect and self-actualization (Senge, 1994). This requires that leaders be genuinely respectful of the intelligence and contributions of their constituents (Kouzes & Posner, 1993) and offer employees challenging work and the opportunity for authorship – putting your signature on your work (Bolman & Deal, 2001). For the knowledge worker, creating something of lasting value is key.

Establishing this connection to and passion for the work itself through inspiring a shared vision, motivating action, and creating an environment to build networks and empower employee success, is the challenge of leadership in leading the knowledge worker and is the hope for organization change and innovation.

Derivation of Leadership Effectiveness

To derive a definition of effective leadership of the knowledge worker so measurement of such could be determined, the effectiveness dimensions of transformational leadership discussed by Bass and Avolio (1994), complexity theory, and Kotter's (1996) work on leadership and change were used. Because the knowledge worker requires complex leadership roles and behaviors, the effectiveness dimensions discussed in these theories it is herein purported, provide the best insight into the criteria that comprise effective leadership.

Transformational leaders inspire motivation by providing meaningful and challenging work and encourage intellectual stimulation by questioning assumptions and stimulating creativity. They pay attention to individual needs for achievement and provide development and mentoring relationships and experiences. Based on interviews with Los Alamos National Laboratory technical staff members, the importance of peer affiliation, interesting science, and the opportunity to present papers in their research area were found to be essential elements for technical staff member attraction and retention (Khoury, et. al., 2001). The Los Alamos National Laboratory in Los Alamos, New Mexico, is a "sister" laboratory to the Lawrence Livermore National Laboratory, the focus of this study, and, like the Lawrence Livermore National Laboratory, a research

and development institution run by the University of California for the National Nuclear Security Administration.

Complex leadership involves creating the conditions that enable productive but largely unspecified, future states. Here leadership builds networks and fosters interdependencies to create the social architecture that enables innovation and change. The social architecture that generates intellectual capital from knowledge worker networks is one that enables not manages knowledge (Von Krogh, Ichijo, & Nonaka, 2000).

Kotter in his work on leading change (1996), suggests transformation efforts fail because they are not founded on a compelling vision and do not follow a systematic process for creating change. To unite a work force of knowledge workers to address organizational objectives rather than individual goals, leaders must put forth a compelling vision. Without a compelling vision knowledge workers are likely to split their loyalty between their profession and peers on the one hand and employing organization on the other (Stewart, 1997).

Finally, effective leaders must understand change and have the ability to enable it. One of the main reasons symbolic-analytic services are increasingly demanded by organizations is the need for companies to adapt to shifting conditions and increased competition, in other words to change.

In his seminal work on leadership, Burns (1978) wrote:

The crisis in leadership today is the mediocrity or irresponsibility of so many of the men and women in power . . . The fundamental crisis underlying mediocrity is intellectual. We fail to grasp the essence of leadership that is relevant to the

modern age and hence we cannot agree even on the standards by which to measure, recruit, and reject it . . . leadership is one of the most observed and least understood phenomena on earth. (Pp. 1-2)

This review of the literature indicates that though much research has been conducted and many leadership books written, effective leadership remains an implicit concept. When explicitly discussed, the debate as to which theory best describes effective leadership puts into questions the varying dimensions and leaves one trying to justify why one theoretical frame is more appropriate than another. It is from this perspective that the following definition of leadership effectiveness of the knowledge worker was derived for use in this study.

The Definition of Leadership of Effectiveness

Given the knowledge worker context and literature review application, the following definition of leadership effectiveness emerged:

Leadership effectiveness is the ability to enable change by setting a dynamic purpose and direction, and, to build a work force and create a work system in which people address problems and opportunities with creativity and commitment, so that the organization achieves its objectives/business results.

The following criteria were based on this definition and were used as the criteria in this study to define leadership effectiveness.

1. Enable change. Define the future, align people with vision, inspire them to make it happen (Kotter, 1996).
2. Set direction. Develop vision of the future and strategies for producing changes needed to achieve it. (Kotter, 1996).

3. Build system and work force capability. Develop networks and foster interdependencies, enable communities of practice and knowledge sharing (Complexity Theory), pay attention to individual needs for achievement, coach, mentor (Bass & Avolio, 1994, Transformational Leadership – individualized consideration).
4. Motivate individual commitment. Motivate and inspire, provide meaningful and challenging work, clearly communicate expectations (Bass & Avolio, 1994, Transformational Leadership - inspirational motivation).
5. Accomplish organization objectives. Achieve business results and accomplish organization goals.

Peter Drucker (1995) states, “the essence of leadership is to make knowledge productive” (p. 250), while, Bradford and Cohen (1997) indicate that the job of leaders is to build the conditions under which subordinates give their best. Ulrich (1996) discusses the principle challenge of leadership to turn aspiration into action to accomplish organization goals. All of these essential leadership effectiveness factors are supported by the above definition.

Leadership Credibility

To inspire loyalty and commitment from the knowledge worker, leadership credibility is a major determinant as is the willingness of leaders to share power by allowing workers exceptional opportunity for putting their knowledge to work (Drucker, 1995). Credibility of action is the single most significant determinant of whether a leader will be followed over time (Kouzes & Posner, 1995).

Credibility is an attribute and comes from the alignment of our values, beliefs, and actions. In other words, leaders model their values and beliefs through their actions. Leaders with personal credibility say what they mean and do what they say. Credible leaders can be counted on. Peter Block (1993) quoted an observation by Martin Buber:

“There are three principles in man’s being and life, the principle of thought, the principle of speech, and the principle of action. The origin of all conflict between me and my fellow-man is that I do not say what I mean, and that I do not do what I say. ” (p. 238)

In a recent case study of over 400 respondents from four continents (America, Asia, Europe, Australia), Kouses and Posner (1993) measured actions that exemplified quality leadership. The top four actions, from both their 1995 and 1987 surveys, included characteristics of personal credibility. These actions were honesty, forward-looking, inspiring, and competent. Block (1993) would add stewardship.

Stewardship according to Block (1993) is to hold something in trust for another. In other words, stewardship is the willingness to be accountable for the well being of the larger organization by operating in service, rather than in control, of those around you. These characteristics of leadership credibility are attributes, attributed to the leader by others, based on the character of the leader that is exhibited through his/her actions.

Components of Credibility

The literature on leadership credibility in the human resource development research is primarily focused on the issue of trust, with recent work applying emotional intelligence to organizational performance. The exception is Kouzes and Posner’s (1988, 1993, 1995) work. As such, Kouzes’ and Posner’s research will be discussed first then

the research regarding trust and emotional intelligence will be reviewed and related to Kouzes' and Posner's research findings.

Kouzes and Posner - Credibility

Kouzes and Posner (1993) report that credibility is about how leaders earn the trust and confidence of their constituents. Constituents offer authority to the leader, not the other way around. As previously mentioned, from their research in the 1980's of more than 400 case studies and forty in-depth interviews with managers, four factors of leadership credibility emerged – honest, forward-looking, inspiring, and competent.

By *honest*, the authors mean worthy of trust, truthful, and ethical. Employees know where they stand because the leader is honest with them. By *forward-looking* the authors mean someone who sets and defines the vision and encourages others to follow that vision, and then is there when you need them. By *inspiring* the authors mean dynamic, uplifting, enthusiastic, positive, and optimistic. By *competent* the authors mean capable and effective, able to get things done for the business unit, technically competent, and taking time to learn the business before making changes. In addition, Kouzes and Posner stated that credibility is mostly about consistency between words and deeds – doing what you say you are going to do.

Posner and Kouzes built their credibility research on their previous case study research begun in 1983 to determine the behaviors leaders reported to have exhibited when describing their “personal best as a leader” (1995). Posner and Kouzes (1988) developed their personal-best experience research based on interviews with over 1330 managers from 1983 to 1987. Since that time they have collected thousands of additional cases. In the initial study, Kouzes and Posner examined the cases of middle- and senior-

level managers in private and public organizations. Since 1987, they have expanded their research to include community leaders, student leaders, church leaders, government leaders, and hundreds of others in non-managerial positions.

From the analysis of the personal-best cases, Posner and Kouzes (1988) developed a model of leadership and a quantitative instrument, *The Leadership Practices Inventory* (LPI), to measure the leadership behaviors identified in their leadership model. In 1988 Posner and Kouzes conducted a study to examine the relationship between the leadership behaviors measured by the LPI and credibility. All dimensions of credibility (trustworthiness, expertise, dynamism) were significantly correlated with the five behavioral practices identified on the LPI.

While their category labels have gone through several iterations (Posner & Kouzes, 1988), the fundamental pattern of leadership behaviors which emerges when leaders are accomplishing extraordinary things in organizations is described on the LPI by the following five practices, each of which consists of two basic strategies:

1. Challenge the Process
 - a. Search for opportunities
 - b. Experiment and take risks
2. Inspire a Shared Vision
 - a. Envision the future
 - b. Enlist the support of others
3. Enable Others to Act
 - a. Foster collaboration through trust
 - b. Strengthen others

4. Model the Way
 - a. Set the example
 - b. Plan small wins
5. Encourage the Heart
 - a. Recognize contributions
 - b. Celebrate accomplishments

More than 80% of the behavior and strategies described in respondents' personal best case studies and interviews were accounted for by these factors (Posner & Kouzes, 1988).

The Kouzes and Posner (1993) research on credibility is strongly related to the five practices measured by the LPI. In fact, in their 1995 book The Leadership Challenge, the authors combine the five fundamental practices of exemplary leadership (the five LPI measures) and the leader characteristics constituents admire (the four credibility factors) as the framework for chapter discussions. Specifically Kouzes and Posner (1995) state, that there are many striking relationships between what leaders say they do when at their personal best and the four credibility factors.

For example, the leadership practice of inspiring a shared vision involves being forward-looking and inspiring. By challenging the process, leaders enhance the perception that they're dynamic. The practice of modeling the way includes the clarification of a set of values and being an example of those values to others. Consistent living out of values is a behavioral way of demonstrating honesty and trustworthiness. Trust is also a major element of enabling others to act. In their descriptions of their personal best, leaders said that they trusted others, which fostered others' trust in them. Likewise, encouraging the heart – the recognition

and celebration of significant accomplishments – contributes to perceptions that one is just, fair, and sincere. (p. 29)

In discussing competence, Kouzes and Posner (1995) assert that though leaders in describing their personal best did not discuss competence, one can infer that since they were talking about a time when they did their best, they were also talking about a time when they were competent. According to Posner and Kouzes, competence and credibility are related behaviors as Posner (2002) succinctly stated in an Email to the researcher –

As to the difference between leadership competence and leadership credibility, it is hard to imagine these two components as not being significantly related (correlated). Could one have competence and not credibility? Credible, but not competent? Competence might be thought of as an outcome while credibility achieved through a process. (p. 1)

In other words, competence is seen by Posner and Kouzes as an implied factor in the five leadership behaviors measured by the LPI and the five leadership practices measured by the LPI are viewed as a measure of leadership credibility.

Trust

There is limited research into the explicit role of trust in organizations though the literature on trust is profuse. Most of the early research on trust was focused on interpersonal trust (Lafferty & Lafferty, 2001). The idea of inferring trust from interpersonal behaviors is at the heart of the earliest studies (Deutsch, 1958; Ricker, 1974). It was not until the 1990's that theorists began to look at trust specifically within the organizational context. Sashkin (1990) for example defined organizational trust as “trust that employees feel toward management and the degree to which they believe what

management tells them ”(p. 6). Moreover, in his Visionary Leadership Theory (Sashkin, 1996), trust corresponds with credible leadership, one of the four transformational leadership behaviors he develops. In fact, the Sashkin and Levin (2000) Management Behavior Climate Assessment (MBCA) organizational trust scales assesses the match between executives’ words – what they say – and past actions, future actions, promised actions, and future outcomes. For example such questions as the following are included on the MBCA:

In this organization, senior- and executive-level managers

Act to keep their word.

“Stay the course” and persist, over time in the actions they have decided on.

Follow through with actions consistent with their statements.

Make sure that what they say will take place actually occurs.

Do what they say they will do.

Act in a trustworthy manner.

Carry out actions they have said would be taken.

Accurately state future results or outcomes. (p. 77)

These and other questions on the MBCA map well to the LPI *Model the Way* and *Enable Others to Act* factors and corresponding questions.

To date the MBCA is the only instrument that measures trust at the organizational level (Levin, 1999); however, much of the literature discussing trust is focused on organizational performance. For example, Bennis (1997) identified organizational trust as a critical factor that may contribute to improved economic performance. Jones and George (1998) postulate that unconditional trust is a mechanism by which organizations

can develop unique capabilities and provide a competitive advantage. And, Whitener, Brodt, Korsdaarg, and Werner (1998), intimate that managerial trust may be critical for success interdependent task performance, re-engineering efforts, and marketplace positioning.

Though there is limited empirical research on the connection between organizational trust and organizational effectiveness, a carefully controlled experiment by Zand (1992) showed that higher levels of trust in a group resulted in significantly greater group performance. Also, Gilbert (1995) found organizational trust to be a predictor of organizational commitment, which is directly related to turnover.

Finally, Zand (1997) develops trust as the second element in the triad – knowledge, trust, and power - of high-performance management. Based on his consulting work and case study analysis, Zand found that trust is the leader’s key to achieving open communication and collaborative, committed action. Zand states, “trust and trustworthiness, modulate the leader’s access to knowledge and cooperation and, as such, when mistrust exists, decision quality and implementation suffer” (p. 89).

It is therefore apparent that trustworthy leadership is related to organizational performance and that the MBCA scale is highly related to the LPI *Model the Way* and *Enable Others to Act* factors.

Emotional Intelligence

Research on emotional intelligence, which many initially described as social intelligence, was stimulated by the work of Goleman (1995) and Mayer and Salovey (1990, 1997). The underlying theme of work in this area is that general intelligence and academic success are poor predictors of later life adjustments. Emotional intelligence is

key and involves the ability to perceive emotions and regulate them effectively to promote emotional and intellectual growth.

While most of the work on emotional intelligence is more connected to self-efficacy than to leadership credibility, the recent work of Goleman, Boyatzis, and McKee (2002), is the exception. Based on research from 500 competency models for global companies, healthcare organizations, academic institutions, and government agencies, the authors identified those personal capabilities that drive outstanding performance, including four leadership competencies.

Of the four leadership competencies (self-awareness, self-management, social awareness, and relationship management) found to be related to emotional intelligence, it is relationship management that is most closely tied to leadership credibility. For example, the behaviors that comprise the leadership competency, relationship management include – inspiration, influence, developing others, change catalyst, conflict management, and teamwork and collaboration. These leadership competencies relate to four of the Kouzes and Posner (1988, 1993) “personal best”/credibility factors. Inspiration is closely related to the factor *Inspire a Shared Vision*, developing others to *Enable Others to Act* and *Encourage the Heart*, change catalyst to *Challenge the Process*, and teamwork and collaboration to *Enable Others to Act*.

Self-Efficacy

Self-efficacy is the belief an individual has about his/her ability to accomplish a task or achieve a desired end. Bandura (1986), the father of self-efficacy theory, has argued that whether or not people will undertake particular tasks or strive to meet particular goals depends on whether or not they believe they will be efficacious in

performing the action. The stronger their self-efficacy, the more they will exert and persist at a task. According to Bandura (1991), decisions that people make about whether or not to attempt certain courses of action and about how long to pursue them are, to an important extent, determined by judgements of personal efficacy. A person's dynamism doesn't come from special powers, it comes from a strong belief in a purpose and the willingness to express that conviction. Leadership has nothing to do with what we look like. It has everything to do with what we feel, what we think of ourselves (Kouzes & Posner, 1995).

The correlation between self-efficacy and health related outcomes in the areas of smoking, pain management, and cardiac rehabilitation has been established (Holden, 1991). Studies have also established the correlation between parental self-efficacy and their children's academic abilities (Seefeldt, Denton, Galper, & Younoszai, 1999) and Bandura (1993) and others (Schunk, 1991; Torkzadh, Pflughoeft, & Hall 1999) have established the correlation between student self-efficacy and academic achievement. The relationship between self-efficacy and leadership effectiveness is only now being studied.

Studies to establish the relationship between self-efficacy and leadership effectiveness have focused on:

- manager motivation to attempt the leadership of change and leadership self-efficacy (Paglis & Green, 2002),
- leadership confidence and optimism and leadership training performance (Chemers, Watson, & May, 2000), and,
- choice of leadership tasks in women and task-specific self-efficacy (Dickerson & Taylor, 2000).

Only the Paglis and Green (2002) study used managers as the study sample. Military cadets and college students comprised the other study's participants, respectively. However, these studies indicate that there is a relationship between self-efficacy and leadership performance.

Studies have also established the relationship between leadership performance and two character dimensions related to self-efficacy, self-esteem and emotional intelligence (Branden, 1994, 1998; Goleman, Boyatzis, & McKee, 2002; Weisinger, 1998). Though neither self-esteem nor emotional intelligence will be measured in this study, they are discussed to augment the limited research base regarding the relationship between self-efficacy and leadership effectiveness.

Self-Esteem

Branden (1994, 1998) in his seminal work on self-esteem asserts that the higher the self-esteem of the leader, the more likely it is that he or she can perform the leadership function successfully. A person who feels undeserving of achievement and success is unlikely to inspire aspiration in others (Branden, 1998). Branden defines self-esteem as "the experience of being competent to cope with the basic challenges of life and of being worthy of happiness" (p. ix). Rosenberg (1979) discussed self-esteem in terms of feelings of general self-worth and confidence. While self-esteem is somewhat different than self-efficacy, both are strongly related concepts and self-efficacy has been found to be a more promising predictor of self-limiting behavior than self-esteem (Dickerson & Taylor, 2000).

In discussing self-esteem and the challenges of leadership, Branden (1998) states that "it takes a significant measure of self-esteem to generate a vision, to embody a

standard of integrity that creates trust and mutual regard, to give away power, and to respond appropriately to change” (p. 54). Bandura (1982) states that “self-efficacy is concerned with judgements about how well one can organize and execute courses of action required to deal with prospective situations containing many ambiguous, unpredictable, and often stressful elements” (p. 23). As such, both Branden and Bandura discuss the relationship between self-esteem and self-efficacy to enabling change, one of the study’s leadership effectiveness factors.

Emotional Intelligence

Also related to self-efficacy is Goleman’s work (1995, 2002) work on emotional intelligence. Goleman’s latest work (Goleman et al., 2002), explores the role of emotional intelligence and leadership. Here the authors argue that a leader’s emotions are contagious – they create resonance. When leaders drive emotions positively, they bring out everyone’s best. By linking neuroscientific research to leadership effectiveness, the authors describe “how who leaders are” affects the workforces they lead. Based on case study analysis, the authors build emotional intelligence leadership competencies – self-awareness, self-management, social awareness, and relationship management.

It is the leadership competency, self-awareness and associated criterion self-confidence, that is most similar to self-efficacy. Leaders with self-confidence welcome difficult assignments and have a sense of presence/self-assurance that lets them stand out in a group (Goleman, Boyatzis, & McKee, 2002). As the authors state, “because leadership is intrinsically stressful and every action is scrutinized by those around them, self-confidence is essential for leaders to assume the risk of change” (p. 163).

Self-confidence has to do with how an individual feels about him or her self and his or her ability to accomplish a task against oftentimes challenging forces. Like self-esteem, self-efficacy, and self-confidence are related to innate characteristics that give leaders the courage to lead and the resonance to engage a workforce to follow.

Development of Self-Efficacy

The literature indicated that self-efficacy is a developed characteristic. For example, recent studies have found a strong correlation between task relevance and belief in one's ability to do the task (Coffin & MacIntyre, 1999). An implication of this study is that by increasing the task-relevance of the competency to be developed, self-efficacy can be enhanced.

Additionally, according to Bandura (1977, 1986), outcome expectations relate both to the learner's understanding of what activities are required to reach a learning goal and to their belief that the learning goal can be achieved and/or applied. Once success is achieved, self-efficacy is increased. In other words, success breeds success when expectations are clear. By focusing competency development on business results, task relevance can be increased which, in turn, increases application success and self-efficacy.

The literature also indicated that to develop leaders who feel unique, competent, secure, empowered and connected to the people around them (in other words, leaders with high self-esteem and high self-efficacy) leaders need support and feedback in actual developmental job experiences. Leadership skills are developed, they are not usually basic cognitive abilities.

To illustrate this point, Wood and Bandura (1989) had working professionals manage a simulated organization. Participants had to match employee attributes to job

requirements and master a complex set of decision rules in how best to guide and motivate their employees. Half the subjects were told that decision-making skills are developed through practice (and hence are acquired skills); the others were informed that decision-making skills reflect the basic cognitive capabilities that people possess (and hence are stable skills). Throughout the simulation, the subjects rated the strength of their perceived self-efficacy in getting the group they were managing to perform at various productivity levels. Those in the stable-skill group displayed a progressive decline in perceived self-efficacy, while those in the acquired-skill condition maintained their sense of managerial efficacy. Those in the stable-skill group were quite uncharitable in their views of their employees, regarding them as incapable of being motivated, unworthy of supervision, and deserving of termination. In contrast, those in the acquired skill condition set more challenging goals in subsequent trials and made more efficient use of analytical strategies, because from their perspective errors did not imply a basic cognitive deficiency.

Implications of this study are that a manager's belief that he/she can learn and improve is critical to perceived self-efficacy and that a manager's self-efficacy is directly related to his/her perceptions of the skills and abilities of the employees he/she manages.

Indications for a Relationship between Leadership Effectiveness and "Character"

The literature reviewed indicated that while behaviors, roles, and traits of effective leadership are discussed and typologies of effectiveness proposed, research into the relationship between leadership effectiveness and "character" is only beginning to be explored.

The link between self-efficacy and leadership effectiveness has not been established. However, Paglis and Green (2002) recently developed a three-dimensional leadership self-efficacy (LSE) construct to reflect managers' self-perceived capability for successfully executing change. The purpose of the study was to predict a manager's motivation for stepping forward to lead change efforts at work by his or her leadership self-efficacy score on the LSE. The study's findings indicated that high LSE managers tended to engage in more leadership attempts compared to self-doubters. Though much research has been conducted to explore the self-efficacy dimension, the Paglis and Green study is the only study that used managers in the research sample.

Unlike self-efficacy, the relationship between leadership effectiveness and leadership credibility has been more thoroughly explored. Most significantly, Kouzes and Posner (1988; 1993; 1995) established the relationship between subordinates' ratings of leadership effectiveness and leadership credibility as defined by the Leadership Practices Inventory (LPI).

While focused on integrity rather than credibility, the Badarocco and Ellsworth (1989) case study explored the importance of integrity in leadership, as defined by leader report. Badarocco and Ellsworth (1989) defined integrity "as the consistency of personal beliefs and values, daily work behavior, and organizational aims" (p. 99). Integrity, as so defined, appears to be similar to the *Model the Way* factor in the LPI. Parry and Proctor-Thomson (2002) furthered the research of Badarocco & Ellsworth by establishing the relationship between perceived integrity and leaders who exhibit transformational leadership behaviors as defined by the Multi-Factor Leadership Questionnaire (MLQ). A

moderate to strong positive relationship was found between perceived integrity and the demonstration of transformational leadership behaviors.

Arvonen and Pettersson (2001) explored the relationship among leadership behaviors and a leader's capacity for change and cost-effective results, finding that capacity for change and results were positively related. Finegan and Shamian (2001) researched the relationship between employees' feelings of empowerment and organizational trust using Kanter's (1977) work force empowerment theory. Results suggest that fostering environments that enhance perceptions of empowerment increase organizational effectiveness.

In sum, the research literature points to a relationship between leadership effectiveness and "character" - leadership credibility and self-efficacy. Exploration of the research questions and hypotheses addressed in this study expanded the research base by building on the work of Kouzes and Posner (1988, 1993, and 1995) and Paglis (1999) and using it to explore the contribution of leadership credibility and self-efficacy to leadership effectiveness.

CHAPTER 3: METHODOLOGY

The purpose of this study was to better understand the relationship of “character” to effective leadership of knowledge workers. Although a variety of frameworks exist that explain leadership effectiveness, this study employed a series of measurement instruments used by the Lawrence Livermore National Laboratory to measure leadership effectiveness and used them to explore the relationship between leadership effectiveness and two “character” dimensions – leadership credibility and self-efficacy. Assumptions of the study were that credibility inspires worker loyalty and direction and self-efficacy gives the leader the will and courage to lead. Without credibility a leader cannot lead and without a belief in oneself as a leader, the roles and tasks of leadership become overwhelming and conviction for the task diminishes.

Given the emergence of the knowledge worker as key to organizational success, the study’s focus was on leader-managers of knowledge workers. There were three study hypotheses.

1. Effective leaders exhibit higher leadership credibility scores according to self and other reports than do less effective leaders.
2. Effective leaders exhibit higher self-efficacy scores than do less effective leaders.
3. As leadership credibility and self-efficacy scores increase, so does leadership effectiveness.

The primary research questions addressed by the study were:

1. To what extent do leaders of knowledge workers at the Laboratory exhibit leadership credibility?

2. To what extent do leaders of knowledge workers at the Laboratory exhibit self-efficacy?
3. To what extent do leaders of knowledge workers at the Laboratory possess factors of leadership effectiveness?
4. To what extent do leaders of knowledge workers at the Laboratory that exhibit leadership credibility and self-efficacy also exhibit factors of leadership effectiveness?

Context of the Study

The study was conducted at Lawrence Livermore National Laboratory located in Livermore, California, which is approximately 30 miles east of San Francisco. The Laboratory is a research and development institution with \$1.2 billion dollar budget, run by the University of California for the National Nuclear Security Administration. The Laboratory's mission is to ensure the safety and reliability of the U. S. nuclear weapons stockpile; to reduce threats to U. S. security; and to provide technical solutions to key energy, environment, infrastructure, and health security problems.

The Laboratory is a facility comprised primarily of knowledge workers who provide services that conform to Reich's (1994) definition of symbolic-analytic services, services that cannot be codified and controlled and services upon which the organization is dependent for competitive advantage. Laboratory employees include research scientists, engineers, systems analysts, management information specialists, organizational development specialists and, recruiters, all of which Reich (1994) lists as representative service professions of symbolic-analytic workers.

According to Reich, to perform symbolic-analytic services a college degree is usually required. The Laboratory workforce of 8650 individuals is comprised of scientists and engineers (40%), technical and crafts (22%), and administrative and clerical (22%) employees. Nearly half of the Laboratory scientists and engineers have a Ph. D. and another 30% have a master's degree. Of the remaining 20% of the scientific workforce, only one percent of the employees do not possess a college degree.

The Laboratory is organized into 13 directorates of which three discipline directorates (Chemistry & Materials Science, Engineering, and Computation), that supply the majority of the scientific and engineering employees to four program directorates (Defense & Nuclear Technologies, National Ignition Facility Programs, Nonproliferation Arms Control & International Security, Homeland Security). Three directorates (Energy & Environment, Physics & Advanced Technologies, and Biology & Biotechnology), combine discipline and program direction authority. Three administrative and operations directorates (Safety, Security & Environmental Protection, Administration & Human Resources, and Laboratory Services), provide support services for Laboratory operation (see Appendix A for the Lawrence Livermore National Laboratory organization chart). The study sample was selected from a mix of program and discipline technical directorates to address generalizability, to the extent feasible, and encourage later use of study results within the Laboratory.

The Lawrence Livermore National Laboratory was selected as the study site by the researcher for two reasons. First and most importantly, the Laboratory workforce meets the characteristics used to define knowledge workers (workers providing symbolic-

analytic services) for purposes of this study. Second, the researcher had access to data and the participant sample.

Research Design/Methodological Framework

To study the relationship between leadership effectiveness and the two “character” dimensions, leadership credibility and self-efficacy, a survey research design and document review process was implemented.

The Leadership Practices Inventory (LPI), developed by Kouzes and Posner (1997) with the addition of a study developed technical competence factor was used as the operational definition of leadership credibility and served as the first independent variable. The general self-efficacy subscale of the Self-Efficacy Survey designed by Scherer and Maddux (1982) and the Leadership Practices Inventory designed by Paglis (1999) defined self-efficacy, and represented the second independent variable. Both were administered to a sample of Laboratory leader-managers. Because leadership credibility is an attribute, the LPI with the addition of the study developed technical competence factor was also administered to 3 to 5 subordinates of responding leader-managers.

For purposes of this study, leaders who had three or more employees reporting to them were considered to be a leader-manager. Such classification corresponds to Mintzberg’s (1973) definition of a manager as a person in charge of an organization or sub-unit.

To define leadership effectiveness, the following documents at Lawrence Livermore National Laboratory were used:

1. FY2003 and FY2004 performance appraisal supervisor/management competency assessments – annual assessment of a manager-leader’s level of

competency on four factors (achieving results, leadership, workforce management, performance management), attributed by the supervisor.

2. FY2004 rank group – annual numerical assessment of a leader-manager’s level of contribution to the organization, attributed by the supervisor and directorate management.
3. Target salary – to protect respondents’ anonymity and to normalize salary across the research sample, target salary, rather than actual salary was selected for use. Salary is assigned to employees based on the level of worth the Laboratory, through the supervisory chain, attributes to each employee.

Additionally, four questions designed to assess leadership effectiveness on four factors (achieving results, leadership, workforce management, and performance management) were administered to three to five reports of responding leader-managers. These four questions were those factor descriptors on the performance appraisal competency assessment attributed by the supervisor (see Appendix B for the FY2003/FY2004 Supervisor/Manager Competency Assessment form).

Prior to determining that these leadership effectiveness measures were appropriate for use, a definition and associated criteria of leadership effectiveness as applied to the knowledge worker was developed from the literature. The measurement instruments used by the Laboratory to determine leadership success were then analyzed, matched to the derived criteria, and selected for use.

As discussed in Chapter 2 – Literature Review, the derived leadership effectiveness criteria were as follows. *Enable and drive change* which means, define the future, align people with vision, and inspire them to make it happen. *Set direction* which

is defined as develop a vision of the future and strategies for producing the changes needed to achieve it. *Build system and work force capability* that means develop networks and foster interdependencies, pay attention to individual needs for achievement, and enable communities of practice and knowledge sharing. *Motivate individual commitment* that is defined as, motivate and inspire, provide meaningful and challenging work, and clearly communicate expectations. *Accomplish organization objectives* which means achieve all major tasks and accomplish organizational goals and results.

Scores of responding leaders on the Laboratory measurement instruments selected for use – rank group, performance appraisal supervisor/manager competency assessment and target salary - were determined through records review and component scores. Given that leadership effectiveness is an attribute and Laboratory assessment instruments measured supervisor perception of leader-manager effectiveness, not necessarily employee perceptions of the effectiveness, subordinate reports of the study sample were randomly selected and asked through a study developed E-survey instrument, to evaluate their manager.

This research design was selected in an attempt to operationalize leadership effectiveness through triangulation of data sources, by combining perceptions of subordinates and superiors on multiple instruments determined by Lawrence Livermore National Laboratory to be measures of effectiveness. Rather than introducing a survey instrument to define leadership effectiveness, a records review and subordinate report survey process was selected to derive leadership effectiveness.

Since “character” is an abstract concept, instruments that define and measure leadership credibility and self-efficacy were used rather than other research designs such

as case study methods, for time and cost efficiency reasons. Additionally, as little has been done to quantitatively measure the relationship between leadership character dimensions and leadership effectiveness, particularly on the self-efficacy dimension, methodology for replication was not readily available.

Study Sample Description and Selection

The study sample was selected from five of the technical directorates at Lawrence Livermore National Laboratory; specifically, the Engineering, Computation, Chemistry & Materials Science, Energy & Environment and Defense & Nuclear Technologies directorates. All leader-managers in the study sample met the following criteria:

- They were knowledge workers.
- They were leader-managers of at least three knowledge workers.¹
- They had participated in one or more leadership development program.

These five directorates were selected as the sample population for the following reasons:

- Employees and leader-managers fit the definition of knowledge workers.
- The directorates had implemented one or more directorate leadership development program, thus addressing the confound participation in leadership training by some and not by others might present.²
- The directorates represented Laboratory discipline, program, and combination discipline/program directorates, thus providing a participant sample that was

¹ Sample selection based on 3 or more subordinates and/or direct reports was predicated by the need to randomly sample at least three direct reports for statistical reasons; to reduce one response skewing the data.

² Directorate specific leadership programs are 6 – 18 month programs that assess and develop participant leadership skills through classroom, mentoring, and assignment opportunities. Selection for participation is competitive and final selection is done by a steering committee comprised on senior managers in the directorate.

representative of the Laboratory technical directorates and addressed the generalizability of study results, to the extent feasible.

- Together the five directorates had over 500 leader-managers who met the study criteria thus providing adequate sample size potential.
- Time and cost efficiency of focusing on five directorates to obtain the study sample rather than all of the technical directorates.

Demographics of the sample directorates indicate their management and employees are primarily white (83. 0%) with Asian (10. 0%), Hispanic (4. 2%), Black (2. 3%) and American Indian (. 5%) employees comprising the remainder of the knowledge worker workforce. Degree distribution of manager-leaders in the sample directorates indicates that 41. 0% have a Ph. D. , 36. 0% have a master's degree, and 22. 8% have a bachelor degree as the highest degree obtained.

To obtain the study sample, the Engineering, Computation, Chemistry & Materials Science, Energy & Environment, and Defense & Nuclear Technology Associate Directors identified leader-managers who met the study criteria. Five hundred and three leader-managers from these directorates were identified as meeting the study criteria.

To increase the response rate prior to contacting these leader-managers, presentations were made by the researcher to management meetings within each of the five directorates to discuss the research project and benefits to the Laboratory. A web site describing the research was also designed so that perspective participants could read a brief overview of the proposed research, particularly the confidentiality procedures, and

preview the E-survey questionnaire, prior to deciding whether or not to participate (see Appendix C for the study's research website).

Given the fact that the research required access to sensitive and confidential information about study participants, a written consent to participate in the research was required. To obtain consent, each of the 503 leader-managers meeting the study criteria were sent an introductory Email requesting their participation (see Appendix D for the request to participate in research Email). Initially, 85 leader-managers responded. To increase the response rate, a second Email requesting participation was sent to all those who did not respond. As the result of the second mailing, 18 leader-managers responded stating they would not participate in the study for reasons such as time, travel, and the sensitive nature of the study, and 50 leader-managers signed a "Consent to Participate in Research" form. One hundred and thirty-five of the 503 leader-managers contacted to request their written consent to participate in the study, agreed to be study participants – a 27% response rate.

Once a signed "Consent to Participate in Research" form was received, an E-survey questionnaire and thank you Email was sent to each leader-manager participant. If the leader-manager did not return his/her questionnaire within a one-week period, he/she was sent a reminder Email. One hundred and eighteen of the 135 leader-managers returned questionnaires, an 87.4% response rate.

Subordinate reports of the 118 managers in the leader-manager sample were then identified by the five study directorates. From this list of 1058 direct or subordinate reports, 611 were randomly selected to receive a "Consent to Participate in Research" form and E-survey questionnaire. After two reminder mailings, 278 subordinate reports

completed E-survey questionnaires, a 45.5% response rate. Unlike the leader-manager sample, subordinate consent was obtained electronically and included as part of the E-survey questionnaire.

There was a mean of 2.4 subordinate reports per manager. Nine percent of the leader-managers had only one subordinate report rater, 36.5% had two raters, and 54.5% had three or more raters.

The leader-managers in the sample had an average of nine years of Laboratory management experience and an average of two years of management experience outside the Laboratory. Most had advanced degrees (74%) and of those with advanced degrees, 65% had a Ph. D. Other identifying data such as gender and ethnicity were not collected to describe leader-manager sample due the Laboratory Human Subjects Internal Review Board concern for the protection of the identity of sample subjects. Identifying information was not collected on the subordinate sample due to the research focus on the leader-manager sample and to increase the responses rate.

Data Collection Methods

Survey questionnaires and document review were the data collection methods used in this study. Specifically, there were two E-survey questionnaires developed – one for the leader-manager sample and one for the subordinate report sample. The leader-manager E-survey contained two demographic questions – years in Laboratory management and years in management outside the Laboratory – and questions from three instruments, the Leadership Practices Inventory (LPI) comprised of 30 questions with the one study developed technical competence question, the Self- Efficacy Scale (17 questions) and the Leadership Self-Efficacy Scale (12 questions).

The subordinate report E-survey questionnaire contained 30 questions from one instrument, the LPI with the one study developed technical competence question, and four study developed questions to measure leadership effectiveness – achieving results, leadership, workforce management, and performance management.

Both the leader-manager and subordinate report instruments required obtaining participant consent prior to completion with written consent obtained from the leader-manager sample and E-survey consent obtained from the subordinate report sample (see Appendix E, for the *Consent to Participate in Research* form).

Document review consisted of reviewing the FY03 and FY04 performance appraisals for each case in the leader-manager sample, obtained from the directorates studied, Engineering, Computation, Chemistry & Materials Science, Energy & Environment, and Defense & Nuclear Technology, and recording scores for each case on four factors – achieving results, leadership, workforce management, and performance management. Rank group and target salary data were obtained from the Laboratory Compensation Division and scores and salary data reviewed and recorded.

The performance appraisal, rank group, and target salary documents and were assumed measures of leadership effectiveness based on literature review results and use by the Laboratory. The three instruments used to measure leadership credibility and self-efficacy – the LPI, the Self-Efficacy Scale, and the Leadership Self-Efficacy Scale - were selected after careful review and testing for reliability and validity. As such, each of these three instruments will be separately discussed.

Leadership Practices Inventory (LPI)

The Leadership Practices Inventory, developed by Kouzes and Posner (1988, 1997) was designed to measure behaviors leaders reported to be their “personal best as a leader”. These five practices measured by 30 items on the LPI are: challenging the process, inspiring a shared vision, enabling others to act, modeling the way, and encouraging the heart.

In 1995 Posner and Kouzes published The Leadership Challenge in which they discussed the five leadership practices and four credibility factors – honest, forward-looking, inspiring, and competent. The Leadership Practices Inventory, developed to measure the five leadership practices and four credibility factors, was introduced commercially in 1997. The five leadership practices/behaviors measured by the LPI, with the addition of a technical competence question, were used in this study as the operational definition of leadership credibility. These five leadership practices/behaviors are: *Challenge the Process* (forward-looking, dynamic, search for opportunities, risk), *Inspire a Shared Vision* (envision future, inspiring), *Enable Others to Act* (trusting relationships, strengthen others), *Model the Way* (honest, set the example, trustworthiness), and, *Encourage the Heart* (just, fair, sincere, recognize contributions).

The technical competence question to be used in this study is – *My supervisor is competent in the technical aspects of the job*. This question is the factor that has been used on an annual basis since 1994 in the Los Alamos National Laboratory Organizational Climate survey to measure technical competence. Reliability of the Organization Climate survey was established in a pilot study conducted in 2002 by the researcher at Los Alamos National Laboratory with 2015 employee responses resulting in

a Cronbach alpha reliability coefficient of .95. The validity of the Organizational Climate Survey has not been established.

Reliability

The LPI was developed based on case study research and on open-ended survey questions which were used to interview over 1300 managers over 3 years (prolonged engagement). Since that time Kouzes and Posner (1995) have collected thousands of additional cases including middle and senior-level managers in private and public organizations.

As indicated by Posner and Kouzes (1988), the internal consistency estimates of the LPI-Self range from .70 - .85. The LPI-Observer had estimates of .81 to .92. A test-retest reliability study based on a convenience sample of 157 MBA students yielded retest results ranging from .93 to .95 for the five practices. Studies of gender found no significant differences between males and females. Similarly, cross-cultural studies conducted found few significant differences across various ethnic and cultural groups (African-American, Hispanic, and Asian-American).

Validity

Factorial validity was established by principle component factor analysis of the 30 items resulting in the five factors, with all items loading in the appropriate dimensions. The five factors accounted for 60.2% of the variance. Construct validity was established through a study of subordinates' ratings of managerial effectiveness on a Leadership Effectiveness scale, comprised of six questions. Using multiple regression, the five component practices of the LPI significantly predicted the Leadership Effectiveness Scale. A series of other studies continued to provide criterion validity of the LPI. Smith

(1991) examined the relationship between the five practices on the LPI and how these impact of job satisfaction, organizational commitment, and productivity, and, Stoner-Zemel (1988) used the LPI to operationalize visionary leadership.

Self-Efficacy Scale

Self-efficacy has been primarily conceptualized as a situation-specific belief. However, there is evidence that the experiences of personal mastery that contribute to efficacy expectancies generalize to actions other than the target behavior (Bandura, 1977). The Self-Efficacy Scale (Sherer & Muddux, 1982) is a 23 item measure of self-efficacy not tied to specific situations or behaviors and is designed to measure general self-efficacy and social self-efficacy. The 17 item measures of general self-efficacy sub-scale were used in this study.

A general self-efficacy instrument is useful as a means for defining the self-efficacy of leaders as it allows exploration of the relationship between leadership effectiveness and self-efficacy to not become situation dependent and, as such, expands application.

Reliability

The reliability of the Self-Efficacy Scale was established with college students and inpatients at a Veterans Administration medical center with Cronbach alpha reliability coefficients of .86 on the general self-efficacy sub-scale (Sherer & Muddux, 1982).

In April 2002, the researcher established the reliability of the Self-Efficacy Scale on Los Alamos National Laboratory leaders. To test the reliability of the Self-Efficacy Scale for leaders, the instrument was electronically distributed to 95 employees at the

Laboratory who hold a management position in accordance with the Laboratory classification system. For sample convenience, the 95 managers receiving the Self-Efficacy Scale consisted of current and past participants in the Laboratory's Leadership and/or Management Institutes. Seventy-three of the 95 leaders receiving the Self-Efficacy Scale responded - a 77% response rate. No follow-up was conducted to increase the response. A Cronbach alpha reliability coefficient of .85 was obtained for the seventeen item general self-efficacy sub-scale.

Validity

Validity of the Self-Efficacy Scale was established through factor analysis that indicated two factors – general self-efficacy and social self-efficacy explained 26.5% and 8.5% of the total variance. The low common variance explained was somewhat problematic. Construct validity was established by comparing subject scores on the Self-Efficacy Scale and several personality measures (i. e. Locus of Control, Personal Control, Social Desirability, Ego Strength, Interpersonal Competence, and Self-Esteem). Predicted correlations between the Self-Efficacy Scale and the other measures were obtained; all were moderate in magnitude and in the appropriate direction. To establish criterion validity, past success in educational and military areas were correlated with their Self-Efficacy Scale scores. The Self-Efficacy Scale positively correlated with job status, educational level, and military rank.

Leadership Self-Efficacy Scale (LSE)

The Leadership Self-Efficacy Scale developed by Paglis (1999), defines the construct of leadership self-efficacy. In this 12 item scale three dimensions of leadership self-efficacy are measured: direction-setting, gaining followers' commitment, and

overcoming obstacles to change. Such an instrument is useful for it is the only instrument found that applies the concept of self-efficacy to the situation specific behavior of leadership.

In her work, Paglis (1999) focuses on a manager's motivation for stepping forward and leading change within their units. Her work proposes that motivation to attempt leadership originates in a sense of leadership self-efficacy as measured by the LSE scale.

Reliability

The reliability of the LSE was established with managers and their direct reports at a real estate firm in the business of managing shopping malls across the United States and at an industrial chemicals firm located in the Eastern part of the United States. Coefficient alphas for direction-setting, gaining commitment, and overcoming obstacles were .86, .92, and .86, respectively.

Validity

Validity of the LSE was established through factor analysis and construct validity tests. The principle factor method was used to extract the factors, followed by oblique rotation, that indicated three factors – direction setting, gaining commitment, and overcoming obstacles explained 80%, 16%, and 9% of the common variance. Since the cumulative variance accounted for by the first three factors exceeded 100%, a factor extraction using the maximum likelihood method was used. This test provided some support for the three-factor structure of the LSE; that is the null hypothesis “Two factors are sufficient” was rejected (Paglis, 1999, p. 81).

To establish construct validity measures similar to leadership confidence were included in the survey of the sampled managers. These question measures concerned effectiveness, ability to match the requirements of a leadership position, and ease of success. All of the question measures were found to be significantly correlated with the three factors of the LSE.

Construct validity was established by comparing subject scores on the LSE with internal locus of control and trait self-esteem measures. Predicted correlations between the LSE and internal locus of control and trait self-esteem measures were obtained; trait self-esteem correlations with the three LSE dimensions ranged from .29 to .39, while the relationships between the LSE and internal locus of control ranged from .26 to .36.

Criterion-related validity evidence was provided by significant correlations of the LSE three dimensions with direct reports' ratings of leadership attempts and with an established leader-problem solving scale – the Managerial Practices Survey (Yukl, Wall, & Lepsinger, 1990).

Survey Administration

The study sample was assessed using two E-survey instruments: one administered to Laboratory leader-managers and one administered to members of the leader's sub-unit subordinate reports. The E-survey instruments used are included in Appendix F, Leader E-Survey and Appendix G, Subordinate Report E-Survey. Prior to survey administration the E-survey instruments were pilot tested with a small sample of Laboratory leader-managers and their reports. Pilot results were used to improve the usability of the E-survey instruments.

To initiate the survey administration process, all leader-managers identified by the selected directorates were sent a “Consent to Participate in Research” form along with an email from the researcher introducing the study. Once the “Consent to Participate in Research” form was returned to the researcher by either email or Laboratory mail, responding leader-managers were sent an e-survey to complete. Given that the data generated by completion of the E-survey were not sensitive until they were matched with the leadership effectiveness data, Laboratory email without encryption was used.

To increase the response rate, the researcher met with the senior leadership of the five selected directorates to discuss the study and designed a web site to explain the research and introduce the researcher. The web site was referenced in the cover letters requesting research participation from the study sample for both the leader-manager and report samples, and was updated with study results as they were developed.

Leader-managers were given one week to complete and return the E-survey questionnaire prior to a follow-up email contact. The questionnaire took approximately 20 – 30 minutes to complete. Two follow-up email contacts were made with non-respondents to increase the response rate.

Once all leader-manager subjects intending to complete the questionnaire had done so, the researcher contacted the selected directorates to request a list of study sample subordinate reports. Subjects to receive the subordinate report E-survey questionnaire were randomly selected from the list provided by the directorates.

Given the number of report sample participants and the minimal risk to the subjects, the researcher obtained informed consent on the Web. The subordinate report reviewed a consent document and gave his/her consent to participate by pressing a

“continue” button which then took him/her to the E-survey instrument. The questionnaire took approximately ten minutes to complete. To increase the response rate, one follow-up email contact was made with each non-respondent. If three subordinates per manager-leader did not return questionnaires after the second contact, additional subordinates, if available, were randomly selected and sent an E-survey questionnaire.

Employee Data Protection

To explore leadership effectiveness, confidential and sensitive data were used. Because triangulation of the data increased the content validity of the research, both subordinate report and supervisor measures of the competencies and behaviors of the studied leader sample were employed. Performance appraisal and rank group information were sensitive information and use of such data to determine leader effectiveness groupings could have been misused if confidentiality was not strictly respected. Additionally, subordinates could have had concerns about providing their assessment of their manager’s behavior. To address these confidentiality issues, the research data was fully de-identify once the data fields were matched.

During the time personal identifiers were attached to the data, the data were securely handled at the Lawrence Livermore National Laboratory. The researcher was the only one with access to the identified data. Fully identified data for each participant were present for no more than a two month period of time. Once all data were collected and matched, names were removed prior to data analysis. Not only did this create de-identified data but it also controlled for research bias.

To reduce the risk of the research to study participants, collection of personal information related to gender and ethnicity, was not approved by the Laboratory Human

Subjects Internal Review Board. While these demographics would have been interesting to explore, the risk to study participants was determined by the Laboratory Human Subjects Internal Review Board to outweigh the benefit. Length of time in management was requested on the leader-manager questionnaire to address the management experience confound and academic degree was obtained from records review to address the degree level confound. Both were used during the data analysis process to better construct and explore data results.

Data Analysis

To explore the relationship between leadership effectiveness and the two character dimensions, various data analysis strategies were used. First, descriptive statistics of the sample were determined. Descriptive statistics regarding the study sample were used to explore the research questions regarding the extent to which leaders of knowledge workers at Lawrence Livermore National Laboratory exhibit leadership credibility and/or self-efficacy.

Second, correlations between the leadership effectiveness measures were explored to determine the independence of these measures. Results were used to modify the analysis approach.

Third, correlation analysis and measure of association were performed to determine the correlation among the various measurement instruments used in the study. Specifically, the correlations among the leadership credibility measures and the self-efficacy measures, whether general self-efficacy or leadership specific self-efficacy, were explored. Given the linear relationship between the self-efficacy measures, multiple-regression was also used to determine their relationship.

Fourth, to increase the power of the research study prior to testing the research hypotheses, leadership effectiveness measure results were used to develop high, medium, and low leadership effectiveness groupings. Descriptive results for each measure were then used to define high, medium, and low leadership effectiveness groups for each of the effectiveness measures. The high, medium, and low groups for each effectiveness measure were then combined and used to classify leader-managers into a High, Medium, or Low leadership effectiveness group.

Fifth, each hypothesis was tested using ANOVA and discriminate function analysis (DFA). Review of the data indicated that the relationships were not linear so multiple regression was not used. DFA addressed the multi-collinearity issues between the variables. During hypothesis testing, each of the self-efficacy scales were analyzed separately as were the leadership credibility factors for both self and subordinate report, to determine whether or not they differentiated the High- and Low-leadership effectiveness groups. Additionally, to again increase the power of the study data, the leadership credibility factors and the leadership self-efficacy factors were combined into one leadership credibility measure and one leadership specific self-efficacy measure. DFA was then used to determine how well these combined scores differentiated between High- and Low-leadership effectiveness groups.

Standards of Quality: Reliability, Validity, Generalizability

It is recognized that causal argument in non-experimental research designs such as this study is generally weak. Random assignment, within-subjects design, and pre-test post-test design are precluded when treatment variables are not used and sample size and time are limited. While this study did not use these designs, it did use multiple sources to

define leadership effectiveness and the instruments used to define the independent variables were valid and reliable.

Care was taken in selection of measurement instruments for the independent and dependent variables to not be related but again this was somewhat weak in the study because treatment variables were not used and resulting assignments were not made to effective and non-effective leader groups. Instead, derived leadership effectiveness criteria and measures were used resulting in the definition criterion and the LPI practices *inspire a shared vision* and *enable others to act* being somewhat related to the definition criteria *set direction* and *build system and work force capability*. Additionally, since the definition of leadership effectiveness was derived from the literature and available Laboratory documents to measure the derived criteria applied, the reliability and validity of these documents was not determined.

Internal Validity/Confounds

There are four major confounds identified in this research study – time in management position, leadership development training, degree level, and management competence. Leadership development training and degree level were addressed by study sample selection. Subject selection based on participation in a leadership development program addressed the confound introduced when some subjects participate in leadership development opportunities and others do not. Selection of scientific and engineering directorates to comprise the study sample addressed the education confound which is introduced when some manager-leaders have an advanced degree and others do not. By focusing on directorates in which a minimum of a master's degree was required for a

scientific or engineering employee hire, education level became a common descriptor not a differentiating demographic.

While not addressed by the study sample, the time in management confound was explored by adding the following questions to the leader E-survey instrument:

- How many years have you been in a management position at the Laboratory?
- How many years have you been in a management position outside the Laboratory?

Time in management was perhaps the most important of the four confounds identified. For instance, Bandura (1986) proposed personal mastery experiences as the most influential source of efficacy information. A pattern of successes in a particular performance strengthens an individual's belief in his/her capabilities, particularly when the person achieves some success by overcoming obstacles through persistent effort (Wood & Bandura, 1989). Therefore one can expect that the leader with more successful experiences in management and leadership roles will have higher leadership self-efficacy, all else being equal (Paglis, 1999).

The management competence confound was not addressed in this study. Management competence while possible to look at via such instruments as the Management Development Questionnaire (MDQ), an inventory of management competencies (Cameron, 1997), holding this variable constant or matching based on results would have severely limited the study sample. Building it in and looking at it as another variable would have greatly complicated the study. Additionally, the MDQ and such other instruments designed to measure management competence do not have well-established validity.

External Validity

External validity was an issue in this study particularly because leader-managers at the Laboratory were the only leadership sample studied. Lawrence Livermore National Laboratory's defense mission may attract a certain type of leader-manager, not representative of the population. Additionally, Laboratory leader-managers operate within a culture that has both academic and military influence, not typical of most organizational cultures. Caution will therefore need to be exercised in generalizing study results to different organizational environments.

External validity was partially addressed by sample size – 200 leaders and a minimum of 600 subordinates or 100 leaders per each independent variable and at least three subordinates per leader. Size of sample increases the likelihood that the sample reflects the population.

Expectancy effects and history did not pose external validity problems because all participants received instruments within the same period of time. However, use of e-surveys introduced the problem of self-selection. To address this issue, follow-up with non-respondents was implemented to the extent feasible.

Even though causal argument was weak, the research was still worth doing given the contribution of the study. However, caution needs to be exercised in applying research findings to other populations given that external validity was negatively affected by this study's design.

Benefits of the Study to the Study Site

The research benefited the study site, Lawrence Livermore National Laboratory in a number of ways. These benefits were as follows:

1. The Laboratory has a better understanding of the relationship between the LPI used in a core Laboratory leadership development course, “The Leadership Challenge”, and Laboratory leadership effectiveness measures. Use of the course in the Laboratory leadership development program implied a Laboratory belief in the relationship. The study quantitatively explored and validated that relationship.
2. The Laboratory has an increased understanding of the relationship among pay, rank group, performance appraisal supervisor/manager assessment, and subordinate report assessment of leadership effectiveness. Because the study used these four measures to define leadership effectiveness, measure independence was explored. The study assumed measure independence; the Laboratory assumed a relationship among the measures. For example, the Laboratory states it has a pay for performance system – pay is the result of performance as reflected by rank group. Part of performance in the Laboratory performance appraisal process is feedback from subordinate reports. The study determined that pay and rank group are significantly associated and that the others measures are not. This data can be used as information to refine the Laboratory performance management system.
3. The Laboratory leadership development program was enhanced by the leadership development model developed from the determined relationship between leadership effectiveness, leadership credibility factors, and self-efficacy factors.
4. The Laboratory is a R&D facility that prides itself on its contribution to the advancement of knowledge. This research supported this contribution in the field of social sciences given that –

- The relationship between leadership effectiveness and leadership credibility had not been quantitatively established by other than subordinate report.
- The relationship between self-efficacy and leadership effectiveness had not been established. Focus in the literature was on emotional intelligence and effective leadership.
- Knowledge workers and leader-managers of knowledge workers have not been widely studied, particularly leadership characteristics and related development models.

Limitations

The study had the following limitations:

- *Inclusion/exclusion*: Use of a standardized survey to collect data created inclusion and/or exclusion problems by limiting respondents to pre-established answer choices. Items deemed to be important by the respondent may not appear on the e-survey and responses may not reflect their observations. Additionally, respondents reported that the lack of a “not applicable” or “do not know” category forced answers that may not reflect actual assessment or resulted in a lack of question response.
- *Sample*: Leaders at the Lawrence Livermore National Laboratory were the leadership sample studied. Lawrence Livermore National Laboratory is R&D facility in the San Francisco area with a defense mission that may attract a certain type of leader not representative of the population. Additionally, Laboratory leader-managers operate within a Laboratory culture that has both an academic and military influence, not typical of most organizational cultures.

- *Sample Skewed to the Right:* Given the sensitive data used to measure leadership effectiveness – performance appraisal, rank group, and subordinate assessment – leader-managers who did not think of themselves as successful, may not have been as likely to agree to participate in the study. Descriptive statistics of the leader-manager sample supported this probability as they reflected an effectiveness profile that was more positive than that of the general Laboratory management population when compared by rank group and target salary. Additionally, when comparing sample leader-manager scores on the five Leadership Practices Inventory factors used to measure leadership credibility against national norms collected by Kouzes and Posner (1997), the study's sample was in the medium to high range of the LPI percentile rankings.
- *Measurement of Leadership Effectiveness:* Since the definition of leadership effectiveness is derived from the literature and available Laboratory documents to measure the derived criteria applied, the reliability and validity of these measurement instruments were not determined and may not be generalizable.

CHAPTER 4: ANALYSIS AND RESULTS

This study explored the relationship between leadership effectiveness and the two “character” dimensions of leadership credibility and self-efficacy. Leadership effectiveness was defined by three factors used to measure leader-manager effectiveness at the Lawrence Livermore National Laboratory: 1) employee rank group, 2) target salary, and 3) performance appraisal effectiveness rating, and by one study developed factor, subordinate effectiveness rating. The performance appraisal effectiveness rating and the subordinate effectiveness rating each measured the leader-manager on four factors: *achieving results*, *leadership*, *workforce management*, and *performance management*.

Leadership credibility was defined by the five factors on the Leadership Practices Inventory (Kouzes & Posner, 1997) – *inspire a shared vision*, *challenge the process*, *enable others*, *model the way*, and *encourage the heart*, and one study developed factor – *technical competence*. Self-efficacy was defined by a one-factor general self-efficacy scale (Sherer & Muddux, 1982) and a three factor leadership specific self-efficacy scale (Paglis, 1999) – *setting direction*, *gaining commitment*, and *overcoming obstacles*.

In this chapter, the results are reported by first reporting findings related to the research questions and, in so doing, establishing sample characteristics. Next, factor correlations are discussed and the results of the three hypothesis tests are reported and explored. The chapter concludes with a summary of the results and application to the Figure 1 Leadership Effectiveness Model.

Research Question Related Findings

General Description of Sample

The leader-manager sample consisted of 118 managers from the technical directorates of the Lawrence Livermore National Laboratory, all of whom were knowledge workers and leader-managers of a minimum of three knowledge workers, referred to as subordinates in this study.³ These managers had nine years of Laboratory management experience ($M = 8.98$, $SD = .60$) and two years ($M = 2.06$, $SD = .47$) of management experience outside the Laboratory. Most had advanced degrees (74%) and of those with advanced degrees, 65% had a Ph. D. Comparing this to the degree level of the science and engineering employee population at the Laboratory, in which 71.8% had advanced degrees and of those with advanced degrees, 56.9% had a Ph.D., indicated that the sample leader-managers were somewhat better educated than the Laboratory technical population.

General descriptive data regarding the sample, outside degree and years in management data needed to address study confounds, was not collected due to the Laboratory Human Subjects Internal Review Board concern for the protection of the identity of sample subjects.

Question 1: To what extent do leader-managers possess factors of leadership effectiveness?

To determine to what extent leader-managers in the sample possessed factors of leadership effectiveness, descriptive statistics on the four leadership effectiveness

³ Subordinate is a term used for clarity not for recommended usage. Reports of a leader-manager are members of the team and should be referred to as such and called team members or colleagues.

measures were reviewed. Here the target salary for the leader-manager sample was found to be \$136,590 annually (M = \$136,590.45, Md = \$135,660.00, SD = \$30,588.00).

Employee rank group characteristics of the leader-manager sample indicated that over half were in the highest employee rank group (59.5%), with 28.8% in employee rank group 2, and only 11.8% in the lower employee rank groups 3, 4 or 5. The mean ranking for the sample was 1.56, SD = .805, as shown in Table 1. In contrast to the sample employee rank group distribution, the employee rank group distribution of the Laboratory technical manager population comprised of 528 leader-managers, indicated that 46.5% were in employee rank group 1 while 37.4% were in employee rank group 2, and 16.1% in the lower employee rank groups. This indicated that leader-managers in the sample

Table 1

Leadership Effectiveness Descriptive Statistics
(N = 118 leader-managers)

Variable	Minimum	Maximum	M	SD
FY04 Rank Group	1	5	1.56	.805
PA – Achieving Results	4	10	8.79	1.589
PA – Leadership	4	10	8.35	1.711
PA – Workforce Management	4	10	8.07	1.761
PA – Performance Management	4	10	7.67	1.857
Subordinate – Achieving Results	3.5	10	8.25	1.347
Subordinate – Leadership	1.5	10	7.34	1.77
Subordinate – Workforce Management	2	10	8.17	1.67
Subordinate – Performance	2	10	7.68	1.392
Target Salary	\$6557/mo.	\$22292/mo.	\$12123/mo.	\$2617/mo.

were ranked more positively by their supervisors than were non-sample technical managers.

The last two leadership effectiveness factors, performance appraisal effectiveness rating and subordinate effectiveness rating, also indicated that the sample was positively evaluated. As indicated in the chart in Table 1, the performance appraisal effectiveness rating attributed by supervisors showed that the leader-manager sample was rated as most effective on the *achieving results* ($M = 8.79$, $SD = 1.58$) and least effective on *performance management* ($M = 7.67$, $SD = 1.857$), on a ten point scale. Though slightly lower than the supervisor ratings on all four factors, subordinates rated their leader-managers' effectiveness highest on *achieving results* ($M = 8.25$, $SD = 1.35$) and lowest on *leadership* ($M = 7.34$, $SD = 1.77$), on a ten point scale. As indicated in Table 1, all but one of the four performance appraisal effectiveness ratings were in the eight point range out of a ten point scale, indicating that the leader-managers in the sample were generally evaluated as effective by their supervisors. Similarly, the data shown in Table 1 indicated that subordinates also generally evaluated their leader-managers as effective given that all four of the effectiveness ratings were in the seven to eight point ranges, out of a ten point scale.

Question 2: To what extent do leader-managers exhibit leadership credibility?

To determine to what extent leader-managers in the sample possessed factors of leadership credibility, descriptive statistics on the six leadership credibility factors were reviewed. As indicated in Table 2, the highest rated leadership credibility factor for the leader-manager sample was *technical competence* as determined by both self ($M = 8.92$, $SD = 1.02$) and subordinate report ($M = 8.57$, $SD = 1.47$) using a ten point scale. *Inspire*

a shared vision was the lowest leadership credibility rating for the leader-manager sample for both self (M = 7.53, SD = 1.56) and subordinate report (M = 6.66, SD = 1.62). The second lowest leadership credibility factor according to self (M = 7.94, SD = 1.05) and subordinate report (M = 7.20, SD = 1.53) was *challenge the process*.

A comparison of leadership credibility self-ratings and subordinate ratings for the

Table 2

Leadership Credibility Descriptive Statistics
(N = 118 leader-managers)

Variable	Minimum	Maximum	M	SD
L-Challenge	5.17	10.00	7.94	1.05
L-Vision	2.33	10.00	7.53	1.56
L-Enable	6.80	10.00	8.86	.69
L-Model	6.17	10.00	8.48	.78
L-Encourage	4.70	10.00	8.01	1.39
L-Competence	6.00	10.00	8.92	1.02
S-Challenge	1.00	9.38	7.20	1.53
S-Vision	1.00	9.83	6.66	1.62
S-Enable	3.00	10.00	8.19	2.45
S-Model	2.83	9.75	7.88	1.28
S-Encourage	1.75	9.58	7.47	1.47
S-Competence	2.50	10.00	8.66	1.75

leader-manager sample in Table 2, indicated that while subordinate ratings of their leader-managers were generally lower than were the leader-managers' self-reports, both

were in the same direction. This finding is similar to that reported by Kouzes and Posner (2000) in which they found LPI other report data to be generally lower than LPI self report data, but to reflect the same factor relationships regardless of industry studied.

Comparing the self and subordinate report leadership credibility ratings exhibited in Table 2 to the percentile self and other report rankings in the Kouzes and Posner database of more than 12,000 leaders and 70,000 observes, the leader-manager sample was found to rank in the medium to medium low range of leadership credibility according to subordinate report and in the high medium to low high range of leadership credibility according to self report (see Appendix H for the percentile ranking results). This means that the sample could be generally described as having a medium level of leadership credibility compared to LPI benchmark data.

Question 3: To what extent do leader-managers exhibit self-efficacy?

To determine to what extent leader-managers in the sample exhibited factors of self-efficacy, descriptive statistics on the one general self-efficacy factor and three leadership specific self-efficacy factors were explored. Table 3 illustrates that the leader-manager sample scored themselves higher on the general self-efficacy scale than they scored themselves on the three leadership specific self-efficacy scale factors. Of the three leadership specific self-efficacy factors, *obtaining commitment* was the highest scored factor, *setting direction* second, and *overcoming obstacles* third, with all of these scores being reported in the upper quartile range, over 75%. This indicates that the leader-manager sample can be described as having a medium to high degree of self-efficacy, especially on the general self-efficacy dimension. It also points to data and analysis issue due to restriction of range of sample responses.

Table 3

Self-Efficacy Descriptive Statistics
(N = 118 leader-managers)

Variable	Minimum	Maximum	M	SD
General Self-Efficacy	3.88	7.00	5.97*	.55
LSE – Communication	52.50	100.00	82.12	10.76
LSE – Direction	20.00	100.00	79.25	13.06
LSE – Obstacles	32.50	100.00	76.99	12.18

Note. General Self-Efficacy was assessed on a seven point scale. Leadership Specific Self-Efficacy was assessed on a 100 point scale.

*85.21 if reported on a 100 point scale.

Factor Correlations

Though care was taken in the selection of measurement instruments to increase the probability that independent and dependent variables were not related, use of derived criteria to measure leadership effectiveness and available scales to measure leadership credibility and self-efficacy increased the possibility that variables were related. To explore the possibility of these associations and to determine the independence of variables used to define leadership effectiveness, a series of correlation analyses were conducted. Results of these tests were used to define the analysis constructs for this study and to understand the relationships among study variables.

The .05 significance level was selected as the criteria for analysis significance given sample characteristics that indicated leader-managers were generally characterized as effective according to the four measures used in the study to determine leadership effectiveness. Additionally, the .05 level of significance is generally considered to be

appropriate in social science research where study results are not intended for use in areas of high risk or consequence.

Independence of Leadership Effectiveness Measures

The association among the measures used to define leadership effectiveness was tested – employee rank group, target salary, performance appraisal effectiveness rating, and subordinate effectiveness rating. Employee rank group and target salary were found to be related ($r = .542, p < .05$) and the strength of this association increased when degree level was used as a control variable ($r = .742, p < .05$). Employee rank group and target salary, two of the four measures used to define leadership effectiveness, were thus determined to be interdependent. This meant that these two measures of leadership effectiveness were too closely related for both to be used in the study. One would need to be selected for use.

Exploring the relationship between performance appraisal effectiveness rating and the other three leadership effectiveness criteria, employee rank group ($r = .265, p < .05$), target salary ($r = .365, p < .05$), and subordinate effectiveness rating ($r = .134, p < .05$), indicated that they were significantly but not strongly related. When degree level was used as a control variable, this relationship did not change ($r = .264, p < .05$), ($r = .257, p < .05$), and ($r = .136, p < .05$), respectively. Thus the performance appraisal effectiveness factor was found to be independent of the other three leadership effectiveness factors, indicating that they were each measuring different criteria of leadership effectiveness. In other words, the performance appraisal effectiveness rating measure was independent of the other three measures of leadership effectiveness used in the study.

The subordinate effectiveness rating was not found to be significantly related to the other leadership effectiveness criteria: employee rank group, target salary or performance appraisal effectiveness rating. When degree level was used as a control variable, again, no significant relationship was found. Thus the subordinate effectiveness rating measure was found to be independent of the other leadership effectiveness factors, meaning it too was a measure appropriate for use in the study to measure leadership effectiveness.

Leadership Credibility and Self-Efficacy Factor Correlations

The association among the leadership credibility and leadership self-efficacy variables was tested. Here a series of associations were found as indicated in Appendix I. Of particular interest was the fact none of the six leadership credibility factors attributed to leader-managers by their subordinates were found to be significantly related to the leader-managers self report on these six factors. This meant that the previously discussed finding showing subordinate ratings, while lower, were in the same direction as the leader-manager's self report, did not hold-up when individual responses were considered and compared. In other words, subordinate attribution of leadership credibility to their leader-manager was not related to the leader-managers self perception of his or her leadership credibility.

Subordinate ratings on the six leadership credibility factors were, however, significantly related to each other with most of the associations being highly correlated. The highest correlations were between *model the way* and *enable others* ($r = .859, p < .05$), *challenge the process* and *inspire a shared vision association* ($r = .857, p < .05$), *encourage the heart* and *enable others* ($r = .854, p < .05$), *model the way* and *encourage*

the heart ($r = .823, p < .05$), and *technical competence* and *challenge the process* ($r = .765, p < .05$). The lowest associations were between *technical competence* and *enable others* ($r = .351, p < .05$) and *technical competence* and *encourage the heart* ($r = .385, p < .05$).

This indicated that *model the way*, *encourage the heart*, and *enable others* were closely related factors; and that *challenge the process*, *inspire a shared vision*, and *technical competence* were closely related factors, according to subordinate report.

Though not as highly correlated as the subordinate leadership credibility ratings, the leader-manager's self report on the six leadership credibility factors were also significantly related to each other. Here the highest associations were between *challenge the process* and *inspire a shared vision* ($r = .722, p < .05$), and *inspire a shared vision* and *encourage the heart* ($r = .711, p < .05$) with *enable others* and *encourage the heart* ($r = .674, p < .05$) and *encourage the heart* and *model the way* ($r = .633, p < .05$) being the next most highly related variables. Interestingly, the study developed *technical competence* factor, though significantly correlated had the lowest association with the other leadership credibility self-report factors, with measures of association ranging from .182 to .283.

This indicated that the *challenge the process*, *inspire a shared vision*, and *encourage the heart* were the most closely related factors according to the leader-managers self report; and, that *technical competence* was not related to the other leadership credibility measures according to the leader-managers self report.

Indeed the low association found between the study's *technical competence* factor and the other five leadership credibility measures, according to both self and subordinate

report, seems to indicate that competence may not be addressed by the five factors on the Leadership Practices Inventory, as the authors suggest (Kouzes & Posner, 1995; Posner, 2002).

Appendix I also reports the correlations between the self-efficacy factors and leadership credibility factors. As indicated in Appendix I, all self-efficacy factors whether general or leadership specific, were significantly correlated with the leader-managers self reported leadership credibility factors and with each other. The self-efficacy factors whether general or leadership specific, were not found to be significantly associated with subordinate reported leadership credibility ratings.

General self-efficacy was most highly related to the self reported leadership credibility factors of *challenge the process* ($r = .541, p < .05$), *model the way* ($r = .480, p < .05$) and *inspire a shared vision* ($r = .405, p < .05$). Similarly, the three leadership specific self-efficacy factors were also most highly related to the self reported leadership credibility factors of *challenge the process*, *model the way*, and *inspire a shared vision*. For instance, the following associations were found: *setting direction* and *inspiring a shared vision* ($r = .592, p < .05$), *setting direction* and *challenge the process* ($r = .515, p < .05$), *gaining commitment* and *model the way* ($r = .652, p < .05$), *gaining commitment* and *inspire a shared vision* ($r = .504, p < .05$). *Gaining commitment* was also found to be significantly associated with *enable others* ($r = .576, p < .05$) and *encourage the heart* ($r = .627, p < .05$), which was not surprising given the factor design of the *gaining commitment* measure (Paglis, 1999). These associations indicated that self-efficacy, whether general or leadership specific, was associated with a leader's perception of his/her ability to *inspire a shared vision*, *challenge the process*, and to *model the way*.

Looking at the relationships in Table 4 between the general self-efficacy factor and the three leadership specific self-efficacy factors, controlling for years in management, it was the leadership specific self-efficacy factor *setting direction* that had the highest association with general self-efficacy ($r = .517, p < .05$). Scatter plots indicated that this relationship was linear. Regression analysis was performed with general self-efficacy as the dependent variable and the three leadership

Table 4

Correlation between General Self-Efficacy and Leadership Specific Self-Efficacy - Controlling for Years in Management (N = 110)

	General SE	Direction	Commitment	Obstacles
General SE	1	.517	.428	.419
Pearson Correlation				
Sig. (2 – tailed)	.000	.000	.000	.000
Direction	.517	1	.509	.482
Pearson Correlation				
Sig. (2 – tailed)	.000	.000	.000	.000
Commitment	.428	.509	1	.481
Pearson Correlation				
Sig. (2 – tailed)	.000	.000	.000	.000
Obstacles	.419	.482	.481	1
Pearson Correlation				
Sig. (2 – tailed)	.000	.000	.000	.000

specific self-efficacy factors as the independent variables. The regression equation was significant ($F = 17.67, p < .05$). The leadership specific self-efficacy factors explained 56.5 % (adjusted $R^2 = .301$) of the variance in general self-efficacy. This meant that general self-efficacy and leadership specific self-efficacy were significantly and strongly

related factors, with *setting direction* being the leadership specific self-efficacy factor most related to general self-efficacy.

Independence of Dependent and Independent Variables

The association of the dependent and independent variables was tested. This test of association included exploring the correlation of the independent variables (leadership credibility and self-efficacy) and the dependent measures of leadership effectiveness. All factors used to determine leadership effectiveness were tested for correlation with the six leadership credibility factors for self and subordinate reports, the one general self-efficacy factor, and the three leadership specific self-efficacy factors. Leadership effectiveness measures tested included employee rank group and the four factors – *achieving results, leadership, workforce management, and performance management* - measured by the performance appraisal and subordinate effectiveness ratings.

No significant correlations were found between two of the three leadership effectiveness measures (employee rank group and performance appraisal effectiveness ratings) and the leadership credibility and self-efficacy factors. Even the assumed association between the two performance appraisal leadership effectiveness measures, *leadership* and *workforce management*, were not found to be significantly correlated with the self reported leadership credibility factors of *inspire a shared vision, enable others,* and *encourage the heart*. However, as illustrated in Table 5, all six of the subordinate ratings of leadership credibility were found to be significantly correlated with the four subordinate effectiveness rating measures and with two of the performance appraisal effectiveness ratings, *achieving results* and *leadership*.

Table 5 shows the strength of the associations between the subordinate ratings of

Table 5

Significant Correlations Between Independent and Dependent Variables
(N = 115 leader-managers; N = 256 subordinates)

	Subordinate Challenge	Subordinate Vision	Subordinate Enabling	Subordinate Modeling	Subordinate Encouraging	Subordinate Competence
Subordinated Reported Result Pearson Correlation Sig. (2- tailed)	.541	.465	.603	.711	.594	.612
Subordinate Reported Leadership Pearson Correlation Sig. (2- tailed)	.703	.763	.701	.707	.775	.548
Subordinate Reported Workforce Management Pearson Correlation Sig. (2- tailed)	.688	.637	.860	.783	.798	.457
Subordinate Reported Performance Management Pearson Correlation Sig. (2- tailed)	.414	.408	.424	.445	.411	.293
Performance Appraisal Result Pearson Correlation Sig. (2- tailed)	.236	.213	.287	.269	.251	.258
Performance Appraisal Leadership Pearson Correlation Sig. (2- tailed)	.270	.239	.304	.289	.277	.271
	.004	.010	.001	.002	.003	.003

leadership credibility factors and the subordinate reported effectiveness ratings were particularly strong. These correlations ranged from the highest correlation between *enable others* and *workforce management* ($r = .860, p < .05$) to the lowest correlation between *technical competence* and *performance management* ($r = .293, p < .05$).

The correlation between subordinate effectiveness ratings and subordinate ratings of leadership credibility, pointed to a study limitation by indicating that that these independent and dependent variables were related, thus weakening this study's findings causal argument. However, the Table 5 associations also pointed to a relationship between specific measures of leadership effectiveness and specific leadership credibility factors. For example, *achieving results* was found to be significantly and highly associated with *enabling others*, *modeling the way*, and *technical competence*; while *leadership* and *workforce management* were found to be significantly and highly correlated with all of the leadership credibility factors except for *technical competence*, which was significantly but not highly correlated. *Performance management* was found to be significantly but not highly associated with all the leadership credibility measures according to subordinate report. This means that perhaps these relationships indeed had more to do with the cause behind the effectiveness measures the study was designed to detect than with overlapping dependent and independent measures.

Analysis Approach Based on Association Results and Power

The study was designed with four measures of leadership effectiveness: employee rank group, target salary, performance appraisal effectiveness rating, and subordinate effectiveness rating. Tests to determine the independence of these measures resulted in employee rank group and target salary being related at the .742 level of association. The

other measures of leadership effectiveness, if significant, were related at or less than the .265 level of association. Given these relationships, a decision was made to use employee rank group and not target salary, thus reducing the leadership effectiveness measures from four to three. With a sample size of 118 leader-managers, employee rank group was determined to be a more appropriate measure for use given the limited number of rank groups as opposed to target salary for power reasons. Additionally, scatter plots indicated that top management inclusion in the sample created several target salary outliers that could skew the results if target salary was used as an effectiveness measure.

To increase power prior to exploring the three research hypotheses, the three leadership effectiveness measures were used to determine High, Medium, and Low leader-manager effectiveness groups. With the limited sample size of 118 leader-managers, three groups resulted in approximately 39 cases in each group. Stevens (1999) indicates that to detect a medium effect size, 40 subjects per group are needed to have close to adequate power (.67567), and to detect a large effect size, 15 subjects per group are needed to have good power (.883361). Given that the effect size in social science research is often medium to low, power considerations were important in guiding this study's design.

To determine the case membership of the High, Medium, and Low leadership effectiveness groups, analysis consisted of the following steps:

Step 1. Rank group data were analyzed using descriptive statistics and three study developed rank groups were formed – Rank Group 1 (High), Rank Group 2 (Medium) and Rank Group 3 (Low). Rank group scores ranged from 1 (high) to 5 (low). Given that

59.5% of the leader-manager sample was in rank group 1 and 28.8% in rank group 2, the lowest rank groups 3, 4, and 5 were combined to become rank group, 3.

Step 2. Performance appraisal rating results on each of the four factors – *achieving results, leadership, workforce management, and performance management* - were totaled and a study developed performance appraisal assessment variable formed. The new performance appraisal variable was analyzed using descriptive statistics to determine the appropriate division of the data into three groups and then each case was assigned a rating of 1, 2, or 3 with one being the highest range rating.

Step 3. Subordinate effectiveness rating results on each of the four factors were totaled and a study developed subordinate assessment variable formed. As with the performance appraisal variable, the subordinate appraisal variable was analyzed, divided into three ranges and each case assigned a rating of 1, 2, or 3 with one being the highest range rating.

Step 4. The three new variables, rank, performance appraisal, and subordinate appraisal, were then totaled and averages derived for each case. These averages became a new study variable – leadership effectiveness rating. Descriptive statistics were then used to divide this variable into ranges and each case was assigned a range rating – High, Medium and Low leadership effectiveness groups.

Correlations between the new leadership effectiveness factors were then performed to determine that each variable was independent prior to combination into the new single, leadership effectiveness variable. Analysis results found that the new study developed *subordinate assessment* variable was not significantly correlated with the new *rank group* variable or with the new *performance appraisal assessment* variable. The

new *rank group* variable and the new *performance appraisal assessment* variable were significantly but not highly correlated ($r = .248, p < .027$). Given the strength of this correlation and the failure to find significance in the other correlation tests, it was determined that the new leadership effectiveness factors were independent measures of leadership effectiveness.

Finally, the new leadership effectiveness rating variable was analyzed. Because this new variable was derived from combining and averaging the new *subordinate assessment*, *rank group*, and *performance appraisal assessment* variables, it was important to ascertain that it retained its originally characteristics prior to declaring it the study's new measure of leadership effectiveness. Reviewing the strength of the association between the new single leadership effectiveness factor, *leadership effectiveness average*, indicated that it was significantly and highly correlated with all of the new assessment variables, the new *rank group* variable ($r = .690, p < .05$), the new *performance appraisal assessment* variable ($r = .561, p < .05$), and, the new *subordinate assessment* variable correlated ($r = .500, p < .05$). This meant that the measure reduction method of totaling and averaging scores used to create the new *leadership effectiveness average*, maintained the integrity of the individual measures. In other words, the High, Medium, and Low leadership effectiveness groups represented the original four measures of leadership effectiveness: *employee rank group*, *target salary*, *performance appraisal effectiveness ratings*, and *subordinate effectiveness ratings*.

The relationship between leadership effectiveness and the two character dimensions of study could therefore be explored by determining how the three leadership effectiveness groups compared in terms of leadership credibility and self-efficacy factors.

Hypothesis Testing

Each hypothesis was tested separately using analysis of variance (ANOVA) comparison of means test and Discriminate Function Analysis (DFA). Review of the data indicated that the relationships were not linear so multiple regression was not used. DFA addressed the multi-collinearity problems of the study found to be present in the subordinate report data.

Hypothesis 1: Effective leaders exhibit higher leadership credibility scores according to self and subordinate reports than do less effective leaders

To test Hypothesis 1, the High, Medium, and Low leadership effectiveness groups were compared in terms of their self-reported and subordinate reported leadership credibility scores. ANOVA was performed with High, Medium, and Low *leadership effectiveness* group being the analysis factor. ANOVA results indicated that effective leaders exhibited higher leadership credibility scores, as attributed by subordinate report, on the *enable others* factor, $F(2, 84) = 3.823, p < .05$, the *model the way* factor, $F(2, 84) = .842, p < .05$, and the *encourage the heart* factor, $F(2, 84) = 3.421, p < .05$.⁴ None of the other leadership credibility factors attributed by subordinate report or determined by leader-manager self report demonstrated a significant relationship. Post hoc tests using Tukey's HSD procedure indicted that the means for each of the three leadership effectiveness groups were significantly different from each other on the *enable others*, the *model the way*, and the *encourage the heart* factors.

Using Omega squared to determine the variance explained by each of these subordinate attributed leadership credibility factors, it was the *model the way* factor that

⁴ $F = \frac{\text{variation among the sample means}}{\text{variation within the samples}}$

accounted for the largest portion of the variance, explaining 15.13% of the difference between the high to low leadership effectiveness groups. *Enable others* accounted for 6.03% of the variance between the three leadership effectiveness groups and *encourage the heart* accounted for 5.2% of the variance between the three leadership effectiveness groups. In total, subordinate attributed leadership credibility scores indicated that the *enable others*, the *model the way*, and the *encourage heart* leadership credibility factors explained 26.26% of the variance between the High, Medium, and Low leadership effectiveness groups.

Similarly, Table 6 discriminate function analysis results indicated that the

Table 6

Discriminate Function Analysis Structure Matrix: Hypothesis 1
(N=118 leader-mangers)

Variable	Function 1**
Subordinate <i>model the way</i>	.872*
Subordinate <i>enable others</i>	.600*
Subordinate <i>encourage the heart</i>	.550*
Subordinate <i>inspire a shared vision</i>	.334*
Subordinate <i>challenge the process</i>	.319*
Subordinate <i>technical competence</i>	.238

*Largest absolute correlation between each variable and any discriminate function

**The first discriminate function was the only significant function; $\chi^2 (12, N = 84) = 23.864, p = .021$.

subordinate attributed leadership credibility factors accounted for 25.4% ($\Lambda = .746$) of leadership effectiveness group membership, with the *model the way*, the *enable others*, and the *encourage the heart* factors having the highest absolute correlation with the discriminate function.

To further explore this finding and to examine how well leadership credibility factors differentiated between leadership effectiveness groups, the new *subordinate assessment* variable was used as the fixed factor. The *subordinate assessment* variable high, medium, and low groups were each compared to the self reported and the subordinate attributed leadership credibility factors. Given homogeneity of variance issues between some of the variables, discriminate function analysis was used.

Not surprisingly, the subordinate attributed leadership credibility factors were the scores that differentiated between the high and low *subordinate assessment* groups. Here 63.9% ($\Lambda = .365$, $\chi^2(32, 84) = 74.056$, $p < .05$) of the variance across all the discriminate functions was explained by the first significant function wherein the subordinate attributed leadership credibility variables had the largest correlations with the first discriminate function – *challenge the process* (.835), *enable others* (.831), *model the way* (.813), *encourage the heart* (.749), *inspire a shared vision* (.736), and *technical competence* (.488).

For Hypothesis 1, the null hypothesis was rejected for three of the subordinate reported leadership credibility factors: *enable others*, *model the way*, and *encourage the heart*. The null hypothesis was accepted for the subordinate reported leadership credibility factors: *challenge the process*, *inspire a shared vision*, and *technical competence*, when the new *leadership effectiveness* variable was the analysis factor and was the null hypothesis was rejected when the new *subordinate assessment* variable was the analysis factor. The null hypothesis was accepted for all of the leader-manager self report leadership credibility factors: *challenge the process*, *model the way*, *encourage the heart*, *inspire a shared vision*, *enable others*, and *technical competence*. In others words,

effective leaders were found to exhibit higher leadership credibility scores according to subordinate report specifically on the *model the way*, *enable others*, and *encourage the heart* dimensions.

Hypothesis 2: Effective leaders exhibit higher self-efficacy scores than do less effective leaders

To test Hypothesis 2, the High, Medium, and Low leadership effectiveness groups were compared according to leader-manager scores on the one general self-efficacy factor and on the three leadership specific self-efficacy factors, *setting direction*, *gaining commitment*, and *overcoming obstacles*. ANOVA was performed with High, Medium, and Low leadership effectiveness group being the analysis factor. ANOVA results showed no significant differences among the three leadership effectiveness groups on any of the self-efficacy variables, general or leadership specific.

To further explore this finding, the new *rank group* variable, the new *subordinate assessment* variable, and the new *performance appraisal assessment* variable were each compared to the four self-efficacy factors. Using each of these three new variables as the analysis factor, ANOVA results again showed no significant differences between the high and low effectiveness groups on any of the self-efficacy measures whether general or leadership specific.

For Hypothesis 2, the null hypothesis was accepted for the general self-efficacy factor and for the three leadership self-efficacy factors, *setting direction*, *gaining commitment*, and *overcoming obstacles*.

It needs to be remembered that the study's leader-manager sample was generally characterized as having medium to high self-efficacy, whether general or leadership

specific. Thus the failure to detect a difference in self-efficacy between the high and low leadership effectiveness groups may be so influenced.

Hypothesis 3: As leadership credibility and self-efficacy scores increase, so does leadership effectiveness

To increase power prior to testing this hypothesis, three new variables were formed – a new *self report leadership credibility* variable, a new *subordinate reported leadership credibility* variable, and a new *leadership specific self-efficacy* variable. These variables were formed by adding the factor scores comprising each of these three variables to form single new variables. General self-efficacy consisted of only one factor so there was no need to combine factors to create a single general self-efficacy variable.

To test Hypothesis 3, High, Medium, and Low leadership effectiveness groups were compared to the three new credibility and self-efficacy variables (*leadership specific self-efficacy, subordinate reported leadership credibility, and self report leadership credibility*) and to the general self-efficacy variable, and then to each of the leadership credibility and self-efficacy factors. Results of these tests will be discussed by first reviewing findings related to the new leadership credibility and new self-efficacy variables and by second reviewing findings related to the leadership credibility and self-efficacy factors.

Findings Related to the New Leadership Credibility and Self-Efficacy Variables

Using ANOVA to compare the means of the High, Medium, and Low leadership effectiveness groups to the three new variables, *leadership specific self-efficacy, subordinate reported leadership credibility, and self report leadership credibility, the new subordinate reported leadership credibility* variable was the only variable to exhibit

a difference in the leadership effectiveness group means, $F(1, 86) = 3.44$, $p < .05$, with post hoc tests showing HSD = 23.566, $p < .05$ between High and Medium effectiveness group and HSD = 26.724, $p < .05$ between High and Low effectiveness groups.

To examine the discriminate validity of the study developed variables to determine how well scores differentiated between high- and low-effectiveness leader-manager groups, a discriminate function analysis was performed. Not surprisingly, the new *subordinate reported credibility* variable was the only variable to again differentiate between the High and Low effectiveness groups. Here 14.1% ($\chi^2(8, 87) = 12.510$, $\Lambda = .859$, $p < .05$) of the variance across all discriminate functions was explained by the first and only significant function, $F(2, 84) = 3.444$, $p < .05$, in which the subordinate reported credibility variable accounted for .838 of the correlation within the function.

Leadership Credibility and Self-Efficacy Factors

To examine the discriminate validity of the leadership credibility and the self-efficacy factors to determine how well these scores differentiated between High- and Low-leadership effectiveness groups, discriminate function analysis was used. As indicated in Table 7, it was again the subordinate reported leadership credibility factors that determined the differentiation between the High- and Low-leadership effectiveness groups. Here 48.2% ($\Lambda = .518$, $p < .05$) of the variance across all discriminate functions, as indicated in Table 7, was explained by the first function in which the subordinate reported leadership credibility scores on *model the way*, *enable the heart*, and *encourage others* accounted for the highest correlations within the function.

Table 7

Discriminate Function Analysis Structure Matrix: Hypothesis 3
(N = 118 leader-managers)

Variable	Function 1**
Subordinate <i>model the way</i>	.594*
Subordinate <i>enable others</i>	.421*
Subordinate <i>encourage the heart</i>	.335*
Self-Report <i>enable others</i>	-.279*
Subordinate <i>challenge the process</i>	.239*
Self-Report <i>technical competence</i>	-.226*
Subordinate <i>inspire a shared vision</i>	.206*
Subordinate <i>technical competence</i>	.191*
Self-Report <i>encourage the heart</i>	-.162*
General Self-Efficacy	-.112
Self-Report <i>inspire a shared vision</i>	.005
Leadership Specific Self-Efficacy – <i>gaining commitment</i>	-.121
Self-Report <i>challenge the process</i>	-.051
Leadership Specific Self-Efficacy – <i>overcoming obstacles</i>	.031
Self-Report <i>model the way</i>	.004
Leadership Specific Self-Efficacy – <i>setting direction</i>	.015

* Largest absolute correlation between each variable and any discriminate function.

**The first discriminate function was the only significant function: $\chi^2(32, N = 118) = 50.390, p = .020$.

As Table 8 illustrates, in comparing the group means of the High, Medium, and Low leadership effectiveness groups by each of the leadership credibility and self-efficacy factors, the subordinate leadership credibility scores *model the way*, *enable others*, and *encourage the heart*, were the only significant functions that differentiated the high, medium and low leadership effectiveness groups. Using Wilks's multivariate criterion (Λ), Table 8 shows that these three factors, *model the way*, *enable others*, and *encourage the heart*, explained 34.75% of the mean variances between the High, Medium, and Low leadership effectiveness groups.

For Hypothesis 3, the null hypothesis was accepted for the general self-efficacy factor, the leadership specific self-efficacy factors, the leader-manager self report leadership credibility factors, and for the subordinate attributed leadership credibility

Table 8

Discriminate Function Analysis Tests for Equality of Group Means: Hypothesis 3 (N = 118 leader-managers)

	Λ	F	df1	p
General Self-Efficacy	.977	1.009	2	.369
Self-Report Challenge	.994	.234	2	.792
Self-Report Vision	.990	.442	2	.644
Self-Report Enable	.948	2.284	2	.108
Self-Report Model	1.000	.015	2	.985
Self-Report Encourage	.983	.725	2	.488
Self-Report Competence	.973	1.145	2	.323
Leadership Specific Self-Efficacy - Direction	1.000	.008	2	.992
Leadership Specific Self-Efficacy - Commitment	.983	.721	2	.489
Leadership Specific Self-Efficacy - Obstacles	.998	.075	2	.928
Subordinate Challenge	.970	1.291	2	.280
Subordinate Vision	.969	1.346	2	.266
Subordinate Enable	.908	4.246	2	.018
Subordinate Model	.826	8.846	2	.000
Subordinate Encourage	.919	3.689	2	.029
Subordinate Competence	.981	.824	2	.442

factors of *challenge the process*, *inspire a shared vision*, and *technical competence*. The null hypothesis was rejected for the subordinate attributed leadership credibility factors of *enable others*, *model the way*, and *encourage the heart*. In other words, when subordinate attributed leadership credibility scores increased for *enable others*, *model the way*, and

encourage the heart so did leadership effectiveness as demonstrated by High, Medium, and Low leadership effectiveness group membership.

Control Variables Effect on Results

Two control variables were used throughout the study – degree level and years in management. To confirm that these two variables did not differentiate the High, Medium, and Low leadership effectiveness groups, degree level and years in management were explored. Descriptive statistics indicated that there was no difference in degree level for leader-managers in the High, Medium, and Low leadership effectiveness groups. The High and Low groups each indicated a mean degree level of 3.2 and the Medium group a mean degree level of 3.04, with 3 representing a master's degree.

Similarly, the High, Medium, and Low leadership effectiveness groups exhibited a similar years in management profile with the High group having 9.7 years in management, the Medium group having 12.0 years in management, and the Low group having 8.1 years in management. In other words, degree level and management experience did not seem to differentiate the three leadership groups and thus did not influence the study's results.

Conclusions

This chapter began by exploring the study's research questions to better understand the leadership effectiveness and character dimensions of leader-managers of knowledge workers at Lawrence Livermore National Laboratory. Here leader-managers of knowledge workers were found to exhibit a high degree of competence and were results oriented. In evaluating their leadership effectiveness, both supervisors and subordinates rated leader-managers highest on achieving results. Leader-managers

indicated a strong belief in themselves as leaders with high general self-efficacy scores and an indicated belief that they could set the direction and gain followership and commitment. Their belief in their leadership ability to overcome obstacles such as obtaining resources was their lowest self-efficacy score and the leadership credibility factors of *inspiring a shared vision* and *challenging the process* were their lowest leadership credibility scores.

Next associations between the variables were tested. In exploring the associations between the two character dimensions, leadership credibility and self-efficacy, self-efficacy, whether general or leadership specific, was found to be associated with a leader's perception of his/her ability to *inspire a shared vision*, *challenge the process*, and to *model the way*.

The associations among the leadership credibility factors according to self-report and according to subordinate report were also explored. Of particular interest was the finding that none of the six leadership credibility factors attributed to leader-managers by their subordinates were related to the leader's self-report on the six factors.

Hypothesis testing indicated that there were no significant differences in self-efficacy scores, whether general or leadership specific, for effective leaders vs. less effective leaders. What did set the most effective leaders of knowledge workers apart from the less effective leaders, according to subordinate report, was that: they *enable others*, they establish trusting relationships and strengthen others; they *model the way*, they are honest, they set the example, and follow through on promises and commitments; and, they *encourage the heart*, they are just, fair, sincere, and recognize contributions.

These leadership credibility factors attributed to the leader-manager by those that worked for them were found to be what accounted for 34.75% of the difference between the most effective leaders and less effective leaders at the Laboratory.

Applying these findings to the Figure 1, Leadership Effectiveness Model, the following conclusions regarding the applicability of the model can be drawn:

1. *Characteristics of the leader-manager sample illustrated the validity of the study model.* For instance, study sample leader-managers were rated highly by both self and subordinate report on the leadership credibility factor of *technical competence* and all indicated high general self-efficacy scores with a mean of 5.97 on a seven point scale. The leadership effectiveness factor of achieving results was the highest assessed effectiveness factor as attributed by both the leader-manager's supervisor and subordinate reports. This indicated that the leader-manager sample was well advanced on the leadership effectiveness continuum line with the leadership credibility factor *technical competence* and general self-efficacy being the primary factors contributing to the leadership effectiveness/success of achieving results.
2. *The leadership credibility factors of enable others, model the way, and encourage the heart were what separated the highest group of effective leaders from their less effective peers, thus validating the leadership credibility factor of the model.* As leadership credibility on these three factors increased, leadership effectiveness also increased.
3. *It was the "how to be" aspects of leadership credibility that separated the most effective leaders from their peers thus validating the implied premise of the model*

that leadership of knowledge workers is related to the “character” of the leader.

For example, to *enable others*, to *model the way*, and to *encourage the heart*, leadership actions and behaviors demonstrate that the leader-manager is trustworthy, honest, just, sincere, sets an example, and demonstrates a belief in the worth and dignity of the men and women who make up the enterprise.

In sum, the findings generally validated the Leadership Effectiveness Model particularly on the character dimension – leadership credibility.

An important factor for leader-manager performance assessment, were the findings that:

- Subordinate report and self report assessments of leadership credibility were not in the same direction when individual cases were considered; and,
- Subordinate report and supervisor leadership effectiveness assessments were not in the same direction when individual cases were considered.

In other words, to obtain a well-rounded picture of the behaviors and performance of the leader-managers of knowledge workers in this research study, subordinate report data needed to be considered. Since it was the subordinate reported leadership credibility factors that differentiated between the high and low leadership effectiveness groups, these data have important implications for assessment and performance management programs.

The implications of the study’s finding for performance management and leader-manager development programs, as well as implications for future research, are discussed in Chapter 5.

CHAPTER 5: DISCUSSION

Problem Discussion

Problem Beginnings

This study was designed to explore the relationship between “character” and effective leadership of the knowledge worker and was conceived from my desire to better understand how to develop effective leaders. Having worked in leadership development for a number of years, both in the public and private sectors, I wondered why our programs often failed to develop effective leaders. Development programs improve skills and competencies and increase self-awareness. Yet, bottom-line business results did not necessarily improve over the long run and staff continued to report problems with management valuing and involving them in the work of the organization. This situation, I believed, was complicated when managers were leaders of knowledge workers. Leader-managers of knowledge workers are faced with the additional challenge of inspiring a workforce to shape company success by causing the talent they lead to generate intellectual capital to achieve desired business results.

To cause a workforce to generate intellectual capital, more than learning about and applying leadership and management competencies seemed to me to be needed. Thinking about this situation and the input and output model, I thought something happened at the through put stage when managers lead, that was not leadership competency and skill related, which made an individual an effective leaders. That is, I thought it was something implicit rather than explicit, and believed it to be leadership credibility and self-efficacy. This study focused on exploring this belief.

The Study

The study hypothesized that the two “character” dimensions, leadership credibility and self-efficacy, were essential ingredients to effectively lead knowledge workers - one who turns aspiration into action to accomplish results for the organization. Both of these “character” dimensions had more to do with substance than with form; personal attributes rather than competency and skill. Traditionally, our leadership development programs have focused on form (competency development), and have done little to enhance substance (personal attributes such as values, beliefs, belief in self). Substance is what makes an individual worthy to lead, privileged with the power to challenge and inspire others.

To generate intellectual capital not just manage it, effective leader-managers in this study were defined as those who build system and workforce capability among knowledge workers to encourage innovation and change. To be effective leaders on these dimensions, the study’s findings indicated that the “how to be” or substance aspects of the leader-manager were what separated the most effective leaders in this study from their peers.

In this concluding chapter, the findings from the hypothesis tests are summarized, along with their theoretical implications. Application of this study’s findings to leadership development are then discussed and applied to address the second goal of this study, which is to develop a leadership development model based on results. Because implementation of the proposed leadership development model operates within a systems context, implications for performance management and talent acquisition are then discussed. Finally, ideas for future research stemming from this study are presented.

Discussion of the Findings

Hypothesis 1: Effective leaders have higher leadership credibility

The central premise of this research was that effective leader-managers of knowledge would be those with higher leadership credibility and self-efficacy than their less effective leader-manager counterparts. When high, medium, and low leadership effectiveness groups were compared, effective leaders were found to exhibit higher leadership credibility scores, on the leadership credibility factors, *enable others*, *model the way*, and *encourage the heart*, when subordinate reports were the source of the leadership credibility rating. These three leadership credibility factors explained 34.7% of the difference in the means of the high- and low-leadership effectiveness groups. Interestingly, it was the *model the way* factor that represented 17.4% of this variance.⁵ This indicated that the most effective leaders at the Lawrence Livermore Laboratory established standards and values and then set the example for others to follow. The fact that it was the *enabling others* and *encouraging the heart* leadership credibility factors that also exemplified the most effective leader-managers, indicates that the standards and values modeled by these leader-managers were those based on being honest and trustworthy and respecting and supporting others.

When subordinate assessment was the only factor considered to determine high, medium, and low leadership effectiveness groups, all subordinate reported leadership credibility factors – *challenge the process*, *enable others*, *model the way*, *encourage the heart*, *inspire a shared vision*, and *technical competence* - significantly differentiated the

⁵ *Model the way* is defined by Kouzes and Posner (1997) to be – “establishing values about how constituents, colleagues, and customers ought to be treated, creating standards of excellence and then setting the example, and following through on promises and commitments” (p. 71).

high from the low leadership effectiveness group. Here 63.6% of the variance in the first discriminate function was primarily explained by these subordinate attributed leadership credibility factors – *challenge* (.835), *enable* (.813), *model* (.813), *encourage* (.749), *technical competence* (.488), and *vision* (.360). In other words, all factors of leadership credibility measured by the Leadership Practice Inventory (LPI) and the study developed technical competence factor were significantly related to leadership effectiveness when both leadership credibility and leadership effectiveness were measured by subordinate report. These findings confirmed the relationship Posner and Kouzes (1988) found between subordinate leadership effectiveness measures and the five leadership practices measured by the LPI.

Theoretical Implications

Those findings that supported the relationship between the leadership credibility factors *model the way*, *enable others*, and *encourage the heart*, and leadership effectiveness were consistent with the Kouzes and Posner (1993) finding that honesty was a major credibility factor that exemplified quality leadership. In fact, honesty was consistently the top action of the four credibility factors (honesty, forwarding looking, inspiring, and competent) found by Kouzes in both their 1993 and 1987 studies of U. S. respondents. And, the percentage of workers selecting honesty as the top factor that exemplifies quality leaders was found to be increasing, from 83% in 1987 to 87% in 1993. The second ranked credibility factor, forward-looking, represented 71% of the 1993 respondents. As Kouzes and Posner found and this study confirmed, honesty is absolutely essential to effective leadership. Using Kouzes and Posner (1993) words,

If people are going to follow someone willingly, whether to be into battle or into the boardroom, they first want to assure themselves that the person is worthy of their trust. They want to know that the would-be leader is truthful and ethical. No matter where we have conducted our studies – regardless of country, geographical region, or type of organization – the most important leadership attribute since we began our research in 1981 has always been honesty. (Pp. 14-15).

Since credibility is about how leaders earn the trust and confidence of their constituents, it is not surprising that the major credibility factors found to differentiate the most effective leaders at the Lawrence Livermore National Laboratory were those that involved trust and valuing of the workforces they lead.

This is also consistent with the research on organizational trust (Bennis, 1997; Jones and George, 1998; Brodt, Korsdaar, Sashkin and Werner 1998; Levine, 2000; and Zand, 1992). In fact, in his case study research, Zand (1992) found that trust was the leader's key to achieving open communication and collaborative, committed action.

The finding that *modeling the way* was the leadership credibility factor that most strongly differentiated the high from the low leadership effectiveness groups was particularly interesting. While the literature postulates that follow through with actions consistent with words is important to effective leadership, it is only now beginning to be studied through such instruments as the Management Behavior Climate Assessment (Sashkin and Levine, 2000), designed to measure organizational trust. The study's results indicated that there is a stronger link between the *modeling the way* factor and leadership effectiveness than any of the other leadership credibility factors measured. The strength

of this relationship has not been found in the literature and the literature has not been focused on leader-managers of knowledge workers.

Hypothesis 2: Effective leaders have higher self-efficacy

Self-efficacy, whether general or leadership specific, was not found to differentiate the high- from the low-leadership effectiveness groups at the Lawrence Livermore National Laboratory. However, self-efficacy, both general and leadership specific were significantly and highly correlated with the leader-manager's self-perception of his/her ability to *inspire a shared vision*, to *challenge the process*, and to *model the way*. In other words, self-efficacy, both general and leadership specific, was significantly related to a leader's belief in his/her ability to be inspiring, take risk and succeed, and to set the example.

Additionally, general self-efficacy and leadership specific self-efficacy was found to be significantly related with leadership specific self-efficacy explaining 56.5% of the variance in general self-efficacy. This confirmed that general and leadership specific self-efficacy were separate, but significantly related dimensions. Thus the need to measure both general and leadership specific self-efficacy dimensions in this study was supported and may be indicated for future research.

Theoretical Implications

While little has been done to study the relationship between self-efficacy and leadership effectiveness, the fact that the study did not find a significant relationship between any of the leadership effectiveness criteria and the self-efficacy factors is surprising particularly given the recent work on emotional intelligence. For example, Goleman, Boyatzis, and McKee (2002) found that self-confidence, a component of

emotional intelligence, is essential for leaders to assume the risk of change; and, Paglis (1999) found a relationship between high leadership specific self-efficacy and a manager's willingness to engage in the leadership of change. Other studies of emotional intelligence have also found support for the relationship between emotional intelligence and effective leadership (Goleman, 1995; Goleman, Boyatzis, & McKee, 2002; and Weisinger, 1998).

Self-efficacy, like self-confidence, was assumed in this study to give the leader-manager the will and courage to lead against oftentimes challenging forces. The found correlations between the leadership credibility factors, *inspiring a shared vision*, *challenging the process*, and *modeling the way*, as previously discussed, indicate support for this assumption.

Hypothesis 3: As leadership credibility and self-efficacy increase so does leadership effectiveness

Given hypothesis 1 and 2 test results, it was not surprising that the study developed subordinate leadership credibility variable was what differentiated the high and low leadership effectiveness groups. In other words, as subordinate attributed leadership credibility increased so did leadership effectiveness.

The two control variables, degree level and years in management, were not found to differentiate the high, medium, and low leadership effectiveness groups, indicating that these two assumed confounds did not influence the major study finding that leadership effectiveness is related to attributed leadership credibility. Of interest is the fact that all three of the leadership effectiveness groups had an average of a master's degree and an average of 9 years of management experience. In other words, the sample was generally

comprised of well educated, experienced managers and these characteristics did not change when membership in high, medium, or low leadership effectiveness groups was considered.

Theoretical Implications

These findings are consistent with the fact that the Leadership Practices Inventory (LPI) was designed to specify those practices of exemplary leadership. It follows, therefore, that they would be related to a leader-manager's leadership effectiveness. In fact, Kouzes and Posner (1988) established the relationship between subordinate ratings of leadership effectiveness and leadership credibility as defined by the LPI. What was particularly interesting was the fact that only three of the six leadership credibility factors were found to account for the differentiation of the high- and low-leadership effectiveness groups when the sample studied were leader-managers of knowledge workers. This finding was not consistent with Kouzes' and Posner's work; however, their research was not focused on knowledge workers. Because knowledge workers need a sense of meaning, the opportunity to create something of lasting value, and the recognition of authorship (Bolman & Deal, 2001), it was not surprising that this study's results indicated it was those leadership credibility factors that supported these motivations (*model the way, encourage the heart, and enable others*), that were found to characterize the most effective leaders at the Lawrence Livermore National Laboratory.

Effectiveness Measures

This study defined leadership effectiveness from a review of the literature and applied study developed criteria to measures of leadership effectiveness used at the Lawrence Livermore National Laboratory. This approach provided reliability and

construct validity for the measures used and provided results that were directly applicable to the Laboratory. The addition of the study developed subordinate assessment factor widened the leadership effectiveness assessment by using the same questions supervisors employed to assess the sample leader-managers. This research design approach has not been used in the literature. Study results indicated the measures used in this study (rank group, supervisor performance appraisal effectiveness rating, and subordinate effectiveness rating), were independent valid and reliable measures of leadership effectiveness for the Laboratory.

Sample Characteristics

Of interest is the fact that the sample leader-manager population was generally characterized as effective, credible, and efficacious, which was not surprising given the study limitation of self-selection and the sensitive nature of the leadership effectiveness measures. It could be assumed that if a leader-manager did not perceive him/herself to be effective and credible, he or she would not have allowed access to sensitive performance data and subordinate assessment of his/her behaviors. Even more interesting was the fact that the study still found that what separated effective leaders from their peers were the leadership credibility factors related to who they were as a leader, particularly their behaviors related to *modeling the way*.

Implications

One of the goals of this study was to develop a model of leadership development based on study findings. Because development does not happen in isolation but occurs within a system, implications for performance management and reward are also important for the development of effective leaders. Because the study focused on leaders who were

themselves knowledge workers and were leader-managers of knowledge workers, the development model proposed was also so focused.

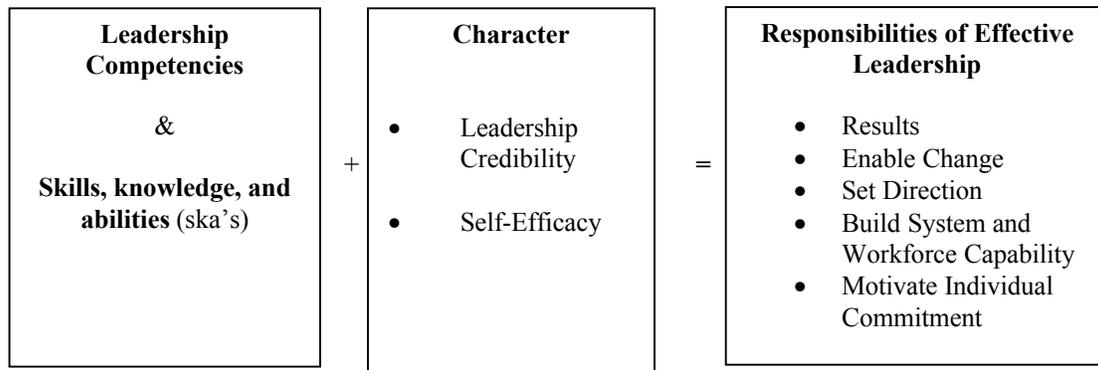
In this section the implications of the research findings for leadership development will first be discussed and a development model proposed. Next performance management and talent acquisition implications will be developed and a systems approach to leadership development suggested. Finally, implications for future research will be presented.

Implications for Development

Study findings indicated that character was an important dimension for effective leadership of the knowledge worker. To develop character, here defined to be leadership credibility and self-efficacy, more than assessment and competency development is needed. Essential knowledge related to leadership credibility such as technical competence and the “how to be aspects” of effective leadership, is often transferred between people and other leader-managers by stories, gossip, and by watching one another work (Gummer, 2000). It happens on the job through challenging assignments, feedback, and coaching (The Center for Creative Leadership, 1998). As such, peer-networks, challenging assignments, coaching, feedback and reflective learning increase in importance as learning tools. Coursework and education is needed to develop skills, knowledge, and abilities when a focused learning event or curriculum is appropriate.

Assuming that effective leadership is consistent with study findings, Figure 2 adds the character dimension of leadership effectiveness to the competency development base present in most leadership development programs.

Figure 2. Effective Leadership Model

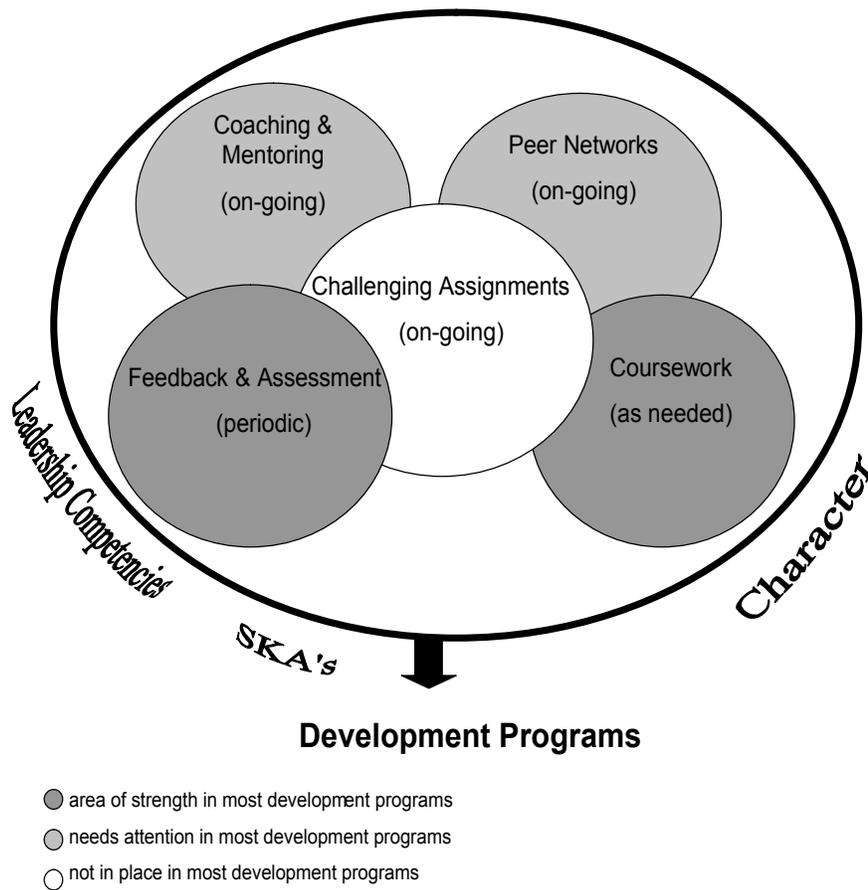


In other words, as can be seen in Figure 2, to turn aspiration into action to accomplish results for the organizations they lead, leader-managers need to have leadership competence plus character. To best accomplish the responsibilities of effective leaders as defined by the study's leadership effectiveness criteria, character was found and is proposed in Figure 2 to be an essential ingredient. The study's results indicated that character, particularly the leadership credibility factors related to honesty and setting the example, were what accounted for the level of achievement of Figure 2 specified leadership responsibilities by the most effective leader-managers as opposed to their less effective peers.

Best practice leadership development programs are competency based and relate specific competency development to coursework and assessment (Linkage, Inc., 2000). To develop character as well as competence in leader-managers of knowledge workers, the study's findings indicated a modified approach was needed. Figure 3 illustrates the proposed revision. Here challenging assignments are the centrifuge of the development approach, and building peer-networks and providing coaching and mentoring are the primary methods proposed to support assignment success. Coursework and education

options are offered as competency and skills/knowledge development is needed. Because development of character is an interactive process based on attribution by others and leader-manager self-perception, feedback and assessment are important components of the development model.

Figure 3. Shifting the Leadership Development Paradigm.



The focus of many development programs is on coursework and assessment, while less emphasis is placed on challenging assignments, mentoring/coaching, and the building of peer network support systems. While best practice companies believe that the most important developmental activities are job assignments or work experience, this is not a wide spread component of development programs nor is it applied to talent development at all levels of the organizations (Fulmer & Conger, 2004). To develop character in leader-managers of knowledge workers, a shift in the way leaders are provided training, education, and development needs to occur.

What enables this paradigm shift is a focus on learning by doing through challenging assignments and teaching others rather than learning through event focused assessment and coursework. Teaching is a way of knowing, and so is doing the work, trying different things and learning. As Pfeffer and Sutton (1999) state,

We have a plethora of seminars in which people sit and listen to ideas and concepts. We human beings can learn some things this way – mostly specific cognitive content. But many things, about the organization, operations, and people, can only be learned by firsthand experience. The tangible, physical, material aspects of knowledge acquisition and knowledge transfer, learning by doing, learning by coaching and teaching, are critical. (p. 96).

Developing character is a similar issue. Character cannot be learned in the classroom; it needs to be practiced by first hand experience and then learned by feedback, reflection, coaching and teaching others. The classroom, along with assessment results, can discuss the concepts of leadership credibility and self-efficacy and show leaders where they stand according to self and other report. The classroom can also be used to set

the value system of the organization but the behaviors and value systems needed to demonstrate character cannot be learned through coursework. Character is developed through practice and is coached through feedback and on-going learning.

Elements of the Shift

Challenging assignments, coaching/mentoring, and peer networks.

In the development model depicted in Figure 3, leaders gain knowledge and practice on-the-job through planned development placements, and are supported in these challenging assignments through mentoring, coaching, and peer-networks. Rather than being left to self-develop and apply learning in practice after assessment and competency development coursework, leaders in this proposed development model receive coaching and mentoring on the job, with support and knowledge sharing with peer-networks.

For example, self-efficacy found to be related to the leader-managers belief in the ability to be inspiring, forward-looking, and to set the example, is a developed character dimension, and is learned through increasing the task-relevance of the competency development experience (Coffin & MacIntyre, 1999). Once success is achieved, self-efficacy is increased (Bandura, 1977, 1986). In other words, the use of challenging assignments, with coaching and peer-network interaction and support, increases the task relevance of the competency to be developed. As such, when successful, the leader-manager's belief in his/her ability to accomplish the responsibilities of leadership increase, thus increasing his/her self-efficacy, both general and leadership specific.

By supporting leaders as they continue to acquire skills, Wood and Bandura (1989) found that not only does this develop the self-efficacy of leaders, but it positively impacts management expectations of employees and the accomplishment of job goals and

objectives. This implies that leadership effectiveness increases as does the leader-manager's belief in the capability of the workforces they lead.

In real work situations the leader-manager also exhibits and develops leadership credibility. Because leadership credibility is important to the relationships developed and to work results, the relational aspects of the leader-manager's work are critical. To best assist managers in dealing with the relationship results of their leadership credibility, it is helpful to see the leader-manager in action on the job and provide appropriate coaching and mentoring on an on-going basis. Rather than waiting for an organizational intervention after failure, proactive, planned on-the-job coaching in this development model becomes part of the leadership development program. When leader-manager failure occurs, it can be assumed that leadership credibility and self-efficacy also suffer. By incorporating coaching, mentoring, and peer-network support as part of the development program to facilitate leader-manager success in challenging assignments, leadership credibility and self-efficacy are developed as leadership effectiveness/success increases.

Development as a continuous process.

An aspect of the Figure 3 model is that development through challenging assignments with coaching, mentoring, and peer-network support is an on-going process rather than a one time event. Bradford and Cohen (1997) found that development needs to be a continuous and intentional process and is best accomplished through day-to-day interactions on the job. Similarly, Zenger, Ulrich, and Smallwood (2000) found that mechanisms for follow-up and tools for holding people accountable, after competency development, need to be put in place for effective leadership development. When this

occurs, leadership development is transformed from an event into a process. In supported on-the-job experiences, leaders perform in real, pressured work situations. Here they learn to fail, try again, and succeed, supported through peer-networks, coaching and mentoring. Challenging assignments, coaching, mentoring, and the building of peer network support become intentional and documented as individual development plans (IDPs) are used to record and track plans and development success. The IDP makes the leadership development explicit for the leader-manager and services as a tool for tracking development progress.

As shown in Figure 3, when development is focused on learning by doing and teaching others, the role of the leader-manager also shifts as he or she actively teaches and develops others. As the leader-manager exercises responsibility for providing employees with feedback on skills, knowledge and abilities relative to performance and for considering opportunities for employee development, the leader-manager teaches others and demonstrates leadership credibility by encouraging and enabling for success those that work with them.

Assessment and feedback.

Because character and competency development are best supported by leader-managers knowing who they are and where they stand, the best development programs are rich in assessment data (The Center for Creative Leadership, 1998). Assessment is important because it gives the leader-manager an understanding of where they are now – what their current strengths are, the level of their current performance or leadership effectiveness, and what supervisors, peers and subordinate reports see as their primary development needs. Feedback and assessment focus the development strategy and

provide encouragement as improvements in behavior and actions are made. Feedback and assessment need to include diverse viewpoints. For example, study results indicated the importance of obtaining subordinate report data to understand the attribute, leadership credibility, and to assess the achievement of the leader-manager responsibilities associated with effective leadership.

Additionally, competencies and character development make the most sense and are the most relevant to leaders if they are linked closely to results (Zenger, Ulrich, Smallwood, 2000). For example, leaders who coach (competency) may create loyalty which *results* in retention of workers; may communicate, through example, an expectation of collaboration and continual improvement (leadership credibility factor, *model the way*) that *results* in improvement in productivity; and, may create a work climate of trust and open, direct, communication (leadership credibility factor, *enable others*) that could foster quicker problem resolution and *result* in projects that are more on-target. By linking results to competency and “character” assessment data, the leader-manager can better understand the consequences of his or her behaviors and actions that are founded on his or her competency and character attributes.

Coursework as needed.

Rather than coursework being the central focus of the leadership development program, Figure 3 proposes that coursework be provided as needed, when the leader-manager needs skills and competency development or when the organization needs to lay a foundation of expectations, knowledge, or skills. For example, the importance of setting a value system or basic knowledge, such as safety, and accompanying expected behaviors may be an important focus of the organization and may be best initiated by coursework.

Similarly, competencies around performance management, basic supervision, conflict resolution, communication, etc., are often best, first introduced in a classroom setting and then practiced on the job with coaching, mentoring, or peer network support. As such, coursework needs to be easily and readily accessible and when part of a standard, required curriculum, tied to an explicit business driver or organizational need.

Implications of the Model for Development Programs and Staff

Given the shift in the proposed leadership development program from a focus on course work and assessment to a development program focused on the explicit use of challenging assignments and coaching, mentoring, and peer-network support, development program strategies and staff qualifications and expertise also need to shift. To implement the Figure 3 development model, development staff becomes internal consultants, not trainers and curriculum designers.⁶ More focused on organization development (OD), staff become consultants and coaches to the leader-manager of knowledge workers both as the leader-manager, as supervisor, consciously uses challenging assignments and development opportunities to build his or her staff and as he or she interacts on-the-job in challenging assignments.

Peer network development becomes an explicit focus of job and team assignments and the maintenance, use, and feeding of these networks a part of development staff, as internal consultants, support responsibilities. Development and learning become part of the climate of the organization, which is modeled by the leader-managers and is coached by the internal consultants. The internal consultant, rather than focusing on event driven

⁶ Note that this discussion is focused on leadership development programs, not technical skills training. Organizations responsible for technical and job skills training will continue to need to be trainers and curriculum designers.

strategic planning, facilitation, and teaming building services, becomes the designer and facilitator of the leadership development program.

This focus implies that development departments have a larger internal consultant/OD staff than training and education staff, and that coursework design and implementation are streamlined by technology, self-directed learning opportunities, and vendor presented or externally provided courses. As development staff become more closely aligned with the business of the organization and directly tied to developing leader-manager's for success, the training and development function becomes a strategic partner critical to improving leader-manager success and thus to the success of the organization. By redefining itself, the leadership development function becomes an imbedded business partner not an appendage providing services that could be provided by others. Assumptions of this shifting paradigm illustrated in Figure 3 are that bottom-line business results will improve and that this improvement in business result has important implications for the success of leadership development programs.

Implications for Performance Management and Talent Acquisition

Performance Management

Because development occurs within a system, performance management including feedback and reward are important elements of the development system, and thus of the proposed model. As is case with the Lawrence Livermore National Laboratory, the responsibilities and results of effective leadership are evaluated through the performance management process and linked to reward. If properly linked, the performance management system reinforces the IDP of the leader-manager by pointing to

the competencies and character dimensions needed to achieve the results of effective leadership for the organization.

Direct reinforcement through the performance management process of the competencies and character dimensions expected of leader-managers, serves as an important element of the development process. For example, the performance management process can be used to provide feedback on how the leader-manager is performing in comparison to others on the leadership competencies and character dimensions identified as important to the organization. A caveat of this approach is that when performance feedback is linked with evaluation and reward, often the development focus is lost if the organization is not characterized by a culture that is developmental. In such cases, performance feedback is often used as a hammer for failure in comparison to others rather than as a mechanism to pinpoint development opportunity and growth; here linking the leadership development program with the performance management process is not recommended.

Using complexity theory as a design basis (Marion & Uhl-Bien, 2001), the performance management system, regardless of whether concerned with leader-manager responsibilities or competencies and/or character dimensions, needs to focus on leader-manager behaviors that enable organization effectiveness as opposed to actions that guide individual effectiveness. In other words, the performance management system needs to focus on those leadership characteristics (competencies, skills/knowledge/abilities, character dimensions) and/or responsibilities expected by the institution to be needed for institutional success. Such focus also makes the values of the organization explicit by measuring those actions and behaviors that are important to the institution. In a sense, by

so doing, the institution models the way by establishing values about how constituents, colleagues, and customers ought to be treated and then creating the standards of excellence by which performance is evaluated and rewarded.

In collecting this information, the study's results indicated that subordinate-report feedback was an important factor. Given the study's results found that subordinate report and supervisor leadership effectiveness ratings were not in the same direction when individual cases were considered, inclusion of subordinate feedback on leader-manager performance is important to obtaining a well-rounded picture of leader-manager behaviors and performance.

Additionally, given the study's finding that it was the "how to be aspects" of leadership credibility as attributed by others that separated the most effective leader-managers from their peers, a reward system that includes methods to reinforce these character factors would encourage the development and demonstration of these attributes. For example, rather than rewarding only results, behaviors in which leader-managers demonstrated leadership credibility to others, could be options for spot awards or other recognition.

Talent Acquisition

In continuing to think of leader-manager development as a system, study results also have implications for talent acquisition. Rather than structuring job ads and interview questions based solely on competencies and demonstrated performance, the personal competencies or character dimensions needed for leadership success could also be considered.

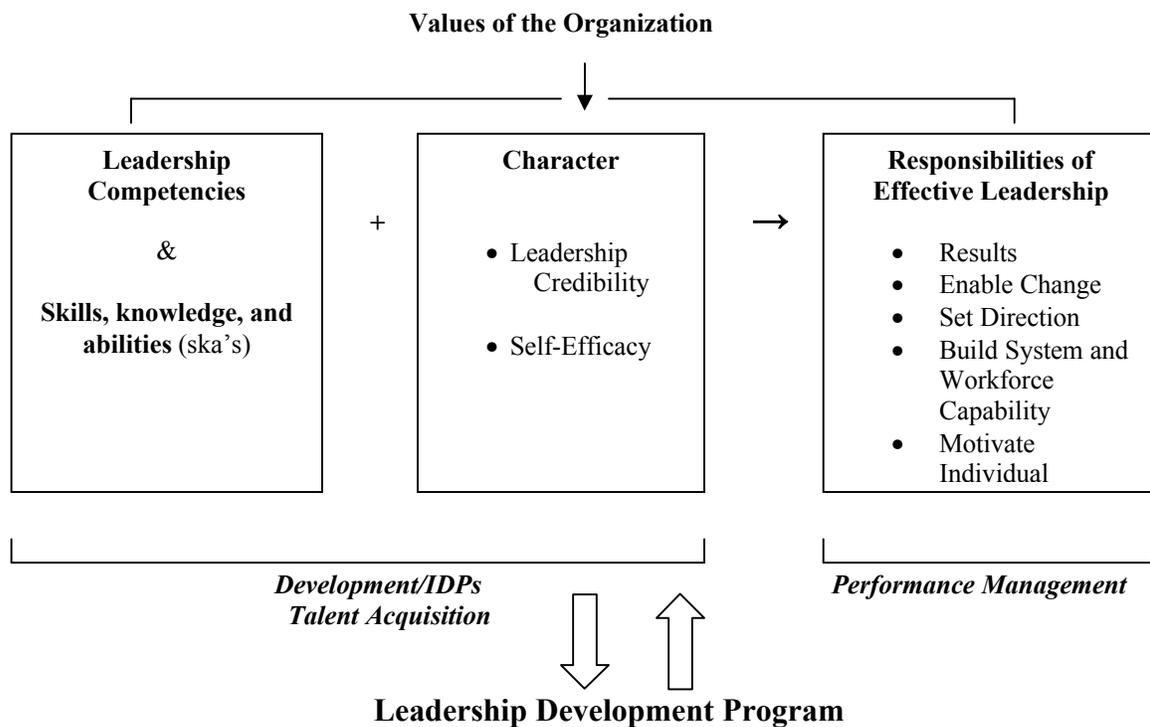
Interestingly, Organization Systems International (OSI) now includes core intrinsic qualities such as adaptability, composure, high standards, and integrity in the competency card decks used by organizations around the world to identify competencies for job searches and question sets for candidate interviews. The OSI card decks have been used at the Lawrence Livermore National Laboratory for the past six months. Of particular interest is the fact that in this six month period, the core intrinsic quality, integrity, has been identified as one of the core competencies desired by all Laboratory management search committees initiated during this period. Integrity is defined by OSI (2002) as, “Effective performers think and act ethically and honestly. They apply ethical standards of behavior to daily work activities. They take responsibility for their actions and foster a work environment where integrity is rewarded” (p. 21). The OSI definition of integrity appears to be closely related to the leadership credibility factors used in this study and related to the study’s results that found the most effective leaders of knowledge workers at the Lawrence Livermore National Laboratory to be those that were honest, trustworthy, set the example, and valued the workforces they lead.

Use of leader-manager competencies and character dimensions important to the organization in candidate interview questions and selection criteria further aligns the human resources organization with organization success by creating a coherent talent acquisition, development, and management process for the organization. By this alignment, the organization drives those competencies and character dimensions important for leader-manager success through the organization; and, by so doing, enhances the leadership development program and results.

A Systems Approach to Leadership Development

As Figure 4 illustrates, development of “character” requires a systems approach to leadership development. Here the human resource performance management, talent acquisition and leadership development programs are aligned and reinforce the competencies, character dimensions, and leadership responsibilities expected for organization success. The development of “character” occurs within a system, as shown in Figure 4, first founded on the values of the organization and then developed and reinforced through human resources development, performance management, and talent

Figure 4. HR Systems Approach to Leadership Development



acquisition practices. Leadership development program objectives are reinforced through this alignment and leader-managers are provided with an explicit framework for

developing the competency and “character” dimensions needed for leadership success. By working in alignment with other human resource programs, the leadership development program helps to create a larger leadership development system and in so doing, better addresses the competency and “character” development needs of their leader-manager customers.

Implications for Future Research

Suggestions for future research are raised by understanding the limitations of the study’s design and by the possibilities of further exploring the study’s findings. Implications for future research will be discussed by categorizing the discussion by these dimensions - research design/study limitation implications and finding theoretical extensions.

Research Design/Study Limitation Implications

There were two main themes that emerged from the limitations of this research study. One theme having to do with inclusion/exclusion of leader-managers participating in the study given the sensitive nature of the data to be collected and the data collection methods; and, one theme related to the sample and the organization studied.

Given the sensitive data used to measure leadership effectiveness in this study – performance appraisals, rank group, and subordinate assessment – it is not surprising that the study found that those leader-managers agreeing to participate in the study were generally evaluated as effective leaders. If the study were to be redesigned, less sensitive data measures could result in a sample with a greater dispersion of scores on the leadership effectiveness measures. In other words, using standardized measures of leadership effectiveness such as transactional vs. transformational leadership factors.

could result in a wider dispersion of effectiveness scores in the high, medium, and low groups of effective leaders. What would be lost in such a design would be the organization specific application of the effectiveness measures and resulting organization specific application and use of study findings.

Additionally, the use of a standardized survey to measure leadership credibility and self-efficacy limited responses to pre-established answer choices. This was problematic in this study for the lack of a “not applicable” or a “do not know” category was reported by some subordinate-report sample respondents to be an issue. At the Lawrence Livermore National Laboratory, employees often work in matrix assignments, assigned to one leader-manager as the discipline host and to another leader-manager for project assignments. This arrangement was reported by five subordinate-report sample respondents to have affected the knowledge they had about the behaviors of their leader-manager. Having the option for a “not applicable” or a “do not know” response on the subordinate-report E-survey questionnaire would have addressed this issue and should be considered in future research.

In terms of other approaches to research design particularly as applied to the sample and sample organization studied, the expansion of the study to include leader-managers in administrative and operations directorates in addition to the technical directorates at the Lawrence Livermore National Laboratory would be interesting to explore. Were study findings indeed related to being leader-managers of knowledge workers at the Laboratory or were they related to being leader-managers at the Laboratory? Similarly, expansion of the study to include organizations of knowledge workers other than the Lawrence Livermore National Laboratory would increase the

generalizability of study results, particularly if the organizations studied were universities, hospitals, and business related organizations, not other national laboratories. Given that the Lawrence Livermore National Laboratory is a public sector organization, private sector leader-managers of knowledge workers would also be an important study sample expansion to increase study finding application and use.

One confound not addressed in the study was management competence. Future study could be designed to measure management competence with an instrument such as the Management Development Questionnaire (Cameron, 1997), and then along with the leadership effectiveness measures, explore the relationship of both management and leadership effectiveness to the character dimensions - self-efficacy and leadership credibility. With the hypothesis that management may be more important in organizations with fewer knowledge workers, use of a means to measure management competence would be particularly important for such future research.

Similarly, the relationships between leadership effectiveness and only two character dimensions were explored in this study. Another possibility for future research would be to explore the relationship between additional character dimensions and effective leadership of the knowledge worker, perhaps building on the emotional intelligence work of Goleman (1995, 2002) and others.

Theoretical Extensions

The study's findings indicated that current research on leadership credibility and self-efficacy may need further exploration and extension. While study findings were not definitive and the limited study sample not representative of the larger leader-manager population, results pointed to the possibility that the theoretical framework for leadership

credibility, particularly as measured by the Leadership Practices Inventory (LPI), may benefit from further research. Similarly, given the limited research in the area of self-efficacy and leadership, study findings indicated that the relationship between self-efficacy and leadership effectiveness may be worthy of further exploration. These leadership credibility and self-efficacy research extensions will be separately discussed.

Leadership credibility.

In their work on credibility and exemplary leadership practices, Kouzes and Posner (1993, 1995) imply that the five factor Leadership Practices Inventory (1997) measures leadership credibility. Concerned that this was not the case, this study added a study developed technical competence factor to ascertain that all factors of credibility – honest, forward-looking, inspiring, and competent – found by Kouzes and Posner (1993) to represent credibility, were measured. The fact that study findings indicated technical competence was significantly but not highly correlated with the five factors measured by the LPI in the sample studied, points to an opportunity to further explore this factor relationship. If the LPI is to be used to measure credibility, future research may need to ascertain that competence is indeed addressed by the five factors on the LPI, as the authors contend (Posner, 2002).

Additionally, Kouzes and Posner (2000) found that the relationship between self- and other-report on the LPI was in the same direction. Study findings indicated that though this was the case in general, when individual cases were analyzed this relationship was not maintained. In other words, this study found that subordinate-report and self-report of leadership credibility were not in the same direction when individual cases were considered. Future research may want to further explore this relationship.

Of particular interest was the study finding that *model the way* was the leadership credibility factor that most differentiated the high, medium, and low leadership effectiveness groups at the Lawrence Livermore National Laboratory. Because this leadership credibility factor, by definition, appears to be related to many of the questions included on the Management Behavior Climate Assessment (Sashkin & Levin, 2000), use of the MBCA to further explore the relationship between leadership effectiveness and credible leadership as measured by organizational trust, is another opportunity for future research.

Self-efficacy.

While the study did not find a significant relationship between leadership effectiveness and self-efficacy, whether general or leadership specific, it did find a relationship between self-efficacy and a leader-manager's perception of his/her ability to *inspire a shared vision, challenge the process, and model the way*. Given the fact that Paglis (1999) found a relationship between leadership specific self-efficacy and leader motivation to attempt the leadership of change, further research to explore the relationship between self-efficacy and leadership effectiveness, particularly on the enabling change and setting direction leadership effectiveness criteria, may be indicated.

The study's found relationship between general self-efficacy and leadership specific self-efficacy was also interesting and may be an opportunity for future research. Study findings indicated that leadership specific self-efficacy explained over half of the variance in general self-efficacy in the leader-manager sample. This finding further validates the Paglis (1999) leadership specific self-efficacy scale and seems to indicate

that a leader's general belief in him/herself is related to his/her courage to assume the tasks of leadership.

Conclusion

Ulrich in the forward to the Zenger and Folkman (2002) book, *The Extraordinary Leader*, wrote about the importance of character in leadership stating, "Everything about great leaders radiates from character. Character improves the probability of exhibiting strong interpersonal skill. Some of this perceived character is innate . . . but more is driven by the leader's self-awareness and interactions with others" (p. ix). The purpose of this study was to explore the relationship between leadership effectiveness and character using leader-managers of knowledge workers as the subject sample. Findings indicated that character, particularly those factors associated with honesty, setting the example, and valuing and strengthening others, were what set the most effective leader-managers apart from their peers. Technical competence and self-efficacy were found to be common characteristics of the study sample as was a drive for results.

Who a leader-manager is, his/her substance, was found in this study to differentiate the "best" leader-managers at the Lawrence Livermore National Laboratory. By their character, leader-managers establish the environment in which knowledge workers contribute and grow. As found by Pfeiffer (2000),

Leaders of companies that experience smaller gaps between what they know and what they do (to turn knowledge into action), understand that their most important task is not necessarily to make strategic decisions, or, for that matter any decisions at all. Their task is to help build systems of practice that produce a more

reliable transformation of knowledge into action. Leaders create environments, reinforce norms, and help set expectations through what they do. (p. 261)

In other words, as confirmed by this research study, their task is to *model the way*.

Study results also confirmed Ulrich's (1996) supposition that to create the "air" in which employees work, leaders have the personal characteristics that engender trust and commitment. In other words, as study results confirmed, the most effective leader-managers establish trusting relationships and strengthen others – they *enable others*; and, are just, fair, sincere, and recognize contributions – they *encourage the heart*.

Based on study findings, the leadership development model proposed was founded on the premise that character can be developed, particularly if done so through assessment and challenging assignments, with coaching, mentoring, and peer network support. However, development of character requires a shift in our leadership development programs. What causes this shift is a focus on learning by doing through challenging assignments and teaching others rather than learning through event focused assessment and course work. Character cannot be learned in the classroom; it needs to be developed through experience and then learned by feedback, reflection, coaching, and teaching others.

Study findings indicated that knowledge workers want to be encouraged, believed in and lead by those they trust to inspire them to accomplish the goals and objectives of the organization. To cause a workforce to generate intellectual capital for the organization, study findings found that the leader-manager's "character" does make a difference.

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