



## Literature Review: e-Leadership

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This article reviews existing literature on e-leadership and the attendant concept of virtual teams. Current scholarship of e-leadership says the goals of leadership have not changed, but the new e-leader needs to implement those goals electronically on computer-mediated virtual teams that are dispersed over space and time. What is very different is that the e-leader may never physically meet one or more of the followers, and that the main communication medium is the computer. The new paradigm provides a range of new opportunities: the ability to instantly communicate one-on-one with employees, customers, and suppliers; the capability to use talent wherever it exists; the opportunity to enhance organizational performance by assembling better multi-functional teams, and to improve better customer satisfaction by using the “follow the sun” methodology; the ability to cut costs; and, scope for better knowledge management. These can positively impact an organization’s competitive advantage. However, e-leaders also have new challenges: how to bridge the physical distance from the followers; how to communicate effectively with far-flung team members; how to convey enthusiasm and inspire followers electronically; how to build trust with someone who may never see the leader; and so on. The article discusses what new skills the e-leader might require for success. It also examines the concept of the virtual team from various angles: structure, communication, degrees of virtuality, multi-cultural issues, trust-building, ethical issues, and so on. Finally, the technology that supports e-leadership and virtual teams is briefly discussed.

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This article presents existing literature on e-leadership. This researcher primarily utilized the following databases through the Regent University Library access: ABI/Inform, Business Source Premier, EBSCO Online, Emerald Management XTRA, IngentaConnect, and ScienceDirect. The following major key words, phrases, and their variants were used in researching the databases: *e-leadership, eLeadership, virtual leadership, distant leadership, tele-leadership, leading from a distance, leading through telecommunications, leading through ICT, leading virtual organizations, leading virtual teams, and leading virtual workforces*. Seventy-seven journal articles were ultimately shortlisted for this study and reviewed. The existing body of knowledge thus discovered falls under three categories: e-leadership; virtual teams and workforces; and technology.

## e-Leadership

The articles in this section define and explore the relatively new leadership paradigm of e-leadership that has arisen in little more than a decade. Authors identify: (a) what is common between e-leadership and the traditional forms of leadership, and what is different; (b) what are the new opportunities and challenges; (c) what are the new skills required by this new generation of leaders; and (d) how do existing leadership theories apply in this new paradigm.

Zaccaro and Bader (2003) noted that today's organizational leader grapples with two interrelated forces: (a) the increasingly global dispersion of divisions and subunits, customers, stakeholders, and suppliers of the organization; and (b) "the exponential explosion in communication technology" that has led to "greater frequency of daily interactions with colleagues, coworkers, subordinates and bosses" dispersed geographically. As a reaction to these changes, "organizational scientists have begun to talk about 'e-leadership' to refer to leaders who conduct many of the processes of leadership largely through electronic channels." The authors postulated that in view of the rapid technology growth in organizations and their increasingly global reach, in the near future "e-leadership will be the routine rather than the exception in our thinking about what constitutes organizational leadership."

Avolio, Kahai, and Dodge (2000) reviewed existing literature to reach a broad understanding of what constitutes e-leadership in organizations. This article represents one of the first instances of the use of the term *e-leadership*: "We chose the term e-leadership to incorporate the new emerging context for examining leadership." The authors defined e-leadership as "a social influence process mediated by AIT (advanced information technology) to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations." They also asserted that e-leadership "can occur at any hierarchical level in an organization," involving both one-to-one as well as one-to-many interactions over electronic media. The authors used the Adaptive Structuration Theory (AST) to study how technology and leadership impact each other – more specifically, how technology impacts leadership and is itself changed by leadership. AST is based on the theory that "human action is guided by structures, which are defined as rules and resources that serve as templates for planning and accomplishing tasks." The authors' research indicated that technology creates organization structures of which leadership is a part, but at the same time, these organization structures continue to be transformed by the impact of leadership and technology. Leadership and technology, therefore, enjoy a recursive relationship, each affecting and at the same time being affected by the other; each transforming and being transformed by the other. Avolio et al. also examined in detail the available research for a special case of advanced information technology called Group Support Systems (GSS). According to the authors, GSS "represents a microcosm

of the potential effects that can occur concerning the interface between leadership processes, group processes, individual processes, and AIT at a group level, and over time at organizational and inter-organizational levels." GSS is especially relevant for an understanding of e-leadership because it is one information technology domain where research has specifically examined leadership style and processes. According to the authors, "the repeated appropriation of information technology generates or transforms social structures, which over time become institutionalized." They discovered that the use of GSS can transform behavior from "working with a norm of equality of input, which was more consistent with the system's spirit, to one based on hierarchical norms," as groups became more comfortable allowing for everyone to provide input. This, the authors observed, enhanced the group's interactions "beyond the GSS designer's original intent." The researchers identified the key characteristics of an AIT-enabled economy as "real-time information availability, greater knowledge sharing with stakeholders, and the use of this information and knowledge to build 'customized' relationships," and noted, "one of the main challenges leaders face today is how optimally to integrate human and information technology systems in their organizations to fully leverage AIT." The authors also noted that although organizations implement AIT with the expectation of business and personal benefits including increased efficiency, productivity, and profitability, "no demonstrable relationship between dollars invested in AIT and corporate profits has been reported." On the topic of e-leadership's adaptation to new technology, the authors noted that "the leadership system in an organization can be characterized by its spirit or intent," and that "consistency between the leadership's spirit and AIT's spirit is important for faithful appropriations, and will likely predict how successful or unsuccessful insertion of new technology will be in an organization."

Kissler (2001) began his examination of e-leadership by posing the question: "what kind of leadership will be required for the pursuit of e-business?" Noting the prior premise that all previous business challenges occurred within a market characterized by incremental change, Kissler took the position that "the past – from a business leadership perspective – can be prologue to the future," and offered "a review of historic drivers of discontinuous change in support of such a view." Beginning with a review of documented past successful leadership actions in organizations such as General Electric Co., Cisco Systems, Owens-Corning, Dell Computer, British Airways, Citicorp (now Citigroup), Aetna, and Wal-Mart Stores, the author suggested that "today's leaders adopting an e-business strategy would face similar fundamental leadership challenges." Kissler examined what he called "an interesting array of actions" that successful leaders have taken to address discontinuous change, and suggested that a study of this evidence has important implications for e-leadership. The categories of the "more successful actions" reviewed by the author include: organizational mind share; "FuturePrint;" organizational alignment; proximity management; creative tension;

sense of urgency; development of people; leading by values; and, resistance and air-cover. In examining these actions, Kissler showed the primary actions that have been taken by successful leaders over the years, and then offered "e-business insights (the 'e' factor) that provide clues as to how these actions might be modified in today's business environment." The author concluded by identifying some e-leadership attributes from Toffler: cognitive skills and education; quick adaptability to change; flexibility; ability to work for more than one boss; the ability to keep ones' heads in the midst of disorder and ambiguity; experience in several different fields and the ability to transfer ideas from one to the other; individuality; and entrepreneurialism.

Walker (2000) defined an e-business as a company whose "Internet-based activities are the primary source of its revenues and profits." The author examined the practices necessary to build organization success and prosperity in the "internet economy," and acknowledged that "the pressure is intense for capable leaders" desiring to build successful e-businesses. Walker addressed the issue of rapid change that is symptomatic of modern times, and noted that building successful enterprises today requires leadership to effectively manage this rapid business change. In many cases, "old economy" companies are cannibalizing their old businesses in order to accelerate e-business growth (Walker). According to Walker, transformation in the face of resistance is the major leadership challenge. Finally, the author stated that in general, e-business is becoming a part and parcel of every business strategy, a potent and omnipresent "state of mind" in leadership, regardless of whether a company is building from scratch or transforming from an established business.

Annunzio (2001) dramatically drove home his perspective of this new model of leadership with a deliberately exaggerated scenario: "What if one morning you arrived at your corporate offices and no one was there?" The author focused on the e-leader's need to generate inter-generational cooperation (meaning, between the baby boomers, and the generations X and Y). In general, the author aimed to prepare e-leadership to respond to the new rules of competition in the digital age; to introduce the rhetoric of change in the organization and help bridge the gap between what is stated and what is practiced; to assist e-leaders attract the best talent from generations X and Y; and to underscore the enduring goodness of traditional corporate America. Annunzio identified seven distinguishing factors of the new e-leadership: honesty, responsiveness, vigilance, willingness to learn and re-learn, a sense of adventure, vision, and altruism. The author addressed the need for inter-generational cooperation with out-of-the-box leadership advice, such as to ask "unaskable questions," speak "unspeakable truths," "make loud statements," "communicate irreverently," and so on. The author concluded by saying that the evolutionary e-leader has a compelling need to make a difference.

Hanna (2007) authored a large World Bank study of e-leadership as it applies to the government sector and public institutions. Hanna sought to come up with information that will help countries to move “from visions of the potential of the ongoing information and communication technology revolution” to “real competitive, innovative and knowledge-based economies.” The author identified several broad trends in governments across the world: (a) there is a shift toward direct and institutionalized engagement of the president, prime minister, CEO or a powerful coordinating ministry like finance or economy as the “e-leader” in government; (b) countries have moved from ad-hoc responses, informal processes, and temporary relationships to institutionalized structures to respond to the challenges of the knowledge economy and technology-enabled development; (c) many countries are opting to create an independent and strong national ICT agency that reports directly to the president, prime minister, or the equivalent; and (d) as e-government programs take hold and mature, countries start to fully integrate e-government into the governance framework and activity of each sector and agency. Hanna went on to discuss the definition of e-development, the strategic issues in designing e-institutions, five basic models for e-institutions, critical success factors, and core institutional capabilities. The author concluded with a call for more research.

Avolio and Kahai (2003) discussed how technology is affecting leadership in organizations by defining e-leadership and exploring how e-leadership impacts leaders, followers, teams, and organizations. The authors described e-leadership as not just an extension of traditional leadership, but as being “a fundamental change in the way leaders and followers relate to each other within organizations and between organizations.” The authors also noted that some fundamentals of leadership will probably always be the same, even in this new context. The authors concluded with some practical observations emanating from their research on e-leadership. The imperative behind e-leadership was created by what the authors described as the “quiet revolution” that resulted in the “wiring of organizations so that many significant human interactions are now mediated by information technology.” The authors described leadership as “a dynamic, robust system embedded within a larger organizational system.” They went on to explain that well-defined organizational structures delineate “the relationships expected among people who work in those organizations.” ICT (information and communication technology) today implements these same organization structures electronically across time and space, where not only does the communication between leader and follower take place via information technology, but even “the collection and dissemination of information required to support organizational work” is discharged via the electronic media (Avolio & Kahai). Today, leaders may lead entire projects from a distance and interact with followers or team members solely through information technology. E-leadership takes shape in the virtual context where collaboration and leader-follower interaction are mediated by

ICTs, and e-leadership aims to create and distribute the organizational vision, glue corporations or individuals together, as well as direct and supervise the execution of the plans. Like traditional face-to-face leadership, e-leadership too can be inspiring by communicates via e-mail or other electronic means their pride in the accomplishments of various teams, reinforced periodically by stories shared electronically throughout the organization. The authors emphasized that they are “fairly confident that leadership mediated by information technology can exhibit exactly the same content and style as traditional face-to-face leadership.” Referring to how access to information and media has changes, the authors mentioned that followers today have access to the same information that leaders have, and this puts pressure on the leadership to be ready with all the latest facts to justify their position at any time. Today a disgruntled employee can instantly communicate their angst to hundreds, if not thousands, of colleagues at the touch of a button. The authors advised e-leaders to balance the traditional with the new, to openly communicate their intent, and to fully use technology to reach-out and touch others.

Hamilton and Scandura (2003) examined the concept of e-mentoring in a digital world as a necessary corollary to e-leadership; identified potential benefits and challenges; and discussed the opportunity to extend technology to address relationship building and nurturing. Underscoring the importance of mentoring in general, the authors quoted other scholars to justify that in the race to the top, mentoring can make a difference. Hamilton and Scandura discussed the barriers to e-mentoring, such as organizational barriers, individual barriers, interpersonal barriers, and the changing nature of work. The authors explored the e-mentoring dimensions defined by functions and phases. Technology is a critical component of e-mentoring, and the use of technology can be influenced by situational factors, social factors and usability factors. Gender, ethnicity, age and personality also play a part. Integrating technology with the traditional mentoring models is a challenge that must be overcome. The authors concluded the e-mentoring is important and extends the use and flexibility of the traditional mentoring models across time and space.

Avolio, Walumbwa, and Weber (2009) observed that leading virtually not only involves leading people from different departments and divisions of one’s own organization, but sometimes even people from competitor companies. In such virtual teams, challenges are more likely to occur when the target sphere of influence spreads across multiple time zones; when local communication and human infrastructures fail; when there is incompatible hardware and software that require integration; or when local work demands necessitate the urgent attention of co-located managers and workers, “thereby creating pressure to pursue local priorities over the objectives of distant collaborators.” The authors identified some common questions regarding e-leadership in general: How does the nature and structure of technology impact leadership style influencing follower motivation and performance? What is the effect of e-leadership on trust

formation? Will the nature of the technology such as its richness or transparency be a factor in building trust in virtual teams? How will mediation through the computer affect the quality and quantity of the communication between team members? How will the nature of the task and its complexity influence how leadership affects virtual team performance?

Malhotra, Majchrzak and Rosen (2007) studied virtual teams to identify the best leadership practices of effective leaders of virtual teams. The study collected survey, interview, and observational data and concluded that successful e-leadership practices included the ability to: (a) generate and sustain trust through the utilization of ICT (information and communication technology); (b) make sure that distributed diversity is both clearly understood as well as well appreciated; (c) effectively monitor and manage the life cycles of virtual work; (d) monitor and manage the virtual team's progress with the use of technology, (e) extend the visibility of virtual members both within the team as well as outside the company; and (f) help ensure that individual team members do benefit from the team.

Pulley and Sessa (2001) explored the impact of digital technology on leadership and identified e-leadership as a complex challenge that is defined by five key paradoxes: (a) swift and mindful; (b) individual and community; (c) top-down and grass-roots; (d) details and big picture; and (e) flexible and steady. In order for people to overcome the challenge of e-leadership, people in organizations must make sense together of the challenges facing them, and participate in leadership at every level. According to the authors, perhaps the greatest e-leadership challenge is how to make individuals work collectively to create a culture that allows all the voices of leadership to be heard.

Gurr (2004) argued that although e-leadership is a relatively recently emerged concept with continuing conceptual ambiguity, there are significant differences between leading traditional organizations and those that have technology-mediated environments. These environments appear to require leaders to cope with paradoxes and dilemmas, and with the associated behavioral complexity. The e-leader must necessarily establish an appropriate social climate through sustained communication, and be able to convey exemplary interpersonal skills through the associated technology. E-leadership also poses greater emphasis on dispersed leadership. In some situations, such as anonymous groups, formal leadership may be detrimental to group performance. Although more research is indeed required, even at this early stage in the development of e-leadership it is quite apparent that leadership in technology-mediated environments as a special niche is important to us.

Shulman (2001) searched for e-leadership in the food industry and found it missing. The author proposed that the emergence of e-leadership will require industry-level

guidance to the uncommitted, sharing of experience from leaders to followers, and, a regular forum where “the involved and the curious can exchange ideas.”

Kerfoot (2010) defined virtual leadership as leading an organization that is other than physical; in other words, it is the management of distributed work teams whose members predominantly communicate and coordinate their work through the electronic media. Virtual leaders are "boundary managers" who inspire people from a distance to develop self-management capabilities. Virtual leaders must focus on the interfacing with the environment. The author focused on the healthcare industry. Distance leadership (or virtual leadership) was found to be increasingly replacing traditional leadership because advancing technologies can support new models of health system communication. Successful virtual leaders learn how to cross time, space, and culture barriers to make improvements across small and large entities in distant venues where direct supervision and interaction are impossible. New skills are required for creating and sustaining high-performance groups across diverse boundaries. The author concluded that the virtual leader must depend on coaching rather than supervision.

Watson (2007) investigated the distributed work environment by specifically focusing on leader behavior and its impact on subordinate outcomes, such as commitment and satisfaction with supervision. Today, the geographic distance between workers is increasing, and this study asks if the traditional core set of leadership behaviors is effective in distributed work environments, and how those behaviors impact followers' work results. Fundamental questions that were explored included: (a) essential management behaviors such as consideration and initiating structure; (b) the types of leadership that can have the most positive impact on employee's perceptions of satisfaction with supervision and organizational commitment; and (c) the importance of the amount of face time between the manager and employee. The author reported that correlational data results did not support the hypotheses that face-to-face interaction scores were positively correlated with affective commitment or satisfaction with supervision. Face to face interaction was not negatively correlated with continuance commitment. Physically co-located employees reported significantly higher levels of satisfaction with management than did remote employees. There was a significant difference between virtual and physical employees, with co-located employees reporting higher levels of career advancement than virtual employees. There was also a stronger relationship between initiating structure and satisfaction with supervision when geographical distance was high; therefore, it appears that spatial distance actually acted as an enhancer.

Davis (2004) declared that his goal is to share with western managers some eastern concepts about leadership that may help its practice at a distance (i.e., the practice of e-leadership). The author quoted Robert Frost and Tao Te Ching to underscore the same



east-west synergy of leadership ideas. However, Davis showed that the east-west ideas are contradictory; he described that while the west believes that leaders obtain their power from a transcendent source, the east believes that leadership materializes from a state of being that transcends the individual leader and is shaped by a mixture of his or her character and circumstances, and that the development of the appropriate inner state and character of leaders will enable the leader to lead wisely. This is critical for leadership in virtual teams because the virtual team members seldom meet face-to-face and must use ICT (information and communication technologies) to bridge differences in time and space. When virtual teams consist of members from multiple nations, they become global virtual teams. Global virtual teams can transfer work from East to West as the earth rotates to maintain continuity of work on a 24x7 basis. This “follow-the-sun approach” to organizing work makes special demands on leadership because e-leadership must be exerted across time and space. The definition of work is no longer limited to the confines of a single workday, and e-leadership must stretch its boundaries to match the elastic nature of global work. Successful globalization requires elasticity, openness to change, and extraordinarily gifted managers. Virtual teams help global firms to use the best talent wherever it is located. The global search for talent must also include ideas from other nations and cultures. Taoism, the oldest set of beliefs and practices in one of the world’s oldest cultures, helps us to understand how the world changes and our place in it. Leadership practice that is rooted in Taoism is transformational and can make virtual teams more effective.

Colfax, Santos and Diego (2009) argued that virtual teams are a necessity in today’s global, and increasingly even in regional businesses, when operations and employees with special talents are unwilling to relocate. Traditionally key employees – experts with technical skills or senior managers who were urgently needed to head up operations in a foreign location – were relocated along with company expansion and change. But the roles and needs of global operations in the new “green era” are transforming this traditional paradigm. Leaders and thinkers are confronted with the need for a fundamental business transformation that is the result of recent global economic changes. It is imperative to develop a virtual management style that takes advantage of the available technologies and minimizes forced face-to-face environments. This need to adopt and expand virtual leadership, as well as virtual communication, challenges the conventional ways of doing business. Virtual work teams are now critical, and so is the need for the development of a new virtual organizational management paradigm. This necessitates regular training of managers and team members, establishment of trust, and fully embracing delegation and constant inclusive communication among all team members. This is creating the next type of leader style called the e-leadership that will reach around the globe and effectively manage virtual teams and virtual operations. Colfax et al. concluded with the hope that

we can understand and face these challenges so that we can bring global operations successfully into the "green era."

DeRosa (2009) asserted that as virtual teams become more prevalent, organizations must take a close look at how to best ensure the success of these teams. Virtual teams' leadership must manage from a distance and will, consequently, face unique issues and challenges.

Yagil (2002) studied the ascription of charisma to socially close and distant leaders. Participants included 554 Israeli combat soldiers, who completed five questionnaires describing their perceptions of either their platoon commander (closer) or their battalion commander (more distant). The results showed that the charisma was attributed to socially close leaders based on (a) the ascription of extraordinary traits to the leader; (b) the perception of the leader as a behavioral model; and (c) his confidence in the individual. However, charisma was attributed to distant leaders based upon (a) the willingness to accept the leader's ideas; (b) the perceived confidence of the leader in the group; (c) the perception of extraordinary traits in the leader; and (d) a general positive impression of the leader. The author discussed these results with regard to the influence of situational variables on the attribution of leadership qualities.

Shriberg (2009) noted that while just a few years ago virtual leadership seemed a task only relevant for international conglomerates, today virtual leadership is essential for almost any business that strives to grow and expand. The company need not have offices in foreign countries or even different cities, in order for management to leverage virtual leadership and virtual teamwork. Virtual leaders need to build technical and human support systems that are "able to sustain the synergy of the team." Support is also required in building tools that foster teamwork and collaboration between team members. Virtual leadership is a paramount task that demonstrates the effectiveness of a leader. It is a very complex act to lead a group of people who are located in different countries, have different time zones, and speak different languages.

Mobley (2003) observed that many multinational firms operating in Asia in the late 1970s were simply sourcing or assembling for export in joint ventures. But today, one sees the accelerating development of global research and development and design centers to Asia; the development of India and China as global software centers; and the development of multiple bio-science centers in Asia. The author explored distance virtual leadership, leadership styles, leadership's value base from a Chinese perspective, organizational culture, influence tactics, economic transformation, localization, and human resource (HR) strategy in China, Asia and other cross-cultural perspectives.

Banerjee and Chau (2004) examined e-leadership in the context of e-government. The e-government objectives of a country go well beyond providing constituents with government information and services by leveraging information and communication technology, the ultimate desired goal being convergence characterized by ubiquitous access to government information and services and total transparency of government functioning, a stage that contributes to the social and economic well being of citizens. The authors proposed a framework for evaluating and analyzing e-government convergence capability in developing countries. The results of the study indicated that the quality and range of e-government services vary significantly across the countries, and that this variance can be attributed in some measure to the e-leadership capability of the countries. The authors reviewed e-leadership in the government context, and argued that e-leadership may not be able to readily combat social maladies or economic handicaps.

Antonakis and Atwater (2002) noted that the concept of leader distance has been subsumed in a number of leadership theories. This article, amongst other goals, discussed leader distance: how distance is implicated in the legitimization of a leader; and, how distance affects leader outcomes. The authors reviewed available literature and demonstrate that an understanding of leader-follower distance is vital to the task of untangling the dynamics of the leadership influencing process. Distance is physical distance, but also social distance. Both types of distance are studied, with physical distance resulting in the need for virtual leadership. Antonakis and Atwater categorized one type of distance leadership as “virtually close leadership,” the type of leader that is “referred to as an ‘e-leader,’” and, noted that “virtual communication may bring several advantages and disadvantages.”

Luther and Bruckman (2010) studied collaborative innovation networks and how they generate swarm creativity by the utilization of the virtual team concept. The authors stepped outside the traditional business context in studying virtual, collaborative networks of amateurs in non-business contexts to provide a crucial and complementary perspective on these phenomena. In particular, the authors studied online communities of Flash animators who collaborate over the internet to create animated movies and games called “collabs.” From a quantitative analysis of nearly 900 collabs on Newgrounds.com, the authors discovered that these projects can be highly successful, attracting hundreds of thousands of Internet audience members to download the completed animations. Luther and Bruckman studied this model for specific factors, including attributes of the e-leader and virtual organizational structures. The focus of the research was on the social dynamics within collabs, especially the role of leadership/e-leadership.

Hambleya, O’Neil, and Kline (2006) explored the new paradigm of work that can now be conducted anytime, anywhere, in real space or through technology. Leadership

within this new context has been referred to as “e-leadership” or “virtual leadership.” This study investigated the effects of transformational and transactional leadership styles on e-leadership. The authors studied the effect of communication media on team interaction styles and outcomes. In the study, the teams communicated through one of the following three ways: (a) face-to-face, (b) desktop videoconference, or (c) text-based chat. The results of the study were analyzed statistically as well as qualitatively. The results indicated no significant effect of transformational or transactional leadership style on team interaction style or outcome. These and other details were discussed in detail by the authors. This study built upon existing theory on virtual team leadership, which compared to FTF leadership theory. The authors suggested that both transformational and transactional leadership styles are similarly successful across communication media in teams carrying out short-term, problem-solving tasks. The results point to the importance of virtual leaders establishing media through which virtual teams can most efficiently communicate and work together. Hambleya et al. concluded that these results provided further evidence that communication media do have important effects on team interaction styles and cohesion.

Howell, Neufeld, and Avolio (2005) noted that changes in organizational structure, size, complexity, and work arrangements make more leaders responsible for managing followers who are at a distance. They examined transformational and transactional (contingent) leadership with reference to physical distance. The study proposed several hypotheses and studied them. The study tried to predict the performance of one hundred and one business unit managers. The results showed that transformational leadership correctly predicted the performance, but that contingent reward (i.e., transactional) leadership was not related to performance. The physical distance between leader and followers negatively moderated the relationship between transformational leadership and business unit performance, and positively moderated the relationship between contingent reward leadership and performance.

Balthazard, Waldman, and Warren (2009) conducted a study to explore the origins and/or the causes of transformational leadership in virtual teams. The study compared 127 virtual team members of various virtual decision-making teams with 135 members of traditional face-to-face teams with reference to the relation between aspects of personality and the emergence of transformational leadership. It was found that that the type of communication media (i.e., virtual media, or physical media) interacts with extraversion and emotional stability in the prediction of emerging transformational leadership. The authors showed how those personality characteristics were relevant to the emergence of transformational leadership in the physical (face-to-face) teams. However, they were largely unrelated to transformational leadership in the virtual teams. The authors also explored why this was so specifically in the virtual context by analyzing the content of team interactions. After accounting for the degree of activity

level, and the linguistic quality in one's written communication, it was found to predict the emergence of transformational leadership in virtual teams.

Purvanovaa and Bono (2009) experimented with transformational leadership in the context of virtual teams (using computer mediated communication) and physical teams (using face-to-face communication). Thirty-nine leaders led both the teams. Repeated-measures analyses revealed similar mean levels of transformational leadership in both teams. But leader rank varied between the teams. The most effective leaders turned out to be those who increased their transformational leadership style in the virtual teams. Analyses at the team level also revealed that the effect of transformational leadership on team performance was stronger in virtual teams than in face-to-face teams. When team members rated their satisfaction with the project (job performed), transformational leaders more appreciated in the virtual teams than in the physical teams. The authors concluded that transformational leadership has a stronger effect in virtual teams (that use only computer-mediated communication), and that leaders who enhance their transformation leadership styles in virtual teams achieve higher levels of team performance.

Holland, Malvey, and Fottler (2009) examined the challenges of e-leadership in healthcare organization. As health care organizations expand and move into global markets, they face many leadership challenges, including the difficulty of leading individuals who are geographically dispersed. Three new business models were discussed: medical tourism, healthcare outsourcing and telerobotics. These business models require leaders to lead virtually and lead virtual team members. The authors provided global healthcare managers with guidelines for leading and motivating individuals or teams from a distance while overcoming the typical challenges that "virtual leaders" and "virtual teams" face, such as employee isolation, confusion, language barriers, cultural differences, and technological breakdowns.

Terence (2006) stated that the new collaborative workplace is evolving both globally and virtually and presents two major challenges: isolation and confusion. The author discussed these typical e-leadership problems and provided guidance on what the e-leader can do to avoid these problems. In particular, Terence presented ten practical guidelines for enabling such teams to perform at their best. The guidelines included suggestions for thinking proactively, applying cultural intelligence, staying person-centric, establishing predictability, and driving for precise communications. Terence provided an opportunity for traditional leaders to re-skill themselves for e-leadership.

Miller, Aqeel-Alzrooni, and Campbell (2010) presented learning from an interdisciplinary collaborative venture in the virtual environment between four university teams. The exercise was designed to enable students to learn experientially the use of a dynamic social network analysis tools through a variety of projects. Inter-

disciplinary and multi-disciplinary collaborating challenged the virtual team members to “rapidly and clearly communicate and demonstrate the value of key principles, processes, and work practices while negotiating multiple levels of complexity, knowledge cultures, skills, and capabilities.” The authors proposed a framework for future collaboration.

Ratcheva (2009) noted that scholars have argued that heterogeneous knowledge when compiled by geographically separated team members hinder effective sharing and use of a virtual team’s knowledge. The author examined how virtual teams that are multidisciplinary can interact effectively amongst team members to overcome the barriers to collaboration, and actually take advantage of their “built in” knowledge diversity. The author suggested that “successful integration of multidisciplinary knowledge can be achieved through team’s boundary spanning activities.”

Hertel, Geister, and Konradt (2005) summarized empirical research on the management of virtual teams. Rather than consider virtual teams as distinct from conventional teams, the authors considered all teams, whether physical or virtual, on a virtual continuum – i.e., all of them have varying degrees of virtuality. The article identified five phases in the management lifecycle for teams with high virtuality: Preparation, launch, performance management, team development, and disbanding.

Ryssen and Godar (2000) conducted a study of a multinational virtual team project involving students. Over a period of five semesters, the authors examined the students’ participation in actual cross-cultural learning alliance within the normal curriculum communicating by emails and the web. They worked effectively as virtual teams to complete their tasks. The authors found that the effectiveness of the projects depended on the e-leaders of the project—the professors. The professors who were successful in assisting students overcome the barriers to intercultural communication had more successful students.

Lin, Wang, Tsai, and Hsu (2010) established a model to explain the structure of perceived job effectiveness in team collaboration. In their model, perceived job effectiveness is “influenced directly by knowledge sharing, cooperative attitude, and competitive conflict,” while knowledge sharing is “influenced by cooperative attitude and competitive conflict.” As a result, job effectiveness, as perceived, is influenced indirectly by shared value, perceived trust and perceived benefit, with cooperative attitude and competitive conflict acting as mediating factors.

Carreno (2008) studied e-mentoring with reference to the virtual leader. The author focused on the use of information and communication technology in educational settings. The specific case of the virtual leader and mentor was examined. The second section discussed the main strengths and skills of the virtual leader and their

importance in the management of education at a distance. Carreno concluded by formulating a research question on providing leadership to the virtual or distance learning.

Smits (2010) recounted the adage that learning and leading must go hand in hand for anyone to achieve his or her full leadership potential, and notes that the primary source of learning to lead, to the extent that leadership can be learned, is experience. The authors discussed approaches to leadership development in the virtual context used e-mentoring principles. Founded on the principles of e-leadership learning, Smits' proposed methodology utilizes peer-coaching methods, mentoring, and the communication capabilities of the internet to build upon the leadership development achievements. The author called it the E-Leadership Development Peer Coaching Network model.

### **Virtual Teams and Workforces**

E-leadership is mostly about the need to lead geographically dispersed teams, called virtual teams. The articles in this section focus on examining virtual teams from many different angles, such as structure, communication, degrees of virtuality, multi-cultural issues, trust-building, and ethical issues.

Zaccaro and Bader (2003) noted that "virtual team" is a phrase "that has recently entered prominently into our leadership lexicon." The authors examined the trend toward establishing "e-teams" that "can span distances and times to take on challenges that most local and global organizations must address," focusing particularly on the similarities and differences between physical teams ("face-to-face teams") and "virtual teams" with particular reference to team effectiveness. As the authors asserted, "the term 'virtual' is misleading because it suggests a degree of unreality, as if such teams exist only in the nether world of electrons." Virtual teams are real teams with real people "having all of the characteristics, demands, and challenges of more traditional organizational teams," except that (a) members "either work in geographically separated work places, or they may work in the same space but at different times"; and (b) not all interaction might occur exclusively through the electronic medium, as there may be a fair amount of physical interaction from time to time. But the new reality is that we now have e-leaders who now lead these new organizational entities called "e-teams." These teams have two critical and unique features that favor them over traditional teams, and provide competitive advantage to organizations that can employ them successfully: "E-teams are less limited by geographic constraints placed on face-to-face teams" and therefore "have greater potential to acquire the necessary 'human capital' or skills, knowledge, and capacities" required to complete projects; and E-teams have "greater potential for generating 'social capital,'" which the authors defined as "the quality of relationships and networks that leaders and team members form in their

operating environment.” Zaccaro and Bader also examined how e-leadership can contribute to the development of e-teams by reducing process losses and enhancing team member trust. How does trust develop in e-teams? The authors quoted existing research to propose a three-stage model: (a) the development of “calculus-based trust,” where team members “trust fellow workers to behave consistently across different team situations”; (b) the emergence of “knowledge-based trust,” where team members “become known to one another well enough that their behaviors can be more easily anticipated”; and (c) the development of “identification-based trust” when team members “understand and share each other’s values, needs, goals, and preferences.”

Cascio and Shurygailo (2003) used a sense of drama to introduce the new paradigm of work: “Close your eyes and imagine this picture on the cover of a popular business magazine: An empty freeway leading to a deserted metropolis. The caption reads: ‘It’s 8:45 a.m. – do you know where your employees are?’” The authors then noted that “the wired world,” on the one hand “brings us all closer together,” although it separates us “by time and distance.” Thus, they argued, “leadership in virtual teams becomes ever more important.” Cascio and Shurygailo traced the growth of virtual teams, examined the various forms they assume, listed the kinds of information and support they need to function effectively, and studied the leadership challenges inherent in each form of virtual team. The authors provided “workable, practical solutions to each of the leadership challenges identified.” Technology enables virtual work arrangements, which may assume various forms, such as telecommuting, teleconferencing, and videoconferencing from geographically dispersed sites. But leadership is the critical factor. Existing research has established that “leaders make a critical difference in team performance,” and “these findings are just as applicable to virtual teams as they are to teams that interact physically.” The authors briefly examined the question, “why virtual teams?” They opined that a major reason for forming virtual teams “is to cut office-space costs, particularly for employees who spend only a small percentage of their time in the office, such as salespeople and consultants.” Furthermore, companies in “undesirable locations may form virtual teams as a strategy for recruiting employees who have the right skills but do not want to move.” Sometimes, virtual teams are formed to integrate “employees who were added through mergers and acquisitions.” The authors identified four categories of virtual teams: (a) Teleworkers: A single manager of a team at one location; (b) Remote teams: A single manager of a team distributed across multiple locations; (c) Matrixed teleworkers: Multiple managers of a team at one location; and (d) Matrixed remote teams: Multiple managers across multiple locations. Cascio and Shurygailo added that “another dimension to be considered is that of time, where workers are on different or staggered shifts.” The authors also discussed trust in virtual teams, emphasizing that “its importance for virtual teams is even more critical.” The authors concluded by re-iterating the key challenges for e-leaders of virtual teams as being: (a) “the difficulty of keeping tight and



loose controls on intermediate progress toward goals;" (b) promoting close cooperation amongst teams members; (c) encouraging and recognizing emergent leaders; (d) knowledge management; (e) establishing and adhering to norms and procedures; and (f) establishing "proper boundaries between home and work."

Hart and Mcleod (2003) examined communication as it occurs in the field and presented leadership lessons culled from a field study that included three business organizations and seven work teams. The authors defined a virtual team as one where members meet face-to-face less than once a month. They studied the relationship between the one hundred and twenty six possible team mates in the sample over a two week period, and categorized all message exchanges under seven categories of messages: informational, planning or action, opinion and feeling, personal, resolution interaction, digression and play, and helping and learning. A detailed study of the messages themselves, followed by in-depth personal interviews of the members, revealed the following findings: (a) close personal relationships are developed one message at a time; (b) communication content between team members with strong personal work relationships is not personal; (c) in strong personal relationships, communication is frequent but short; and (d) relationships in virtual teams are developed and strengthened through a proactive effort to solve problems. The authors concluded that close relationships in virtual teams are not only important for task-oriented action, but are also important for professional satisfaction and individual development.

Zigurs (2003) defined what a virtual team is; reviewed existing knowledge on virtual teams, and on e-leadership; and addressed key issues governing e-leadership of virtual teams. One important component of e-leadership is teams. Virtual teams come in many forms, with various objectives, criteria for team membership, cultural diversity, organizational structure, and so on. Virtual teams present a new challenge to the practice of leadership, because whereas our traditional ideas of team communication is based on face-to-face contact, remote leadership of teams complicates relationship building, the issue of trust, conflict resolution, and dealing with sensitive issues that are best done face to face. Since virtual teams rely on computer-mediated communication across the boundaries of geography, time, culture, and organizational affiliation, e-leadership must investigate and resolve issues such as the following: (a) virtual teams incorporate and redefining the traditional roles of leaders; (b) expressing roles across distance and time; (c) the role of facilitators in virtual teams; and, (d) critical factors for effective virtual teams. Discussing what makes a team "virtual", the author suggested that it is best to think of a team as existing on a continuum of virtuality; the more the dimensions of dispersion or distance, the greater the virtuality. Zigurs defined a virtual team as a collection of individuals who are geographically and/or organizationally or otherwise dispersed, and who collaborate via communication and information technologies in order to accomplish a specific goal. Discussing trust in virtual teams, the author argued that trust can indeed emerge among virtual team members rather

swiftly, but that such trust is fragile and may be difficult to maintain. Leadership in virtual teams comes in varied forms, and virtual teams sometimes may or may not have an assigned leader at all. Different people might take on leadership behavior at different times. Discussing the question of leadership “presence”, the author recapped that leaders in traditional teams make their presence known in a variety of ways, including where they sit in meetings, office location and trappings, body language, voice inflections, style of dress, and so on, but these methods are lost in virtual environments. A new kind of presence has to be established, namely a distant, or telepresence, that may be defined by the two dimensions of vividness and interactivity. The title of this article asks the question whether leadership in virtual teams is an oxymoron or opportunity. The author’s answer was that it is emphatically an opportunity.

Xiao , Seagull, Mackenzie, Klein, and Ziegert (2008) conducted a field experiment in a real-life trauma center with surgical teams operating on patients. In their study, the leader of the surgical unit alternated between co-locating with the team, and moving to an adjacent room (where the leader interacted with the team virtually). The study showed that when the team leader was in the adjacent room, the leader had greater influence on communications between the senior member in the room and other team members. When the team leader was in the same room as the team, the volume of communication between the team leader, the senior member, and junior members was more balanced. When the task urgency was high, the team leader was more involved with the senior team member in terms of communication regardless of location, whereas the communication between the team leader and junior members was reduced.

Balthazard, Waldman, and Atwater (2008) examined the role of e-leadership in mediating virtual group member interaction by comparing virtual and face-to-face teams. The study revealed that group members were generally more cohesive in face-to-face situations; accepted group decisions more readily; and exhibited a greater amount of synergy than they did virtual teams. Face-to-face teams exhibited, in general, a higher volume of constructive interaction in comparison with virtual teams. Virtual teams, on the other hand, scored significantly higher on defensive interaction styles.

Munkvold and Zigurs (2007) discussed that virtual teams often face tight schedules. Therefore, they often need launch quickly and perform instantly. This study focused specifically on the special challenges faced by such teams. The authors used time-interaction performance theory as the framework for following the processes and functions within virtual teams. The task was a software development project. The authors studied in detail the group process. The study showed that virtual teams faced with such daunting challenges must work effectively at multi-dimensions.

Potter (2002) examined whether factors that drive conventional team performance also exist in the virtual environment. Results showed that the interaction styles of virtual

teams affect both performance and process outcomes in ways that are directionally consistent with those exhibited by conventional face-to-face teams.

Youngjin and Alavi (2004) noted that the best way to monitor the pulse of a virtual company is to act virtual, and that sitting in a central office without plugging into the virtual culture was almost a guarantee of failure. The authors studied the behaviors and roles that are enacted by emergent leaders in virtual team settings. They focused specifically on two research questions: (a) What behaviors differentiate emergent leaders from other members in virtual teams; and (b) What roles are performed by the emergent leaders in virtual team settings? The study involved seven virtual teams composed of senior executives of a US federal government agency. In particular, the authors analyzed quantitative and qualitative data to identify differences between team members who emerged as leaders, and as non-leaders, in terms of their behavior as evident from their e-mail messages, which were categorized as task-oriented messages, relationship-oriented messages, or technology-oriented messages. The results indicated that overall, the emergent leaders sent more and longer email messages than their team members did. The number of task-oriented messages, particularly those that were related to logistics coordination, sent by emergent leaders was higher than that of non-leaders. However, there were no differences between emergent leaders and non-leaders in terms of expertise-related messages. No significant differences in relationship oriented and technology management messages between emergent leaders and other team members existed. Furthermore, the emergent leaders enacted three roles: initiator, scheduler, and integrator. These findings are discussed and their implications for research and practice are described further by the authors.

Hunsaker and Hunsaker (2008) provided guidelines to help leaders understand and lead virtual teams. The authors offered a formal technique based on a design/methodology approach and discussed the importance of effective leadership for virtual teams. Beginning with a review of conventional teams versus virtual teams, the authors then focused on two primary leadership functions in virtual teams: performance management and team development. Hunsaker and Hunsaker provided a detailed guide for the leadership of virtual teams over the life of a project, which they defined as the four stages of a project timeline: Pre-Project, Project Initiation, Midstream, and Wrap-Up.

Walvoord, Redden, Elliott, and Coovert (2008) noted that practice of effective leadership necessarily requires relationship skills in the areas of problem solving conflict management, motivation, communication, and listening. They argued that perhaps the paramount leadership skill involves communicating one's intent to followers, for it is only then that followers may first understand, and then execute the goals of the team and leader. In a world dominated by computer-mediated communication, such communication is fundamental to the viability of virtual teams.

However, simple transmission of information may not suffice, because the virtual environment presents significant challenges for effective communication. The authors examined developments in multimodal displays that allow teams to communicate effectively via single or multiple modalities (e.g., visual, auditory, tactile). Firmly grounded in commonly acceptable guiding principles for the design and use of information displays culled from an extensive review of the literature, Walvoord et al. presented a practical example of the utility of these guiding principles for multimodal display design in the context of communicating a leader's presence to a virtual team via commander's intent.

Kayworth and Leidner (2000) identified the growing popularity of inter-organizational alliances, the increasingly flatter organizational structures, the globalization of commercial operations, the shift from production to service related businesses, and the resultant spawning of a new generation of knowledge workers not bound to physical work locations as factors contributing to an accelerated the need for virtualization of teams. The global virtual team has emerged as a new form of organizational structure, supported by enabling information and communication technologies. The advantages are: (a) the ability to maximize organizational expertise without having to physically relocate individuals; the required expertise for a given task or project may be dispersed at multiple locations throughout the organization, but a virtual team facilitates the pooling of this talent to provide focused attention to a particular problem without having to physically relocate individuals; (b) the ability to unify the varying perspectives of different cultures and business customs to avoid counterproductive ethno-centric biases; (c) cost reduction; (d) cycle-time reduction; and, (e) improved decision-making and problem solving skills. In the future, the source of human achievement may not be extraordinary individuals, but extraordinary combinations of people. Just as companies benefit from virtual teams, they must also face numerous complexities inherent to this new type of work group: difficulty in managing communication effectively, varying time zones, technology disparity, and differences in technology proficiency amongst virtual team members. Kayworth and Leidner discussed the results of an exploratory global virtual team project undertaken with members from Mexico, Europe, and the United States. The authors attempted to identify specific issues and challenges faced by virtual teams, to identify critical success factors, and to stimulate compelling ideas for future research. The study was conducted amongst twelve virtual teams that were given the freedom to select whatever technology seemed to be most appropriate for the assigned task. Interestingly, there was a significant variance among teams in their adoption and use of various technologies. While some teams adopted e-mail alone, others adopted e-mail, internet collaborative tools, as well web pages. Anecdotal evidence suggests that team member experience with technology may have had a significant role in their adoption of technology. Upon final analysis of the experimental data emerging from the field, the

authors were able to identify four basic classes of issues faced by virtual team groups: communications, culture, technology, and project management. The study also provided rich insights into some of the types of specific challenges faced by culturally diverse global virtual teams. By studying these challenges, the authors derived and articulated a set of critical success factors believed to be important in the successful design and deployment of virtual teams. Some of these success factors for virtual teams are no different from success factors for physical teams; for instance, the three major domains remain: communication, culture, and project management. But some of the challenges within these domains are unique to the virtual environment: (a) problems as delayed communication; (b) misunderstandings arising out of lack of response; (c) lack of a shared context within which to interpret messages; and, (d) the inability to monitor team members. Also significant was the fact that the solutions at the disposal of team leaders to correct the problems of teamwork are quite different in the virtual environment where much of the control and reward capabilities of the leader are reduced. So the e-leader must create inventive solutions to address team problems.

Nauman, Khana and Ehsana (2010) noted that virtual teams can rapidly respond to business globalization challenges, and that their use is expanding exponentially. The authors studied the relationship of empowerment, e-leadership style, and customer service standards as a measure of effective project management in projects involving virtual teams. The authors measured empowerment through two constructs: (a) the psychological empowerment construct, where the focus is the individual's psychological empowerment state; and (b) the empowerment climate, where the focus is on work environment. The study compared the empowerment climate across projects exhibiting different degrees of virtuality. Nauman et al. also examined the moderating effects of the degree of virtuality on the relationship between empowerment and leadership style. The authors tested their hypotheses with information collected from project management professionals in five countries using statistical methods and operations research concepts such as linear programming. The results revealed that the empowerment climate had a significant effect on concern for task, concern for people, and concern for customer service. The authors also discovered that empowerment is higher in more virtual projects. The authors concluded with the hope that project management professionals will be more conscious of both psychological empowerment and empowerment climate and concern for people in their projects that have any degree of virtuality.

Salomon (2009) examined how certain technologies affect digital natives and seeks to understand specific correlations that emerge among video games, and colleges that offer both traditional and online courses. He examined interesting questions such as whether there a significant difference between learning preferences and playing video games, and whether there is a correlation between playing games online and taking virtual courses. Two hundred and thirty-five Miami Dade College students participated

in this study. Although the results showed no significant relationships within the inferential assessment, close examination revealed a trend effect ( $p = .052$ ) in participants' preference for virtual or hybrid courses, which reflected their amount of technology usage. Moreover, if this trend is accurate, then it may indicate that digital natives will be more inclined toward preferring virtual or hybrid courses over their traditional counterparts.

Chad, Craig, and Ying (2001) argued that it is critical that managers build stronger relationships and cohesion among virtual team members as they have significant impact on the performance and satisfaction of virtual teams. The effect of social factors on the performance and satisfaction of virtual teams have been recognized. Social factors such as relationship building, cohesion, and trust are crucial for the effectiveness of virtual teams. Communication is a tool that directly influences the social dimensions of the team. The performance of the team has a positive impact on satisfaction with the virtual team.

Lurey and Raisinghani (2001) described that the issues of effectiveness within virtual teams have become critical for companies that are dispersed across space, time, and/or organizational boundaries. Globalization of the marketplace makes such distributed work groups achieve a competitive advantage in this ever-changing business environment.

Lunman and Barth (2003) explored the dilemma between exploitation and exploration in dispersed "bridge-teams," i.e., teams in a firm working closely with an external partner. The authors examined what type of learning is generated in teams and presented four cases from two firms giving some variety in learning approaches. The researchers argued that distinctiveness of the activity being performed, the team itself, and the company have an ultimate influence on the learning (what is learned and how much is shared). The authors argued that virtual teams that are multi-cultural have higher exposure to a variety of rich knowledge.

Kelley and Sankeya (2008) studied whether virtual projects provide different challenges from conventional projects. Can virtual projects be more useful – in certain contexts – than those conducted by face-to-face teams? The authors looked at two distributed information technology projects conducted within a global banking corporation. Their findings indicated that time zone and cultural differences in particular, affected communication and team relations. The authors concluded that virtual teams are useful for projects requiring cross-functional or cross-boundary skilled inputs.

Andrew and Chris (2001) presented virtual team studies conducted in a European automobile project. The authors investigated how advanced information technology and telecommunications could support virtual teamwork alongside the automotive

engineering supply chain. Incorporating video conferencing shared whiteboard, online application sharing and data management tools, the project involved approximately 40 engineers in four countries. The study found that the potential savings in automotive design development time could be around 20%, which could translate into cost savings of 90 million pounds. The authors identified and recommended some basic technical requirements for a collaborative environment.

Panteli (2004) addressed the question of “presence” in virtual teams. Articulating “presence” virtually is a touch challenge. The empirical data was taken from a series of emails that were exchanged. The study identified three different articulations of “presence” in a virtual organization: (a) present availability; (b) absent unavailability; and (c) silenced availability. The author concluded with the statement, “These discursive articulations of presence are central to understanding virtual organizing and the theoretical and practical implications of this are discussed.”

Workman, Kahnweiler, and Bommer (2010) discussed telecommuting (alternate name proposed: Telework) and virtual teams as strategic organizational innovations with wide ranging potential benefits for all concerned: individuals, business, and society. This empirical study investigated telework and virtual team innovations from the perspective of commitment, information richness, and cognitive style (mental self-government) theory. Workman et al. reported that their findings indicated certain combinations of cognitive styles and media as contributing to commitment in telecommuting. The authors concluded by making some specific recommendation on setting up a telework environment for best success.

Pithon, Brochaod, Sandonato, and Teixeira (2006) focused on the task of communicating from a distance. Virtual work modifies established habits of teamwork, and extends the concepts of space and time. Innovations in communications and computer science present new ways of distributing knowledge and reinforce cooperative work. Pithon et al. presented an analysis of application boarding of Computer Supported Cooperative Work (CSCW) developed by two workgroups with distinct objectives. While group-A launched a virtual team for cooperative work, group-B analyzed the functioning of a small company virtually.

Paul, Seetharaman, Samarah, and Mykytyn (2004) examined collaborative conflict management in a multi-cultural heterogeneous virtual team consisting of members from the United States and India, working on a project involving a decision to be taken for a client. The entire process was conducted virtually, and a web-based decision support system was utilized that allowed team members to effectively collaborate, including discussing task options, critique suggestions, and vote on the results. The data analyses suggested that collaborative conflict management style positively impacted satisfaction with the decision-making process, perceived decision quality, and

perceived participation of the virtual teams. The study found only weak evidence that linked a group's heterogeneity to its collaborative conflict management styles.

Dekker, Rutte, and Van den Berg (2008) conducted a study that investigated whether members of a virtual consisting of members from the United States, India and Belgium assigned the same priorities to some behavioral structures as did virtual team members from an earlier Dutch study. Thirty-four virtual team members from the three countries were interviewed by means of the critical incident technique, involving four hundred and ninety-three critical incidents grouped into thirteen categories. The study found discrepancies between the results of the earlier Dutch study and this one. Indian and Belgian team members identified a new category: Respectfulness.

Huang, Kahai, and Jestice (2009) focused on decision-making challenges in a virtual team. How do e-leaders structure team processes and provide task support? The authors explored the interaction effects between leadership styles and media richness on task cohesion and cooperative climate. This, in turn, influenced team outcome in decision-making tasks. The results obtained suggest that transactional leadership behaviors directly improve task cohesion of the team, while transformational leadership indirectly improve task cohesion by first improving the cooperative climate within the team, which, in turn, improves task cohesion. These effects on team outcome were mediated by media richness – they occurred only when media richness was low. The study also advocated that task cohesion results in group consensus and members' satisfaction with the discussion, whereas cooperative climate enhances discussion satisfaction and reduces time spent on the task.

Lee (2009) addressed the question of ethics in virtual teams. Lee began by presenting a literature review on current ethical theories as they relate to e-leadership, virtual teams, and virtual project leadership. Ethical theories reviewed included participative management, Theory Y, and its relationship to utilitarianism; Kantian ethics, motivation, and trust; communitarian ethics, ethic of care and egalitarianism; Stakeholder Theory; and the use of political tactics. The author concluded by presenting four propositions for future research.

Bryant, Albring, and Murthy (2009) explored human dynamics in virtual teams. The authors postulated three hypotheses: (a) The use of a mixed-incentive reward structure will improve team member satisfaction, influence group cohesion, and reduce social loafing in a virtual team; (b) There will be enhanced team member satisfaction as well as team cohesion and reduced social loafing with the use of a richer technology medium; and (c) Team member satisfaction, group cohesion, and perceived social loafing will differ between males and females. The study was conducted using eighty-nine MBA students at a large southeastern university. The results showed that social loafing decreased with the use of a mixed incentive reward structure; that social loafing



decreased with the use of a richer technology medium; and that social loafing did differ between males and females, with the females engaging in greater social loafing in the absence of a mixed incentive scheme. The results thus also shed light on the role of gender in virtual teams.

D'Souza and Colarelli (2010) studied the issue of team member selection in a virtual team. The authors examined the importance of task skills and four personal characteristics when selecting members of virtual and Physical (face-to-face) teams. The study, involving one hundred undergraduate students, indicated that task skills had a greater impact on selection decisions for virtual teams. Females appeared to take more females into their teams in both virtual and physical environments; thus, gender bias was an issue. The study did not find any influence of race, physical attractiveness, and attitudinal similarity to participants.

Reed and Knight (2010) reported on a study in which over one hundred and fifty information technology professionals (some of them participating remotely) participated in an exercise that examined the differences in communication risk between traditional project teams and virtual project teams. The results indicated little difference between the two circumstances. However, virtual team projects exhibited notably more risk due to insufficient knowledge transfer.

Greenberg, Greenberg, and Antonucci (2007) investigated trust in a virtual team environment. In physical teams, trust is generally established over time only when there is a history of reliable behavior. Therefore, it follows that it will be hard to establish trust in virtual teams because there is no physical contact and no history. The study found that swift trust can develop quickly in a virtual team, but that such trust can be quite fragile. Greenberg et al. described the three components of trust building – ability, integrity, and benevolence – and assigned these to different stages in the life cycle of a virtual team. The authors proposed how e-leaders and virtual team members can develop trust and sustain it through the entire project lifecycle.

Kanawattanachai and Yoo (2002) conducted an empirical study to examine the dynamic nature of trust in virtual teams. The authors also drew distinction between high-performing virtual teams and low-performing virtual teams and sought explanation for the performance differential and its influence on trust. The study differentiated in the amount of trust in the early stage, middle stage and late stage of a project. Using data gleaned from a study of thirty-six four-person MBA teams from six universities competing in a web-based business simulation game over a eight week process, the authors found that both high-performing and low-performing teams started with similar levels of trust, but high-performing teams were better at developing and maintaining the trust level throughout the project life.

Rusman, Bruggen, Sloep, and Koper (2009) hypothesized that a hampered process of trust building in virtual teams that work in knowledge-intensive applications can cause collaboration problems. The authors want to understand how interpersonal trust forms in physical teams and in virtual teams. Only such an understanding can facilitate the prevention of low trust. Synthesizing literature from various disciplines, the authors proposed a model for the formation of interpersonal trust between project team members. The authors devised a method whereby they tried to make information on virtual team members available to others, to see if that enabled better trust building. The authors also reviewed existing literature on the antecedents of trustworthiness. They finally extended the well-accepted antecedents (ability, benevolence, and integrity) with several other antecedents (communality and accountability). The authors used these antecedents to determine which information is relevant for team members in assessing the trustworthiness of other team members.

Navarro, Orengo, Zornoza, Ripoll, and Peiro (2010) studied the effect of communication and information technologies (TICs) on group functioning and group outcomes. Virtual teams need to communicate to share task related information and knowledge. From this perspective, this study sought to: (a) analyze the group interaction styles in virtual teams over time; and (b) analyze whether the group virtuality level moderates the relationships between group interaction style and group outcomes over time. Forty-four groups of four members each participated in the study. The virtual teams had varying degrees of virtuality. The results showed a differential role of group interaction style according to the level of group virtuality.

## Technology

The virtual teams are connected by information and communication technology, and all interaction amongst the virtual team members, as well as with their leader(s) is mediated by computers. The articles in this section examine some aspects of this technology.

Peña-Mora, Hussein, Vadhavkar, and Benjamin (2000) presented software architecture for the next generation of virtual collaboration amongst a geographically dispersed team. In particular, the software architecture addresses a concurrent engineering environment to help engineers and designers collaborate effectively in virtual space. Peña-Mora et al. discussed research in computer-supported collaboration work based on various models of group interaction, social communication theory, negotiation theory, and distributed artificial intelligence concepts. The authors described a distributed conferencing architecture called the Collaborative Agent Interaction and Synchronization system (CAIRO), aimed at managing virtual interaction amongst designers and engineers in a distributed design meeting setting. The technology supports multi-media interactions over computer networks remotely and allows the

virtual team members to interact in a media rich manner. The system provides both media synchronization and agent synchronization. Therefore, it ensures that all information exchanged between users is synchronized, and also guarantees effective structuring and control of a distributed conference.

Zigurs (2003) noted that leadership in virtual teams is expressed through technology; therefore leaders must know how to make sense of technology in order to make the most competent use of it. The author described communication technology in terms of media richness, which he said influences media choice, and elaborated that it is natural to choose the right media that will provide enhanced performance virtual groups. The author categorized media richness in terms of rapid feedback, language variety, personalization, and multiple cues. The greater the ability of a medium to provide for those characteristics, the richer the medium is. Zigurs presented an alternative to viewing media from a richness perspective by looking at it in terms of media synchronicity, which deals with two basis processes: (a) conveyance, which is the exchange of information, and an attempt to understand its meaning with reference to symbol variety, parallelism, feedback, rehearsability, and reprocessability; and, (b) convergence, which is the development of shared understanding on the meaning of the information exchanged.

Jarvenpaa and Tanriverdi (2003) identified a new kind of technical structure, if not technology itself, called the virtual knowledge network that supports the e-leader. They noted that knowledge resources today are more important than physical and financial resources as "drivers of firm performance." The organizations themselves are transitioning from hierarchical tree structures to flatter web-like structures that better facilitate the flow of knowledge. The firms now create networks of customers, vendors, partners and business associates and "tap into complementary knowledge sources." As a result the place where working, learning and innovation occur appears to have moved from inside the organizations to a virtual knowledge network. The authors observed that organizations cope with uncertainties by designing structures that increase their information processing ability, a virtual knowledge network being one such structure, consisting of hardware, software, digital media, electronic records, intellectual property, people, and so on. It is a "transient, boundary-less, lateral, and computer-mediated organization structure." Jarvenpaa and Tanriverdi explained this type of e-leadership to be "network-centric leadership practice," and concluded by noting that firms need leadership that can create and nurture these virtual knowledge networks.

Petzel, Archer, and Fei (2010) explored how the web's collaborative potential can be harnessed strategically and practically in a sustainable manner. Building upon research led by Peter Gloor of MIT into collaborative innovation networks (COINs), the researchers evaluated COINs' strategic potential for sustainability as well as their

practical application. The authors also provided a set of recommendations for people considering utilizing COINs for sustainability.

Keen (2000) provided a brash and disruptive definition of leadership in electronic commerce: "Take your company to a place that no one expects it to go." Focusing mostly on leadership for eCommerce that is virtual, online and conducted in a geographically dispersed manner, Keen explored leadership in terms of structure ("fitting all the pieces together: marketing, technology, process integration, finance and operations") with the goal of exploring where information technology fits in: how can I.T. "be part of the leadership process."

Karpova, Correia, and Baran (2008) focused on the technology to support virtual collaboration, computer-mediated communication, and teamwork. This study examined how global learning teams utilized technology in a virtual collaboration to solve complex problems. Explaining the use of technology by the learning teams to support computer-mediated communication, a model of technology application at different stages of virtual collaborative process was proposed. The authors claimed that the model maximizes the potential of global teams and facilitates greater integration of virtual collaboration into a geographically dispersed team. Time difference and lack of nonverbal cues were identified as challenges the global teams faced. The benefits of virtual collaboration are articulated as the opportunities to: learn how to use technology in a meaningful way; practice using technology to solve problems; and broaden one's perspective by communicating with people from different cultures.

Bishop, Riopelle, Gluesing, Danowski, and Eaton (2010) discussed e-mail networks and the technology to support global virtual teams. The authors acknowledged that historically, managing employees that are not co-located has relied mostly on endless e-mail folders bursting at the seams, designed to track issues, manage performance, and distribute workload. Such methods are highly inefficient beyond the most rudimentary data volume. As a result, the distant manager's understanding and perception of his virtual team members is often skewed by lack of information – information that they normally obtain by being in close proximity to employees. The authors proposed a set of tools – called the Digital Diffusion Dashboard – that provide metrics and analytics to enable the virtual manager better understand the network that connects him or her with the virtual team. The tools analyze the network the extract analytics pertaining to volumes, response time, individuals with whom an employee regularly interacts, cultural influences in the workload of an employee, "buzz" around critical topics, emotion, and team collaboration. Additionally, the proposed tools can help manage the adoption of new global processes as well as staff changes and turnover to shorten transition time for both incoming and exiting employees. All of these measurements have a significant impact, especially in virtual teams where the tools help bridge the gap between location and perceived performance.

Chen, Liou, Wang, and Chi (2007) focused on collaboration technology that enables web-based group dynamics and group decision support. The authors noted that companies are going global, and this is especially true for companies participating in the global supply chain. To become agile enterprises, these companies are deploying virtual teams to carry out short- and long-term projects. Chen et al. defined “collaboration” as activities that involve people engaged in various business processes (e.g., marketing, engineering, research, and development) working together by sharing information and making decisions. Distributed teams can carry out critical tasks only with appropriate decision support technologies. The authors discussed the architecture and detailed design of a web-based application called TeamSpirit. A series of empirical studies were reported to assess the effectiveness of TeamSpirit in supporting distributed group problem solving when in-person facilitation is not possible. The results indicated that giving creative problem solving training to TeamSpirit participants had positive impacts on team performance.

Danowski (2010) examined technology required for online collaboration. Collaborative Innovation Networks (COINS) are typically defined using individuals as nodes. The different departments in organizations can be considered as forming COINS of interest. Danowski analyzed interdepartmental collaboration networks based on co-occurrence of department names in news stories, and demonstrated the utility of using the WORDij 3.0 tool to identify collaborative innovation networks of interest.

## Conclusion

The goals of leadership have not changed, but a new medium for implementing the goals has arisen. The fundamental leadership objectives are still the same, and continue to address the issues of vision, direction, motivation, inspiration, trust, etc. E-leadership is a new leadership paradigm that requires the leader to achieve these leadership objectives in a computer-mediated manner with virtual teams that are dispersed over space and time, the main medium of communication amongst leader(s) and followers being the electronic conduit supported by computers. What is very different is that the e-leader may never physically meet one or more of the followers. The new paradigm provides a plethora of new opportunities, as well as a number of new challenges. Some of the exciting new opportunities are: (a) the ability to instantly communicate one-on-one with potentially thousands of employees (Scott McNealy, the recently retired Chairman of Sun Microsystems, personally articulated corporate vision to over seventeen thousand employees worldwide via email and kept them posted on the realization of that vision); (b) the capability to use talent that does not necessarily live within driving distance from the office; (c) the opportunity to enhance organizational performance by assembling multi-functional teams that are richer because one can now cherry pick the talent one desires from wherever it may exist; (d) the ability to target better customer satisfaction by providing 24x7 service using the “follow the sun”

methodology; (e) the ability to cut costs; and (f) the scope for better knowledge management. Some of the key challenges for e-leaders are: (a) communicating effectively through the electronic medium; communicating enthusiasm digitally; (b) building trust with someone who may never see the leader; (c) creating a viable electronic “presence”; (d) inspiring far flung team members; (e) mentoring virtual employees; (f) monitoring and controlling social loafing; (g) preventing lack of technical competence from affecting performance; and (h) maintaining work-life balance – and helping followers maintain work-life balance – in this new 24x7 paradigm. Some of the new skills required by the e-leader are: (a) stronger written communication skills; (b) strong social networking skills; (c) a global, multi-cultural mindset; (d) greater sensitivity towards followers’ state of mind; and (e) a 24x7 orientation. E-leadership is mostly about the need to lead geographically dispersed teams, called virtual teams. The concept of virtual teams is examined from many different angles, such as structure, communication, degrees of virtuality, multi-cultural issues, trust-building, ethical issues etc., many of which are already covered in the discussion on e-leadership. Finally, some newer technological innovations are in progress to support the e-leadership movement. There does not appear to be any serious disagreement amongst scholars on e-leadership; there are only working variations in research focus. There is agreement that this is a new field and that more research needs to be conducted.

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