

THE RISE AND EFFECT OF VIRTUAL MODALITIES AND FUNCTIONS ON ORGANIZATIONAL LEADERSHIP: TRACING CONCEPTUAL BOUNDARIES ALONG THE E-MANAGEMENT AND E-LEADERSHIP CONTINUUM

Montgomery VAN WART
Alexandru ROMAN
Sharon PIERCE

Montgomery VAN WART

Professor, Public Administration Department,
College of Business and Public Administration,
California State University, San Bernardino, USA
Tel.: 001-909-537.5760
E-mail: mvanwart@csusb.edu

Alexandru ROMAN

Associate Professor, Public Administration Department,
College of Business and Public Administration,
California State University, San Bernardino, USA
Tel: 001-909-537-5762
E-mail: aroman@csusb.edu

Sharon PIERCE

California State University, San Bernardino, USA
E-mail: piers304@coyote.csusb.edu

Abstract

The massive shift to virtual modalities and functions has changed the context of leadership and organizational structures, and thus how leadership is exercised. To date, the fields of e-leadership and e-management, or more generally, virtual leadership, have been unable to make much progress.

This exploratory study uses adaptive structuration theory, an approach recommended by Avolio (2001 and 2014), to provide a broad framework that is modified for the field. It uses the multi-method, multi-level approach recommended by structuration theory. Findings regarding three specific advanced information technologies (AITs) are discussed, study limitations are provided, and future research opportunities are reviewed.

Keywords: organizational leadership, e-management, e-leadership, structuration theory.



1. Introduction

The massive shift to virtual modalities and functions has changed the context of leadership and organizational structures, and thus how leadership is exercised (Government Business Council, 2015). Among the striking changes that the virtual environment has created are: the enormous increase in the overall volume and speed of communication; the constancy of communication; the great impact on the nature of leadership competencies (e.g., managing emotionally charged contexts at a distance); the expansion of communication channels that leaders are expected to navigate and master; and the importance for leaders to understand, adopt, maintain, and, frequently, use new, organization-wide technological systems.

This series of shifts has had an amplifying effect with increased demands for rapid change in organizational environments, which in turn requires leaders to have expanded skill sets in both traditional communication methods and managing through virtual means. Further, while the opportunities of virtual communications and management are much touted, the challenges of achieving success in this new virtual environment are considerable. For example, personnel costs can be driven down by virtual efficiencies, but advanced information technologies (AIT) systems are expensive themselves, and technical staff may replace content staff. Physical distances are reduced in a virtual world, but this places greater communication and coordination demands on those in charge. Similarly, as social and interpersonal distance are reduced in a virtual world emphasizing democratic access to information and communication, expectations of leader responsiveness and candor are increased and expectations of leader privacy are reduced.

While leaders have more communication venues, those venues require a greater array of skills. Although asynchronous communications have provided flexibility, they have perversely increased expectations of around-the-clock responses in many environments. Large-scale public sector AIT systems bring wonderful efficiencies when successful, but failures are commonplace and expensive (Anthopoulos *et al.*, 2016). And while AIT systems create opportunities for increased reliability and security, the possibilities for system crashes and breaches become heightened. In the US, the Obama administration provides a good example with four cabinet-level secretaries having major AIT related issues, generally leading to their replacement. Table 1 provides a summary of the types of challenges faced by leaders dealing with virtual communications and structures.

While this irony has been acknowledged by the leading experts (Van Wart, 2013), the field has been unable to make much progress. 'Although the potential impact of AIT has been recognized by leadership scholars and practitioners as important, what we know about the interaction between AIT and leadership still remains at the very nascent stages of development' (Avolio *et al.*, 2014, p. 105). Reasons include: the relative newness of phenomenon; newness of field and the confusion over concepts, terms, and focus; number of factors to consider (see Table 2); and an inability to aggregate studies beyond the micro level because of a lack of a guiding theory or framework.

Table 1: Challenges related to virtual communication and structures

	Challenges
Costs	- The costs of systems can be enormously expensive to build, maintain, and potentially replace; - IT experts may begin to replace subject matter experts;
Physical Distance (space)	- Lack of distance accelerates demand for contact by field employees or for free or low cost services;
Social Distance (power)	- e-communication is often used in a disingenuous manner; expectations of leader privacy/confidentiality are often reduced;
Interpersonal Distance (contact frequency and speed)	- Creates expectations of frequent communication which may lead to disapproval without communication or to empty communications in order to stay in touch; - Greater speed becomes expected by clients-customers and is demanded by competitive market-place; e.g., constant contact;
Virtual venues and skills	- Leaders potentially have more communication skills to master; - Various online formats can have serious weaknesses and/or require significant proficiency in order to communicate effectively. Lack of understanding may lead to serious communication skill deficiencies (unclear messages, lack of group focus, unintended messages, brusqueness, vagueness, lack of response, sense of employee isolation, etc.) due to lack of trust, lack of non-verbal cues, weak bonding, inability to distinguish informal and formal communication needs, loss of synergy in synchronous sessions, etc.
Time flexibility	- Managerial and creative opportunities inherent in real time and face-to-face analysis may be reduced;
Accuracy and reliability	- Demands for and on complex systems become so great, that system breakdowns become disastrous and system design flaws can lead to catastrophic failures; - Sometimes new reliability problems are introduced;
Security	- Security breaches are commonplace; - Mistakes in security adjustments have disastrous consequences.

Source: The author

Table 2: Factors commonly included in theories related to virtual leadership

<p>A. Leader characteristics:</p> <ul style="list-style-type: none"> a. Loci of leadership: leader, follower, leader-follower dyad, collective, context; b. Virtual skills alone: select traits, behaviors, cognition and affect; and c. Virtual skills in combination with other skills and traits. <p>B. Situational factors:</p> <ul style="list-style-type: none"> a. Virtual design characteristics, such as: <ul style="list-style-type: none"> i. Degree of virtuality (e.g., in teams); ii. Types of virtuality; iii. Amount of leader control versus amount of self-management; iv. Amount of training provided for leaders and followers; and v. Amount of support provided to followers by leaders. b. Follower/subordinate characteristics, such as: <ul style="list-style-type: none"> i. Virtual skills (competence with AITs); ii. AIT acceptance; and iii. Follower attributions of the leader as affected by virtuality. c. Task characteristics, such as: <ul style="list-style-type: none"> i. Role, task, and organizational clarity as affected by virtuality; ii. Task complexity as affected by virtuality; and iii. Task interdependence as affected by virtuality. d. Organizational characteristics, such as <ul style="list-style-type: none"> i. Power relationships and organizational design; ii. External communication flow; and iii. Environmental uncertainty. e. Other factors, such as: <ul style="list-style-type: none"> i. Gender and virtuality; and ii. National culture and organizational diversity.
--

Continue on next page

Table 2 (Continued)

C. Performance factors: <ul style="list-style-type: none">a. Productivity (standard and high performance);b. Profitability;c. Employee satisfaction;d. Employee development;e. Organizational change (alignment);f. Alignment with ethical values (e.g., sustainability); andg. Citizen trust.
--

Source: The author

The primary purpose of this article is to focus on the last of these issues, the lack of an overriding theory or framework. Avolio *et al.* (2001; 2014) have twice recommended the use of adaptive structuration theory to provide a model that emphasizes context, complexity, and co-evolution of agents of change and the structures that frame leadership itself. This recommendation has largely gone unheeded. This article seeks to provide a macro-level model adapted from adaptive structuration theory that not only includes the uses and effects on organizations by leaders, but also the factors of adoption (context) and leader/technology co-evolution.

The remainder of the article is organized as follows: core definitions and literature; key propositions; methodological approach; empirical findings; and conclusion and overarching comments with study limitations.

2. Theory building to date in fields related to virtual leadership

2.1. Definitions

The definition of advanced information technologies (AITs), sometimes called information and communication technologies (ICTs), include the internet (e.g., websites, YouTube), e-mail, video conferencing, virtual teams, groupware systems, social media, texting, blogs, document sharing, as well as a host of enterprise information storage and analysis systems, among others. It is important to note that AITs have very different purposes, including informing, interaction, planning, record-keeping, and data analysis. Some are meant to serve multiple purposes while others are targeted at a specific purpose. Following the leading experts in the field, we define *e-leadership* as a social influence process embedded in both proximal and distal contexts mediated by AIT that can produce a change in attitudes, feelings, thinking, behavior, and performance (Avolio *et al.*, 2014).

High performance leaders, 'good' (effective) at e-leadership, use a variety of advanced information technologies well, resulting in improved outcomes such as better performance, higher satisfaction, less turnover, etc. The leadership function can be expressed through the leader, followers, dyads, groups, teams, or even context itself. E-leaders also affect the adoption of advanced information technologies to take advantage of new advanced information technologies.

E-management is defined as the process of using AITs to provide both internal and external management functionality. It includes the use of AITs in information management and dissemination, transactions in support of services, the provision of e-services, marketing and public relations, decision support, AIT system maintenance itself, among others. E-managers affect the adoption of advanced information technologies to improve services and/or implement organizational rationalization such as staffing and structure adjustments. Both e-leadership and e-management are important to today's leaders. We define virtual leadership as encompassing both arenas. *Virtual leadership* is constituted of those aspects of the entire leadership-management function that are performed through or potentially improved by virtual means.

2.2. Theory in e-leadership and e-management

Two initial types of questions are generally asked. First, what are the performance and side effects of virtual leadership – how much is performance affected by efficiency, cost reduction, satisfaction, etc.? Second, what 'virtual' skills, behaviors, and practices improve performance? A fuller understanding of the leadership process also asks questions about the adoption of AITs in the first place, and thus inquires, what are the antecedents of virtual leadership? This begs a challenging long-term question, which is, how is virtual leadership affecting the evolution of organizations, and vice versa? Finally, the issue that this article raises is: how do you incorporate these various areas of interest into a macro-level model that can provide a mental map of the field, as well as a tool for in-depth case studies? We briefly review the literature to date related to each of these questions.

A major question regarding performance is the comparison of traditional and virtual teams performing under a variety of conditions – which performs better under what conditions? A much-examined area has been the identification of strengths and weaknesses of traditional versus virtual teams using different styles. The most common comparison has been transactional versus transformational styles (Balthazard, Waldman and Atwater, 2008; Kahai, Sosik and Avolio, 2002; Puranova and Bono, 2009), but other comparisons have been employed as well such as Theory X and Y (Thomas and Bostrom, 2008) and additional style conventions (González-Navarro *et al.*, 2010). While differences were often detected, the results were mixed and have more to do with the context in which experiments and field studies are conducted than the medium itself. Still another comparison was based on trust, frequently also with recommendations on how to increase it. For example, Kanawattanachai and Yoo (2002) find that traditional teams create more effective bonds and virtual teams tend to form more cognitive bonds, while other researchers have looked into the challenges of building trust rapidly in virtual environments (aka 'swift trust') (Greenberg, Greenberg and Antonucci, 2007). More basic research has been conducted into trustworthiness antecedents (Rusman *et al.*, 2010), and trust in government teams (Bannister and Connolly, 2011).

However, the performance of specific AITs has not been a typical research consideration (see Moon, Lee and Roh (2014) for a full review of the IT literature and public administration), at least with a leadership focus, and so with most AITs non-anecdotal data are fragmented or lacking regarding the effect of email, document sharing, etc. The major exceptions in the public sector are websites and online teaching, as well as social media for external purposes (Zavattaro and Bryer, 2016).

2.3. What skills, behaviors, and practices improve performance?

The research on the quality of virtual leadership implementation and the array of recommendations for the improvement of virtual leadership has been extensive. A good example of a practitioner-oriented competency list that has six elements is provided by Malhotra, Majchrzak and Rosen (2007). They assert a successful virtual team leader establishes a culture of trust through communication technology, ensures the diversity and comparative strengths of team members is appreciated, manages the life-cycle of the team through meetings and milestones, monitors progress via technology (e.g., dashboards), ensures the visibility of virtual members inside and outside of the organization, and guarantees individual members all benefit from participation in the virtual team. It is easy to imagine group and team leaders with many other responsibilities underestimating the importance of, or neglecting altogether, one or more of these steps due to data or work overload, thus unwittingly allowing the team or group to flounder or even fail.

Other analysts have developed similar competency lists but organized them by using the project lifecycle model such as preparation, launch, performance management, team development, and disbanding (Hertel, Geister and Konradt, 2005; Hunsaker and Hunsaker, 2008). It is important to note the quality of relationship building (e.g., trust) is often found to be more important than the managerial aspects (e.g., monitoring progress) (Lin, Standing and Liu, 2008). Also, good communication skills, especially written (Balthazard, Waldman and Warren, 2009), are critical where nonverbal communication is weaker or absent altogether.

2.4. What are the antecedents of virtual leadership?

Antecedent conditions have not been as well represented in the mainstream leadership literature. 'The role of context has generally been of secondary concern to psychologists in general and to leadership researchers in particular' (Eberly *et al.*, 2013). The complexity of context makes it far more difficult to study comparatively. Since some researchers assert that leadership alone generally only accounts for 10% of all performance (Avolio, 2001), antecedent conditions are critical to understanding leadership, and particularly vital when considering the relationship of technology and leadership.

One major literature that is particularly important is the diffusion of innovation literature. Rogers (2003) posits that potential adopters must review the relative advantage of technologies (e.g., cost, richness of media, flexibility), ensure its compatibility with and adaptability to the extant organizational system, judge the

appropriateness of its knowledge barrier (ease of use), navigate its testability, and be able to ascertain its effectiveness in the organization (e.g., stability and reliability of the technology). Thus, leaders' awareness and review of the capability of technology, related to task needs, is essential.

The external environment is also critical in technology adoption (Oliveira and Martins, 2011). Industry characteristics, market structure, and government regulation often play a huge role in promoting technology adoption. The comfort, concerns, and expectations of users need to be considered. Of course, the characteristics and preferences of leaders themselves are extremely important for adoption, especially from the leadership perspective. Their knowledge and comfort with potential AITs, their preferences for how they will be used whatever the original purpose, and their concerns are critical to adoption.

2.5. How is virtual leadership affecting the evolution of organizations?

At least three major perspectives have affected research on change in organizations. Transformational leadership, as a broad-based change theory, studies the effects of individuals and groups of transformational agents. While transformational leadership approaches have their use as heuristic tools regarding the leader's abstract role in using and incorporating technology and technological change, they are crude due to the lack of specificity regarding technical issues and their failure to explain complexity. Another tradition, closer-to-home with regard to technology, is sociotechnical theory. Sociotechnical theory recognizes the importance of synergistic interaction between people and technology in workplaces (Trist and Bamforth, 1951).

Technology, no matter whether it is mechanical, virtual, or simply a process of doing work, will have manifold and complex effects that can rarely be fully understood in advance of implementation. Some of the major reasons are that people's reactions to the technology are important in terms of learning, usage, and long-term attitude, and create inevitable substantial side effects. Organizational leaders and designers must view the acquisition of technology as an iterative process that cannot be fully anticipated, and one in which adaptations of the technology during implementation are expected, and in which unfolding human aspects must be appreciated and harnessed for optimum benefit (Welch and Pandey, 2007).

The more modern and theoretically robust perspective that essentially subsumes sociotechnical ideology is complexity science which has many schools of thought across the sciences (Gleick, 1987; Kiel, 1994). In the case of technology and leadership, 'agents' may initially select a technology, but then new structures and attitudes evolve, often with unexpected side effects, that place new demands and constraints on future agents. This theoretical perspective predicts the types of initial challenges and even failures (McDermott, 1999; Orlikowski and Yates, 2002) seen so frequently in trying to get interoperability of information systems among various agencies, and rapid deployment of large scale systems such as occurred in the Affordable Care rollout in the US.

2.6. Macro-level theory building

Because the last two sets of questions are not typically addressed in leadership theory, a broader theoretical perspective must be used if they are to be included. DeSanctis and Poole (1994) developed a model, adaptive structuration theory (AST) that examines the co-evolution of agents (leaders) and technology because neither an institutional nor technology-focused approach provides a clear picture of the process of organizational development. 'AST examines the change process from two vantage points: (1) the types of structures that are provided by advanced technologies, and (2) the structures that actually emerge in human action as people interact with these technologies' (DeSanctis and Poole, 1994, p. 121). Their model proposes three antecedent conditions (structure of advanced information technology, other sources of structures such as task, and group's internal system) which affect social interaction and adoption decisions, and which produce decision outcomes (performance) and new structures over time.

This project modifies the DeSanctis and Poole (1994) model from a more sociologically-oriented model (e.g., examining the deep structures of power) toward a leadership and managerial perspective. It looks at a holistic organizational example of the growth and integration of virtual leadership via an institutional analysis and a strategic conduct (individual actor) analysis.

3. Propositions regarding the adoption, adaptation, and effects of leadership and technology

The following propositions are adapted from the DeSanctis and Poole (1994) theory of adaptive structuration theory, but provide a focus on a more managerial perspective (less on social structure and more on leadership, performance, and quality of implementation aspects of the overall process).

- Proposition 1: The greater the capability of AITs along various dimensions, the more likelihood that an organization and its leaders will adopt and subsequently use them, separately or in combination, and that they will affect communications, organizational structures, and/or organization products.
- Proposition 2: The greater the use of AITs in the external environment of an organization, the more likely leaders will adopt those same AITs in organizations.
- Proposition 3: The more amenable internal drivers for AITs are, the more likely they will be selectively adopted in organizations.
- Proposition 4: The combination of AIT capability, external drivers, and internal drivers will generally have a multiplicative effect on the use of AITs in e-communications and task structures (e-leadership).
- Proposition 5: The combination of AIT capability, external drivers, and internal drivers will generally have a multiplicative effect on the use of AITs in providing virtual services and products (e-management).
- Proposition 6: Over time, the structures and culture of the organization will co-evolve and adapt to the framework 'imposed' by technological change and progress.

- Proposition 7: Effective e-leadership and e-management will positively affect the success of reaching various performance goals, as well as side effects on the structure and culture of the organization.
- Proposition 8: Success in improving performance and reaching planned goals will be moderated by the quality of implementation of e-leadership and e-management.

These propositions and their sub-factors are represented in a causal chain framework in Figure 1.

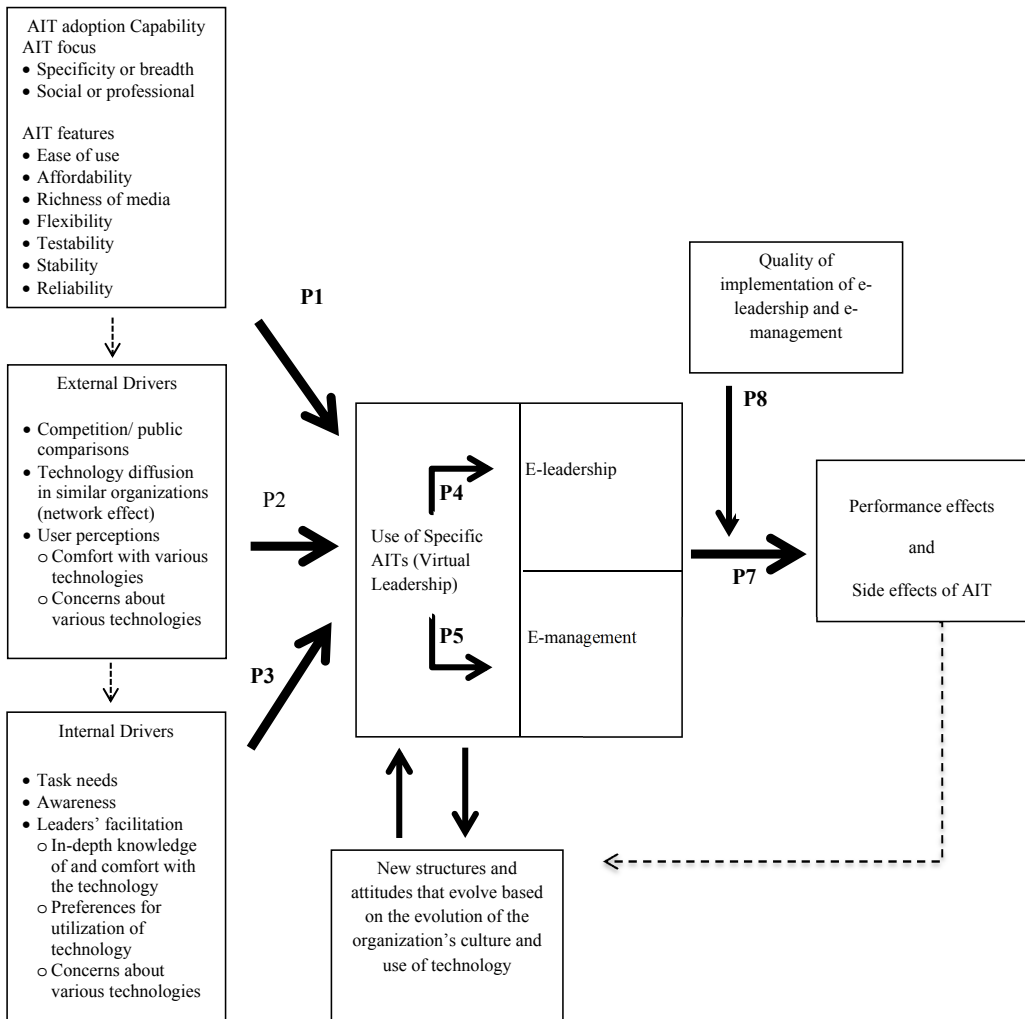


Figure 1: Model of AIT adoption, structural changes, and effects

Source: Adapted from DeSanctis and Poole (1994)

4. Methodological approach

This exploratory study focused on the effects of AITs on leadership in a public, comprehensive university of approximately 19,000 students, compiling data qualitatively to demonstrate the utility of the proposed framework to understand the virtual leadership capacity of a single organization. For this study, faculty as well as administrators were considered leaders, while students were viewed as clients. Following philosophy and general recommendations of structuration theory, mixed methods were employed in order to study the effects at both the macro (institutional) and micro (individual) levels of the organization. This is in line with Groeneveld *et al.*'s (2015) recommendation for more methodological diversity in the field.

At the institutional level, where relevant and available, institutional statistics were gathered regarding issues such as online teaching usage. Second, a survey was conducted that provided analysis at the institutional level to explore the propositions. Examples of questions asked were: what is the comfort level of students, faculty, chairs/academic directors, deans, and vice presidents with various types of AITs; what is the perceived level of displacement of face-to-face communication by virtual communication; and how great a gap does the institution have relative to the state-of-the-practice? The exact questions are embedded in the tables in the findings section.

After Beta-testing with several audiences, the survey was distributed electronically to all faculty and chairs. The faculty list included all 400 regular faculty, as well as 700 lecturers (full time faculty without tenure-track status) and adjunct faculty as well, or a total of approximately 1,100 individuals. The total faculty/chair response was 192, 21 of whom were chairs or school directors. Given the courtesy access to this list, it was not possible to track individuals and determine how representative the responses were; the sample was likely heavily skewed toward regular faculty, and was likely lightly skewed toward more technologically savvy faculty because of responder bias. Deans and vice presidents were contacted separately; 12 individuals with the title of dean, associate dean, or assistant dean responded, and four vice presidents and the president responded at the executive level. The total of all responses from institutional 'leaders' was 209. In addition, two large classes were surveyed; one was in the College of Natural Sciences and the other was in the College of Business and Public Administration, for a total of 309 students. Analysis of the two groups revealed small but significant differences such as in the utilization and expectations of online teaching, or the expectation that affective uses of virtual communication (e.g., trying to inspire) would be used by instructors.

Third, in order to get the individual perspective, a series of half-hour structured interviews of 30 faculty and administrators were conducted in order to get a sense of the range of opinions on concrete virtual leadership issues. For this exercise, only three AITs were examined and discussed in some depth: email, an online teaching platform (generally Blackboard in this case), and electronic document sharing. Email was selected as a highly mature and stable AIT, Blackboard was selected as a mature AIT but one evolving more quickly, and document sharing was selected as an AIT (or

cluster of closely aligned AITs) that is emerging strongly, but whose usage patterns are more mixed and whose trajectory is less well understood. Finally, a series of five focus groups totaling 32 students were conducted; the questions paralleled those asked of faculty and administrators.

5. Findings

The first proposition asserted that the greater the capability of AITs along various dimensions, the more likelihood an organization and its leaders will adopt and subsequently use them. Nine factors were selected to identify the degree of capacity; three functions were examined at the micro level as examples: email, Blackboard, and document sharing. Each will be briefly discussed in terms of interview data.

Email has broad functionality by providing an integrated system of informing, interaction, planning and record keeping. It once had both a strong professional and personal focus but the personal focus has been much eroded. However, there were no indications the professional focus had been significantly eroded in the university setting by social media or texting, with the notable exception of public relations and recruitment functions. The ease of use of email is extremely high among all groups, including students, even if it is not their preferred medium today. Affordability is not a significant issue. Flexibility was perceived as a great strength in terms of the ability to easily communicate with varied audiences in a speedy manor, tailor and craft simple to complex messages with precision, provide asynchronous information, track communications, keep records and maintain documentation, among others. While the ability to add attachments, embed pictures and emoticons, and add links contributed to communication richness, lack of richness was the major drawback of the medium for professional purposes. Almost universally, it was pointed out that messages that require subtlety and tack were poorly suited, humor was often misconstrued, confidentiality was highly insecure, and that it was easy to have intentions misinterpreted without nonverbal cues. Testability of email is not relevant as a fully diffused and infused AIT. The stability of email is high.

Blackboard also has a broad set of functionalities related to teaching and training in that it integrates informing (e.g., announcements, recorded lectures), interaction (e.g., discussion boards), planning (e.g., small groups working on projects), and record keeping (e.g., grades and usage statistics). It has only a professional purpose. Its initial ease of use is perceived as relatively low for faculty and moderate by most students because there are many functions to learn about and for faculty to control settings. In the long term, ease of use is much reduced by those who use it consistently (although some still complained of 'clunkiness'), and the ability to 'roll-over' a completed class was cited as a tremendous benefit. The cost of renting and maintaining Blackboard was cited by the administrators in charge as extremely high but users were oblivious to costs. Flexibility was cited by faculty and students as very high. The ability to load enormous amounts of class information in a single site and differentiate usage from fully online to classroom support functions (e.g., announcements, posting documents, etc.) was cited as a positive. Also, the variety of activities that can be accomplished

through various features, the ability to track individual students, and the elimination of travel were also popular responses. Although a few faculty cited richness as a positive feature such as by integrating real time virtual lectures or high-quality video presentations, many others found these features difficult or impractical to use and two-dimensional. Faculty who do not use the group function complained about the lack of easy interaction though some cited interaction as a strength due to ease of universal participation requirements. Once institutionally adopted, testability is high. For their part, students complained that many faculty used too few features or used them poorly. Blackboard stability was considered high. Reliability is considered a moderate to strong problem for many faculty, administrators, and students who remember outages during exams, glitches with features that were difficult to fix, and poor technical support. However, many faculty and administrators feel reliability has improved since the institution outsourced the maintenance function.

Document sharing (aka file sharing or use of a shared drive) provides a single location for documents that can be accessed by specified individuals via an intranet or internet. It has individual uses typically ranging from repository functions to group editing, and enterprise functions such as placing documents online for recruitment committees (e.g., NeoGov). The individual use types include Google.docs, Dropbox, and Microsoft 360, as well as group types with customized shared drives for a unit or division. It was discussed in this study as an exclusively professional AIT, although social media types of document sharing are currently proliferating. The functionality of document sharing is relatively broad. Users perceived the editing features as a strength and weakness. Both faculty and students expressed frustration over the editing of materials by others when they felt it was unnecessary. Ease of use tended to vary substantially by the amount of exposure to document sharing and the tech-savviness of users. The range of perceptions was evenly distributed from very difficult to very simple to use. For the most part, students were consistently critical of faculty's lack of knowledge or use of document sharing in class settings such as when group projects were required. The flexibility of data, access, and control of access were widely cited. Because of the specific utilization patterns for document sharing, richness of the AIT was not a significant factor. Stability of document sharing was sometimes cited as a problem in terms of locating and using different document sharing programs. Reliability was well perceived as a backup, but many concerns were expressed about repetition of errors by users in editing functions, lapses of confidentiality, and potential breaches of the data system.

The second proposition is the greater the use of AITS in the external environment of an organization (via competition, diffusion in the industry, and user perceptions), the more likely leaders will adopt select AITs in organizations. Interviews and focus groups indicated that competition and public comparisons were not a factor for email and document sharing; however, they were a modest factor in the use of online teaching related to Blackboard for some university administrators. The institution was not experiencing any enrollment pressures and most faculty were entirely indifferent to competition issues. Technology diffusion was important in email because of its

universality and diffusion pressures were sometimes perceived as important in online learning utilization, and as significant for some users of document sharing but not by occasional users. The importance of user perceptions was not applicable in email, and moderately important for online teaching and document sharing for university employees on average in terms of their perceptions of student comfort and concerns.

Survey data indicated that the students’ actual comfort was high with email and online instruction, but much less so with document sharing (see Table 3). Generally higher levels of AIT comfort by students and faculty and administrators who are of a different generation is consistent with the characteristics of ‘digital natives’ that have shown some significant shifts in learner characteristics (Yong and Gates, 2014; Broadbent and Poon, 2015).

Table 3: Comparative comfort levels of students, faculty and administrators with select AITs

	Students	Faculty	Chairs	Deans	President / VPs	All (excl. students)
Email	4.37	4.81	4.9	4.92	4.8	4.83
Online instruction	4.26	3.49	3.82	3.25	3.75	3.52
Document sharing	3.63	3.16	3.25	3.00	3.50	3.15

* Based on a five point Likert scale, with 5 being high.

Source: The author

The third proposition was the more amenable organizational needs for and leader perceptions of AITs are, the more likely they will be selectively adopted in organizations; the indicators were task needs, awareness, and leaders’ facilitation. Undoubtedly, all three AITs met various task needs well. Email acts as the communication backbone of the organization; Blackboard offers a comprehensive supplement for face-to-face classes as well as a partial or full substitute to traditional teaching methods; and document sharing programs are rapidly replacing email attachments, thumb drives, and old-fashioned hard-copy files. While awareness of email and Blackboard is universal, it was clear in interviews that some faculty and administrators had very little awareness of what document sharing was. University employee comfort with email was nearly complete at 4.83/5. However, comfort with online instruction only averaged 3.52/5 (with a standard deviation of 1.2) across the survey, and it dropped further to 3.15/5 with document sharing. Leaders’ preferences for the use of virtual communications showed great similarity with students for operational, basic communications, and participation purposes, with operational purposes topping the list for leaders. Yet while students thought that other interactive purposes should be as important, such as goal setting, inspiring and creating strategic purposes, organizational leaders’ perceptions of the importance of these purposes dipped substantially. In other words, while students thought inspiring was slightly more important in a virtual mode than in a traditional mode, university leaders thought it was somewhat less important, with a .95 spread in the 5-point Likert scale item. See Table 4 for perceptions of functional importance by respondent groupings.

Table 4: Types of functional purposes for virtual communications

Faculty version: How important is virtual communication versus traditional methods with staff and students for the following purposes?						
Student version: How important is an educator's ability to communicate virtually versus traditional communication methods for the following purposes?						
	Students	Faculty	Chairs	Deans	President / VPs	All (excl. students)
Operational	3.44	3.58	3.58	3.64	4.20	3.60
Participation	3.20	3.05	3.11	3.18	3.20	3.08
Goal setting	3.25	2.39	2.22	1.91	3.00	2.34
Inspiring	3.16	2.22	2.16	1.92	2.60	2.21
Creating strategic purposes (students: dissemination classroom expectations)	3.34	2.89	2.68	2.35	2.80	2.77
Communication with non-subordinates (students: communicating with students as a whole)	3.6	3.29	3.32	3	4.00	3.31

* Based on a five point Likert scale, with 5 being high.

Source: The author

The fourth proposition was that the combination of AIT adoption capability, external drivers, and internal drivers will generally have a multiplicative effect on the use of AITs in e-communications and task structures (e-leadership). In the case of students, nearly half of all communications to both individuals and groups have been displaced by virtual communications according to perceptions recorded in surveys. Utilization patterns vary significantly in various university employees in their professional capacity. Faculty displacement of individual communications is 37% and drops off to 29% for group communications, probably because faculty more frequently communicate 'en masse' in class situations, and respond to students more frequently by email or via Blackboard.

Department chairs/directors had by far the highest level of individual virtual communications at 67%. However, when group communication was rated by chairs, only 28% was virtual. Deans (including associate and assistant deans), the equivalent of senior managers, use individual virtual communication nearly half of the time, but send group virtual communications sparingly. At the presidential level where individuals are locked into nearly endless meeting schedules, most communication remains in a traditional mode to both individuals and groups (see Table 5).

Table 5: Substituting virtual communications for face-to-face communications with individuals and groups

How much do virtual communications substitute for face-to-face communications?						
	Students	Faculty	Chairs	Deans	President / VPs	All (excl. students)
<u>Individual</u>						
More than 50% of the time	49%	37%	67%	45%	20%	40%
<u>Group</u>						
More than 50%	46%	29%	28%	18%	20%	23%

Source: The author

The fifth proposition was that the combination of AIT adoption capability, external drivers, and internal drivers will generally have a multiplicative effect on the use of AITs in providing virtual services and products (e-management). Here the AITs that served as examples were Blackboard and document sharing.

In terms of Blackboard, institutional statistics report 4.1% of all classes offered at the university are fully online, and an additional 2.8% are offered in a hybrid format, totaling 6.9%. This is lower than national data indicate at public four year public institutions where 8% of all students take some classes online (a relatively similar calculation to the total number above), and 6% take all classes online which represents a far greater intensity of usage than single online classes reported in the case study (IPEDS, 2014). Growth rates are smaller at the institution studied, at 6.4% over the last five years compared to the national average growth rate of 10.1%, although the high growth rate is declining nationally (Allen and Seaman, 2015) and increasing in the institutional study. This lower-than-average utilization rate of online teaching seemed to be largely based on perceptions of poor performance based on perceptions of low communication richness and reliability of the medium, lack of competition, lack of faculty comfort, and other concerns such as difficulties with cheating and amount of time to prepare.

Only qualitative interview and focus group data were available regarding document sharing. Individual and small group usage seemed low overall, but a third of the interviewees were 'power users' who used document sharing extensively. Lack of training seemed to contribute to harsh reviews of document sharing capability, lack of external drivers led to random usage, and outright lack of awareness led to missed opportunities to aid students with up-to-date applications.

The sixth proposition was that over time, the structures and culture of the organization will adapt and co-evolve because of the effect of technology on the organization. At the organizational level, a new and fully independent information technology division at the vice presidential level was only created in 2005. It is also responsible for all IT training university-wide as well as the university-wide help desk. The major exception is the sharing of training on Blackboard with a faculty teaching resource center which handles the more pedagogical aspects. Additionally, since approximately 2000, all colleges have begun to recruit and add to their own technical support for both college-level enterprise technology, as well as individual technical computer support. Individual interviews and focus groups indicated numerous powerful examples of the co-evolution of technology and organizational structures such as how email has profoundly changed work structures and culture in the last quarter century. For those faculty who use Blackboard in a full or relatively full mode, the changes has been dramatic, but for some faculty Blackboard has had no effect to date. The impact of document sharing is generally modest, with notable exceptions, where some enterprise functions are changing meeting patterns.

The seventh proposition was that effective e-leadership and e-management will have a positive significant effect on the success of reaching performance goals, as

well as side effects on the structure and culture of the organization. The issue of performance was examined in two quantitative ways. First, all groups were asked about the level of impact of new virtual technologies. The group to report the least impact was students, with 40% of responses being 'not critical' or 'high'. Employee leaders rated the two top categories from 54 to 80% (see Table 6 for the results of AIT effects). It can be speculated that the evaluation by students of a lower impact may be because students assume a virtual environment and are less aware of its recent impact, or because their demands are higher.

Table 6: Overall perceived effect of AITs

In your specific area, how great an impact do you feel that new virtual technologies are having? [Student: As a student, ...]						
	Students	Faculty	Chairs	Deans	President / VPs	All (excl. students)
Overall effect in general:	%	%	%	%	%	%
none	3	3	0	0	0	3
modest,	21	16	17	9	20	15
moderate,	35	25	17	36	0	24
critical,	15	20	17	18	40	21
high	25	36	50	36	40	38

Source: The author

The next question was to help make a judgment about the effectiveness of the university's overall performance. Interestingly, students were the least critical and chairs were the most critical. In interviews and focus groups, all subgroups tended to note both strengths and weaknesses of virtual leadership, sometimes quite caustically, but the tenor of comments overall echoed the median finding in Table 7 that the institution had modest gaps for a university with a balanced teaching/research agenda. However, of university employees who were surveyed, only 14% thought the institution was up-to-date, while 23% thought there were large gaps.

Table 7: How large is the perceived gap for integrating AITs? (percent of respondents)

Criticality at CSUSB: In your specific area, how well have virtual technologies been integrated for communication and work functions compared to the state-of-the-art? [Students: ...for communication and learning purposes...]						
	Students	Faculty	Chairs	Deans	President / VPs	All (excl. students)
Up to date	33	22	11	0	20	14
Modest gaps	51	58	61	82	60	59
Large gaps	15	23	28	9	20	23
Critical gaps	1	3	0	9	0	4

Source: The author

The eighth proposition was that success in reaching performance goals will be moderated by the quality of implementation of e-leadership and e-management. All survey respondents were asked about comparative importance of virtual leadership skills compared to traditional communication skills, social skills, the ability to influence and negotiate, analytic skills, and technical skills. Approximately two thirds

of all respondents said virtual leadership skills were as important or more important (see Table 8 for results). The qualitative data provided extensive examples of good, average, and poor implementation of AITs which cannot be reviewed for reasons of space.

Table 8: Relative importance of virtual skills compared to traditional communication skills (percent of respondents)

Five traditional skills for leaders are: traditional communication skills, social skills, the ability to influence and negotiate, analytic skills, and technical skills. In comparison to these skills on average, how do you rate virtual communication skills?						
	Students	Faculty	Chairs	Deans	President / VPs	All (excl. students)
Somewhat less important	33	37	33	18	20	34
As important	53	59	67	82	60	62
More important	15	4	0	0	20	4

Source: The author

6. Discussion and conclusion

There is little evidence that the fundamentals of leadership are different in terms of the need for leaders to be competent in communication, instilling confidence, creating trust, etc. as well as to find the best ways to structure and accomplish work. However, virtuality has dramatically changed communication patterns, the skills needed to instill confidence and trust, and contemporary leadership simply cannot be understood without the effect and co-evolution of AITs on e-leadership, and e-management.

The general findings of this case are that adaptive structuration theory does indeed provide a good model for an institutional analysis of e-leadership and management within an organizational setting and for generating a great deal of general information how AITs do and should function optimally for leaders. It provides a wealth of information about how an institution is doing and the range of reactions for how leaders are coping with AITs. For the same reasons, it is less useful from a scholarly perspective in terms of quantifying exact relationships; additionally, fulfilling the spirit of the multimethod approach inherent in adaptive structuration theory is daunting.

Numerous, empirically supported observations flowed from the study. Observations that were in line with the literature and likely to have high generalizability included the following: (1) E-leadership can be looked at as an aggregate, but like leadership in general, it has many elements. A leader may be excellent in some areas and quite deficient in other areas, and not aware of those deficiencies. (2) E-leadership is as much about the successful adoption of ICTs as it about the quality of use of them. (3) AITs have different foci and characteristics so a full understanding of e-leadership requires an understanding various classes of AITs in various setting. (4) Most AITs that leaders use require some degree of sophistication. Without training, the leaders' skills levels may fossilize at a relatively low level of performance. (5) Bad

experiences have an enormous dampening effect initially, and residual effect in the long term, when there is a high degree of AIT voluntariness. Minimizing and quickly mitigating negative experiences is important if a technology is to be widely adopted. (6) Consumers' AIT preferences are likely to be given substantially lower priority in the selection process if internal organizational champions and support do not exist. (7) Providing institutional support for e-leadership adoption and quality utilization is complex because of the variety of types of AITs and highly specialized nature of individual needs.

Also supported in the qualitative research in terms of this case study, but which must be tested in other settings include the following. (1) The importance of e-leadership skills has become widely recognized. Over 50% of respondents place virtual technology as moderate or high in importance, and 60 to 80% of respondents thought that they were as important as or more important than traditional communication skills. (2) AIT-mediated communication with single individuals is currently at 50% or more for some leaders. AIT-mediated communication for group communications is generally less used but still substantial ranging from 18 to 29%. (3) The more instrumental aspects of AITs (e.g., operational functions and simple participation) are easier for leaders to utilize. The more abstract aspects of leadership, such as inspiring, goal setting, and strategic planning are perceived as harder by leaders, but more important by followers. (4) Email has become and is likely to remain the backbone of most administrative agencies. (5) Appropriate and high-capability AITs, such as Blackboard and document sharing in this case, will not have high levels of usage unless a series of other conditions are met including external pressures coming from other organizations and users, and internal drivers such as AIT awareness, personal comfort, and other facilitating conditions such as training and troubleshooting.

The study has a number of limitations. First, as with any single case study, there are issues of external validity. Universities have many special features, and so the generalizability from this single study may be low. Generalizability is also limited in relation to specific AITs. As was noted, the adoption, structural changes, and effects of AITs vary not only among themselves, but from organization to organization. While it is likely the stable environment of email has the broadest generalizability, it is likely the analysis of other institutions will have widely disparate experiences with Blackboard and document sharing, even within academe. Second, the samples were representative but were not random due to many pragmatic decisions that had to be made in order to gather data from many layers of an entire organization, given the limitations of access. Future studies can improve sample methodology by examining a narrower portion of an organization, or better, a set of organizations. Third, because of the vast amount of data collected, only a portion of it could be reviewed in this article, and citations had to be curtailed to the most pertinent.

In conclusion, the study of leadership is complex by itself, and incorporation of the co-evolution of technology and leadership only makes it more challenging. Adapting the DeSanctis and Poole (1994) model makes it conceptually manageable.

The adaptive structuration theory model of virtual leadership provides the 'big picture' on one hand, and the parameters within which to conduct more focused studies on the other. The exploratory qualitative case study provides data to support the widely-held assumption that virtual leadership has become extensive, that virtual leadership skills have become as important as traditional skills, and in many cases, that the virtual revolution has already shifted the leadership context dramatically, with more change likely in the future.

References:

1. Allen, I.E. and Seaman, J., *Grade Level: Tracking Education in the United States*, Babson Park, MA: Babson Survey Group and Quahong Research Group, LLC, 2015.
2. Anthopoulous, L., Reddick, C., Giannakidou, I. and Mavridis, N., 'Why e-government Projects Fail? An Analysis of the Healthcare.Gov Website', 2016, *Government Information Quarterly*, vol. 33, no. 1, pp. 161-173.
3. Avolio, B.J., Kahai, S. and Dodge, G.E., 'E-leadership: Implications for Theory, Research, and Practice', 2001, *Leadership Quarterly*, vol. 11, no. 4, pp. 615-668.
4. Avolio, B.J., Sosik, J.J., Kahai, S.S. and Baker, B., 'E-Leadership: Re-examining Transformations in Leadership Source and Transmission', 2014, *Leadership Quarterly*, vol. 25, no. 1, pp. 105-131.
5. Balthazard, P.A., Waldman, D.A. and Warren, J.E., 'Predictors of Emergence of Transformational Leadership in Virtual Teams', 2009, *Leadership Quarterly*, vol. 20, no. 5, pp. 651-663.
6. Balthazard, P.A., Waldman, D.A. and Atwater, L.E., 'The Mediating Effects of Leadership Interaction Style in Face-to-Face and Virtual Teams', in Weisband, S. (ed.), *Leadership at a Distance: Research in Technologically-Supported Work*, Mahwah, NJ: Lawrence Erlbaum Associates Publisher, 2008, pp. 127-150.
7. Bannister, F. and Connolly, R., 'Trust and Transformational Government: A Proposed Framework for Research', 2011, *Government Information Quarterly*, vol. 28, no. 2, pp. 137-147.
8. Broadbent, J. and Poon, W., 'Self-regulated Learning Strategies & Academic Achievement in Online Education Learning Environments: A Systematic Review', 2015, *The Internet and Higher Education*, vol. 27, pp. 1-13.
9. DeSanctis, G. and Poole, M.S., 'Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory', 1994, *Organization Science*, vol. 5, no. 2, pp. 121-147.
10. Eberly, M.B., Johnson, M., Hernandez, M. and Avolio, B.J., 'An Integrative Process Model of Leadership: Examining Loci, Mechanisms, and Event Cycles', 2013, *American Psychologist*, vol. 68, no. 6, pp. 427-443.
11. Fichman, R.G., 'Information Technology Diffusion: A Review of Empirical Research', 1992, *Proceedings of the Thirteenth International Conference on Information Systems*, pp. 195-206.
12. Gleick, J., *Making a New Science*, New York: Viking, 1987.
13. Government Business Council, *Delivering on Digital Government: A Candid Survey of Federal Managers*, Washington, 2015.

14. Groeneveld, S.M., Tummers, L., Bronkhorst, B., Ashikali, T. and Van Thiel, S., 'Quantitative Methods in Public Administration: Their Use and Development through Time', 2015, *International Public Management Journal*, vol. 18, no. 1, pp. 61-86.
15. González-Navarro, P., Orengo, V., Zornoza, A., Ripoll, P. and Peiró, J.M., 'Group Interaction in a Virtual Context: The Effects on Group Outcomes', 2010, *Computers in Human Behavior*, vol. 26, no. 6, pp. 1472-1480.
16. Greenberg, S., Greenberg, R.H. and Antonucci, Y.I., 'Creating and Sustaining Trust in Virtual Teams', 2007, *Business Horizons*, vol. 50, no. 4, pp. 325-333.
17. Hertel, G., Geister, S. and Konradt, U., 'Managing Virtual Teams: A Review of Current Empirical Research', 2005, *Human Resource Management Review*, vol. 15, no. 1, pp. 69-95.
18. Hunsaker, P.L. and Hunsaker, J.S., 'Virtual Teams: A Leader's Guide', 2008, *Team Performance Management*, vol. 14, no. 1/2, pp. 86-101.
19. IPEDS (Integrated Postsecondary Education Data System), Enrollment component, *Digest of Statistics*, 2014.
20. Kahai, S.S., Sosik, J.J. and Avolio, B.J., 'Effects of Leadership Style, Anonymity and Rewards in an Electronic Meeting System Environment', 2002, *Leadership Quarterly*, vol. 14, no. 4, pp. 499-524.
21. Kanawattanachai, P. and Yoo, Y., 'Dynamic Nature of Trust in Virtual Teams', 2002, *Journal of Strategic Information Systems*, vol. 11, no. 3/4, pp. 187-213.
22. Kiel, L.D., *Managing Chaos and Complexity in Government*, San Francisco: Jossey-Bass, 1994.
23. Lin, C., Standing, C. and Liu, Y-C., 'A Model to Develop "Effective" Virtual Teams', 2008, *Decision Support Systems*, vol. 45, no. 4, pp. 1031-1045.
24. Malhotra, A., Majchrzak, A. and Rosen, B., 'Leading Virtual Teams', 2007, *Academy of Management Perspectives*, vol. 21, pp. 160-170.
25. McDermott, R., 'Why Information Technology Inspired but Cannot Deliver Knowledge Management', 1999, *California Management Review*, vol. 41, no. 4, pp. 103-117.
26. Moon, M.J., Lee, J. and Roh, C.Y., 'The Evolution of Internal IT Applications and e-Government Studies in Public Administration: Research Themes and Methods', 2014, *Administration & Society*, vol. 46, no. 1, pp. 3-36.
27. Oliveira, T. and Martins, M.G., 'Literature Review of Information Technology Adoption Models at Firm Level', 2011, *Electronic Journal Information Systems Evaluation*, vol. 14, no. 1, pp. 110-121.
28. Orlikowski, W.J. and Yates, J., 'It's About Time: An Enacted View of Time in Organizations', 2002, *Organization Science*, vol. 13, no. 6, pp. 684-700.
29. Puranova, R. and Bono, J.E., 'Transformational Leadership in Context: Face-to-face and Virtual Teams', 2009, *Leadership Quarterly*, vol. 20, no. 3, pp. 343-357.
30. Rogers, E., *Diffusion of Innovations*, 5th edition, New York: Free Press, 2003.
31. Rusman, E., Van Bruggen, J., Sloep, P. and Koper, R., 'Fostering Trust in Virtual Teams: Towards a Design Framework Grounded in Trustworthiness Antecedents', 2010, *International Journal of Human-Computer Studies*, vol. 68, no. 11, pp. 834-850.
32. Thomas, D. and Bostrom, R., 'Building Trust and Cooperation through Technology Adaptation in Virtual Teams: Empirical Evidence', 2008, *Information Systems Management*, vol. 25, no. 1, pp. 45-56.

33. Trist, E. and Bamforth, K., 'Some Social and Psychological Consequences of the Longwall Method of Coal Getting', 1951, *Human Relations*, vol. 4, no. 1, pp. 3-38.
34. Van Wart, M., 'Administrative Leadership Theory: A Reassessment after 10 Years', 2013, *Public Administration*, vol. 91, no. 3, pp. 521-543.
35. Welch, E.W. and Pandey, S., 'E-government and Bureaucracy: Toward a Better Understanding of Internet Implementation and Its Effect on Red Tape', 2007, *Journal of Public Administration Research and Theory*, vol. 17, no. 3, pp. 379-404.
36. Yong, S.T. and Gates, P., 'Born Digital: Are They Really Digital Natives?', 2014, *International Journal of e-Education, e-Business, e-Management and e-Learning*, vol. 4, no. 2, pp. 102-105.
37. Zavattaro, S. and Bryer, T. (eds.), *Social Media for Government*, New York: Routledge, 2016.