



International Journal of Managing Projects in Business

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Article information:

To cite this document:

Nixon Muganda Kiyashen Pillay, (2013), "Forms of power, politics and leadership in asynchronous virtual project environment", International Journal of Managing Projects in Business, Vol. 6 Iss 3 pp. 457 - 484

Permanent link to this document:

<http://dx.doi.org/10.1108/IJMPB-11-2011-0075>

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Forms of power, politics and leadership in asynchronous virtual project environment

An exploratory analysis in South Africa

Power, politics and leadership

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Abstract

Purpose – The paper aims to investigate the forms of power, politics and leadership exercised by project leaders within asynchronous virtual project environments (VPEs). The purpose of this paper is to link effective project leadership to particular forms of power and politics within a VPE.

Design/methodology/approach – The empirical data are based on a quantitative telecommunications sector case study, complemented with some interviews, following a semi-structured approach. The research was approached based from a positivistic philosophical paradigm and using a survey research strategy. The questionnaire-based survey consisted of a sample of 28 respondents split between project managers (39.3 percent) and team members (60.7 percent).

Findings – The research results indicated a significant finding which linked leadership effectiveness to asynchronous VPE usage and communication. Factor analysis of the type of leadership exercised within an asynchronous VPE revealed two forms of effective leadership. The first one, named, Structured Charismatic Exchange, is underpinned by three forms of leadership styles: charismatic, virtual and transactional leadership. The second insight from the factor analysis also revealed significant loadings for two forms of leadership: Participative and Shared leadership. The common strand in both is the need to elevate the ethos of teams, which effectively implies that control in VPE ought to be decentralized responsibly to enhance sharing. This is possibly relevant in a bid to minimize conflicts and thus develop a project organization that encourages teamwork. Therefore, this factor was named Decentralized Team Leadership. Unlike the first factor, where the focus is on how the project leader projects his/her personality to influence people, the realization is that for a project organization to succeed, project goals and decisions emerge from bargaining, negotiating, and jockeying for position among members of different coalitions.

Research limitations/implications – Reported limitations are based on the sample size, effect of sectoral culture on the findings and constrained view of the virtuality construct. Future research should investigate other sectors with a large sample and expand the dimensions of the virtuality as a construct.

Practical implications – The paper concludes that project leaders should re-orient leadership practices to fit virtual project environments, taking into account the need for a more decentralized form of leadership and systematic trust building.

Originality/value – The recognition of the uniqueness of particular forms of power and politics relevant for the exercise of effective leadership in asynchronous virtual environments is emphasized in this research paper.

Keywords Project management, Leadership, Virtual work, Power, Politics, South Africa, Asynchronous virtual project environment

Paper type Research paper



International Journal of Managing
Projects in Business
Vol. 6 No. 3, 2013
pp. 457-484

© Emerald Group Publishing Limited
1753-8378

DOI 10.1108/IJMPB-11-2011-0075

The authors acknowledge the support received from the telecommunications companies based in South Africa.

1. Introduction

Project management in an asynchronous virtual project environment (VPE) remains a problematic issue due to a number of factors reminiscent of the VPE itself, organizational culture and project management practices. From a project management perspective, Pokharel (2011) highlights the critical role of communications, human resources, integration and scope. While from an organizational culture perspective, Hyvari (2006) links project management effectiveness to the issue of leadership. This research paper focuses on how these factors play out in an asynchronous VPE. The research seeks to answer the following question:

RQ. How effective is project management in an asynchronous virtual project environment in terms of leadership, power and politics?

We seek to address this research questions within the context of South Africa, as an emerging country recognized as an economic “power” in Africa, playing a significant role in technology and management innovations that are “mimicked” by many of the developing nations in sub-Saharan Africa. Stuckenbruck and Zomorrodian (1987) point out the increasing social and political pressures such as unemployment and lack of skills facing emerging countries. Project management can fulfil a need in developing countries to manage projects in an economical way (Stuckenbruck and Zomorrodian, 1987). Research by Sauer and Reich (2009) and Bolden (2004) acknowledges that the use of software and other technological innovations has changed the conduct of project management. From a stakeholder perspective, Pokharel (2011) asserts that leadership in VPEs is not fully understood in terms of politics, culture and governance. According to Martins *et al.* (2004), leadership in a virtual environment has only recently been initiated and this problem needs attention as little research has been conducted on the topic, especially if it is considered that developing countries based in Africa are typically late adopters’ project management tools.

South Africa was selected due to its strategic role in the sub-Saharan region of Africa, especially in the Southern Africa Development Community (SADC). Currently, SADC has a membership of 15 countries namely; Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. The total population of the SADC region is approximately 257 million, with a gross domestic product (GDP) of US\$472 billion. South Africa is the largest economy on the SADC region, with an estimated GDP of US\$202 billion and a population of approximately 50 million. One of the sectors playing a crucial role in many African economies is the information and communications technology (ICT) sector. The ICT sector is not only a major industry in its own right, but also a backbone for many others. For instance, in 2009, South Africa’s ICT sector generated \$24.2 billion and contributed more than 7 percent to the country’s GDP (IOL, 2011). Of particular note is the influence of the telecommunications sector on the ICT industry. Investments in cellphones have grown from an estimated US\$8 billion in 2005 to almost \$70 billion today, according to the UN’s International Telecommunication Union (ITU). Cellphone companies are now a major sources of revenue for African Governments, averaging 7 percent of tax revenues (IOL, 2011), a scenario driven by the strong growth in mobile phone usage in Africa. In South Africa, nearly 95 percent of adults own a mobile phone, a device which is considered to offer more than voice, text, music and gaming; but offers sustenance: mobile agricultural

advice, healthcare support, and money transfer, turning small, local merchants into the equivalent of bank branches (Dutta and Mia, 2011).

Therefore, in this paper, given the trends in the ICT sector in general, the motivation for situating the study within the telecommunications sector is linked to a number of reasons. First, the telecommunications infrastructure is increasingly becoming the backbone for several activities such as mobile commerce and internet-based inter-organizational information systems (IOSs) such as e-commerce and e-government. Inevitably, collaboration activities that straddle several departments and organizations rely on the telecommunications infrastructure for effective support of collaboration. In addition, the telecommunications companies, who provide services to a diverse set of organizations sometimes, have to rely on virtual tools to enable project collaboration. Therefore, the choice of the telecommunications sector was apt, since these companies not only have to employ virtual project collaboration tools within their organizations, but also with their customers in certain cases. South Africa has four mobile phone providers (MTN, Vodacom, Cell C, 8ta) and two fixed telephony providers (Telkom and Neotel). Therefore, one of the motivations for selecting this sector is linked to the role that these organizations play in enabling the infrastructure for the practice of virtual project management.

The second motivation is linked to the need to understand the leadership practice in large virtual high risk project environments in South Africa. When an attempt is made to understand the nature of project management in high risk IT projects, then the possibility that the practice of leadership may be unique in VPEs can be a justification especially in the emerging economies of Africa. While recognizing that all IT projects remains a high risk process, the motivation in this paper is partly based on the fact that the degree of risk is influenced considerably by environmental and organizational contexts and pressures (Willcocks and Margetts, 1993). McFarlan (1981) makes the argument that large, high-risk projects require specific tools, techniques, and resources that differ from those required by small, low-risk projects. From an organizational context perspective, the nature of IT projects that telecommunications service providers engage in are typically IOSs, which are not physically bound within a single organization, but may spread over a number of organizations, depending on the nature of the project. Therefore, the leadership employed may rely on virtual tools, which are typically used formally in large IT projects. This is because large organizations tend to be much more structured in their planning approaches and even tend to have more resources allocated for IT projects.

The third motivation arises from the need to contribute to the accumulation of knowledge on experiences related to ICT virtual project management in Africa. It therefore reinforces the efforts of the International Federation for Information Processing (IFIP) Working Group 9.4 on ICT in developing countries that specifically calls for articulating the social implications of computers in developing countries by collecting, exchanging, and disseminating experiences of ICT implementation practices in developing countries. This study may provide a different perspective on the nature of leadership in VPEs, especially when we consider that a majority of African countries have a history of colonial dominance and cultural diversity (Wanasika *et al.*, 2011), which can be critical influencers to leadership practice. For instance, in contrast to Western practices, South Africa has a cultural dimension which includes deep respect for experience, group solidarity, collectivism, teamwork, and service to others and

a spirit of harmony or Ubuntu (Wanasika *et al.*, 2011). Furthermore, there is high power distance in South Africa which is based on status and age and this may restrain participative leadership. Therefore, uniqueness of the historical social context may enable unique insights into the leadership practices in asynchronous VPEs that is unique to developing countries in Africa.

2. Literature review

The following themes were identified as relevant literature for the study: leadership, power, politics, VPEs and project management. In addition, Pokharel (2011) identified the following areas of influence in a VPE: complexity of project, clarifying project objectives, types of stakeholders, trust, policies, standards and four main knowledge areas. Lastly, the intangible aspects of project management are explored such as charisma, trust, respect, personality, motivation, experience, networking and interpersonal skills. In reviewing the literature, challenges were identified from the overlap between the characteristics of project management and VPEs. They are as follows: scope, communication, monitoring, resource management and time management. In addition, challenges were identified from the overlap between organizational culture and project management. They are as follows: respect, networking, personality and motivation. Leadership and experience is important to organizational culture, VPEs and project management.

2.1 *Virtual project environments*

A VPE refers to the technology used by the project manager and team within a project. Booch and Brown (2003) identifies that, a collaborative development environment (CDE) is a virtual space. It can be used to communicate, share information, brainstorm, and negotiate by all stakeholders within a project. Several characteristics of a CDE are identified by Booch and Brown (2003): centralized information management, calendaring and scheduling, project resource profiling, dashboards, electronic document workflow, discussion forums, virtual meeting rooms, instant messaging, online voting, shared whiteboards, co-browsing of documents, personalization capability, established protocols/policies, defined scope and good leadership. From a leadership perspective, what is critical in these CDEs is the nature of teams in these VPEs. Referred to as virtual teams, Kirkman and Mathieu (2004) define them as groups of workers with unique skills, who often reside in different geographical places and who have to use for co-operation means of ICT in order to span the boundaries of time and space. The use of these virtual teams are inevitable in VPEs and offers certain benefits such as: team members can work from anywhere at any time, while providing flexibility to the individual (Townsend *et al.*, 1998); members can be recruited for their competencies, not just physical location (Hagen, 1999); recruiting expenses and relocation costs can be reduced or eliminated (Hagen, 1999); organizations increase the ability to develop knowledge sharing networks and become a learning environment; expenses associated with travel, lodging, parking, and leasing or owning a building may be reduced and sometimes eliminated (Townsend *et al.*, 1998); increased individual production (Kimball, 1997); virtual teams allow individuals to develop a diverse skill-set (Horvath and Duarte, 1997); team members move on and off projects quickly without the delay and expense of relocation (Henry and Hartzler, 1997); and team members can be brought up to speed quickly by examining electronic team communications and

documents (Townsend *et al.*, 1998). The common characteristic of all teams is the need to communicate and collaborate; however, in virtual teams, these roles must be accomplished using communications technology (Duarte and Snyder, 1999).

Of relevance to this study is the nature of leadership in a virtual project management environment. Virtual project management is considered by Vaddavalli and Poosarla (2004) as the third generation of project management which is used to facilitate communication at various sites with minimum communication delays and gaps such that all the projects can be both estimated and executed at the most efficient and effective timeframes. Literature links the challenge of communication to be intertwined with the management of stakeholder expectations. For instance, Schwalbe (2010) states that “managing stakeholder expectations” is what makes an effective project manager, yet research by Pokharel (2011) identifies the difficulty of communicating stakeholder expectations in a VPE. Research by Purvanova and Bono (2009), Karpova *et al.* (2009) and Buxbaum (2001) also acknowledge that communication is difficult in a virtual environment. Thus, as project teams transition to virtual project teams, the major issue of concern is how to enhance the effectiveness of project management in these VPEs. Effectiveness of project management is critically linked to organizational structures, the type of project management tools and methods, “leadership competence”, critical success and failure factors and the characteristics of an effective project manager (Fox and Spence, 1998; Pollack-Johnson and Liberatore, 1998; Belassi and Tukel, 1996; Zimmerer and Yasin, 1998). In this study, we focus more on the human aspects linked to leadership as a critical link to ensuring effectiveness in virtual project management.

2.2 Organizational culture and leadership

Organizational culture is the set of shared assumptions, values and behaviors that characterize the functioning of an organization (Kwantes and Boglarsky, 2007). The features of an organization such as leadership, power, control and culture are closely linked to each other, while power and politics also permeates through interpersonal communication within an organization (Fairholm, 2009). The political frame of an organization views politics as coalitions of individuals competing for power and leadership (Schwalbe, 2010, p. 47). PMI (2008) states that being culturally aware of politics and skillfully using power and politics aids in project success. Organizational culture allows an individual to make sense or ascribe meaning to one’s experience thus enabling the linkage of organizational culture to leadership effectiveness and personal effectiveness (Kwantes and Boglarsky, 2007). Furthermore, Kwantes and Boglarsky (2007) identified a relationship between organizational culture and leadership effectiveness as well as personal effectiveness that the relationship between organizational culture and personal effectiveness was the strongest in South Africa.

Riggio and Feldman (2005) deduced the following critical success factors for leaders: effective communication, interpersonal skills, providing motivation, mutual trust, respect and nonverbal communication. Purvanova and Bono (2009) links effective virtual team leadership to the transformational and participative leadership styles in situations where teams use computer mediated communication. In particular, the participative leadership style is more effective when used in combination with collaborative technologies (Koliavasili, 2007). Furthermore, participative leadership is effective when there is a low power distance between leaders and followers (Yukl, 2010; Campbell and Craig, 2005).

Research by Dvir *et al.* (2002, cited in Hambley *et al.* (2007)) identified that transformational leadership is more effective than transactional leadership overall. Hambley *et al.* (2007) explored the effect of transformational leadership, transactional leadership and communication media on team outcomes. Hambley *et al.* (2007) concluded that these leadership styles did not affect team outcomes through communication media. Moreover, rich communication media did not improve task performance. However, in VPEs where face-to-face interactions are minimal, there is need for shared or horizontal leadership since it influences the levels of trust (Koliavasili, 2007), which is a critical component in VPEs.

2.3 Trust in virtual environments

A common construct in organizational culture and leadership studies is the critical role that the construct of trust plays. Trust is considered as a fundamental component of leadership (Atwater, 1988) and project management in general (Cheung *et al.*, 2011). Past research point out that instilling trust as part of the organizational culture is the greatest challenge, critical for the success of projects in a VPE (Kirkman *et al.*, 2002; Jarvenpaa and Leidner, 1998). One of the key concerns in effective leadership is how to ensure coordination of teams' members in a project, yet without a certain degree of trust, it is almost impossible to establish coordinated action within and across organizational boundaries (Kramer and Tyler, 1996; Sako, 1992). Trust is envisaged as a willingness to be vulnerable to another, based on the belief that the other is reliable, open, competent and concerned (Mishra *et al.*, 2011). Communication plays a critical role in ensuring the sustainability of virtual collaboration and in a virtual team; this is accomplished through the use of ICT to facilitate collaboration across distance, time and organizational boundaries (Hung *et al.*, 2004). ICT is used since in VPEs, there is a lack of or minimal physical interaction and synergies that often accompany face-to-face communication. Thus, in virtual project endowments, in which traditional modes of building trust are inhibited, shared leadership is the norm during which trust becomes even more critical since self-direction and self-control are paramount (Handy, 1995).

Mishra *et al.* (2011) view the development of trust as non-linear and built across the four dimensions of reliability (ability to follow through in words and action), openness (willingness to share important information), competence (ability to perform duties as promised) and compassion (concern for others interests). Reliability and competence are considered as foundational to the overall project implementation and progress, while if openness and compassion are present at the outset of a project, this is notably linked to the initiative of the leader (Mishra *et al.*, 2011). The supportive behavior of the leader can therefore be linked to the development of organizational trust through acts of honesty and compassion. These acts of the leader can only be exercised taking into account that such behavior involves the use of the leaders influence through power and politics. Thus, leadership involving the use of power and politics is complimentary to the notion of some form of control, which is consistent with the determination by Weibel (2007, p. 513) that a leader can build trust with team members "by applying the right form of managerial control in the right way". This enables a claim be made, which is consistent with Mishra *et al.* (2011), that the right way to achieve this form of control that compliments trust building includes two-way communication (openness) and a concern for the collective (compassion). Thus, trust inevitably becomes a key component for effective leadership, based on a form of control which is unique to VPEs.

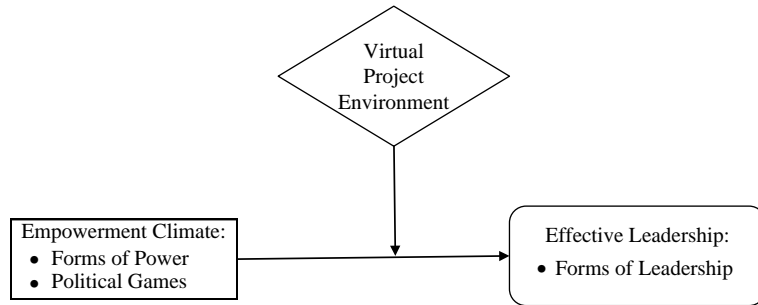
2.4 Conceptual framework for effective virtual project leadership

Strong leadership is important for a VPE (Booch and Brown, 2003), where leadership is the process of influencing others (Koliavasili, 2007). Linking leadership to power and politics: power is the ability to influence and is considered as the essence of leadership (Fairholm, 2009); while politics is power and influence in action (Snedaker, 2002). Some of the political games identified as a challenge in a VPE include: Information, deception and higher source politics ICT (Pinto, 1998). Networking, as part and parcel of communication, is a critical foundation for the use of power and politics within project environment. However, networking requires trust building relationships which may be difficult in an asynchronous environment (Riggio and Feldman, 2005). From a power perspective, expert, personal and information power were identified as difficult to convey in a VPE (Gottschalk, 2008). In addition, the intangible aspects of project management such as networking, motivation, status, personality, respect, communication and trust was identified as a challenge in a VPE (Riggio and Feldman, 2005; Purvanova and Bono, 2009; Schwalbe, 2010; Pokharel, 2011). Respect is based on the status of a leader, and is central for a leader to exercise politics and is necessary for trust (Clarke, 2011). However, trust is a challenge in a VPE (Pokharel, 2011; Mumbi and McGill, 2008; Siaskas and Siaskas, 2008). Research conducted by Purvanova and Bono (2009) determined that for such challenges to be addressed within a VPE, transformational and participative leadership styles are effective when used within computer-mediated communication environments.

Therefore, leadership provides the traction needed for the effectiveness of virtual teams and Bell and Kozlowski (2002) links this role to creation of explicit structures and procedures. The study of leadership in VPEs is still nascent and leadership literature reviewed indicates that leadership in traditional non-VPEs is more effective (Burke and Aytes, 1998; Evel and Bikson, 1988). Part of the success seen in traditional teams is linked to how managers maintained control through monitoring and control of lower echelon employees by telling them what to do (Miles and Creed, 1995), whose approach is linked to nineteenth century managerial philosophy that emphasized the "limited competence of the rank and file". This approach persists in modern notions such as agency theory and transactions cost economics, with their emphasis on distrust and opportunistic behavior (Creed and Miles, 1996), yet an argument has been advanced earlier that trust is necessary for effective leadership. Nauman *et al.* (2010) suggest that effective leadership in VPE should be approached in ways that differ from established practices designed for the traditional environment. Evidence indicates that such leadership in virtual teams should espouse more flexibility and a willingness to let others take the lead when necessary (Jarvenpaa *et al.*, 1998; Jarvenpaa and Leidner, 1998; Kayworth and Leidner, 2000). These concerns of leadership in VPEs provides us with the motivation to explore further the nature of leadership and how it is related to asynchronous VPEs, especially when the context of a developing country is taken into account. In this present study, the work of Malone (1997) is adapted as a basis for exploring the nature of leadership in asynchronous VPEs (Figure 1).

Empowerment climate (independent construct) is hypothesized to influence how effective leadership (dependent construct) is conceptualized within a VPE (moderating construct). Organizational behavior literature suggests that the most important factors that contribute to empowerment, engagement and satisfaction of employees are based on their relationship with the leader (Sheridan and Vredenburg, 1978;

Figure 1.
Effective leadership
in VPE



Source: Adapted from Malone (1997)

Eisenberg *et al.*, 1983; Rhoades *et al.*, 2001). However, in a virtual environment, the issue of empowerment is not left alone to an individual team leader, but rather, a virtual team may function as a substitute for many of the leadership functions that are normally executed by a team leader who is physically present and interacting face-to-face with a team (Kerr and Jermier, 1978). Thus, empowerment climate, becomes a “collective”, reminiscent of the exercise of leadership within the VPE, that, in a sense, influences overall effective project leadership. It is for this reason that empowerment climate is considered as an independent construct, while effective leadership is considered a dependent construct.

3. Research methodology

The primary research objective was to investigate the effectiveness of leadership in an asynchronous VPE. The research focused on asynchronous VPEs as the absence of nonverbal communication and body language may significantly impact project management. Lack of nonverbal communication may impede communication (Riggio and Feldman, 2005). The research conducted was limited to South African telecommunications companies. Furthermore, it was limited to the knowledge of project managers and team members who have worked within an asynchronous VPE. The researchers selected a quantitative survey research strategy. Quantitative research is primarily used by positivist researchers and a survey is strongly linked to positivism (Oates, 2006). The researcher selected the sampling frame as the list of employees at various telecommunications companies in South Africa. Carvalho and White (1997) recommend probability sampling for quantitative research. However, the researchers opted to use non-probability sampling techniques such as convenience and snowball sampling to mitigate for low response rates.

3.1 Key constructs

The effective virtual project leadership and empowerment climate items were drawn from literature on organizational behavior, project management and leadership. It was earlier highlighted that leadership literature generally captures the notion that there is more effective leadership in traditional teams than in virtual teams. This claim provided the motivation for undertaking a study within VPE in order to understand and explain the nature of leadership in VPE. Thus, VPE was considered as moderating the relationship between effective leadership and empowerment climate. The notion of effective leadership was therefore captured seven items that sought to unearth the type

of leadership style in a moderated VPE. The mode of leadership style was influenced by an empowerment climate characterized by a leader exercising certain types of power games (seven items) and politics (seven items). Thus, there were a total of 21 items measuring the effectiveness of leadership within a VPE (Table I).

Although the test items were sourced from instruments used in prior research (as per Table I), the instrument was still piloted among six IT professionals and an academic and minor corrections for purposes of clarification and better language use were done.

3.2 Sampling approach

A census approach was taken and thus the sampling frame consisted of all the six telecommunications companies based in South Africa. The target population of respondents consisted of project managers and team members who have used an asynchronous VPE within these companies. A list of 35 project managers and team members was created using a snow-ball sampling approach that allowed the researchers to identify respondent(s) who have implemented a project within a VPE in their organizations. After telephonic follow-up and some site visits, usable returns were received from 28 respondents, representing a very high 80 percent response rate. There were no missing values since during the collection of the questionnaire; all respondents were guided in filling in the questionnaire. The final sample consisted of 11 project managers (39 percent) and 17 virtual project team members (61 percent). Figure 2 shows the division and frequency of project managers versus team members from the sample.

Out of 11 project managers, eight have indicated their project management experience. The average level of project experience was 7.63 years, while the lowest level of experience was five years. The level of analysis was considered at the individual level.

3.3 Data analysis tools

A descriptive and inferential analysis was used to identify patterns in the data and draw conclusions. A factor analysis based on a principal component analysis (PCA) with varimax rotation of the leadership scale was conducted to investigate the internal structure as well as to determine the smallest number of factors that could be used to best represent

Constructs	Test items	No. of items	References
Leadership style	Transformational; transactional; participative; situational; virtual; charismatic; shared	Seven	Yukl (2010), Bolden (2004), Nauman <i>et al.</i> (2010), Hambley <i>et al.</i> (2007), Yang <i>et al.</i> (2011), Pierce (2002)
Political games	Coalition; control decision; control resource; control committee; scientific element; higher power; use position information politics; deception; misc. games	Ten	Pinto (1998)
Power	Reward; expert; information; referent; legitimate; coercive; personal	Seven	French and Raven (1959), Fuqua <i>et al.</i> (2010), Schwalbe (2010), Pearce and Sims (2002), Yukl (2010)

Table I.
Constructs, test items
and references

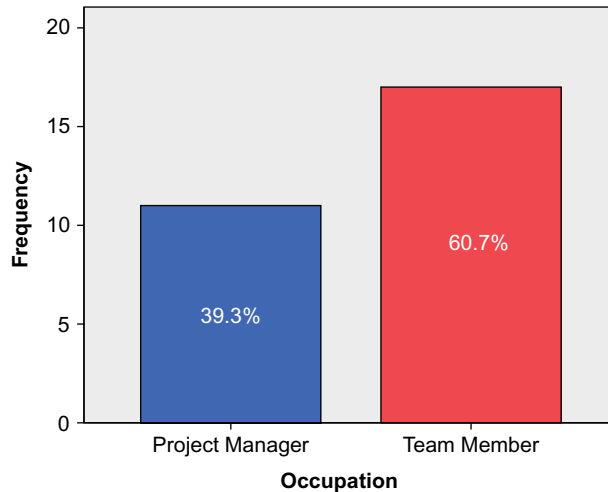


Figure 2.
Respondent categories

the interrelations among the sets of variables for the construct. In deciding on the number of factors to extract, a combination of the Kaiser-Guttman rule (K1 rule) and the scree plot were utilized to determine the most appropriate component solution. The K1 rule advocates for retention of those factors with eigenvalues of at least 1, while the scree plot considers only those factors that appear before the steep decline ends. Factors considered significant were based on a criteria proposed in the literature. Comrey and Lee (1992) suggests that the pattern/structures in excess of 0.71 loading are considered excellent, 0.63 as very good, 0.55 as good, 0.45 as fair, and 0.32 to be poor. Hair *et al.* (2006) suggests that there should be due consideration of the sample size when deciding on the threshold for the loadings. According to their guidelines, the ideal factor loading for a study with a small sample size should be in excess of 0.71 (excellent). This cut-off was considered appropriate, especially to help in clearly delineating the type of leadership that is appropriate in an asynchronous VPE. Thus, factor analysis was mainly employed as a heuristic tool to intuitively unearth general tendencies related to effective leadership in a VPE.

Cronbach's α internal reliabilities were assessed for each construct. All constructs were "substantially reliable" with their alphas above 0.61 (Landis and Koch, 1977). Landis and Koch's (1977, p. 168) benchmarks were employed to determine reliability, that is from:

- 0 to 0.20 as "slightly reliable";
- 0.21 to 0.40 as "fairly reliable";
- 0.41 to 0.60 as "moderately reliable";
- 0.61 to 0.80 as "substantially reliable"; and
- 0.80 to 1.0 as "almost perfect".

The overall sample size, discussed previously, was 28 respondents. The reliabilities were: leadership type, $\alpha = 0.698$; forms of power exercised, $\alpha = 0.677$; and political games played, $\alpha = 0.703$ thereby indicating high internal construct consistency and reliability.

4. Analysis of results

The analysis and presentation of results are reflected in this section. The analysis and presentation in this section links effective leadership to asynchronous VPEs.

4.1 Linking effective leadership to asynchronous VPE

The pie chart in Figure 3 shows the distribution of respondents that described leadership in their asynchronous VPE. 13 (46.4 percent) respondents indicated leadership was about right whereas 12 (42.9 percent) respondents suggested it was good. However, only three (10.7 percent) respondents said leadership was bad.

Significant findings in Table II identified strong associations at a significance level of 1 percent between leadership effectiveness and the following: communication, virtual environment usage, coalition politics, motivation, stakeholder management and performance management. It is important to note that no correlation could be identified between face-to-face interaction and leadership effectiveness. Negative relationships were found between leadership effectiveness and miscellaneous games and the emphasis of the risk process group as a challenge.

Table III describes the mean and standard deviation of the different leadership styles employed within an asynchronous VPE. The reliabilities of the item-scale is also captured in the table, indicating that construct items were all “substantially reliable” with Cronbach’s α s above 0.61 (Landis and Koch, 1977). In all the cases except two (transactional and charismatic leadership), all the respondents agree that shared (4.25), participative (4.18), situational (3.86), transformative (3.82) and virtual leadership (3.5) dimensions are exhibited in an asynchronous VPE. However, the respondents are indifferent regarding the conveyance of transactional and charismatic leadership through an asynchronous virtual environment. Therefore, the criticality of these leadership styles is of significant importance. Purvanova and Bono (2009) identified that participative leadership was more effective in a team using technology.

Table AI in Appendix 1 presents the correlation matrix for the different forms of leadership variables. The correlations of the constructs were all below the 0.90 threshold indicating the distinctness of each construct (Bagozzi *et al.*, 1991). Transformational leadership is significantly positively correlated to participative leadership ($r = 0.65$, $p < 0.00$) and situational leadership ($r = 0.502$, $p < 0.01$). Other significant correlations are found between virtual leadership and transactional leadership ($r = 0.486$, $p < 0.01$) and also between situational leadership and virtual leadership ($r = 0.444$, $p < 0.02$).

A factor analysis based on a PCA of the leadership scale was conducted to investigate the internal structure as well as to determine the smallest number of factors that could be used to best represent the interrelations among the sets of variables for the construct. In deciding on the number of factors to extract, a combination of the K1

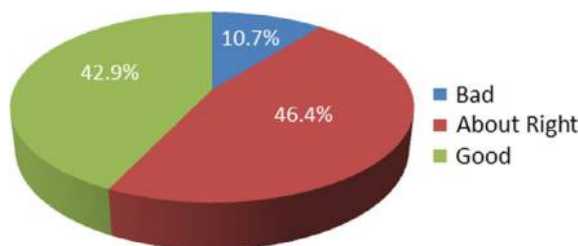


Figure 3.
Leadership effectiveness

Table II.
Correlation matrix:
leadership effectiveness

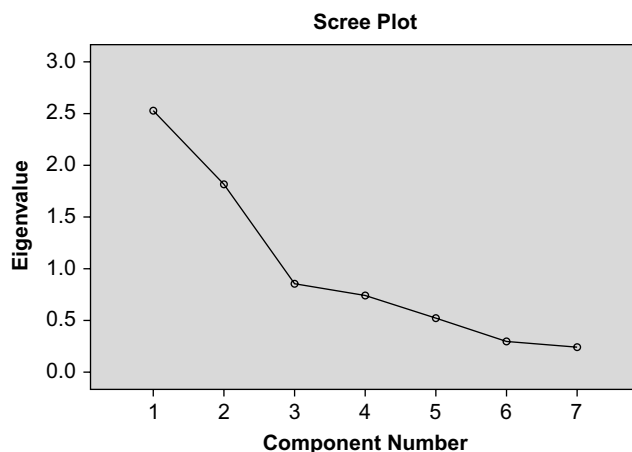
	Leadership effectiveness: correlation matrix							
Leadership effectiveness	VPE usage	F2F	Misc. games	Coalition	Motivation	Stakeholder management	Performance management	KA risk
Correlation coefficient	1.000	0.494**	0.349	-0.385*	0.450*	0.383*	0.408*	0.407*
Sig. (two-tailed)		0.007	0.069	0.047	0.016	0.044	0.031	0.031
<i>n</i>	28	28	28	27	28	28	28	28
								0.510**
								0.009
								25

Table III.
Leadership styles

Leadership style	Mean	SD	Cronbach's α
Participative leadership: involved members in the decision making process	4.18	0.67	0.688
Shared leadership: distributed responsibility throughout the team	4.25	0.844	0.697
Charismatic leadership: sacrificed self and was a role model	3.44	0.934	0.637
Situational leadership: adjusted his/her leadership style according to the situation	3.86	0.97	0.655
Transformational leadership: showed respect, inspired loyalty, motivated and promoted trust	3.82	0.983	0.657
Virtual leadership: used technology to bridge time zones and geographical and cultural barriers	3.5	1.036	0.619
Transactional leadership: viewed leadership as an exchange process where there is good pay for reliable work	3.39	1.133	0.684

rule and the scree plot were utilized to determine the most appropriate component solution. The K1 rule (Table AII in Appendix 2) advocates for retention of those factors with eigenvalues of at least 1, while the scree plot considers only those factors that appear before the steep decline ends. The scree plot (Figure 4) generated did not help in factor extraction since the point of inflexion is unclear. For the KI rule, the degree of variance which is explained by factors as you go down the table becomes smaller and smaller, therefore it can be assumed that the first few factors are the most important ones. In Table AII (Appendix 2), it is evident that the first two factors are the most important with a cumulative explained variance of 62 percent. Thus, for this research, the table of communalities was relied upon for factor extraction.

Factors considered significant were based on a criteria proposed in the literature. Comrey and Lee (1992) suggests that the pattern/structures in excess of 0.71 loading are considered excellent, 0.63 as very good, 0.55 as good, 0.45 as fair, and 0.32 to be poor. Hair *et al.* (2006) suggests that there should be due consideration of the sample size when deciding on the threshold for the loadings. According to their guidelines, the ideal factor loading for a study with a sample size of 50 or less respondents should have factor

**Figure 4.**
Scree plot: leadership style

loadings of more than 0.75. However, given the exploratory nature of this research as well as the use of factor analysis as a heuristic tool in this study, a cutoff of 0.70 could be considered appropriate. Using factor analysis as a heuristic tool enabled us to capture what the general tendencies of the leadership variables that are considered important and therefore presented us with a way of summarizing the body of data.

Thus, out of the seven leadership variables from the 28 observations (a ratio of 4:1), a factor analysis resulted in the retention of two components or factors which were significant (Table IV). The re-produced rotation component matrix in Table IV reveals the loadings of both components.

If a threshold of 0.70 is used, virtual, charismatic and transactional leadership are substantially loaded onto component 1 with values of 0.781, 0.727 and 0.804, respectively, while participative and shared leadership are significantly loaded onto component 2 with values of 0.913 and 0.815, respectively. Participative and shared leadership both share a common theme of decentralization and a team based approach and therefore can be named "Decentralized Team Leadership". However, virtual and transactional leadership both emphasize structure and exchange. Virtual leaders must encourage information exchange between team members (Walvoord *et al.*, 2008), whereas, transactional leaders exchange compensation for good work (Bolden, 2004). Walvoord *et al.* (2008) stipulates that virtual leaders must establish structure for communication activities and transactional leaders support structure to increase efficiency according to Bolden (2004). When structure and information exchange are considered in light of the need for charismatic leadership, factor 1 can therefore be named "Structured Charismatic Exchange".

4.2 Power and leadership within asynchronous VPE

Table V describes the mean, standard deviation and Cronbach's α s for the various types of power instituted within an asynchronous VPE. Reward and expert power have been found to have the highest mean values and lowest standard deviation. This is in contrast to Gottschalk (2008), who suggested that expert power may be a challenge in an asynchronous VPE. A respondent elaborated that due to the asynchronicity of e-mail, an individual has time to research before responding which frames oneself in being knowledgeable. Personal power may be difficult to convey within an asynchronous environment as suggested by Riggio and Feldman (2005), Purvanova and Bono (2009), Schwalbe (2010) and Davis *et al.* (2007) due to a dependency on status. This is consistent with the findings in Table V as the majority of respondents are indifferent regarding the

Components

	<i>Factor 1</i>
Charismatic leadership: sacrificed self and was a role model	0.727
Virtual leadership: used technology to bridge time zones and geographical and cultural barriers	0.781
Transactional leadership: viewed leadership as an exchange process where there is good pay for reliable work	0.804
	<i>Factor 2</i>
Participative leadership: involved members in the decision making process	0.913
Shared leadership: viewed leadership as an exchange process where there is good pay for reliable work	0.815

Table IV.
Rotated component matrix

Types of power	Mean	SD	Cronbach's α
Reward power: possessed an ability or power to deliver something of value to another person	3.82	0.772	0.624
Expert power: exercised power based on his/hers individual's knowledge or expertise	3.89	0.832	0.658
Information power: possessed the ability or power to control access to information and its distribution	3.57	0.920	0.670
Referent power: exercised power based on his/her charisma and followers were attracted and admired the leader	3.21	0.957	0.634
Legitimate power: exercised power based on his/her position or authority	3.82	0.983	0.709
Coercive power: exercised his/her ability to administer punishment and negative reinforcement	2.86	1.008	0.588
Personal power: had power derived from his/her personality (e.g. physical appearance or traits)	2.75	1.076	0.587

Table V.
Types of power

conveyance of personal power though an asynchronous environment. Personal power had the lowest mean value of 2.75.

The overall level or mean of power distance and dynamics within an asynchronous VPE is 1.96 (medium). Wanasika *et al.* (2011) indicated that there is a high power distance in South Africa which may restrain participative leadership. Table VI conveys the viewpoints of two respondents and project managers regarding power distance and authority; while Table VII presents a correlation of power distance with a sample of factors that provide an insight to how power is exercised. This connection emanates from Hofstede (1991) claim that the relationship between bosses and subordinates in a low power distance society is one of interdependence in contrast to dependence in a high distance culture.

Thus, from Table VII, it can be highlighted that when the levels of inequality are high, power distance is high, and subsequently from the study's results leaders within a VPE require the application of more effort in stakeholder management ($r = 0.500, p < 0.007$)

Respondent	Comment
R12	"In email there is low power distance and everybody is treated equally"
R24	"I could not convey power, authority and urgency on email. It was better face to face. Email is very formal and you have to be polite. It removes the emotional urgency"

Table VI.
Views on
power distance

	Power distance	Motivation	Stakeholder management	Coercive power	Personality	Trust	Interpersonal
<i>Power distance</i>							
Correlation coefficient	1.000	0.461*	0.500**	0.417*	0.421*	0.514**	0.466*
Sig. (two-tailed)		0.014	0.007	0.027	0.029	0.006	0.014
<i>n</i>	28	28	28	28	27	27	27

Table VII.
Correlation matrix:
power distance

and strive to achieve higher levels of trust ($r = 0.514, p < 0.006$). The effort applied within such a high power distance society is, in a preliminary sense, achievable through the use of reward, legitimate and expert power as evidenced from the means in Table V. The implications of this results point to the need to use these three forms of power (reward, expert, legitimate) in a society with high power distance in order to redress the issue of unequal power distribution occasioned by low trust resulting in weak stakeholding.

4.3 Political games and leadership within asynchronous VPE

It has long been recognized that the IT project management process is political in nature and the exercise of power also involves engaging in politics or political games. David and Gardner (2004) suggest that leadership can be viewed as a political process, while Pinto (1998) links the success of managers to how they use the political process towards for their own agenda. Thus, literature has noted the merits and demerits of politics in team and generally managers have employed politics to solidify their political clout to facilitate relational dynamics with other staff (Long *et al.*, 2010). In our analysis of the influence that politics has on effectiveness in virtual project leadership, we do not consider the construct as insidious, but rather inevitable in virtual team behavior. A presentation of the means, standard deviation and the reliabilities of the possible political games that can be employed in a VPE are captured in Table VIII. The reliabilities captured indicate that the political games construct items were all “substantially reliable” with Cronbach’s α s above 0.61 (Landis and Koch, 1977). The respondents agreed that project leaders mostly relied on political games such as coalition building (3.75), controlling the decision making process (3.75), control of critical resources (3.82), controlling project committee (3.82), use of scientific element (3.75) and the use of higher power sources (3.71). Whereas, miscellaneous games, deception and information politics have been found to be the least likely in an asynchronous VPE.

Table IX describes the comments made by respondents regarding types of politics. Two respondents verified that higher power source politics can be easier in face-to-face interactions, while the other two respondents had opposing views for deception politics. For instance, while R2 is of the view that e-mail can enhance deception; however, the fact that “proof” exists constrains the use of information politics in a VPE (R5), thus the lower means score for information politics as a political game. Therefore, a majority of

Types of political games	<i>n</i>	Mean	SD	Cronbach's α
Coalition: building coalitions with certain members	28	3.75	0.701	0.698
Control decision: controlling the decision making process	28	3.75	0.844	0.721
Control resource: controlling critical resources	28	3.82	0.863	0.675
Control committee: controlling the committee process	28	3.82	0.863	0.726
Scientific element: use of the scientific element	28	3.75	0.967	0.699
Higher power: gaining support from higher power sources	28	3.71	0.976	0.711
Use position: use of positional authority	28	3.25	1.041	0.658
Information politics: using information as a source of power	28	2.5	1.291	0.653
Deception: deceit and deception	28	2.36	1.311	0.655
Miscellaneous games: engaging in unforeseen miscellaneous games	27	2.67	1.387	0.675

Table VIII.
Types of political games

Table IX.
Comments regarding
politics

Respondent	Comment
R12	"Top management support can be easier to obtain in face to face interactions as it build trust"
R2	"For higher power source politics, senior management infrequently uses tools. Therefore, I disagree"
R12	"Technology can control who is allowed access to information. However, in a face to face environment people get suspicious if they see a meeting with certain people which leads them to enquire more. If somebody is not cc'd, they will never know what happened"
R12	"In email, it may be easy to lie and deceive, but from a project management perspective, it is hard to detect"
R5	"Email can be referred back to as proof for future reference, so deception is difficult"

respondents resort to use of coalition building, control decisions, control resources, control of committees; being scientific, use of higher power and use position.

Additional significant correlations (Appendix 2) at a 1 percent significance level were found as follows: use of higher power is positively correlated with use of positional authority ($r = 0.513, p < 0.005$); control of resources is correlated with using positional authority ($r = 0.561, p < 0.002$); focusing on scientific element is correlated with higher power ($r = 0.513, p < 0.005$) and the use of deception is positively correlated with both information politics ($r = 0.781, p < 0.000$) and other miscellaneous games ($r = 0.766, p < 0.00$). However, given the low mean scores of information politics, deception and miscellaneous games, the political games, with high mean scores and with acceptable levels of significance were use of position, control of resources, higher power and scientific element and were therefore the basis of any conclusions on how political games can be used to enhance leadership practice in a VPE.

5. Discussion of findings

Although Wanasika *et al.* (2011) indicated that South Africa may have a high power distance, respondent R12 suggested that there is a low level of inequality in an asynchronous environment. From the findings, participative leadership had a mean value of 4.18 with the lowest standard deviation. Further correlations linked participative leadership and the following: personality, trust and networking. Therefore, a participative style may be effective in an asynchronous environment. The benefit of trust is increased collaboration, motivation and communication (Siaskas and Siaskas, 2008). These are leadership success factors (Riggio and Feldman, 2005). Hyvari (2006) identified networking as a success factor for project management and Yukl (2010) mentioned personality for leadership success. Furthermore, Purvanova and Bono (2009) concluded that a participative style was more effective in a team using technology. Intrinsic motivation can be increased by self-sacrifice or charismatic leadership (Cremer, 2006). Transformational leadership, charisma, trust and motivation were correlated with an indication that adoption of charisma and transformational leadership may improve motivation; while personality was also correlated with motivation. Therefore, leaders should continue to convey their personality through asynchronous technology. In addition, a significant correlation was identified between motivation and communication with significance, with indications that enhanced communication can possibly optimize motivation.

Factor analysis of the type of leadership exercised within an asynchronous VPE revealed two forms of effective leadership. The first one, named, “Structured Charismatic Exchange”, is underpinned by three forms of leadership styles: charismatic, virtual and transactional leadership. The underlying rationale that appears to provide a link amongst these three leadership styles is a quest by project leaders to resolve the vexing issue of how to assert control in a virtual environment which is typically unstructured (thus the quest for structure), uncontrolled feedback during information exchange unlike face-to-face communication (a key feature of virtual leadership), and the quest for structure through transactional leadership. Therefore, given the nature of VPE, what is salient for project leaders is to assess and assert their values related to how they can project their charisma, to evolve some form of structure for control of the project and develop an information exchange mechanism for effective feedback. Thus, from a managerial perspective, the insight on Structured Charismatic Exchange directs the project leader to sort his/her normative values related to “how they interact and influence other people”. The findings revealed that the forms of power that are likely to be exercised in support of these values revolve around the use of reward power (linked to the political game of control of resources) and expert power (linked to the political game of scientific element).

The second insight from the factor analysis also revealed significant loadings for two forms of leadership under factor 2: participative and shared leadership. The common strand in both is the need to elevate the ethos of the team, which effectively implies that control in VPE ought to be decentralized responsibly to enhance sharing. This is possibly relevant in a bid to minimize conflicts and thus develop a project organization that encourages teamwork. Therefore, this factor was named “Decentralized Team Leadership”. Unlike factor 1, where the focus is on how the project leader projects his/her personality to influence people, the realization is that for a project organization to succeed, project goals and decisions emerge from bargaining, negotiating, and jockeying for position among members of different coalitions. Thus, leadership in VPE demands the use of information, referent and legitimate power (types of power exercised) through the use of coalition building and higher power (political games). Therefore, the second factor, named Decentralized Leadership is focused on the methods of team building to enable realization of project goals.

6. Conclusions

This study was premised on the notion that project management is increasingly occurring in VPEs as information technologies and tools become more pervasive. The starting point was therefore to theorize the relationship between effective leadership and asynchronous VPEs. The study adds to the growing body of research on leadership in virtual projects environments by exploring its relationship with power and politics (as a subset of the empowerment climate) and how they contribute to effective virtual project management. In view of the findings reported in this paper, claims to both practical and theoretical contributions can be made, taking into account the limitations highlighted below into account. The first claim is linked to our contribution in extending the research on empowerment and leadership within a VPE. The findings demonstrated that a VPE may require call for employing different forms of leadership, power and politics for influencing the nature of interactions, which is required for collaborative work. Especially, within contexts where there is a high power distance

(in most developing economies of Africa), this calls for the fusion of normative application of particular forms of power (such reward, legitimate and expert) and values related to politics (such as coalition building) geared towards enhancing trust and communication. This is more urgent since research shows that subordinates who perceive their supervisors as highly involved in organizational politics are less open in their communication and generally less satisfied with their supervisors than subordinates who perceive their supervisors as moderately or minimally involved in politics (Jablin, 1981, p. 273). However, in high power distance contexts such as in South Africa, a project leader can judiciously use the authority emanating from specific forms of power and certain political games build trust which is typically low in such environments. This approach finds support from Long *et al.* (2010) who maintain that project leaders in a virtual environment can use resources (control of resources) and information (information politics) to for effective information exchange. Such a claim solidifies the conceptualization of the nature of leadership (Structured Charismatic Exchange) inferred from the factor analysis in this paper since this form of leadership will not only solidify the political clout of the manager, but will also facilitate positive trust dynamics.

The second contribution is linked to the finding that a VPE also requires an emphasis on Decentralized Team Leadership as a form of team “control”. Therefore, what the insight of Decentralized Team Leadership implies is for project managers to demonstrate a shared vision that becomes embedded as part of the team’s value systems by encouraging “ownership, learning and sharing” (Gastil, 1997). This is a process of team building towards realizing a shared project outcome, which becomes even more changing in a virtual environment where there are minimal or no face-to-face interactions. One of the major challenges is how individuals can fit within the virtual team environment. Shamir (1995) asserts that a leader’s vision is most effective when it is most congruent with the followers’ personal values, therefore seemingly elevating the criticality of value congruence in attaining team leadership. If value congruence forms the backbone of Decentralized Team Leadership, then effective leadership within VPE can be regarded as “control neutral”, in which the ethos of virtual project teamwork and code of conduct is elevated for purposes of coordination, while in equal measure, artificial departmental “silos” are repressed through reinforcement of “pathos (I want to be a good team player) and logos (good teams need rules for working together effectively)” (Barker, 2005, p. 792). “Control neutrality” implies that leadership functions are devolved to a team by creating technologically mediated structures and routines that substitute for face-to-face interactions, thus enhancing the ability of the team to be self-managing (Tuffley, 2009). Thus, in virtual project endowments, in which traditional modes of building trust are inhibited, shared leadership is the norm during which trust becomes even more critical since self-direction and self-control are paramount (Handy, 1995). We summarize the managerial implications of the two insights in Table X.

Limitations and recommendations for future research

The first limitation is linked to the small sample size of 28 respondents, even though this number comprised the total number of project managers in the telecommunications sector in South Africa. A possible consequence of this limitation is that the findings may have been influenced by the culture of the sector; whilst if the sample used more sectors, the effect of culture may have been minimized. There is a need to conduct a similar study

Table X.
Managerial implications

Managerial implications	Actions
Re-orienting project leadership	Establish virtual structures to enable responsible delegation Ensuring value congruence in teams Establishing self-managing virtual teams
Asserting structured charismatic exchange	Facilitate trust building through coalitions Develop a transparent information exchange mechanisms Apply legitimate, reward and expert power to open channels of communication

across several sectors to validate the findings in this research in order to solidify and generalize the findings that have been reported in this paper. The second limitation is that the study focused on asynchronous VPE, yet there is possibly more technological sophistication that allows for synchronous collaboration. However, our choice of asynchronous VPE, especially given the high telecommunications bandwidth costs in Africa which may limit effectiveness of these technologies in a synchronous environment. Furthermore, the present study focused on the self-reporting of individuals in virtual teams, while sometimes leadership effectiveness may sometimes be more visible at group or at organizational levels. Future research should extend the dimension of virtuality to include synchronous collaboration as well and also extend the unit of analysis to include teams and organizations. We also recognize that the nature of research is context specific and depends on the situation. A qualitative research strategy may provide further depth into the research topic to identify different perceptions. By simplifying the various constructs into specific variables, it prevents different angles from being explored. For example, communication of an asynchronous technology may be effective in distributing to all stakeholders, but may lack depth of content being conveyed. Ideally, depth and breadth should be accommodated in considering communication.

Despite the limitations highlighted, this research is still critical since it has covered a relatively nascent area, especially when the context of developing countries is taken into account. While taking into account that no finite generalizations can be drawn as well, the results still provide a snapshot that can be used in structuring the relationship between various forms of power, politics and leadership in VPEs in order to afford opportunity for further inquiry. Thus, the limitations need to be viewed as an opportunity for further validation of the tentative claims of this research paper.

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Further reading

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(Appendices follow overleaf.)

Table A1.
Correlation matrix of
leadership styles

	Transformational leadership	Participative leadership	Charismatic leadership	Virtual leadership	Shared leadership	Transactional leadership	Situational leadership
<i>Transformational leadership</i>							
Correlation coefficient	1.000	0.650**	0.174	0.099	0.441*	0.105	0.502**
Sig. (two-tailed)		0.000	0.385	0.617	0.019	0.596	0.007
<i>Participative leadership</i>							
Correlation coefficient	0.650**	1.000	-0.021	0.084	0.422*	-0.073	0.253
Sig. (two-tailed)	0.000		0.919	0.672	0.025	0.713	0.195
<i>Charismatic leadership</i>							
Correlation coefficient	0.174	-0.021	1.000	0.381*	0.175	0.312	0.185
Sig. (two-tailed)	0.385	0.919		0.050	0.382	0.113	0.356
<i>Virtual leadership</i>							
Correlation coefficient	0.099	0.084	0.381*	1.000	0.157	0.486**	0.444*
Sig. (two-tailed)	0.617	0.672	0.050		0.424	0.009	0.018
<i>Shared leadership</i>							
Correlation coefficient	0.441*	0.422*	0.175	0.157	1.000	-0.038	0.199
Sig. (two-tailed)	0.019	0.025	0.382	0.424		0.847	0.310
<i>Transactional leadership</i>							
Correlation coefficient	0.105	-0.073	0.312	0.486**	-0.038	1.000	0.409*
Sig. (two-tailed)	0.596	0.713	0.113	0.009	0.847		0.031
<i>Situational leadership</i>							
Correlation coefficient	0.502**	0.253	0.185	0.444*	0.199	0.409*	1.000
Sig. (two-tailed)	0.007	0.195	0.356	0.018	0.310	0.031	

Note: Significant values indicated with an *

Appendix 3

	Correlation matrix of political games									
	Higher power	Coalition	Control resource	Control decision	Control committee	Use position	Scientific element	Deception	Information politics	Misc games
<i>Higher power</i>										
Correlation coefficient	1.000	0.408*	0.163	0.273	0.020	0.468*	0.513**	-0.134	-0.031	-0.143
Sig. (two-tailed)		0.031	0.408	0.159	0.920	0.012	0.005	0.498	0.876	0.475
<i>Coalition</i>										
Correlation coefficient	0.408*	1.000	0.191	0.065	-0.027	0.194	0.396*	0.150	0.194	0.143
Sig. (two-tailed)	0.031		0.330	0.741	0.890	0.324	0.037	0.445	0.323	0.477
<i>Control resource</i>										
Correlation coefficient	0.163	0.191	1.000	0.238	0.211	0.561**	0.282	0.217	0.247	0.294
Sig. (two-tailed)	0.408	0.330		0.224	0.281	0.002	0.146	0.267	0.205	0.137
<i>Control decision</i>										
Correlation coefficient	0.273	0.065	0.238	1.000	0.234	0.099	0.433*	-0.146	-0.101	-0.180
Sig. (two-tailed)	0.159	0.741	0.224		0.230	0.618	0.021	0.459	0.609	0.368
<i>Control committee</i>										
Correlation coefficient	0.020	-0.027	0.211	0.234	1.000	0.184	0.400*	-0.006	-0.171	-0.048
Sig. (two-tailed)	0.920	0.890	0.281	0.230		0.347	0.035	0.975	0.385	0.814
<i>Use position</i>										
Correlation coefficient	0.468*	0.194	0.561**	0.099	0.184	1.000	0.322	0.334	0.354	0.204
Sig. (two-tailed)	0.012	0.324	0.002	0.618	0.347		0.095	0.082	0.064	0.306
<i>Scientific element</i>										
Correlation coefficient	0.513**	0.396*	0.282	0.433*	0.400*	0.322	1.000	-0.077	-0.070	-0.131
Sig. (two-tailed)	0.005	0.037	0.146	0.021	0.035	0.095		0.698	0.724	0.516
<i>Deception</i>										
Correlation coefficient	-0.134	0.150	0.217	-0.146	-0.006	0.334	-0.077	1.000	0.781**	0.766**
Sig. (two-tailed)	0.498	0.445	0.267	0.459	0.975	0.082	0.698		0.000	0.000
<i>Information politics</i>										
Correlation coefficient	-0.031	0.194	0.247	-0.101	-0.171	0.354	-0.070	0.781**	1.000	0.807**
Sig. (two-tailed)	0.876	0.323	0.205	0.609	0.385	0.064	0.724	0.000		0.000
<i>Misc games</i>										
Correlation coefficient	-0.143	0.143	0.294	-0.180	-0.048	0.204	-0.131	0.766**	0.807**	1.000
Sig. (two-tailed)	0.475	0.477	0.137	0.368	0.814	0.306	0.516	0.000	0.000	

Note: Significant values indicated with an *

Table AIII.
Correlation matrix
of political games