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Examen de los factores que afectan al rendimiento de los equipos virtuales en las organizaciones públicas

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Article abstract

Despite numerous studies in private organizations on Virtual Teams (VTs), very little has been documented about the factors affecting the performance of VT members in public organizations. To fill this gap, this paper takes a qualitative and exploratory stance to explore this topic in Canadian public organizations. Through extensive interviews with 34 managers and employees, the findings uncovered three key issues that affect VT performance: virtual leadership characteristics, team member characteristics, and task characteristics, highlighting the implications of these issues and how they could be addressed. Finally, the findings offer managerial implications to support managers involved in VT management.

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ABSTRACT

Despite numerous studies in private organizations on Virtual Teams (VTs), very little has been documented about the factors affecting the performance of VT members in public organizations. To fill this gap, this paper takes a qualitative and exploratory stance to explore this topic in Canadian public organizations. Through extensive interviews with 34 managers and employees, the findings uncovered three key issues that affect VT performance: virtual leadership characteristics, team member characteristics, and task characteristics, highlighting the implications of these issues and how they could be addressed. Finally, the findings offer managerial implications to support managers involved in VT management.

Keywords: Global virtual teams; flexibility, public service, communication, leadership, team performance management, task complexity

Résumé

Malgré l'étendu des études menées sur les équipes virtuelles (EV) dans des entreprises privées, les facteurs affectant les performances des EV dans les organisations publiques restent peu étudiés. Ce papier adopte une position qualitative et exploratoire pour explorer ce sujet dans les organisations publiques canadiennes. Grâce à des entretiens approfondis avec 34 cadres et employés, les résultats ont mis en évidence trois facteurs clés qui affectent la performance des EV : les caractéristiques du leadership virtuel, les caractéristiques des membres de l'équipe et les caractéristiques des tâches, en soulignant les implications de ces facteurs. Les résultats offrent des implications managériales sur la gestion des EV.

Mots-clés : Équipes virtuelles globales, flexibilité, service public, communication, leadership, gestion de la performance des équipes, complexité des tâches

Resumen

A pesar de los extensos estudios sobre los equipos virtuales (VT) en las empresas privadas, los factores que afectan al rendimiento de los VT en las organizaciones públicas siguen siendo poco estudiados. Este documento adopta una posición cualitativa y exploratoria para explorar este tema en las organizaciones públicas canadienses. Mediante entrevistas exhaustivas con 34 directivos y empleados, los resultados pusieron de relieve tres factores clave que afectan al rendimiento de los veteranos : las características del liderazgo virtual, las características de los miembros del equipo y las características de las tareas, destacando las implicaciones de estos factores. Los resultados ofrecen implicaciones de gestión para el manejo de los VE.

Palabras clave: Equipos virtuales globales, flexibilidad, servicio público, comunicación, liderazgo, gestión del rendimiento de los equipos, complejidad de las tareas

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The nature of work is changing and becoming increasingly complex due to disruptions caused by the proliferation of information and communications technology (ICT) (Priem *et al.*, 2012; Gilson *et al.*, 2015). Organizations and employees are faced with multiple pressures and challenges to perform in this constantly changing environment (Ale Ebrahim *et al.*, 2009; Rezgui, 2007); however, to cope with such challenges, organizations are becoming more dynamic by embracing ICT in their operations, business processes, and human resources management. Furthermore, these technological influences have resulted in people shifting from physical workplaces to technology-enabled virtual spaces (Priem *et al.*, 2012; Gilson *et al.*, 2015). The Virtual Team (VT) phenomenon is not just limited to private organizations; its influence has been seen even in the public sector (Green and Roberts 2010), which has also been embracing this change (Cascio, 2000; Mathieu *et al.*, 2008). Thus, virtual teams, which were once known to be mainly adopted by private organizations, have now started to emerge in public organizations (Green and Roberts, 2010; Breu and Hemingway, 2004). Moreover, given the context of the coronavirus pandemic, in a matter of weeks, working remotely became the new normal for all public organisations in Canada.

Although the public sector uses virtual teams as regularly as the private sector to conduct numerous tasks (Day and Burbach, 2015), research has mainly attempted to keep up with virtual teams based on the private sector (Kimble, 2011). Thus, studies examining the effective use of virtual public sector teams are an under-represented research area (Green and Roberts, 2010). In addition, with more public sector employees working from home, there is an increasing problem with office staffing and organizational effectiveness (Green and Roberts, 2010).

Based on the relatively limited number of studies existing in the public sphere on the performance of VTs (Gilson *et al.*, 2015), this paper aims to fill this gap by exploring the factors that affect virtual team members' performance in public service organizations. To do so, this paper examines the Information Management and Information Technology (IM/IT) organisation of one of the largest Canadian public service departments. IM&IT organisation has geographically distributed teams who work in different time zones, with nearly 75% of its employees located outside of its headquarters, thus providing the perfect context to examine the factors that may affect the performance of VT members in public organizations.

Furthermore, before the pandemic, Public Service and Procurement Canada (PSPC)[1] had supported the virtualization of Canadian public organizations by developing an integrated vision of the workplace - named the Activity Based Workplace (ABW) – where employees can work anywhere and at any time. By doing so, Canadian public organizations are promoting organizational virtualisation as a means to address employee work-life balance, reducing the need for employees to commute daily to their workplace and thereby addressing environmental challenges due to traffic pollution and responding to the scarcity and high cost of office space. As a result, the implementation of ABW has increased the number of virtual teams within IM&IT, including headquarters' employees. According to the Chief Information Officer (CIO) of IM&IT, moving from a collocated team to virtual one is challenging for existing managers and supervisors, who have grown up in face-to-face management approach. When public sector employees work virtually, it can increase managers' challenges to ensure employee commitment, involvement in work, accountability, productivity, etc. (Green and Roberts, 2010).

To address the research question, this paper adopts a qualitative and exploratory stance followed by in-depth interviews with managers in order to delineate the characteristics of VTs in a public government context and unmask the challenges faced by managers. A qualitative data methodology was adopted after the authors had a series of visits and discussions with the top management of the public organization. The initial discussions with the top management gave us a clear indication on how to analyse the problem more broadly and how to capture various thoughts, opinions, and issues to effectively address the challenges in VTs. As a result, the primary discussions shed light on managers' issues in managing VTs. The contribution of this study is twofold. First, it adds to the growing body of literature on virtual teams in public organizations, and second, it explores various factors that affect the performance of VT members, for which a need for more research has been noted (e.g., Gilson *et al.*, 2015).

1. PSPC is a Canadian department responsible for providing accommodations, including office space, to government employees.

Theoretical Background

Research on virtual teams has led to several definitions, but has also shown a lack of depth (Jaakson, Reino, and McClenaghan, 2019). For context, we adopt the definition by Hertel, Geister, and Konradt (2005), i.e., *"global virtual teams predominantly use digital media to communicate and coordinate their work with at least one of the team members working at a different location and/or in a different time zone"*. Previous research on VTs has focused more on face-to-face (FtF) teams with physical dispersion and the use of technology for interactions. Recently, however, this focus has shifted to "virtualness" as a potential characteristic of these teams (Griffith *et al.*, 2003), and as a result, most organizational teams are now considered to be "virtual" in one way or another (Kirkman, Gibson, and Kim, 2012). The existing literature on virtual organization has focused largely on the organizational design aspect (e.g., Chesbrough and Teece, 1998; Desanctis and Monge, 1999; Cramton, 2001; Griffith, Mannix, and Neale 2003), whereas this study investigates the transition from traditional brick-and-mortar businesses to virtual organizations (Boudreau *et al.*, 1998; Dutton, 1999). This organizational virtualisation has increased the number and complexity of team boundaries as well as impaired the sharing of sensitive knowledge between peers (Breu and Hemingway, 2004). VTs are believed to provide organizations with unprecedented levels of flexibility and responsiveness (Powell, Piccoli, and Ives, 2004; Ale Ebrahim, Ahmed, and Taha, 2009). In addition, having a VT has potential benefits like the promotion of employee work/life balance, reduced commuting times, attenuated employee stress levels, lower sick time utilization, and increased employee job satisfaction, thereby enhancing employee recruitment and retention strategies (Green and Roberts, 2010). However, although most private corporations across the world have embraced VTs, working in a virtual team environment may not always be a pleasant experience (Gupta and Pathak, 2018). VT also faces several challenges due to the lack of face-to-face interactions. VT members need to be motivated and guided either with or without minimal face-to-face communication (Hertel, Geister, and Konradt, 2005).

Another important challenge is building and maintaining high team spirit and trust despite geographical dispersion and the frequent cultural diversity of the teams' members (Ebrahim, Ahmed, and Taha, 2010). Team trust is defined as "the shared willingness of team members to be vulnerable to the actions of other team members based on the shared expectation that all team members will perform particular actions that are important to the team, irrespective of their ability to monitor or control the other team members" (Breuer *et al.*, 2020, 3). Trust is a key factor that ensures effective collaboration and is an important predictor of behaviour in VTs. In addition to its role in VT performance, trust can be developed via communication (Jarvenpaa and Leidner, 1999). Trust is believed to take more time to develop among VT team members (Zhu and Lee, 2017); however, scholars still suggest that little is known regarding how trust influences virtual team performance (De Jong and Elfring, 2010). Due to VTs' specific characteristics, the levels of trust in such teams are usually low, and in geographically dispersed teams, it is more difficult to coordinate resources, as there are shorter windows of time for synchronized meetings, and meetings often do not take place during standard hours (Benetytė and Jatuliavičienė, 2014).

The majority of VTs are knowledge-based, and are responsible either for developing new products, improving organizational processes, or satisfying complex customer problems (Duarte and Snyder, 2006). The most important outcome of developing new products and improving organizational processes is process improvement (Kirkman *et al.*, 2004). According to Edmondson, Bohmer, and Pisano (2001), process improvement is similar to team learning, defined as: *"activities carried out by team members through which a team obtains and processes data that allow it to adapt and improve"* (Edmondson, 1999, 351). For customer satisfaction, VTs, specially IM&IT teams, are constantly trying to meet different clients' needs.

In this study, VT performance was evaluated by interviewing IM&IT managers. Canadian public organisations use a standardized employee performance management tool, but due to privacy rules, we could not gain access to employee performance reports. Thus, we relied on managers' assessments of their VT employees' performance as evaluated during projects they worked on. Managers use four indicators following project management principles to assess employee performance: financial performance, schedule performance, and scope/quality performance of a project team (Ahmed and Anantatmula, 2017). The fourth measure is customer or stakeholder satisfaction, which has been shown to be an effective measure of project performance (Berssaneti and Carvalho, 2015).

Communication and collaboration styles are different, and this must be resolved via the effective use of digital media and technology. Furthermore, performance needs to be monitored via digital media instead of face-to-face feedback. Because of these challenges, VTs require different leadership styles, and this requires organizations to put additional effort into overcoming the challenges in order to make virtual collaboration more effective (Hertel, Geister, and Konradt, 2005). There is a heightened sense of scepticism, however, about the effectiveness of virtual teams as tools for achieving organizational goals, even as the use of virtual teams increases (Purvanova, 2014). The reason for this scepticism is that fewer than 1 in 3 virtual teams actually succeeds (Levasseur, 2012). Hence, it is important to understand the various challenges related to the interface between technology and humans in a virtual workplace setting.

Despite VTs having been adopted by many organizations globally, evidence also exists that carrying out tasks via virtual interactions has some drawbacks, particularly in terms of promoting collaborative behaviour amongst team members (Montoya, Massey, and Lockwood, 2011). Thus, in the Canadian public service organization noted in this paper, the number and complexity of global virtual teams are increasing, and managing these VTs has posed some challenges given their members' geographical dispersion, time zone differences, and use of both of Canada's official languages.

Data and Methods

This study adopts an exploratory approach with the use of the qualitative method, as suggested by Eisenhardt (1989)Gupta and Pathak (2018). Thus, adopting qualitative methodologies was appropriate for exploring the key concepts (Yin, 2003; Patton, 1990; Glaser and Strauss, 2010). In addition, the nature of the research question is contextual, and allows the study of contextual phenomena in more depth (Eisenhardt, 1989). Qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena regarding the meanings people bring to them (Denzin and Lincoln, 2008). Hence, we decided to collect the data based on interviews with managers in order to analyse how they perceive and understand the challenges of VT. We further followed the suggestion by Gupta and Pathak (2018) of using semi-structured interviews in order to avoid the possibility of biased responses (Shank, 2006; Green *et al.*, 2007).

Participants and Study Background

Our study is set in the IM&IT organization of one of Canada's largest public service departments that has geographically distributed teams working in different time zones. This geographic distribution is due to Canadian government centralisation and consolidation of its IT organizations, which aims to reduce the duplication of systems, to simplify processes, and to improve services' readiness for digitalization. In addition, the implementation of ABW has led to a proliferation of virtual teams in IM& IT and added a degree of complexity to the management of those teams. According to the Chief Information Officer (CIO) of IM& IT, in a regular global virtual team environment, even if employees are distributed and work remotely, their locations are known to their managers and supervisors, but in the context of ABW, employees' locations could change on a daily basis, which increases the complexity of managers' and supervisors' work. In such a work environment, public service managers/supervisors face multiple pressures and challenges regarding managing the performance of their virtual team members that they are neither used to nor prepared to face. All these factors make this IM& IT organization the perfect context to examine the research question of this paper.

The CIO of the organization invited the authors to analyse the problems and issues associated with their VTs and to provide feedback. This led us to have a series of visits and discussions with the CIO before exploring the problems and issues with the managers. From the initial discussion with the CIO, we had some sense of the probable challenges the VTs were facing; however, more in-depth interviews were necessary to understand the perspectives of the managers who were facing them. This study is relevant for multiple reasons. First, the organization is geographically dispersed, with different time zones, and most of its IM& IT workforce operates outside of the headquarters, which is in the National Capital Region (NRC), with 12 regional offices in other parts of Canada. The IM& IT organisation is presently a large virtual organization, and nearly 75% of its employees are located outside of the NRC. Table 1 illustrates the structure and geographical distribution of IM&IT's VT.

TABLE 1
Distribution of Information Management & Technology Services Employees by Location

Region	Province	City	Number of employees
Central and Arctic	Ontario	Burlington	10
		Prescott	2
		Sarina	5
		Parry Sound	1
	Manitoba	Winnipeg	5
Pacific	British Colombia	Kamloops	1
		Victoria	3
		Sidney	11
		Mission	1
		Nanaimo	6
		Vancouver	32
Gulf Region	New Brunswick	Moncton	30
		Tracadie-Sheila	1
Quebec	Quebec	Mont-Joli	20
		Montreal	1
		Quebec	27
National Capital Region	Ontario	Ottawa	144
Newfoundland & Labrador	Newfoundland & Labrador	St. John's	33
Maritimes	Nova Scotia	Dartmouth	29
		St. Andrews	2
		Sydney	1
Canada wide			365

The interviews and data collection process started in September 2018 and were completed by April 2019. This study adopted three types of data sourcing: formal and informal interviews and company documents (e.g., reports, news articles, and web information related to VTs). Thirty VT managers and four employees agreed to participate in the interviews on the conditions of anonymity and confidentiality (Please refer to Annex, Table 2). The face-to-face in-depth interviews, which lasted about 60 to 90 minutes, were audio-recorded.

TABLE 2
Sample's Structure

Respondents	Number of Interviews
Director General	2
Senior director	2
Director, Application Development	3
Director, Client Portfolio Management	1
Director Service Desktop Management	1
Director, Information Management	1
Manager, Application Development	6
Manager, Information Management	3
Manager, Infrastructure and Operations	2
Manager, Library, Policy and Service	1
Project Leader/ Technical Advisor, Planning	1
Team Lead, Infrastructure and Operations	6
Employees	4
Total	**34**

We used a general protocol in our semi-structured interviews in order to not interrupt the natural flow of the interview process. We interviewed only those managers who managed a virtual team and employees in a virtual team who were working under the same manager. The unit of analysis is the VT managers, and the employees were used for convenience of triangulation. Following the guidelines of Gupta and Pathak (2018) and Guest, Bunce, and Johnson (2006), we carried out interviews until we reached a saturation point where no new information was generated. At the end of each interview, the participants were given the opportunity to comment or to suggest any information that could enrich our study. The audio-recordings were then transcribed, which resulted in a 300-plus-page document. The documents and informal interviews were used for the process of information triangulation in order to check the accuracy of certain facts. In order to ensure greater rigor in the results, the data analysis was largely based on strategies espoused in previous work (Kahai, Huang, and Jestice, 2012). The transcribed document was then coded using Nvivo8 to find themes and categories, allowing us to understand the phenomena involved. The data were coded in three types: simple coding, axial coding, and selective coding (Point and Fourboul, 2006). Table 3 illustrates the structure of the coded data.

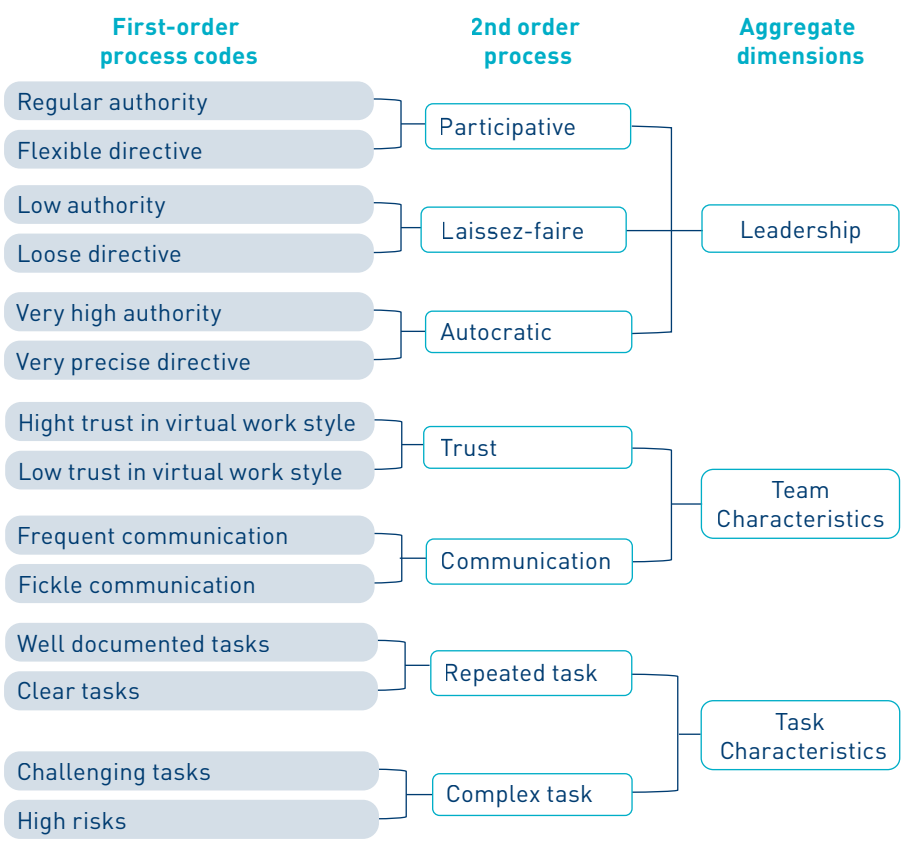
Findings

Following the data obtained from NVivo, we followed open and selective coding procedures to develop categories from the data by using an inductive interpretation method (Ritchie *et al.*, 2013). This analysis generated three major themes explaining the challenges of global virtual team performance in public service organisations: 1) leadership characteristics, 2) team characteristics, and 3) task characteristics. To present our findings with rigor and relevance, we followed Gioia, Corley, and Hamilton's (2013) methodology for the categorization approach in order to develop first-order concepts and second-order themes. The following section elaborates on each of the three themes, including quoted transcriptions. Figure 1 provides an overview of the most significant first-order concepts and resultant second-order themes identified in the coding procedure, and displays how they consequently relate to the aggregate dimensions of dominant and emerging design logic.

TABLE 3
Representative Quotes Underlying Second-order Themes

Theme 1: Leadership Style	
Participative	*"My philosophy is a group is smarter than an individual. I don't believe that a manager knows everything. It is important to lesson more that talk... we have two ears and one mouth as they say. for instance, we have developers who spend their whole life in developing programs so technically they may be used as subject matter experts. As a manager I take these employees' point of view in consideration."* Manager, Application Development *"My manager gives me task to do with some directions and he is always open to hear my suggestion. Usually, whenever he gives me something to do he doesn't impose his way of doing things." "For important project, I like to go see my supervisor with at least two options. He appreciates my efforts and recognizes the value of my work."* Employee
Autocratic	*"With the use of telecommunication, you can know if the employee is connected or not but not more than that... you don't know if he or she is working."* Director *"If I allow an employee to telework, others will ask for similar thing or something else, especially the one whose supervisor is in another region. We created some rule to limit that, for instance, if an employee is working with secret information he/she has to come from office."* Director
Laissez-faire	*"I don't really care if my employee is working at 5 am or 7 pm as long the job is done.... time management approach doesn't mean that employees are actually working and productive just because they are sitting there (smile) ... I see cases who spend a lot of time taking breaks to smoke or have several coffee breaks."* DG *"I don't believe in controlling my employees.... I make sure the understand their objectives, make sure they have the mean to do their job and give them my feedback regarding their deliverables."* Manager
Theme 2: Team Characteristics	
Communication	*"We are only equipped with skype, so we work a lot with Skype today – link Enterprise, so we needed a good tool to be able to have meeting." Team Lead* *"We use weekly the stand-up meeting in order to keep employees updated about what is going on."* DG *"He does each two weeks he does what he calls water cooler thing – It is a virtual meeting – it's not a regular meeting with an agenda and other things It's almost like let get a coffee thing but virtual. So, someone may talk about a trip he/she had."* Senior Director *"We try to keep contented with director and managers on regions but for team leads it is hard to do this. So, we lose them."* Senior Director *"We have tools like Link that we use. We can see people but it still very hard. I feel like I have to make more effort to communicate with my managers who work from region... Even for explaining thinks and interacting. It is really difficult... and communicating over the only the phone is worse because you lose in terms of communication 70%... you don't see and something is missing. For example, if I have to explain something to you, it is easy, you are here I can use the white board. I can see your body language, I can see if you are comfortable or no.... I try to visit them once a year as well as bring them to capital two time a year, I went last summer but it is not enough."* Senior Director
Trust	*"Given the organization was established by forcing the consolidation of all regional teams under the CIO, meeting the desired performance will not be achieved without building a strong team trust among Virtual teams."* CIO of IM&IT *"If we structure our deliverables so that it's very clear for everyone. This is my role and these are my responsibilities and my deliverables.... so that doesn't mean I have to be sitting down the hall from my boss. You know from eight to four, but there's that trust and there's that understanding."* Manager *"I think the people think that Senior Management, including Myself, don't know what we are doing. and so, and I think. I believe that. It's related to miscommunication, and what they are expecting."* DG *"We have some employees who have young children. I don't think that these employees can get the job done while taking care of children or a sick family member... there no way to be sure they an employee working from home is actually working."* Director
Theme 3: Task Characteristics	
Repeated Task	*"I have over 50 employees work on "help desk" that they need less directions because they receive the client – or end-user- request.. end-user send their requests as ticket in platform and help desk employees connect and work out their tickets.... For each type of ticket, we have a predeveloped procedure they follow."* Director *"Our work in government in general, and in IT, we have procedures and policies to follow in order to meet regulation. specially for sensitive issues like cybersecurity or information management, there is no room for improvisation and we have the legal obligation to apply and respect the policies and procedures of the Treasury Board of Canada.... For these kinds of projects, employees do not really need a lot of interactions on back and forth."* Director
Complex Task	*"For application development represent it is very hard to deal with the team.... Managing developers over the phone is hard to do because we cannot make sure that objectives are clear, deadlines and so one... as their projects do not follow a specific policy... they rather deal with problem-solving kind of tasks which required a lot of team support, interaction, collaboration."* Manager *"To manage our developers we use SCRUM, this a specific approach for the development of applications where the team breaks the work to be achieved into multiple actions in order to complete them in an iterative way called Sprint, within a given timeframe mainly a month. The progress is tracked during daily 15 minutes stand-up meetings."* Director

FIGURE 1
VT Performance Qualitative Coding



Leadership Style

During the interviews, the participants provided information about the managerial or leadership roles they played in the organization. Subsequently, the data analysis revealed three different leadership styles that interact with task and team characteristics for managing virtual teams in the IM&IT organisation.

Autocratic Leadership Style

The participants provided information on how tasks are repetitive and scripted, and that the employees did not have the flexibility or latitude to work outside the established procedures and processes. This leadership style is more frequently used to manage help-desk teams.

> *We usually keep things under control and tight over projects. We clearly monitor employees work virtually and ensure they follow clear guidelines; if not, we stress the importance of it. As we are a public organization, we must be secured with the information and data, so, we have obligations to protect it information's from cyber-attacks, this makes us vigilant with our employees. As a director, I was responsible for the control of data security with some of our ministerial information, hence people working on this project may have felt that we have control over them, however, to ensure that our employees follow what we say, we were just doing our duty to make sure everything was right.*

The participants suggested that all employees involved in IT Security were provided with clear tasks and goals and had no latitude on how to fulfil their duties, as decisions had to be made quickly to address a crisis. The execution of the assigned tasks was done with tight oversight in order to minimize risk and improve outcomes. The director who was interviewed also communicated with his colleagues, the directors of applications development and maintenance, to ensure that no risk was introduced and that all potential vulnerabilities in the existing applications were addressed and the risks mitigated. This situation created a high-stress environment for the IM/IT employees which the director admitted that his employees felt. However, these decisions helped to protect the organization's information assets and IT infrastructure.

Participative Leadership Style

This leadership style considers the input from employees in an organizational or work-related decision-making process. Since the IM&IT organisation was

facing work environment challenges, the IM director was asked to develop an action plan.

We created a task force to create an action plan and we could see our manager and director being very encouraging. During my work on creating the task force, I travelled across Canada to ensure the team was motivated and had all the support that they needed to execute their tasks. When discussing the action plan with my team members I ensured to take their advice suggestion and important points to execute the task effectively. Further, when discussed and asked their opinions it was well received by everyone. The members were engaged in a positive state of mind assuring us that they will implement effectively.

Similarly, the information management (IM) director said that he participated in various meetings and discussions with members by selecting key personnel. He was further involved in training the members and in task design, and had been empowering the members with his leadership style. As a continuation of this leadership style, when the plan was presented to all IM/IT staff across Canada via videoconference, the director asked a junior employee to submit an action plan for the Task Force, and when he did so successfully, he said the effort encouraged her to do much more tasks and in better quality.

Laissez-faire Leadership Style

Managers with this style of leadership avoid using strict rules, and focus on giving employees the freedom to adopt flexibility in order to achieve goals (Chaudhry and Javed, 2012). The analysis has shown that employees who perform well when this style is used are ones who can work autonomously with minimum supervision and who have a clear understanding of how their tasks and objectives contribute to the overall ones.

When we implemented modern technologies such as cloud and artificial intelligence, the director was very supportive and gave us the freedom to explore and learn the implementation methods and its importance for our organization. A lot of dialogue and discussion were set up by the director to ensure we understood it clearly"

"When my director has these leadership characteristics, we feel positive in our work and get motivated to learn". In my case, the freedom you get from your leaders should not have any deadlines or budget constraints, in some other cases, this may not be appropriate and I knew that many of project implementation had issues and were not positive, I would say it's due to the leadership problems and this led to some staff with no clear and precise direction."

Team Characteristics

Trust

The IM/IT organization was not created through a well-organized design, but was developed based on numerous managerial decisions without the involvement of the employees' desires or feelings. This had a created a negative impact on the work environment which further eroded trust toward senior management.

In 2013, when many VT groups were reporting to the regional management and due to some budget constraints, they made all of us to report to the CIO, created a sense of distrust and I believe many employees in regions felt uprooted and they lost the relationships they took years to build regionally.

The centralization of the IM/IT functions forced the creation of virtual teams, in turn forcing employees to report to supervisors and managers located in different locations and time zones. From the analysis of the interview with the CIO, it appears that multiple efforts were made to build trust between the team members and their managers, supervisors, and directors. Visits were organized to allow the managers to meet face-to-face with their employees, technology was acquired to allow more videoconferencing and better interaction with employees, and finally, training on the management of virtual teams was provided. All these initiatives were undertaken across the organization in an effort to restore trust between the employees and their managers.

Based on the analysis, some managers were able to restore trust and to achieve trusting relationships with their employees. These managers invested time and effort in the relationships, and by having regular meetings with their staff, they increased and improved communications with their employees. Some were less successful, as they had not been fully committed to establishing strong relationships with their staff through better communications and regular meetings. When managing virtual teams, trust is the glue that holds the teams together, especially when teams are geographically distributed and where

spontaneous interactions are almost nonexistent or difficult to have. In the case of the IM/IT organisation studied, trust was very difficult to restore, and thus more effort may be required to achieve the trust needed to perform at the desired level; however, wider use of instant messaging and videoconferencing will help increase and encourage spontaneous interaction among team members and to build and restore trust.

Communication

The use of technology in virtual teams is taken for granted; however, it is not usually the case in the decision-making process, and the employees interviewed reported that in many instances they did not understand the management's decisions and objectives regarding communication. Further, some expressed that the timelines for changes made by management were not clearly communicated to the global virtual teams. For instance, one of the application group teams was divided between maintenance and development, and it would have been more beneficial to establish centres of expertise for maintenance and development at the same locations.

Collaboration and communication have been identified as crucial for the good management of global virtual teams; however, there is no standard approach for collaboration within these teams or among IM and IT teams. Some managers reported using government tools such as GCConnex to improve collaboration and communication within their teams and with their colleagues. Additionally, some managers had multiple meetings with their staff, and understood that the key to effective communication is not quantity but quality. Their meetings and discussions were well structured and organized, and all employees were encouraged to contribute and provide input regarding all projects, including major transformations.

"Involving employees and mainly those in regions will improve and make communication and collaboration more effective while helping breaking silos and breaking engagement. We believe that, that if the tools available for collaboration, if used adequately, it can make communication effective."

"Sometimes, we have bandwidth issues, with video conferencing and Lync is not always reliable. However, during good bandwidth and connection some people hesitate to be reluctant to come on camera for talking. I feel that, we need a dedicated tele-conference room as such facility would have better video conferencing capabilities than the desktop camera. We have used SCRUM[2] and it's a very intensive process tool and using it in a global virtual environment was challenging. In our team we use, GCconnex, the Government of Canada's internal professional social networking platform, as a form of watercooler type connection."

Task Characteristics

As the organization is highly distributed and relies on virtual teams to achieve its objectives, the analysis showed that the characteristics of the task to be accomplished by the employees influence the outcomes. Some teams are working in environments that are highly scripted and do not need match interaction between the team members, while others need continuous interaction between team members to achieve their goals and objectives.

Repeated Tasks

When a task is repeated and does not vary over time, interaction between team members is not required, e.g., for the help desk. In the IM/IT organization organisation studied, the different help desk teams were distributed across Canada and did not work on projects, but rather reacted to problems reported by end-users. The help desks were structured in two groups. First there was Tier 1, who received end-users' requests and needed to solve them within 30 minutes by following an established process. If Tier 1 could not resolve the issue, it was automatically escalated to Tier 2 via the system, and the Tier-1 employee moved on to another request. The service desk outcomes were not only scripted, however, and were subject to metrics to track the performance of the employees and the quality of the service provided in terms of the timeline and resolution of the issue.

"I have over 50 employees work on "help desk" that they need less directions because they receive the client – or end -user- request. End-user send their requests as ticket in platform and help desk employees connect and work out their tickets.... For each type of ticket, we have a predeveloped procedure they follow."

2. Management software for agile projects

Complex Tasks

In contrast to repeated tasks, some are complex and require continuous interaction. As an example, some teams used Scrum[3] methodology to develop new applications. The team breaks the work to be achieved into multiple actions in order to complete it within a given timeframe – generally a month – in an iterative way called Sprint, and progress is tracked during daily 15-minute stand-up meetings. Based on the interview conducted with the director responsible for Scrum development, using virtual teams in such an environment makes the work more complex and impacts the team's trust and interaction.

The complexity of task makes interdependence of the work of the team members stronger.

> *"For application development represent it is very hard to deal with the team.... Manager developer over the phone is hard to do because we cannot make sure that objectives are clear, deadline and so one... as their project do not follow a specific policy... they rather deal with problem solving kind of task which required a lot of team support, interaction, collaboration."*

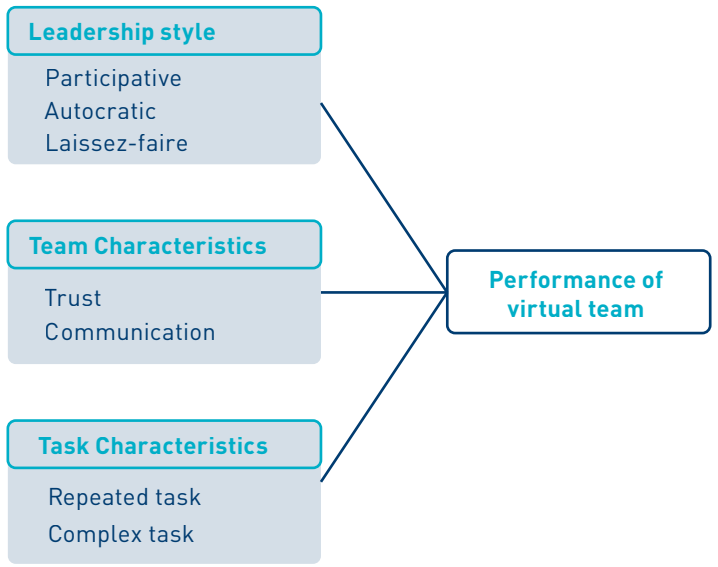
Discussion and Implications

With the aim of identifying the factors that may affect performance of VT members in a public organization, the findings from this paper have important implications for future research studies. Furthermore, the relationships between team members and managers in a virtual environment seem to be a growing phenomenon in recent years. Despite the growth of virtual spaces, the issues are narrowed down to the characteristics discussed in this paper. Several scholars have studied various leadership styles and their effects on virtual team members' performance (e.g., (Kahai and Avolio, 2006; Kahai, Huang, and Jestice, 2012), including team characteristics (Burman and Shastri, 2016) and task characteristics and their effect on VT members' performance (Connelly and Turel, 2016). The findings of our paper provide key implications for VT members' performance in the context of public service organizations as well as some implications for future studies.

Leadership Implications for VT Members' Performance

As the workforce changes and workers need more independence and self-motivation, leadership is believed to have a significant impact on managing and directing employees. Leadership involves a social process of influencing members of a group toward achieving a common goal (Algahtani, 2014), and research has demonstrated that leaders can make a critical difference to a team member's performance and effectiveness (e.g., Morgeson, Reider, and Campion, 2005; Zaccaro and Klimoski, 2002), especially in virtual teams (Huang, Kahai, and Jestice, 2010). Furthermore, our results highlight three different types of leadership behaviour that can have both positive and negative impacts on VT members' performance.

FIGURE 2
The three categories that affect VT members' performance



3. SCRUM is a methodology of Agile project management used for developing applications.

For instance, autocratic leadership, which involves directing, monitoring, and the use of authority to ensure performance, was perceived to be negative by the employees in this study. Autocratic leadership is a management style wherein one person controls all the decisions and accepts very little input from other group members (De Cremer, 2006). Autocratic leaders make choices or decisions based on their own beliefs, and do not involve others for suggestions or advice (Van Vugt *et al.*, 2004). Autocratic leadership involves a leader using authority to centralize the work process, and this is further perceived to create a power differential between team members and the leader. It is found that leaders with a directive, autocratic leadership style will not work well in self-directed teams (Hermann, 2005), and especially in virtual teams (Lewin, Lippitt, and White, 1939). Research suggests that employees often dislike autocratic leadership and that it is rarely effective. Autocratic leaders make decisions without consulting others, and only their ideas matter (Lewin *et al.*, 1939). To ensure that goals are attained, the autocratic leader may use direct orders and often manipulation, and employees are told what to do and how to do it. Thus, this leadership style also has negative implications for public service organization VTs, as found in this study.

Participative leadership, which is defined as the equalization of power and the sharing of problem-solving with followers by consulting them before decisions are made, is found to have a significant positive impact on VT performance (Hayat-Bhatti *et al.*, 2019). Participative leadership is more positively related to a range of solution proposals for semi-structured problems (Kahai, Sosik, and Avolio, 1997). Hertel *et al*. (2005) proposed that virtual team leaders engage in activities such as personnel selection, task design, team initiation, performance management, training, and team development. VTs need more participative leadership and employee engagement, especially in decision-making, task distribution, and responsibility-sharing, which can provide positive benefits and increased performance.

On the other hand, laissez-faire leadership, in which a leader who minimizes their involvement in decision making, allows subordinates to make independent decisions (e.g., Avolio and Kahai, 2003), and does not involve the use of authority (Turner, Keegan, and Crawford, 2002). The laissez-faire leadership style gives followers the ability to make decisions independently and implies that goal-setting, decision-making, or problem resolution falls completely to the individuals on the team because of the leader's minimal intervention. Laissez-faire leadership in a virtual environment where communication may be more challenging (Hogue, 2015) does not empower followers, as there is no clear mission. When tasks are delegated, follow-up is the only mechanism to determine if the work was completed successfully (Lowe, Kroeck, and Sivasubramaniam, 1996). Although this style gives freedom to employees in decision-making and task delegation, it may cause higher levels of stress and frustration due to the absence of clear missions and goals (Burns and Rechy, 2004; Hogue, 2015), which causes team members to be less productive, deliver fewer results, and become uninspired (Den Hartog, Van Muijen, and Koopman, 1997). Laissez-faire leaders assume that their followers are motivated to be successful without any additional guidance (Earley and Mosakowski, 2004)managers must be able to navigate through the thicket of habits, gestures, and assumptions that define their coworkers' differences. Foreign cultures are everywhere-in other countries, certainly, but also in corporations, vocations, and regions. Interacting with individuals within them demands perceptiveness and adaptability. And the people who have those traits in abundance aren't necessarily the ones who enjoy the greatest social success in familiar settings. Cultural intelligence, or CQ, is the ability to make sense of unfamiliar contexts and then blend in. It has three components - the cognitive, the physical, and the emotional/motivational. While it shares many of the properties of emotional intelligence, CQ goes one step further by equipping a person to distinguish behaviors produced by the culture in question from behaviors that are peculiar to particular individuals and those found in all human beings. In their surveys of 2,000 managers in 60 countries, the authors found that most managers are not equally strong in all three of these areas of cultural intelligence. The authors have devised tools that show how to identify one's strengths, and they have developed training techniques to help people overcome weaknesses. They conclude that anyone reasonably alert, motivated, and poised can attain an acceptable CQ. In dealing with virtual teams, laissez-faire leadership may cause team members to feel isolated and detached from the rest of the team (Zhang, Fjermestad, and Tremaine, 2005).

Implications of Team Characteristics (Trust and Communication) for VT Members' Performance

Virtual teams are more task-focused than FtF (Face-to-Face) teams, and the success of these teams can be attributed to the role of team characteristics. In our study, it was found that team characteristics, including communication and trust, have a significant influence on VT performance (Burman and Shastri, 2016). Communication is crucial in virtual teams, and research suggests that the method, tool, mode, frequency, and clarity of communication impacts the teams' performance (Marlow, Lacerenza, and Salas, 2017; Espinosa, Nan, and Carmel, 2015; Verburg, Bosch-Sijtsema, and Vartiainen, 2013)and Salas 2017; Espinosa, Nan, and Carmel 2015; Verburg, Bosch-Sijtsema, and Vartiainen 2013; (Henderson, Stackman, and Lindekilde, 2016).

Furthermore, the problems associated with lack of communication and trust create conflict and coordination problems within a team. The influence of technology may partly explain the factors involved in trust and VT performance (Jaakson, Reino, and McClenaghan, 2019), as the role of trust in promoting collaboration in teamwork has been well documented in face-to-face interpersonal relationships (Barczak, Lassk, and Mulki, 2010). VTs need to build and maintain team trust despite the geographical dispersion and frequent cultural diversity among the teams' members (cf. Ale Ebrahim, Ahmed, and Taha, 2009; Furst *et al.*, 2004). Our study supports the argument that trust is critical for VT performance (Breuer, Hüffmeier, and Hertel, 2016).

> *"Given the organization was established by forcing the consolidation of all regional teams under the CIO, meeting the desired performance will not be achieved without building a strong team trust among virtual teams." CIO of IM& IT organization.*

Our study identified that VT members were advised by management to make use of the communication tools that were provided to them, but the use of platforms like video conferencing, chatting, calling, etc. has been found to involve communication problems which further affect trust. For instance, Germain and McGuire (2014) suggested that trust in a technology needs to be established first because some members may not be as comfortable as others with the choice of platform provided to them. Trust is the core factor for building relationships in a virtual team (Choi and Cho, 2019; De Jong, Dirks, and Gillespie, 2016), and it is believed that team trust has a significant influence on team performance and determines the team processes of cooperation and coordination (Colquitt *et al.*, 2007). Consequently, teams without trust will have severe collaboration problems, with increased risks of hampered information exchanges, misunderstandings, or personal conflicts (Hakkinen, 2004; Rusman *et al.*, 2010). In a virtual environment, trust can help in effective interactions, and increases positive intentions to interact (Cheng *et al.*, 2016; Collins and Weinel, 2011).

On the other hand, VTs are usually connected through computer-mediated communication and are found to outperform face-to-face teams (Desanctis and Monge, 1999). Kirkman and Mathieu (2005) identified three dimensions of team virtuality: the use of virtual communication tools, the amount of informational value provided by those tools, and synchronicity of communication, while Martins, Gilson, and Maynard (2004) suggested four others: geographic dispersion, use of computer-mediated communication, temporality, and diversity. Thus, it is important for public service organizations to focus on improving communication and trust among VT members, which can have positive implications for performance.

Implications of Task Characteristic on VT Performance

A notable phenomenon in current workplaces is the use of technology to organize interactions and tasks in virtual space (Gaskell, n.d.). Carrying out a task in a virtual environment has a few drawbacks, however, particularly in terms of promoting collaborative behaviour among team members (Montoya, Massey, and Lockwood, 2011). As found in this study, tasks can be repetitive or complex. Complex tasks involve a larger number of "components", and require greater "coordinative" and "dynamic" activities (Wood, 1986) and "strategies for proper completion" (Bonner *et al.*, 2000, 22). Component complexity is a function of the number of actions needed to perform a task as well as the number of information cues processed. Coordinative complexity refers to the type and number of relationships between the task inputs and task products, whereas dynamic complexity is due to external changes that have some effect on the relationships between the task inputs and products. As task complexity increases, the requirements for task-specific skills and knowledge increase, and performance in a task becomes less sensitive to increases in effort, and thus to incentives (Bonner *et al.*, 2000, 22). A repetitive task involves the task being perceived in terms of

units produced in a given time period. Research suggests that repeated tasks cause an individual to learn and become expert in them (Bailey and Fessler, 2011); however, from our study, such tasks are repeated and distributed among a team's hierarchy.

Conclusions, Limitations, and Future Research

The aim of the present study was to explore the factors that may affect the performance of VT members in a public service organization. It is inevitable that due to the nature of VTs, their leaders may find it challenging to monitor team members' performance, which may have an impact on performance management as well as VT development (Bell and Kozlowski, 2002). Since virtual teams, by definition, lack frequent face-to-face interactions, there may be an increased risk of miscommunication (Johnson, Heimann, and O'Neill, 2001) and difficulty in cultivating trust (Levasseur, 2012).

In addition, this study explored the various challenges faced by managers and their employees that may impact overall VT performance. The qualitative data analysis revealed three interesting themes and suggests that major concerns underlie virtual leadership. Though public service organizations have embraced VTs, problems still prevail with regard to team and task characteristics. Despite the challenges, our results highlight clear issues that need to be addressed by public service organizations, e.g., that higher levels of internal trust between leaders and employees are needed to keep up VT members' spirits and ensure their continued performance (Hacker *et al*., 2019). From our findings, we conclude that leadership training programs are essential to equip leaders to develop more e-trust and skilled e-leadership (Levasseur, 2012; Bell and Kozlowski, 2002). As virtual platforms are new for Canadian public service organizations, virtual management skills for leaders are critical for long-term success. Public service organizations' top management should analyse and audit the characteristics presented in this report and focus on providing the necessary training and strategies to support VT effectiveness.

Our results are valuable, as they suggest issues that need managerial attention. Furthermore, for organizations, highlighting these issues may help in resolving conflicts and strengthening employee VT performance. This research has documented the importance of leadership and leaders' behaviour, team members' communication and trust, and the role of task performance, which may impact overall VT performance. Thus, we propose that there is a strong need for public service organizations to provide employees with effective communication tools in a virtual setting and to facilitate the development of trust among VT members. Virtual teams are evolving at an unparalleled pace in most private organizations, and public service organizations seem to be lagging in making VTs perform effectively. The findings of this paper may help in providing directions and implications for managers of public service organizations on how to sustain VTs and increase VT performance by addressing the underlying issues.

A long-standing debate on the similarities and disparities between public and private organisations exists in the literature. For instance, in private organizations, virtual teams have witnessed the positive effect of transformational and transactional leadership styles (e.g., Hambley *et al*., 2007), whereas in our study, we found that the leadership literature on virtual teams has focused mostly on leader behaviours and traits in private organizations, and that these also have impacts on team performance (Liao, 2017). Thus, while our study extends the literature on public service organizations with laissez-faire and participative leadership, the negative effects of autocratic leadership can also be seen in our results. This may be due to public sector managers having a lower level of organizational commitment than private sector managers, especially regarding their willingness to invest extra effort (Buelens & Van den Broeck, 2007), and that public sector leadership accountability is blurred and government does not assign complete authority to any leader or organization (Flemming, 2016). Numerous team characteristics studies have been done scholars with regard to private organizations that have found that team characteristics have impacts on VT performance (e.g., Schaubroeck and Yu, 2017; Wong and Burton, 2000); however, issues such as coordination, communication, and trust have also been explored. Though trust is a challenge in VT, it is an important prerequisite for VT leaders to solve communication- and technology-related challenges (e.g., Hacker *et al*, 2019), and thus the findings from this study have implications for public service managers.

Since this paper has used a qualitative approach, it has a few limitations. For example, questions may be raised regarding the method of data collection, which involved fact-to-face interviews, as well as the method adopted to code

the data. In addition, there may be bias in the perception of the coding method (Gupta and Pathak, 2018). The study was based on respondents who were team members located in one geographical location of Canada, and future studies may consider issues involved in virtual teams by conducting comparative studies in different geographical regions. Future studies may also consider making a comparison of whether relevant issues are similar or different by location. The findings of the study may provide guidelines for future research using quantitative techniques in order to more appropriately measure the causal factors in VT performance, and future research should theorise on and empirically investigate how the three major dimensions found in this study impact VT performance. Lastly, the findings of the study may provoke new insights and generate further questions regarding VT performance.

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