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Assessing job performance in Brazilian digital government

The role of knowledge management systems use and social capital

Diego Rodrigues Cavalcanti

Dissertation presented as partial requirement for obtaining the Master's degree in Information Management

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ASSESSING JOB PERFORMANCE IN BRAZILIAN DIGITAL GOVERNMENT: THE ROLE OF KNOWLEDGE MANAGEMENT SYSTEMS USE AND SOCIAL CAPITAL

by

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RESUMO

Diante dos desafios do governo digital, esta pesquisa busca compreender os propulsores do desempenho laboral e organizacional na administração pública brasileira. Foi criado modelo de pós-adoção para avaliar o desempenho da administração pública mediante a utilização de sistemas de gestão do conhecimento (KMS), com base nos conceitos de satisfação do usuário, uso enxuto de sistemas (duração, frequência e intensidade), capital social, e liderança transformacional. Após revisão de literatura sobre as teorias de liderança transformacional e capital social, foi analisado o impacto destes fatores contextuais no ambiente governamental de uma agência pública brasileira (Ministério do Meio Ambiente). Utilizando-se de abordagem empírica, a pesquisa recolheu dados de 295 funcionários públicos, após questionário on-line, e obteve como resultados que o desempenho individual no trabalho, usando KMS, afeta positivamente o desempenho da organização, sendo também impactado por fatores como intensidade do uso de KMS, satisfação do usuário e capital social. A satisfação do individuo impacta o desempenho individual, sendo afetada pela frequência e intensidade do uso do KMS, assim como pelo capital social, que desempenha relevante papel no desempenho individual e organizacional, ampliando o relacionamento entre a satisfação do usuário e o desempenho individual, vez que apresenta efeito moderador. O desempenho organizacional é influenciado pela liderança transformacional, responsável por moderar as conexões entre a performance individual e institucional. A pesquisa fornece informações relevantes para a literatura em sistemas de gestão do conhecimento, de forma a conectar o uso de KMS com a satisfação e o desempenho, elucidando a importância do capital social para o alcance de melhores resultados em ambientes governamentais.

PALAVRAS-CHAVE

Governo digital; Uso enxuto de KMS; Capital social; Liderança transformacional; Desempenho individual; Desempenho organizacional

ABSTRACT

Faced with the challenges of digital government, this research seeks to clarify the drivers of individual and organizational performance in the Brazilian public administration. A post-adoption model was developed to evaluate the performance of public administration with knowledge management systems (KMS), given the concepts of user satisfaction, lean system use (duration, frequency and intensity), social capital, and transformational leadership. After literature review on theories of transformational leadership and social capital, the impact of these contextual factors on the government environment of a Brazilian public agency (Ministry of the Environment) was verified. Using an empirical approach, the survey collected data from 295 public officials, using online questionnaire, obtained as results that the individual performance at work, using KMS, positively affects the organizational performance, being also impacted by factors such as intensity of the KMS use, user satisfaction and social capital. User satisfaction impacts individual performance, being affected by the frequency and intensity of KMS use, as well as by social capital, which plays a relevant role in individual and organizational performances, amplifying the relationship between user satisfaction and individual performance, given its moderating effect. Organizational performance is influenced by transformational leadership, responsible for moderating the connections among individual and institutional performance. The research provided relevant information to the literature on KMS, to connect system use, satisfaction and performance, elucidating the importance of social capital to achieve better results in government contexts.

KEYWORDS

Digital government; lean use of KMS; social capital; transformational leadership; job performance; organizational performance

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ABREVIATIONS AND ACRONYMS LIST

AVE	Average Variance Extract
CA	Cronbach's Alpha
CR	Composite Reliability
D&M	Delone and Mclean
DUR	Duration
EGTI	General IT Strategy
e-SIC	Information Access Module
FREQ	Frequency
GT	Social Capital - Generalized Trust
GTTI	Working Group on Information Technology
HTMT	Heterotrait-Monotrait Ratio of Correlation
IC	Transformational Leadership - Individual Consideration
ICT	Information and Communication Technologies
IDENT	Social Capital – Identification
II	Transformational Leadership - Idealized Influence
IM	Transformational Leadership - Inspirational Motivation
INT	Intensity
IPEA	Institute of Applied Economic Research
IS	Transformational Leadership - Intellectual Stimulaton
IS	Information System
IT	Information Technology
JP	Job Performance
KM	Knowledge Management
KMS	Knowledge Management System
K-S	Kolmogorov-Smirnov

MLQ	Multifactor Leadership Questionnaire
OP	Organizational Performance
PLS	Partial Least Squares
PSN	Social Capital - Pro Sharing Norm
R	Coefficient of Determination
SAIC	Secretariat of Institutional Articulation and Environmental Citizenship
SBIO	Secretariat of Biodiversity
SC	Social Capital
SECEX	Executive Secretariat
SEDR	Secretariat of Extractivism and Sustainable Rural Development
SEM	Structural Equation Modelling
SFB	Brazilian Forest Service
SISP	IT Resource Administration System
SMCF	Secretariat of Climate Change and Forestry
SRHQ	Secretariat of Water Resources and Environmental Quality
TL	Transformational Leadership
US	User Satisfaction
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor

1. INTRODUCTION

Progress in information and communication technologies (ICTs) have enabled transformation in the public sector, using technological tools, to transform complex bureaucratic structures into agile, efficient and results-oriented organizations (Janowski, 2015; Janowski et al., 2012). However, the ICTs systems underutilization (lack or inefficient use, employee's resistance, and lack of training) is still one of the biggest problems in practice, causing financial and performances losses to the all kinds of organizations (Alavi & Leidner, 2001; Venkatesh et al., 2003). Considered as a key dependent variable at multiple levels of theorists, both for individuals and for business studies, the IT use is linked to performance (Jasperson et al., 2005; Maruping et al., 2017; Venkatesh et al., 2003). Prior literature indicates individual performance gains in the context of IT implementation and use, are contingent on the fit among task, system, user, organizational support, and cultural factors (e.g., Bock et al., 2005; Kankanhalli et al., 2005; Kulkarni et al., 2007), besides the gain in organizational performance (e.g., Lee & Choi, 2003; Pee & Kankanhalli, 2016).

In the implementation context, knowledge management systems (KMS) are widely used by organizations to increase their competitiveness and effectiveness (Bessa et al., 2018; Schultze & Leidner, 2002) even in the government environment, with public administration services being knowledge-intensive by nature (Pee & Kankanhalli, 2015; Willem & Buelens, 2007). A KMS is a class of information system (IS) that manage organizational knowledge, being a ICT-based system developed to support and enhance the organizational process of knowledge creation, storage and retrieval, transfer, and application (Alavi & Leidner, 2001). The use of KMS can bring benefits such as organizational economic growth, employee cost reduction, and improved individual performance at work (Zhang, 2017). Previous research on KMS implementations, cites the importance of KMS use as instrument of organizational success, examining the application of different drivers (Kankanhalli et al., 2005; Kulkarni et al., 2007; Maruping et al., 2017). Otherwise, Zhang & Venkatesh (2017) presented some researches, which KMS implementations have failed to improve job performance and job satisfaction.

The role of ICT into government represents a part of a larger transformational effort called electronic government – when IT is used to transform the internal organization and the government work (Janowski et al., 2012). In Brazil, "digital government refers to the use of digital technologies, as an integrated part of government modernization strategies, to generate benefits for society" (Brasil, 2016, p. 7), being structured in the early 2000s under the name of "e-government" (e-Gov). In this period, organizational and strategic changes were initiated in some agencies of Brazilian government, and between the years 2004 and 2014, emerged several initiatives to institutionalize KM models, giving rise to new projects for the implementation of KMS (Batista et al., 2014).

Given that previously studies of KMS have focused more on knowledge sharing (Bock et al., 2005; Willem & Buelens, 2007) and understanding that the existence of KMS in organizations, whether public or private, affects more than just the knowledge sharing (Pee & Kankanhalli, 2016), but also the use of KMS, improving the overall performance. The objectives of this research are: a) examine the relationship between user satisfaction, KMS use, job performance and organizational results in the government environment, given the existence of contextual factors as leadership and social capital; b) develop and test a model to understand lean use of KMS and its impact on public employee performance, besides the impact on the overall organizational results. This study applies to

KMS the perspective of lean system use, from Venkatesh et al., 2008), adopting as moderating factors, transformational leadership and social capital, to consider the contextual influence of environment (Kankanhalli et al., 2005), affecting the relation between user satisfaction, KMS use, job performance and organizational results.

Through the application of structured questionnaire with 295 employees in the Ministry of Environment, a Brazilian public agency which currently use a KMS, we expect as three main contributions. Firstly, to improve the academic research, believing this paper will extend research related to performance and lean use of KMS in the digital government context, proposing a new model to analyze the impacts between the lean use of a KMS, user satisfaction, individual and organizational performance. Secondly, this research will contribute to the management context affecting employee's job and organizational performance, by incorporating context factors (social capital and transformational leadership) into theory development, helping to understand performance gains resulting from KMS use. Finally, to provide suggestions to public organizations, to improve management skills and leadership, guiding public officials to effectively use a KMS, understanding their influence on the overall performance.

This research is organized as follows. Initially, the literature related to the KMS context in Brazilian government was reviewed, followed by the performance topic of the D&M model, the presentation of the concept of lean use, as well as the theories of social capital and transformational leadership. In the sequence, the methodology of research and data analysis is presented through the modelling of structural equations (SEM). The research is concluded with a topic of discussion of the obtained results, practical and theoretical contributions, besides limitations and suggestions to the future researches.

2. LITERATURE REVIEW

2.1. KMS IN BRAZILIAN GOVERNMENT

Being embedded and fluid within an organizational context, knowledge brings individuals with specific domain expertise, lessons learned from previous experiences, documents, routines, systems, and information relevant to the organization's success (Kulkarni et al, 2007). Defined as the process by which organizations leverage and derive value from their intellect or knowledge (Kulkarni et al., 2007), knowledge management (KM) is a multifaceted discipline that targets the management of an organization's knowledge assets, holistically combining behavioral, organizational, and IS (Karlinsky-Shichor & Zviran, 2016). KM initiatives, by motivating the creation, application and dissemination of knowledge, helps the organization achieve its goals (King et al., 2009), allowing greater efficiency and productivity at work through the acquisition, organization and communication of tacit and explicit knowledge among employees (Alavi & Leidner, 2001). Referring to a class of ICT, KMS is a type of social technology, to facilitates knowledge share and transfer among employees, managing and providing access to knowledge artefacts (Zhang, 2017).

To better understand how Brazil can adjust to the technology society, it is important to emphasize the role of social capital building policies and environments, which encompasses concepts of networks, norms and shared trust, to facilitate coordination and cooperation between processes, people, flows and capacities, producing gains or mutual results, having as main impacts the stimulus to innovation (Cepik & Canabarro, 2010). Despite the fact that KM is growing globally at different levels of public administration (Pee & Kankanhalli, 2015; OECD, 2013) in Brazilian government, KM comes linked to the e-government program, resulting from the Working Group on Information Technology (GTTI) formed in 2000, to propose policies and guidelines to the new electronic forms of interaction between digital society and government. However, only in 2003 with the technical committees of electronic government, the first concrete initiative appeared under the theme of KM and strategic information (Andrade & Joia, 2012). The regulatory framework for KM emerged in May 2004, with the strategic planning workshops report, presenting general guidelines for the implementation and operation of e-government, including the promotion, use and dissemination of KM practices of KM (Brasil, 2004). The Brazilian report defines KM within e-government policies as "a set of systematic, articulated and intentional processes capable of increasing the ability of public managers to create, collect, organize, transfer, and share information and strategic knowledge which can serve for decision-making, for the management of public policies and for inclusion of the citizen as producer of collective knowledge" (Brasil, 2004, p. 17).

Since the beginning of the IS in the federal government in the middle of 1990, the secondary role assigned to IT - merely ancillary to their efforts - can be considered the cause of the gap between the middle and the end activities of the public organizations, as well as the misalignment between such activities and government IT, which led to the absence of expressive IT governance in the federal administration until the beginning of 2008, when was struturated the IT Resource Administration System – SISP in the government, creating the bases for KM growth (Cepik & Canabarro, 2010). Created in 2000, the SISP was effectively structured following the General IT Strategy - EGTI of 2008/2009, which provided principles for significantly raises IT governance in the federal government of Brazil (Cepik & Canabarro, 2010). In 2010, the new EGTI of 2010, proceeded the qualification of human resources and the accomplishment of IT planning, in favor of the

sustainability of the IT Governance Model, leading to several initiatives of institutionalization of practices and models of KM (Batista et al., 2014; 2005), as well as projects of KMS implementation at diverse public agencies, as verified in some reports of the Institute of Applied Economic Research - IPEA (http://www.ipea.gov.br/observatorio/), published between 2004 and 2015.

2.2. PERFORMANCE IN D&M MODEL AND LEAN USE CONCEPT

Considering extensive IS research that emphasizes the use of KMS as a proxy for system success (Zhang, 2017), the variable "system use" plays an essential role in IS researches that use D&M model (DeLone & McLean, 1992, 2003). In prior researches, system use was effectively measured in many ways, even in the presence of theoretical limitations, being possible to say that the concept of system use is varied and somewhat complex (Burton-Jones & Straub, 2006; Jasperson et al., 2005). Different concepts of system use need categorization into two basic types: rich use (Burton-Jones & Straub, 2006) and lean use (Venkatesh et al., 2008). The concept of rich use considers user, system and task as essential factors, containing two dimensions: cognitive absorption (user and technology interactions) and deep use of the structure (how the relevant system resources have been deployed to the task, in terms of breadth and depth of use) (Burton-Jones & Straub, 2006; Zhang, 2017). In the other hand, lean use considers the technology investigated, conceptualizing system use with three predictors: frequency, duration and intensity. Duration represents the amount of clock time spent using a system, considering the accumulation of quantifiable units. In a context where work activities are scheduled along a defined time continuum, the frequency of use will be structured around the employee activities. The intensity is dependently structured according to the type of activity that compose the work, if highly complex or simple/routine (Venkatesh et al., 2008).

Important for organizations and their employees, the term “performance” can be related to effectiveness and productivity (Tam & Oliveira, 2016), being highly complex to measure in government organization context (Da Cruz & Marques, 2014). About individual performance, literature review brings divergent studies, related to the way employees use systems, being important to understand how KMS can be better leveraged, maximizing the level of individual work and organizational performance (Zhang & Venkatesh, 2017). Even with the difficulty of measuring organizational performance using individual IS research, as demonstrated by previous research, there is also evidence that the individual-level factors are important predictors of organizational performance (Brewer et al., 2000; Kim, 2005), and the intensive use of KMS affect individual performance (Kankanhalli, Lee, & Lim, 2011), leading to better organizational performance (H. Lee & Choi, 2003), which should also be accounted for. In view of the different scenario in which public organizations are inserted, with less concern about financial returns or unavailability of objective measures of performance (Kim, 2005), there is a need to evaluate the capacity of these organizations to fulfil their institutional mission, considering all dimensions relevant to organizational effectiveness (Pee & Kankanhalli, 2016).

Created after empirical studies review, the original D&M model identifies six factors for IS success, as: system quality, information quality, system use, user satisfaction, individual impact, and organizational impact (DeLone & McLean, 1992). Ten years after the original model, was proposed an update, including new dimensions such as: service quality, intention to use, and net benefit (DeLone & McLean, 2003). In 2013, D&M developed a new taxonomy, proposing five new determinant and independent variables, responsible for influencing the IS success: organizational characteristics,

project, task, social, and individual (Tam & Oliveira, 2016). Through D&M model, previous studies found that the match among system quality and information is more likely to have a positive impact on performance when users feels satisfaction, utilizing the system (Tam & Oliveira, 2016). Other research of Ali et al. (2017), stated that the system uses results in benefits (e.g. better performance) for users and organizations, given that IS attributes, such as system and information quality, influence users' perceptions of the system, thus impacting the overall system use.

Since the KMS represent a specialized type of IS, many models of KMS success were built applying different versions and variations of D&M model (Ali et al., 2017; Halawi et al., 2008; Kulkarni et al., 2007; Wang & Lai, 2014; Wu & Wang, 2006). As an example, the generic model of KMS success, tested in corporations (Wu & Wang, 2006), and a multi-dimensional model tested in a petroleum company and its business partners, both in Taiwan. In the USA, a KMS model was tested with data collected from knowledge-based organizations (Halawi et al., 2008). Studies from New Zealand included organizational factors and leadership and tested a new model in the healthcare sector (Ali et al., 2017), finding positive results about the influence of leaders, organizational culture and norms, with respect to the system use. In contrast, Kjærgaard & Kautz (2008) shows the importance of culture and organizational identity in the establishment of KM, warning about the possibility of failure in the implementation of KM, even in an environment of valuing knowledge, broad job satisfaction, and mature IT use.

2.3. SOCIAL CAPITAL AND TRANSFORMATIONAL LEADERSHIP

Based on sociology studies, social capital present arguments to describe how companies enter socially into networks of relationships, incorporating various organizational actors, representing the inherent ability of individuals to obtain benefits through association in social networks or other social structures (Inkpen & Tsang, 2005; Nahapiet & Ghoshal, 1998). Social capital can affect knowledge transfer across network members, affording to them privileged access to knowledge, opportunities and preferred information, reputation, and influence (Inkpen & Tsang, 2005), to allow better performance. This research adopts the Nahapiet & Ghoshal (1998) definition of social capital, as the aggregate of resources available, and coming from the network of relationships that an individual or organization has (Sheer & Rice, 2017). Through the relational dimension, social capital represents the relations that people have developed with each other through a history of interactions, that influence their behavior (Inkpen & Tsang, 2005).

Using Nahapiet & Ghoshal (1998) research to describe the organizational context which motivates the parties to knowledge creation and share, through exchange and combination, were defined three key aspects of social capital: trust, identification (Willem & Buelens, 2007), and norms (Kankanhalli et al., 2005). Explaining the relational dimension - when the individuals relationships have strong and positive characteristics (Wasko & Faraj, 2005), trust, norms, and identification are considered social capital, being organizational assets that interfere in social relations, resulting in benefits of coordination and managerial efficiency (Kankanhalli et al., 2005). Trust, as a complex phenomenon with several dimensions and levels of analysis in organizational environment (Wasko & Faraj, 2005), means the believe that the other party, in a cooperative episode, is reliable and trustworthy in the government context (Willem & Buelens, 2007). Generalized trust is an impersonal form of trust relative to a behavior that is generalized to a social unit or departmental environment, independent of a specific individual. In this research concerns in the competence, good intention,

and reliability of employees, regarding the sharing and use of knowledge through KMS, allowing social exchange in general, and cooperative interaction in particular (Kankanhalli et al., 2005; Nahapiet & Ghoshal, 1998). In a context of strong generalized trust, people can trust each other, given the cooperation and the effective free exchange atmosphere between committed partners (Inkpen & Tsang, 2005), increasing the willingness to document and share knowledge (Renzl, 2008; Zimmermann et al., 2018), even without much personal knowledge about others (Tsai & Ghoshal, 1998). In a weak generalized trust context, knowledge collaborators may find that the required effort to share knowledge is too high, discouraging cooperation because of the belief that their knowledge could be misused by others (Kankanhalli et al., 2005).

Representing a certain degree of consensus in the social system, norms can moderate individual behavior, according to group expectations (Kankanhalli et al., 2005). Government environment are often presented as strongly dominated by norms, formalization and procedures (Willem & Buelens, 2007). According to Kulkarni et al. (2007), the success of KM initiatives is influenced by norms, which employees in a context of pro sharing norms associate with the share and use of knowledge base. With the opposite context, that does not encourage shared norms, employee beliefs that the share and use of knowledge diminishes power and increases personal risk, the desired perception of utility will be affected, leading to the failure of KM's initiative. A pro sharing norms represents a context which cooperation norms can establish a solid foundation for the intellectual and social capital creation, influencing the exchange of knowledge among parties, and ensuring motivation to engage in the relationship (Nahapiet & Ghoshal, 1998). With strong pro-sharing norms, the low costs of knowledge creation, exchange and use, may be an encourage factor to knowledge contributors. In the opposite, in a weak pro-sharing norms context, the contribution costs may be outstanding (Kankanhalli et al., 2005), creating excessive expectations of obligatory behavior (Inkpen & Tsang, 2005), discouraging the actors to collaborate with new knowledge.

Considered as a key influencer on compliance with organizational KM initiatives (Ravishankar & Pan, 2008), identification is the process in which individuals see themselves as one with another person or group, setting the niche of collaboration and knowledge exchange with organizational members (Nahapiet & Ghoshal, 1998). Represents the willingness of people to sacrifice for the unit and the organization’s goals, being a dimension of commitment (Willem & Buelens, 2007). To provide the ideal context for the pro-social behavior, to increase the concern with collective interests that converge to the individual's interests, there are three components of identification: similarity of values (intensity of goals and common interests among organizational members), membership in the organization (intensity in which the members self-concept is linked to the organization), and loyalty toward the organization (intensity of support and advocate to the organization by its members) (Kankanhalli et al., 2005). With strong identification, the costs of knowledge exchange for individuals, would be inexpressive given the dominate of collective benefits in the group cooperative episodes (Willem & Buelens, 2007). In the opposite context, the high effort required for knowledge sharing may be a barrier to the contributor’s behavior, increasing the need for organizational reward or incentives for new knowledge shared (Kankanhalli et al., 2005; Willem & Buelens, 2007).

Leadership, as a contextual factor, plays a key role in affecting success of systems implementations and use, in a technology context (Zhang, 2017). Earlier studies provided evidence of the essentiality of KM leadership for KM success, being more important than usage bonus or incentives granted to KM users (Alavi et al., 2006). Transformational is the leadership style that

leaders provide constructive feedback to their followers, convincing and encouraging them to exhibit extra effort to think disruptively about complex problems, to implement changes and formulate visions by motivating people within the organization (Piccolo & Colquitt, 2006). Emphasizing the relationship between leaders and followers, the transformational style adds a supportive factor to complement the directive leadership style, giving importance to the leader's charismatic characteristics, claiming they must transform the organization and the workers, to obtain the necessary goals (Ricard et al., 2017).

Even though transformational leadership has a more inspiring and visionary focus, it is recognized in the literature that leaders can influence performance by altering the structural features of followers' jobs (Grant, 2012; Piccolo & Colquitt, 2006). Thus, transformational leadership has four dimensions: inspirational motivation (the degree to which leaders articulate their visions so as to attract followers), idealized influence (the degree to which leaders behave, making followers identify with them), intellectual stimulation (the degree to which leaders solicit ideas from followers, challenging and encouraging their participation), and individualized consideration (the degree to which leaders meet the needs of followers by interacting and counselling them as mentors or coaches) (Grant, 2012; Piccolo & Colquitt, 2006; Zhang, 2017).

3. CONCEPTUAL MODEL

To explain job performance and organization performance we proposed a research model, please see, Figure 1. The relationship between the lean use of KMS, user satisfaction, and job performance is theorized, as well as the relationship between job performance and organizational performance, through the existence of contextual factors, proposed by the social capital (pro-sharing norms, generalized trust, and identification), and the transformational leadership (individual consideration, idealized influence, intellectual stimulation and inspirational motivation) as influencers and moderators of the relationships.

In this work the concept of organizational performance includes quality improvement, efficiency of operations and results, coordination, collaboration, competitive advantage, and overall success. Thus, job performance will be measured using survey that will be applied in the employees of the Ministry of Environment in Brazil, to represents the benefits earned by public official with the use of KMS (Tam & Oliveira, 2016; Urbach et al., 2010).

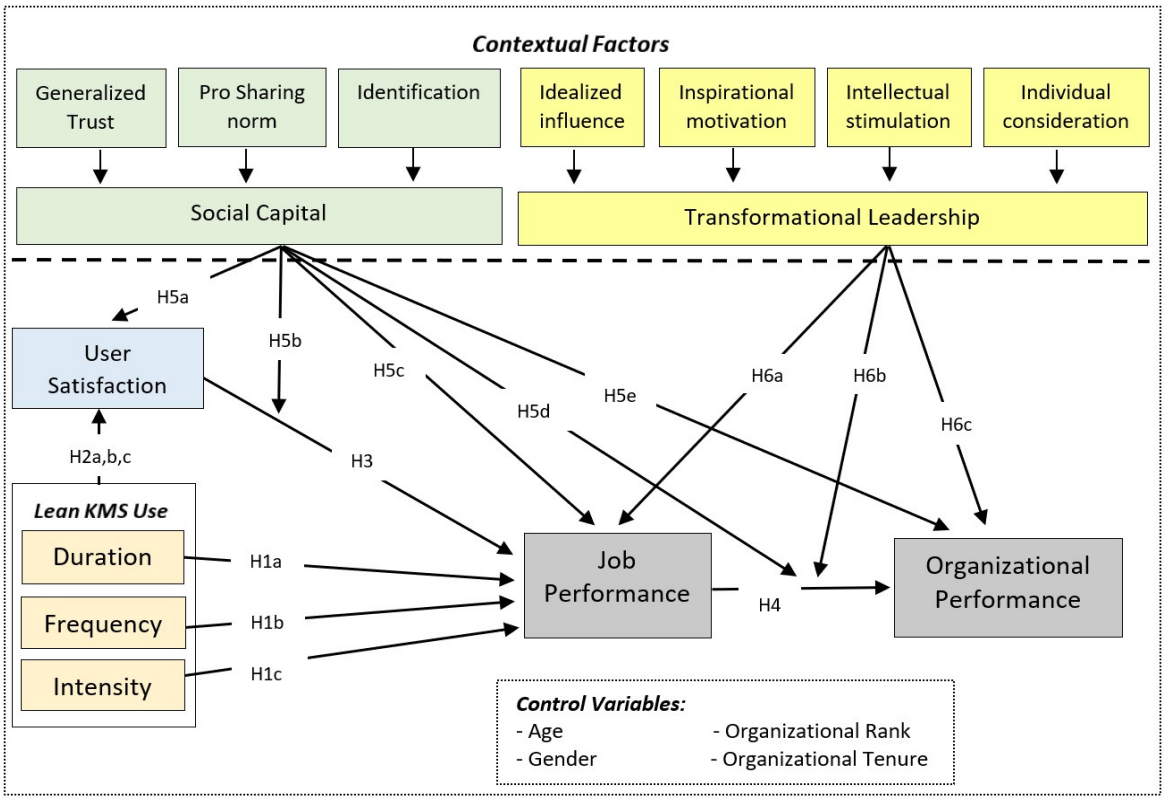


Figure 3.1. Research model proposed

LEAN KMS USE

The more clock time users spend using a system (KMS), the more likely they are to work harder, resulting in increased productivity and performance. Previous researches indicates that the amount of effort and the degree of persistence have a significant impact on performance (Venkatesh et al., 2008; Zhang, 2017). Thus, the hypothesis is:

H1a: Duration of use will have a positive effect on job performance.

The individual who better understands the nature and activities of his work, seeing the importance of his tasks in the agency environmental context (Venkatesh et al., 2008), tends to use KMS more frequently and repetitively, increasing the frequency of interaction with the system, and consequently their individual performance. Thus, the hypothesis is:

H1b: Frequency of use will have a positive effect on job performance.

Influenced by nature and labor demands, employed with complex work activities will show greater intensity in system use (Venkatesh et al., 2008) - KMS in our case - given that they will be inclined to create more knowledge, or seek solutions to the demands in the system database, increasing the intensity of the interactions with the platform, and consequently the job performance. Thus, the hypothesis is:

H1c: Intensity of use will have a positive effect on job performance.

The D&M (2003) model states that system use (in our case the KMS), must precede user satisfaction, since a positive user experience will lead to increased user satisfaction. Understanding that the intensive use of KMS, measured through duration, frequency and intensity, will lead to increased user satisfaction, resulting in greater use of the system in an iterative cycle, the hypothesis is:

H2a: KMS use (duration) will have a positive effect on user satisfaction.
H2b: KMS use (frequency) will have a positive effect on user satisfaction.
H2c: KMS use (intensity) will have a positive effect on user satisfaction.

USER SATISFACTION

Based on previous study on individual performance, for example Tam & Oliveira (2016) mention user satisfaction as an important factor with strong direct effect on individual performance. An employee more satisfied to use KMS will present better performance at work, considering the associations proposed by D&M model (1992, 2003), supporting that greater user satisfaction will affect individual performance. Urbach et al. (2010) found results indicating that user satisfaction directly influences the individual performance obtained by employees, after use the system. Thus, the hypothesis is:

H3: User satisfaction will have a positive effect on job performance.

JOB PERFORMANCE

Despite the lack of studies about the impact of KM outcomes on firm performance, we believe that desirable KM outcomes, as knowledge share and use, lead to desirable firm performance outcomes (Kulkarni et al., 2007). Urbach et al. (2010) found influence of individual performance on organizational performance, in the context of organizational portal. Considering previous study, we state that better job performance will positively affect the organizational performance. Thus, the hypothesis is:

H4: Job performance will have a positive effect on organizational performance

SOCIAL CAPITAL

Social capital provides the necessary conditions for the exchange of knowledge, containing three essential aspects that could define the organizational environment of knowledge management - norms, trust and identification (Nahapiet & Ghoshal, 1998) - which in this research are the first order constructs of social capital. As pointed out by Zheng et al. (2010), preterits studies on the impact of contextual and organizational factors on employees, indicate that a decentralized structure encourages communication, facilitates the success of knowledge management, increases employee satisfaction and motivation, and is capable of generate the free flow of communication in the environment. Thus, a context of strong general confidence, favorable norms and high identification of the individual (Kankanhalli et al., 2005), will be positively linked to a higher employee satisfaction with KMS, influencing positively the job performance, creating the hypothesis:

H5a: Social capital will have a positive effect on user satisfaction.
H5b: Social capital will moderate the relationship between user satisfaction and job performance.

Social capital builds the environment to influence positively job performance. Previous studies demonstrates that where are elevated levels of identification and trust, people are more inclinable to take risks in the exchange of information and knowledge (Nahapiet & Ghoshal, 1998), increasing proactivity and productivity at work. Thus, the hypothesis is:

H5c: Social capital will have a positive effect on job performance.

The research of Tsai & Ghoshal (1998), shows clear performance implications for intrafirm by showing how social capital contributes to generates innovations at firms level, impacting the performance. In a context of good intent, competence and reliability, norms of teamwork and strong employee identification (Kankanhalli et al., 2005), the individual performance will increase the organizational results, allowing the hypothesis:

H5d: Social capital will moderate the relationship between job performance and organizational performance.

Believing that differences among firms (e.g., performance), can represent differences in their ability to exploit and create social capital, Nahapiet & Ghoshal (1998) identified several ways in which social capital can reduce the organization's transaction costs, generating competitive advantage and savings in information, sustaining dynamic efficiency, organizational growth, and even value creation (Tsai & Ghoshal, 1998). Previous study shows that technology, structure, and culture, composing the social capital dimensions, are an additive factors of a larger infrastructure capability that positively impacts key aspects of performance and organizational effectiveness (Gold et al., 2001), as the hypothesis below:

H5e: Social capital will have a positive effect on organizational performance.

TRANSFORMATIONAL LEADERSHIP

As an effective process for influencing changes in the assumptions and attitudes of organizational members, transformational leadership is considered second order reflective-formative type (Ringle et al., 2012) with four reflective constructs: inspirational motivation, idealized influence,

intellectual stimulation, and individualized consideration (Grant, 2012; Piccolo & Colquitt, 2006). Motivated individuals are known to tend to spend more time on activities in which they are internally motivated (Venkatesh et al., 2008), leading to better performance at work. As stated, the leader transformational support, providing constructive feedback to their followers, encouraging them to exhibit extra effort and think creatively to solve problems, the intellectual stimulator and mentor (Piccolo & Colquitt, 2006), should trigger greater job performance. Thus, the hypothesis is:

H6a: Transformational leadership will have a positive effect on job performance.

For Bass et al. (2003), excellent leaders are more likely to exhibit transformational leadership traits, allowing them to expand their cultural factors, improving organizational performance. In KM context, leaders can influence the KM-related actions of individuals who possess the relevant knowledge and also of those who can possibly benefit from the use of this available knowledge (Kulkarni et al., 2007), impacting in the organizational performance. Able to transform the organization and motivate workers to achieve business objectives (Piccolo & Colquitt, 2006), transformational leadership has the potential to elevate job performance, creating the basis for better organizational performance, allowing the hypothesis:

H6b: Transformational leadership will moderate the relationship between job performance and organizational performance.
H6c: Transformational leadership will have a positive effect on organizational performance.

4. METHOD

To test the model using empirical data, this research examined the proposed hypotheses in the Ministry of Environment, a public agency of Brazil. Our target population were the public officials of the environmental specialist career, considering the participation of all the seven secretariats of the agency (Secretariat of Institutional Articulation and Environmental Citizenship – SAIC, Secretariat of Water Resources and Environmental Quality – SRHQ, Secretariat of Climate Change and Forestry – SMCF, Secretariat of Extractivism and Sustainable Rural Development – SEDR, Secretariat of Biodiversity – SBIO, Brazilian Forest Service – SFB, and Executive Secretariat – SECEX) and their departments, which currently use the KMS daily for the accomplishment of their work activities. The KMS is a commercial software, representing an integrated solution to support communication and management of corporate knowledge, allowing web access (external to the organization's network environment). It provides a collaborative and interactive environment for creating and exchanging knowledge among employees, generating qualified data and information for corporate decision making. As basic functionalities, the KMS allows knowledge repositories as: portal, user profile and contact management, institutional information environment, thematic working groups, interactive systems with social media technologies (forums, blogs, wiki, messaging, virtual meeting), task and project management, and library. The KMS had features to facilitate the curricular collection of employees, tools for simple creation of interactive surveys or forms, and the integration of information access module (e-SIC) and other corporate systems to support the agency's business. Initially, a questionnaire developed in english was used, based on the proposed literature, which was then translated independently into portuguese with the assistance of professional translators, and after returned to english by a different translator, ensuring translation equivalence (Brislin, 1970). Most items were measured using the seven-point range scale, ranging from totally disagree (1) to fully agree (7).

4.1. MEASUREMENT

We adapted some items to the KMS government context as necessary, to fit in the conceptual model. The survey questionnaire started by presenting our conceptualization of KMS, followed by measurement items (Appendix A), which were adapted from Kankanhalli et al. (2005), Urbach et al. (2010), Venkatesh et al. (2008), and Zhang (2017), with slight adaptations. From the literature, Lean KMS use construct, including duration (Dur), frequency (Freq), and intensity (Int) were adopted from Venkatesh et al. (2008); user satisfaction (US) and organizational performance (OP) from Urbach et al. (2010); from Zhang (2017) we adapted job performance (JP) and transformational leadership, measured as second order reflective-formative type (Ringle et al., 2012), with items reached by four reflective constructs from Multifactor Leadership Questionnaire (MLQ Form 5X) from Avolio & Bass (1995): individual consideration (IC), idealized influence (II), intellectual stimulation (IS), and inspirational motivation (IM); and social capital, from Kankanhalli et al. (2005), measured as second order reflective-formative type (Ringle et al., 2012), with three reflective constructs from Nahapiet & Ghoshal (1998): generalized trust (GT), pro sharing norm (PSN), and identification (Ident). All constructs items are described in the Appendix A.

4.2. DATA

At first, using an online survey website, pilot questionnaires were applied in a sample of 54 employees spread between coordination's and departments of the Executive Secretariat – SECEX, between February 5–9 of 2018, to test the instrument. Some items were dropped to reduce the instrument length and others were slightly modified to simplify the interpretation. The results provided preliminary evidence of the reliability of the scales and were all included in the main survey result. Data was collected over a period of more than three weeks (March 7-30, 2018) after e-mailing to 548 public officials of the environmental specialist career. Until 25 of march, we received 236 valid responses, which correspond to a 43% response rate. A follow-up email was sent to improve the response rate in the last week, obtaining 59 valid responses from late responders, to form a total of 295 (53.8%) usable responses. Nonresponse bias was tested comparing the sample distribution of the early and late respondent groups (236 and 59 respectively), using Kolmogorov-Smirnov (K-S) test, which indicated the absence of non-response bias (Ryans, 1974). In addition, to compare the means of respondents and non-respondents and their demographic characteristics, t-tests were applied, and no significant difference was found between the two groups (Armstrong & Overton, 1977). Exists two paths to examine the common method bias. Firstly, the Harman's one-factor test (Podsakoff et al., 2003). In this research, most of the variance is not explained by any factor individually. The marker variable approach (Lindell & Whitney, 2001) as secondly method, allows to add to the research model a theoretically irrelevant marker variable. The maximum shared variance value obtained in our model, for this irrelevant variable was 2.0%, after the comparation with the value shared with other variables. This value is considered low, by us (Johnson el al., 2011) since no significant common method bias was found.

Of the 295 responses, the age of responders ranged from 27 to 61 years, and the small majority of 149 were women (50.5%). Another fact is that of the total valid answers, the following participation percentages per sector were obtained: SAIC with 6.8%, SRHQ with 9.2%, SMCF with 10.2%, SEDR with 10.5%, SBIO with 13.2%, SFB with 22.4%, and SECEX with 27.8%.

Distribution (n = 295)					
Demographic Attribute	*Count*	*Percentage*	*Demographic Attribute*	*Count*	*Percentage*
Gender			**Age**		
Male	146	49%	27-32	78	26%
Female	149	51%	33-40	125	42%
Work experience (years)			41-50	56	19%
2-6	114	39%	51-61	36	12%
7-12	122	41%	**Education**		
13-20	35	12%	Undergraduate degree	5	2%
21-30	18	6%	Bachelor	70	24%
>30	6	2%	Post-graduation degree	158	54%
KMS usage duration			Master degree	51	17%
No system use	13	4%	Doctoral degree	11	4%
1 - 5 hours/week	152	52%	**Rank**		
6 - 10 hours/week	52	18%	Technical or Agent	59	20%
11 - 20 hours/week	55	19%	Analyst or Specialist	215	73%
21 - 30 hours/week	18	6%	Manager	8	3%
> 30 hours/week	5	2%	Coordinator or Director	12	4%
			Secretariat or Minister	1	0%

Table 4.1. Respondent characteristics

5. RESULTS

The quantitative analysis of the data was estimated with partial least squares (PLS), a technique opportune for complex and not tested models (Hair et al., 2011), which has been selected as an IS/IT tool in the field (Chin et al., 2003). The software SmartPLS3 (Ringle et al., 2015) was used to estimate the relationship defined by the conceptual model. Another reason for PLS use were the sample, which met the conditions for the use of PLS to modelling formative constructs, and the condition that not all items in our data are distributed normally ($p<0.01$ based on K-S test)(Chin, 1998).

5.1. MEASUREMENT MODEL

To assess the reliability of measures, as seen in Table 2, as traditional criterion for assessing internal consistency reliability, the Cronbach's Alpha (CA) coefficients were higher than the recommended level of 0.7 (Chin et al., 2003). To Dijkstra & Henseler (2015), the most important PLS reliability measure is composite reliability (CR), presenting results above 0.922, which is currently the only consistent reliability measure of PLS construct scores, once the recommendation of a minimum reliability value of 0.7 (Henseler, 2017). The psychometric properties of the measurement model were assessed in terms of its convergent validity, using average variance extracted (AVE), with values greater than 0.5 (Fornell & Larcker, 1981), and factor loadings of the indicators, statistically significant with values higher than 0.7 (Henseler et al., 2009). Ensuring good convergence, Table 2 shows that the AVE for each construct is above the 0.5, and Table 3 presents all loadings greater than 0.7.

Constructs	*Mean*	*SD*	*CR*	*CA*	DUR	FREQ	INT	US	JP	OP	GT	PSN	IDENT	II	IM	IS	IC
Dur	8.415	9.083	1.000	1.000	**1.000**												
Freq	4.125	1.595	1.000	1.000	0.550	**1.000**											
Int	3.803	1.501	1.000	1.000	0.634	0.801	**1.000**										
US	4.199	1.409	0.965	0.952	0.518	0.643	0.683	**0.935**									
JP	3.632	1.499	0.955	0.930	0.559	0.636	0.711	0.832	**0.937**								
OP	3.986	1.525	0.968	0.959	0.496	0.581	0.658	0.828	0.851	**0.927**							
GT	4.569	1.278	0.922	0.887	0.289	0.236	0.311	0.416	0.459	0.451	**0.865**						
PSN	4.725	1.292	0.943	0.919	0.326	0.327	0.408	0.483	0.524	0.490	0.707	**0.898**					
Ident	4.813	1.215	0.930	0.910	0.316	0.317	0.388	0.407	0.470	0.455	0.624	0.702	**0.831**				
II	4.930	1.242	0.958	0.950	0.173	0.293	0.297	0.324	0.343	0.277	0.469	0.463	0.537	**0.861**			
IM	4.746	1.401	0.960	0.944	0.123	0.255	0.243	0.318	0.327	0.266	0.361	0.400	0.501	0.827	**0.925**		
IS	4.959	1.378	0.961	0.946	0.122	0.231	0.226	0.287	0.318	0.225	0.376	0.373	0.463	0.839	0.784	**0.928**	
IC	4.992	1.412	0.933	0.904	0.141	0.256	0.239	0.304	0.315	0.248	0.341	0.388	0.404	0.795	0.725	0.824	**0.882**

Notes: The square root of AVE values is printed in bold; Duration (Dur); Frequency (Freq); Intensity (int); User satisfaction (US); Job performance (JP); Organizational performance (OP); Social capital - Generalized trust (GT); Social capital - Pro sharing norm (PSN); Social Capital – Identification (Ident); Transformational leadership - Idealized influence (II); Transformational leadership - Inspirational motivation (IM); Transformational leadership - Intellectual stimulaton (IS); Transformational leadership - Individual consideration (IC).

Table 5.1. Correlation matrix and CR, CA, and AVE of first order constructs

Constructs		Dur	Freq	Int	US	JP	OP	GT	PSN	Ident	II	IM	IS	IC
Duration (Dur)	Dur	**1.000**	0.550	0.634	0.518	0.559	0.496	0.289	0.326	0.316	0.173	0.123	0.122	0.141
Frequency (Freq)	Freq	0.550	**1.000**	0.801	0.643	0.636	0.581	0.236	0.327	0.317	0.293	0.255	0.231	0.256
Intensity	Int	0.634	0.801	**1.000**	0.683	0.711	0.658	0.311	0.408	0.388	0.297	0.243	0.226	0.239
User satisfaction (US)	US1	0.520	0.610	0.653	**0.916**	0.775	0.780	0.392	0.449	0.375	0.314	0.309	0.268	0.261
	US2	0.453	0.563	0.609	**0.938**	0.778	0.772	0.398	0.446	0.385	0.306	0.307	0.290	0.299
	US3	0.486	0.613	0.647	**0.945**	0.786	0.782	0.391	0.454	0.390	0.301	0.285	0.264	0.280
	US4	0.475	0.616	0.642	**0.940**	0.768	0.760	0.377	0.456	0.371	0.289	0.286	0.250	0.298
Job performance (JP)	JP1	0.480	0.596	0.624	0.762	**0.926**	0.787	0.431	0.501	0.447	0.352	0.339	0.338	0.318
	JP2	0.541	0.580	0.675	0.773	**0.949**	0.788	0.443	0.492	0.450	0.308	0.292	0.273	0.278
	JP3	0.549	0.612	0.696	0.801	**0.935**	0.816	0.417	0.481	0.423	0.306	0.289	0.284	0.289
Organizational performance (OP)	OP1	0.458	0.585	0.630	0.797	0.824	**0.936**	0.420	0.476	0.425	0.245	0.248	0.226	0.227
	OP2	0.482	0.536	0.631	0.784	0.815	**0.945**	0.438	0.474	0.431	0.267	0.262	0.218	0.233
	OP3	0.446	0.556	0.599	0.749	0.753	**0.915**	0.419	0.469	0.432	0.246	0.229	0.195	0.219
	OP4	0.423	0.499	0.583	0.718	0.732	**0.900**	0.366	0.397	0.386	0.259	0.233	0.204	0.242
	OP5	0.487	0.516	0.605	0.783	0.814	**0.937**	0.441	0.448	0.432	0.269	0.257	0.201	0.232
Social capital - Generalized trust (GT)	GT1	0.260	0.185	0.255	0.357	0.433	0.395	**0.896**	0.611	0.583	0.489	0.395	0.419	0.369
	GT2	0.247	0.217	0.302	0.413	0.436	0.428	**0.911**	0.650	0.546	0.422	0.316	0.325	0.319
	GT3	0.274	0.243	0.297	0.381	0.408	0.403	**0.878**	0.654	0.536	0.397	0.313	0.308	0.301
	GT4	0.217	0.169	0.216	0.281	0.302	0.328	**0.770**	0.526	0.491	0.304	0.212	0.241	0.176
Social capital - Pro sharing norm (PSN)	PSN1	0.319	0.301	0.361	0.479	0.496	0.463	0.681	**0.933**	0.658	0.438	0.365	0.351	0.365
	PSN2	0.319	0.295	0.380	0.446	0.485	0.453	0.681	**0.941**	0.661	0.451	0.381	0.363	0.375
	PSN3	0.311	0.323	0.401	0.451	0.505	0.464	0.580	**0.909**	0.613	0.386	0.355	0.324	0.326
	PSN4	0.214	0.253	0.324	0.352	0.393	0.376	0.593	**0.804**	0.585	0.385	0.336	0.299	0.326
Social Capital – Identification (Ident)	Ident1	0.226	0.243	0.279	0.268	0.352	0.313	0.466	0.563	**0.858**	0.427	0.415	0.379	0.339
	Ident2	0.244	0.257	0.328	0.312	0.372	0.350	0.484	0.579	**0.876**	0.491	0.480	0.429	0.341
	Ident3	0.205	0.210	0.277	0.248	0.281	0.267	0.434	0.460	**0.778**	0.417	0.328	0.333	0.278
	Ident4	0.295	0.295	0.363	0.407	0.441	0.458	0.603	0.626	**0.848**	0.398	0.374	0.365	0.317
	Ident5	0.299	0.246	0.296	0.391	0.434	0.418	0.601	0.653	**0.838**	0.441	0.426	0.386	0.337
	Ident6	0.296	0.323	0.386	0.384	0.442	0.442	0.500	0.595	**0.782**	0.505	0.466	0.414	0.398
Transformational leadership - Idealized influence (II)	II1	0.176	0.230	0.247	0.286	0.328	0.267	0.456	0.469	0.532	**0.823**	0.682	0.620	0.620
	II2	0.150	0.215	0.219	0.270	0.287	0.250	0.441	0.414	0.508	**0.877**	0.746	0.781	0.740
	II3	0.133	0.269	0.264	0.298	0.255	0.217	0.353	0.343	0.427	**0.884**	0.698	0.761	0.695
	II4	0.110	0.273	0.268	0.268	0.278	0.237	0.400	0.401	0.464	**0.882**	0.719	0.745	0.673
	II5	0.224	0.309	0.319	0.380	0.404	0.337	0.441	0.441	0.510	**0.834**	0.648	0.627	0.604
	II6	0.195	0.252	0.287	0.263	0.328	0.255	0.430	0.419	0.458	**0.880**	0.740	0.714	0.686
	II7	0.080	0.243	0.211	0.223	0.227	0.149	0.355	0.308	0.381	**0.846**	0.671	0.748	0.714
	II8	0.131	0.233	0.238	0.254	0.273	0.211	0.366	0.407	0.430	**0.862**	0.789	0.772	0.731
Transformational leadership - Inspirational motivation (IM)	IM1	0.139	0.290	0.254	0.309	0.299	0.247	0.319	0.394	0.486	0.747	**0.897**	0.679	0.630
	IM2	0.114	0.220	0.226	0.280	0.292	0.226	0.346	0.358	0.460	0.795	**0.944**	0.768	0.713
	IM3	0.105	0.208	0.208	0.313	0.328	0.286	0.364	0.377	0.496	0.777	**0.934**	0.728	0.668
	IM4	0.097	0.228	0.213	0.276	0.292	0.224	0.305	0.354	0.413	0.742	**0.926**	0.726	0.669
Transformational leadership - Intellectual stimulaton (IS)	IS1	0.134	0.220	0.230	0.304	0.331	0.247	0.395	0.390	0.491	0.799	0.756	**0.918**	0.749
	IS2	0.097	0.194	0.180	0.226	0.260	0.164	0.328	0.314	0.415	0.773	0.733	**0.949**	0.771
	IS3	0.137	0.214	0.230	0.274	0.299	0.214	0.326	0.341	0.410	0.761	0.690	**0.919**	0.742
	IS4	0.087	0.228	0.201	0.260	0.292	0.211	0.347	0.338	0.402	0.782	0.731	**0.927**	0.797
Transformational leadership - Individual consideration (IC)	IC1	0.215	0.292	0.290	0.363	0.395	0.330	0.420	0.448	0.482	0.697	0.669	0.707	**0.826**
	IC2	0.042	0.168	0.140	0.190	0.174	0.105	0.209	0.254	0.263	0.665	0.572	0.709	**0.885**
	IC3	0.087	0.215	0.178	0.213	0.214	0.160	0.235	0.302	0.311	0.705	0.638	0.758	**0.915**
	IC4	0.150	0.228	0.233	0.304	0.324	0.276	0.336	0.363	0.366	0.733	0.672	0.731	**0.899**

Notes: Duration (Dur); Frequency (Freq); Intensity (int); User satisfaction (US); Job performance (JP); Organizational performance (OP); Social capital - Generalized trust (GT); Social capital - Pro sharing norm (PSN); Social Capital – Identification (Ident); Transformational leadership - Idealized influence (II); Transformational leadership - Inspirational motivation (IM); Transformational leadership - Intellectual stimulation (IS); Transformational leadership - Individual consideration (IC).

Table 5.2. PLS Loadings and cross-loadings

To check the discriminant validity of the measurement model, three criteria were employed. Firstly, the square roots of AVEs (diagonal elements) should be larger than the correlation between the constructs (elements outside the diagonal) (Fornell & Larcker, 1981). Secondly, loads of each indicator must be greater than all cross loads (Chin, 1998). As third method, was assessed the Heterotrait-monotrait ratio of correlation (HTMT) (Henseler et al., 2014). Table 2 presented the square root of AVE larger than the correlation between the constructs. As seen in Table 3, the patterns of loadings are greater than cross-loadings, indicating that both measures of discriminant

validity are satisfied. An HTMT value clearly below 0.90, provides sufficient evidence of the discriminant validity of a construct pair (Henseler et al., 2014). Satisfactory results presented, as the convergent and discriminant validity, as well as the reliability of the indicators and constructs, our model is consistent, reliable and valid, indicating that our constructs are statistically different and can be used to test the structural model.

	DUR	FREQ	INT	US	JP	OP	GT	PSN	IDENT	II	IM	IS	IC
Dur													
Freq	0.550												
Int	0.634	0.801											
US	0.530	0.659	0.700										
JP	0.579	0.660	0.737	**0.884**									
OP	0.506	0.593	0.672	**0.866**	**0.899**								
GT	0.307	0.250	0.329	0.451	0.503	0.487							
PSN	0.338	0.341	0.426	0.515	0.567	0.520	0.781						
Ident	0.329	0.331	0.406	0.434	0.507	0.483	0.690	0.763					
II	0.179	0.301	0.306	0.342	0.368	0.292	0.510	0.497	0.580				
IM	0.127	0.263	0.251	0.336	0.350	0.279	0.391	0.431	0.540	**0.872**			
IS	0.126	0.237	0.233	0.302	0.340	0.236	0.408	0.400	0.499	**0.883**	0.829		
IC	0.147	0.269	0.251	0.328	0.343	0.266	0.376	0.425	0.444	**0.855**	0.783	**0.891**	

Notes: Duration (Dur); Frequency (Freq); Intensity (int); User satisfaction (US); Job performance (JP); Organizational performance (OP); Social capital - Generalized trust (GT); Social capital - Pro sharing norm (PSN); Social Capital – Identification (Ident); Transformational leadership - Idealized influence (II); Transformational leadership - Inspirational motivation (IM); Transformational leadership - Intellectual stimulation (IS); Transformational leadership - Individual consideration (IC).

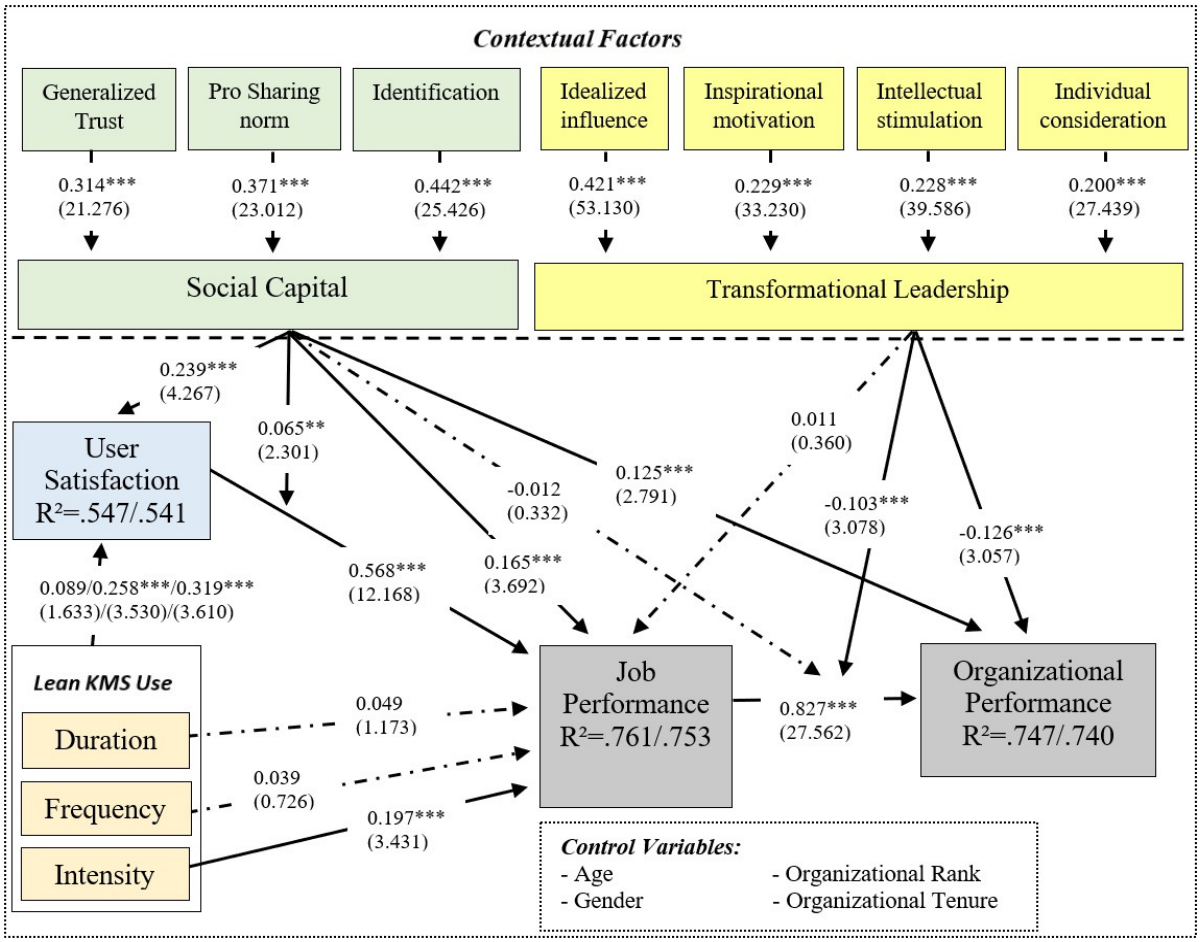
Table 5.3. Heterotrait-Monotrait Ratio (HTMT) criterion

To evaluate the formative constructs, we firstly evaluate the multicollinearity, used to social capital and transformational leadership, based on variance inflation factor (VIF). The VIF is lower than 5, reveals that we do not have multicollinearity (Hair et al., 2017). Secondly, we test the weights significance, and all are statically significance. We can conclude that for formative construct multicollinearity is not a problem and are relevant. We can estimate the structural model.

5.2. STRUCTURAL MODEL

In the structural model, first we evaluate collinearity issue through the values of VIF which should be lower than five (Hair et al., 2017). In our model this criterion is met. Figure 2 presents the model results with hypotheses testing, the path coefficients (β), the coefficients of determinant (R^2), and t-values. Indicating the strengths of the relationships between independent and dependent variables, the model path coefficient was measured with bootstrapping t-statistics, derived from standard error with 5,000 iterations of resampling (Hair et al., 2017). Based on the R^2 value of dependent variables, the model explains 54.7% of the variation in user satisfaction with KMS, 76.1% of the variation in job performance with KMS, and 74,7% of the variation in organizational performance using KMS. The summarized results inform that intensity ($\hat{\beta}$ = 0.197, p<0.01) of lean use, is statistically significant in explaining job performance, but duration and frequency are not statistically significant, confirming hypothesis H1a and rejecting H1b and H1c. To explain user satisfaction, both frequency ($\hat{\beta}$ = 0.258, p<0.01) and intensity ($\hat{\beta}$ = 0.319, p<0.01) of lean use are statistically significant, to confirm hypotheses H2b and H2c, and reject H2a, given that duration is not statistically significant. The user satisfaction ($\hat{\beta}$ = 0.568, p<0.01) is statistically significant in explaining job performance, thus confirming hypothesis H3. The job performance ($\hat{\beta}$ = 0.827, p<0.01) is

statistically significant in explaining organizational performance, supporting hypothesis H4, as reported by Table 5.



Notes: Path significance (Path- β): ***p<0.01; **p<0.05; *p<0.1; Dashed arrows represent not supported hypothesis; Continuous arrows represent supported hypothesis.

Figure 5.1. Research model results. Standardized path coefficients are reported, with t-values in parentheses

About the contextual factors, social capital is statistically significant in explaining user satisfaction ($\hat{\beta}$ = 0.239, p<0.01), job performance ($\hat{\beta}$ = 0.165, p<0.01), and organizational performance ($\hat{\beta}$ = 0.125, p<0.01). As a moderating variable, social capital will intensify only the relationship between user satisfaction and job performance ($\hat{\beta}$ = 0.065, p<0.05), having no influence among job and organizational performances. Thus, hypotheses H5a, H5b, H5c, and H5e are confirmed. The transformational leadership ($\hat{\beta}$ = -0.126, p<0.01) represented an unexpected opposite result, explaining organizational performance, and moderating the relationship between job performance and organizational performance ($\hat{\beta}$ = -0.103, p<0.01), confirming hypotheses H6b, and rejecting hypothesis H6a and H6c.

6. DISCUSSIONS

In the current challenge faced by government agencies in all countries regarding digital governance and the use of technological tools to maximize results by achieving better service delivery, human resources, processes and performance, achieving greater efficiency and effectiveness of public governance (Gil-Garcia et al., 2018), emerges the KMS to provide a collaborative and interactive environment for the creation and exchange knowledge among employees, allowing better decision making. Gold et al. (2001) see the KMS, as a practical tool to create synergy of the information processing capabilities offered by ICT, with the innovative and creative capabilities derived from human and social elements available in the organization. This research sought to identify the impact of lean KMS use, user satisfaction, and contextual factors on individual and organizational performance. This is the first empirical research developed at government context, more specifically in a Brazilian public agency, connecting social capital and transformational leadership theories, to investigate the relationship between use, satisfaction and performance, considering the KMS use. The results indicate total support for almost all hypotheses, except for H1a, H1b, H2a, H5d, and H6a.

In the presented model, 76.1% of the variation in job performance using KMS, is explained by lean use (intensity), user satisfaction, and the social capital, converging with results reported in similar studies about job performance and: lean use impact (Zhang & Venkatesh, 2017), user satisfaction (Urbach et al., 2010) and social capital (Kumi & Sabherwal, 2018). However, duration and frequency of lean use and transformational leadership did not have a significant direct effect on job performance using KMS. One explanation to this fact can be based on the Venkatesh et al. (2008) assumptions that duration are connected to clock time spent using a system, and frequency is associated with employees vision of the importance of their tasks in the institution context. In terms of duration, perhaps public officials do not believe in the importance to measure the system use, counting the hours spent on a software. As for frequency and transformational leadership, one explanation is the predominant existence of a sectorized view of work, making more relevant for the individuals to consider their work more important at the local level team, than at global context, something common in governmental organizations influenced by the political aspect, as defended by Morgan (2006). In the organization as a political or governmental system, there is the development of factions and coalitions, where the political game is latent in the horizontal relations between specialized units and within multidisciplinary teams. People can identify with responsibilities and objectives of their function, work group, department or project team, valuing more the fulfilment of individual objectives, than the achievement of broad organizational objectives, which are not even recognized (Morgan, 2006).

In terms of the moderating effects of contextual factors, in an environment with strong social capital, user satisfaction has high importance to explain job performance, directly affecting its result, as represented by the Figure 3a. Conversely, when transformational leadership is low, the importance of job performance to explain organizational performance is higher, as shown in the Figure 3b. This finding may be related to the study developed by Pawar & Eastman (1997), who argues that organizational structure context influences organizational receptivity to transformational leadership. Highly centralized and formalized bureaucratic structures, such as those in the public

sector, are negatively associated with transformational leadership, given the greater reliance on hierarchical authority and weaker lateral/upward communication (Pawar & Eastman, 1997).

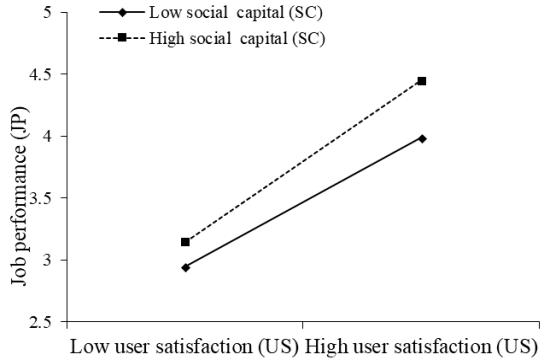


Figure 6.1. Moderating effect of social capital between satisfaction and job performance

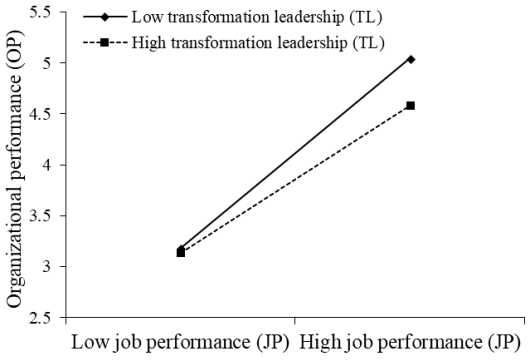


Figure 6.2. Moderating effect of transformation leadership between job performance and organizational performance

The organizational performance is explained by social capital, transformational leadership and job performance using KMS, unfolding 74.7% of the variation in the construct. Our model results are consistent with other researches, which connects job performance (Urbach et al., 2010) and social capital (Gold et al., 2001; Tsai & Ghoshal, 1998) with organizational performance. The result of the opposite impact of transformational leadership in organizational performance, is inconsistent with other study (Bass et al., 2003), which denotes the specificity of the sector and the environment under analysis. Two possible explanation to reverse impact of transformational leadership in organizational performance at government, even as a moderating effect, can be explained by political changes, and by the current well know Brazilian scenario of widespread corruption. Public sector faces more environmental change than the private sector, due to frequent changes in policy and the imposition of short term time horizons tied to election cycles (Boyne, 2002). The unstable political environment that permeates Brazilian agencies, where every four years entails organizational changes, through the entry of new leaders appointed by the political coalitions in power. This continuing change, driven more by politics than by results, creates an environment of aversion not only to new leaders, but also to the change itself. Any change in hierarchically controlled structures towards more flexible and emerging standards generates implications for the distribution of power and control within the organization. When change threatens the status quo, defensive routines come into action, diluting or diverting the attack to established practices (Morgan, 2006). As for widespread corruption, a study conducted in four Latin American countries showed that, in addition to the costs and delays that this issue generates in public institutions, with the increase in transaction costs, public employees who experience corruption are less likely to believe in legitimacy of its political and administrative system, exhibiting low levels of performance and interpersonal trust (Seligson, 2002).

Our model explains 54.7% of the variation in user satisfaction with KMS, explaining that lean use (frequency and intensity) and social capital are important constructs to support user satisfaction, referring other similar works (Karlinsky-Shichor & Zviran, 2016; Urbach et al., 2010). Understanding the power of contextual factors in our model, social capital explains user satisfaction, job and organizational performances, and moderate the relationship between user satisfaction and job

performance. In addition to moderating the relationship between job and organizational performance, transformational leadership also impacts organizational performance. The high impact of contextual factors is convergent with two theories: socio-technical theory and institutional theory. The first describes the organization from the social and technical perspectives, which, although independent, must be interactive and correlative, bringing improvements in the design and performance of the organizational system (Orlikowski & Barley, 2001). As social facilitators, we have employees and their knowledge, attitudes, values and needs, as well as organizational culture, leadership and organizational structure, while ICT is a technical factor (H. Lee & Choi, 2003). The institutional theory used in e-government researches (Hassan & Gil-Garcia, 2008), notes the importance of social factors and context, influencing use, design and implementation of ICT, acknowledging the iterative relationship between them (Orlikowski & Barley, 2001). Through the development of an integrative vision of the system, as an institutional intervention to enhance legitimacy of the ICT, the agency should take advantage of the influential contextual factors that per pass his environment (Wang & Lai, 2014).

6.1. MANAGERIAL IMPLICATIONS

From practical implications, our results contribute for decision makers at diverse government environment, demonstrating that the intensity of KMS use, in addition to generating greater user satisfaction with the system, leads to an increased job performance. Due to the correlation between intensity and complex work activities (Venkatesh et al., 2008), for better individual performance, public managers should focus on job enrichment, improving the nature of the activities developed by employees using KMS, to increase user satisfaction, extend the job performance and consequently the organizational performance. Another implication is represented by the impact of social capital on both individual and organizational performances, regarding the use of KMS, affecting also the user satisfaction. It demonstrates to public managers the need to invest and maintain the best environment, strengthening the networks of interpersonal relationships among members of the agency, to provide conditions for the knowledge use and share. Public organizations should connect the departments of people management and communication, developing internal actions and programs for the integration of employees, creating an interactive and collaborative work atmosphere. On the other hand, public managers should also be aware of the negative effects of the high promotion and dissemination of social capital, since according to Perla et al. (2018), high levels of social ties in the workplace can have harmful effects, being associated with the dissemination of corrupt and negligent behavior, reducing the productivity of work teams. The social capital should occur through the encouragement and maintenance of an environment with three basic characteristics: strong generalized confidence, where people can cooperate and trust each other; with pro-sharing norms of teamwork, collaboration, tolerance to failure, diversity of ideas, allowing the solution of conflicts and creativity flows; and identification, leading to common interests between individuals and organizations, creating an identity based on the similarity of values, adherence and loyalty to the organization (Kankanhalli et al., 2005). The confluence of these social capital factors allows the reduction in the effort to combine, exchange and use knowledge (Nahapiet & Ghoshal, 1998), enabling the increase in individual and organizational performances regarding the use of KMS.

As for satisfaction, the frequency and intensity of lean use, is responsible for the increased user satisfaction with KMS, acting together with the active social capital. We recommend public organizations to invest in users training and communication, to show the overall benefits that the intensive use of KMS brings not only to the agency, but also to the high job and organizational performances. The organization should consider promoting incentives to managers and employees, not necessarily financial (e.g., work benefits, recognition, flexible working hours), stimulating the use of new features of KMS, causing high user satisfaction, increased job performance and better performance of the government agency.

6.2. THEORETICAL CONTRIBUTIONS

Considering the complexity of governmental environment, we can state that: job performance using KMS influences the organizational performance, being directly impacted by the intensity of the lean use of KMS, by the satisfaction of the user with the system, and by social capital as contextual factor. User satisfaction with the system is impacted by frequency and intensity of KMS use and social capital, which is also responsible for influencing organizational performance. By impacting organizational performance in an inverse way, an increase in transformational leadership leads to a reduction in organizational performance. Social capital extends the relationship among user satisfaction and job performance, and the transformational leadership affects the relationship in an inverse way, between both performances using KMS.

To contributes to the management literature, this is the first study to demonstrate the impact of social capital and transformational leadership on organizational and individual performances using KMS in government, supporting Putnam's argument that social capital has favorable effects on the way that governments perform (Putnam, 2016). To revel the novelty of the proposed study, and the innovation applying KMS in a governmental context, recent paper conference conducted a literature review in KMS (Iskandar et al., 2017), through the past two decades, and list as the three most discussed topics: the exploration of KMS features (capabilities), big data in KMS, and adoption studies of new technologies for KMS. Our research fills the research gap proposing a new model to understand the influence of contextual factors, in the relationship between lean use of a KMS, user satisfaction, and performance in the digital government context. This study may contribute to future works, since our results not only rectify two majors IS theories (socio-technical and institutional), but correlate constructs of two IS models (D&M and UTAUT with lean use), adding aspects of the theories of leadership and social capital, as contextual factors influencing the use of KMS by government.

6.3. LIMITATIONS AND FUTURE RESEARCH

This work has several limitations. At first, was conducted only in Brazilian government, focusing in the ministry of environment. Generalization of the results are only possible, after the application of the presented model with large sample size and place. Future research should apply the presented model in other agencies, not only in Brazil, but also in other countries with different organizational environments, government rules, distinct bureaucracy evolution, and divergent political arrangements. Second, cross-sectional data were used, not allowing observation of the evolution of the agency's performance, KMS use, satisfaction or individual performance. To address this limitation, we recommend conducting a longitudinal study to observe the evolution of these constructs, considering contextual variations such as leadership and social capital. Third, to focus on

post adoption stage (use and performance of KMS), was not used important constructs that evaluate aspects prior to use, such as those proposed by D&M (e.g., system, information and service quality) or UTAUT model (e.g., facilitation conditions, effort expectancy). Future work should consider other construct factors impacting the use, user satisfaction, and performance using KMS. Forth, was used the concept of lean use applied to KMS, as well the concepts of social capital and transformational leadership, considering the proposition of the literature review of these topics, and the context of Brazilian government. For future studies, a different approach can test other system use concepts (e.g., rich use of KMS), leadership style (e.g., transactional), or distinct composition of social capital (e.g., obligations, network ties, enjoyment, participation), to explore other compositions. Fifth, contextual factors such as transformational leadership were considered only as second order reflective-formative type with their reflective constructs, and the individual effects of these reflexive constructs on KMS use, satisfaction or performance were not analyzed. Given the results obtained by Lee et al. (2011), which of the dimensions of transformational leadership, only found positive results for intellectual stimulation on performance, for further research it is recommended detailed studies considering separately the direct impacts of each dimensions of transformational leadership in the other variables of the research.

7. CONCLUSIONS

Our main purpose was to understand the drivers of KMS use on individual and organizational performances in the Brazilian government, considering user satisfaction, and the influence of contextual factors such as social capital and leadership. Using the post-adoption stage of KMS use, a literature review was conducted to clarify the concepts of KMS and the factors responsible for the success of this tool in organizations, explaining the current challenges of digital government. Considering lean system use, items from D&M model, social capital and transformational leadership (as contextual factors), the model demonstrate that job performance using KMS, positively affects organizational performance, being impacted by intensity of KMS use, user satisfaction and social capital. User satisfaction has a statistically significant effect on job performance, being affected by frequency and intensity of KMS use, and by social capital, which plays a key role on both performances. Transformational leadership presented reverse results in organizational performance, moderating the connections between both. We empirically evaluated the conceptual model using data collected from ministry of environment in Brazil, to contribute to the KMS literature, clarifying the relationship between government work context, and the satisfaction, performance and use of KMS. Our findings teach public managers the high value of human and social capital, their networks of relationships and environment, to achieve better individual and government performance using KMS.

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9. APPENDIX A: CONSTRUCTS AND MEASURES

Construct	Items	Items adapted from
Duration	1. On average, how many hours do you use the system each week? (DUR) **open field*	Venkatesh et al., 2008
Frequency	1. How often do you use the system? (FREQ) **7-point scale ranging from "Don't use at all" to "Use several times each day."*	Venkatesh et al., 2008
Intensity	1. How do you consider the extent of your current system use? (INT) **7-point scale ranging from "Non use" to "Heavy use."*	Venkatesh et al., 2008
User satisfaction	1. How adequately does the KMS support your area of work and responsibility? (US1) 2. How efficient is the KMS? (US2) 3. How effective is the KMS? (US3) 4. Are you satisfied with the KMS on the whole? (US4)	N. Urbach et al, 2010
Social capital	*Generalized Trust* 1. I believe that people in my organization give credit for other's knowledge where it is due (GT1) 2. I believe that people in my organization use other's knowledge appropriately (GT2) 3. I believe that people in my organization share the best knowledge that they have (GT3) 4. I believe that people in my organization do not use unauthorized knowledge (GT4)	Kankanhalli et al., 2005
	Pro-Sharing Norm 1. There is a norm of cooperation in my organization (PSN1) 2. There is a norm of collaboration in my organization (PSN2) 3. There is a norm of teamwork in my organization (PSN3) 4. There is a willingness to value and respond to diversity in my organization (PSN4)	Kankanhalli et al., 2005
	Identification 1. I am glad I chose to work for this organization rather than another company (IDEN1) 2. I talk of this organization to my friends as a great company to work for (IDEN2) 3. I am willing to put in a great deal of effort beyond that normally expected to help my organization to be successful (IDEN3) 4. I find that my values and my organization's values are very similar (IDEN4) 5. In general the people employed by my organization are working toward the same goal (IDEN5) 6. I feel that my organization cares about me (IDEN6)	Kankanhalli et al., 2005
Transformational leadership	**Please rate the following questions in terms of how much you agree or disagree with these questions that describe your leader of your business unit.* *Idealized influence* 1. Instill pride in others for being associated with me. (II1) 2. Go beyond self-interest for the good of the group. (II2) 3. Act in ways that build others' respect for me. (II3) 4. Display a sense of power and confidence. (II4) 5. Talk about my most important values and beliefs. (II5) 6. Specify the importance of having a strong sense of purpose. (II6) 7. Consider the moral and ethical consequences of decisions. (II7) 8. Emphasize the importance of having a collective sense of mission. (II8)	Zhang, 2017
	Inspirational motivation 1. Talk optimistically about the future. (IM1) 2. Talk enthusiastically about what needs to be accomplished. (IM2)	Zhang, 2017

	3. Articulate a compelling vision of the future. (IM3) 4. Express confidence that goals will be achieved. (IM4)	
	Intellectual stimulation 1. Re-examine critical assumptions to question whether they are appropriate. (IS1) 2. Seek differing perspectives when solving problems. (IS2) 3. Get others to look at problems from many different angles. (IS3) 4. Suggest new ways of looking at how to complete assignments just as a member of the group. (IS4)	Zhang, 2017
	Individual consideration 1. Spend time teaching and coaching. (IC1) 2. Treat others as individuals rather than just as a member of the group. (IC2) 3. Consider each individual as having different needs, abilities and aspirations from others. (IC3) 4. Help others to develop their strengths. (IC4)	Zhang, 2017
Job performance	1. Using the KMS helps me find solutions to work problems. (JP1) 2. Using the KMS reduces the time I spend on the completion of job tasks. (JP2) 3. Using the KMS improves the quality of my work. (JP3)	Zhang, 2017
Organizational performance	1. The KMS helps my organization to improve the efficiency of internal operations. (OP1) 2. The KMS helps my organization to improve the quality of working result. (OP2) 3. The KMS helps my organization to enhance and improve collaboration and coordination. (OP3) 4. The KMS helps to distinguish my organization from similar organizations. (OP4) 5. The KMS helps my organization to make itself an overall success. (OP5)	N. Urbach et al, 2010