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ROBÉRIO BANDEIRA DE MELO MOREIRA

BRIDGING THE DISTANCE: WHAT DRIVES PUBLIC SERVANT ENGAGEMENT IN REMOTE AND HYBRID SETTINGS.

FORTALEZA

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> Dissertação apresentada ao Programa de Mestrado Profissional em Administração e Controladoria da Universidade Federal do Ceará, como requisito parcial à obtenção do título de Mestre em Administração.
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> Orientador: Prof. Dr. Diego de Queiroz Machado.

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A Deus.

À minha esposa Alessandra, por tanto amor e suporte durante o período em que escrevi esse trabalho. Aos meus filhos, por serem constante fonte de inspiração em meu desenvolvimento, e a toda a minha família, pelo suporte sempre presente.

"When people are financially invested, they want a return. When people are emotionally invested, they want to contribute." (SINEK, Simon. 2012. Twitter: @simonsinek)

Abstract

The COVID-19 pandemic accelerated the global shift to remote and hybrid work, profoundly altering organizational structures and employee experiences, particularly in the public sector. This transformation has given rise to new questions on what engages public servants in virtual environments. Using the Gallup Q12 framework, this research investigates the key factors that influence this engagement, exploring key individual and organizational dimensions such as basic needs, individual contribution, teamwork, and growth. Thus, public servants are segmented into engagement profiles, to investigate how the interplay of tenure, gender, age, household size, and pet ownership shape their engagement experiences. Finally, by applying factor and cluster analysis, patterns that underscore the complexity of sustaining engagement in virtual environments are revealed. These findings are expected to enrich the theoretical understanding of employee engagement and offer practical knowledge for organizational leaders who seek to foster connection, motivation, and well-being of public servants in remote settings.

Keywords: employee engagement, remote work, hybrid work, public sector, Gallup Q12.

Resumo

A pandemia de COVID-19 acelerou a transição global para regimes de trabalho híbrido e remoto, reconfigurando estruturas organizacionais e experiências no trabalho, particularmente no setor público. Essa transformação levantou novas questões acerca dos determinantes do engajamento de servidores públicos em ambientes virtuais. Utilizando o framework Gallup Q12, este estudo investiga os fatores centrais associados ao engajamento, explorando dimensões individuais e organizacionais, tais como necessidades básicas, contribuição individual, trabalho em equipe e desenvolvimento. Dessa forma, procede-se à segmentação dos participantes em perfis de engajamento, com o objetivo de examinar como a combinação de tempo de serviço, gênero, idade, tamanho do domicílio e posse de animais de estimação relacionam-se às experiências de engajamento. Por fim, por meio da aplicação de análises fatorial e de clusters, revelam-se padrões que evidenciam a complexidade de sustentar o engajamento em contextos virtuais. Espera-se que os resultados ampliem a compreensão teórica sobre engajamento organizacional e ofereçam subsídios práticos a gestores públicos interessados em promover conexão, motivação e bem-estar de servidores em regimes de trabalho híbrido e remoto.

Palavras-chave: engajamento organizacional, trabalho remoto, trabalho híbrido, setor público, Gallup Q12.

SUMMARY

1 INTRODUCTION

1.1 Contextualization

Keen to maintain productivity in the post-pandemic era, organizations lacked sufficient planning to manage employees in remote settings, leading to profound transformations in organizational dynamics. Consequently, employees were abruptly required, without preparation, to transition to remote or hybrid work arrangements for the first time (Galanti et al., 2023). Amidst these changes, the significant growth of remote work has revealed numerous challenges within organizational contexts, particularly regarding motivation, engagement, and the management of remote teams. Remote work is now at unprecedented levels, reshaping work relationships, and employee dynamics (Boell; Cecez-Kecmanovic; Campbell, 2016). These shifts in work models are pushing organizations to make remote and hybrid work settings (RHS) a permanent feature (Dua et al., 2022).

According to the Google Academic database (accessed on October 30th, 2024), by the year 2019, the keyword "engagement" appeared in only 2,180 scientific articles. In the five years that followed, engagement appeared in additional 1,500 publications, indicating a significant growing interest in the topic. One possible explanation is that work engagement is positively associated with how well employees adapt to organizational changes after COVID-19. (Wontorczyk; Rożnowski, 2022). This ability to adapt might be explained by the employees' proactive behavior, adapting parts of his job requirements or taking a more active role in shaping tasks to get better results. These actions, called approach-oriented job crafting, are linked to better work outcomes, such as a higher employee engagement (Lichtenthaler; Fischbach, 2018; Zhang; Parker, 2019).

Further, this proactive adaptation and job-crafting behavior are especially important for public servants, who often face fewer resources and greater pressure, along with higher scrutiny (Indahsari; Raharja, 2020; Ugaddan; Park, 2017), specially after the introduction of new public management (NPM) reforms. The NPM was developed in response to bureaucratic inefficiencies in the 1980s and is a management approach focused on enhancing the efficiency and effectiveness of public services. It adopts private sector management practices that focus on cost efficiency and accountability, but that, in turn, imposes increasing performance pressures on public servants (Indahsari; Raharja, 2020; Ugaddan; Park, 2017). These conditions create massive pressures on public servants that have to face financial limitations and the demands of sustaining public trust (Indahsari; Raharja, 2020; Ugaddan; Park, 2017).

The NPM also incorporates performance measurements, evaluates efficiency and service quality, and promotes accountability in the use of resources (Indahsari; Raharja, 2020). NPM revolves primarily on stimulating innovation by automating processes, reducing costs, and increasing flexibility through Public-Private Partnerships (PPPs), due to the amount of outsourcing involved. However, decentralization can lead to less social participation, especially in the formulation and implementation of social policies (Indahsari; Raharja, 2020).

NPM's emphasis on performance suggests that organizational success also relies on employee satisfaction (Indahsari; Raharja, 2020). In this context, employee engagement in the public sector serves as a catalyst for enhanced job satisfaction and organizational commitment (Indahsari; Raharja, 2020).

Engaged public employees tend to do more than required due to a strong sense of duty and alignment with public values (Borst et al., 2019), which differ from the motivations of the private sector, where profit comes first. Hence, understanding and stimulating engagement in public organizations might significantly enhance service delivery and ultimately build stronger and more resilient public institutions (Borst et al., 2019).

Recently, scientific studies have identified specific precursors of engagement in RHS, suggesting the importance of leadership practices to sustain engagement (Hajjami; Crocco, 2023). For instance, employees in RHS often experience the feeling of solitude and disengagement, particularly those who thrived in on-site settings. When regular, face-to-face interactions decrease, social bonds and support may erode, and camaraderie may fade (Galanti et al., 2023). Overtime, this disconnection can negatively impact mental well-being, leading to emotional exhaustion, reduced job satisfaction, and a greater risk of burnout syndrome (Galanti et al., 2023). As Han states: "burnout syndrome occurs when the ego overheats, which follows from too much of the same" (Han, 2015, p. 7), a framing that helps explain how the constant connectivity, and repetitive demands in RHS can overstimulate and depress engagement.

Moreover, RHS rarely holds the same equipment quality of the employer's workplace. Remote settings are often pseudo-home-adjusted work environments and are not ergonomically optimized (Wontorczyk; Rożnowski, 2022). Conversely, RHS employees who perceive their home work environment as highly functional, exhibit greater engagement when compared to their counterparts (Mäkikangas et al., 2022).

1.2 Problematization and research question

Even though this shift towards RHS has increased research into remote work

productivity, employee engagement remains an under-researched area. As Charalampous et al. (2018) argue: "engagement, so critical to the employees' well being and performance, has been largely neglected in the context of remote work". Most of what we know about engagement comes from studies set in traditional, in-person work environments. Lesener, Gusy, and Wolter (2018) offer a thorough review of the research, stressing just how infrequently remote employees have the main focus.

Also, despite the growing popularity of RHS and the perception that it is beneficial for employees, the evidence for such a relationship is still conflicting. De Menezes and Kelliher (2011) reviewed several studies and found that the evidence does not yet provide a clear picture of its impact for employee well-being. Yet, Ter Hoeven and Van Zoonen (2015) state that when individuals have greater control over work-location, they report better work-life balance, autonomy, and communication. Conversely, research finds that employees in RHS often overcompensate by working longer hours (Kelliher; Anderson, 2009), and that after-hours work contact is associated with feelings of guilt and distress, particularly among women (Glavin; Schieman; Reid, 2011). This response to remote work creates challenges and, as Kelliher and Anderson (2009) argue, can undermine the presumed advantages offered by remote work flexibility.

Among the studies that use the Q12 framework, Putri and Welly (2014) investigated engagement at the Indonesian start up PT Safta Ferti to assess engagement, highlighting career development, job fit, and social support as key factors in an organization that had never systematically measured engagement, motivation, or satisfaction.

Gallup also conducted a meta-analysis (Gallup, 2024) based on 736 studies across 347 organizations, 53 industries, 183.806 work units, and approximately 3.35 million employees. The research showed a strong correlation between employee engagement, as measured by the Q12 framework, and key organizational performance indicators, such as customer loyalty, profitability, productivity, and turnover. Gallup's extensive research and large-scale interviews have influenced the academic community as it established significant connections between employee engagement and these key performance indicators (Memon; Soomro; Kumar, 2018).

Importantly, Gallup's Q12 engagement framework serves as a reference point in discussions on employee engagement. In this context, Sarangi and Nayak (2016) provided relevant empirical evidence from a manufacturing company in India, showing that the implementation of specific leadership strategies can enhance the level of employee engagement. By employing the 6Cs framework, which emphasizes workplace safety, role clarity, and trust in management, the study adds nuance to existing engagement models.

In Brazil, Lopes (2016) validated Gallup Q12's framework in non-governmental organizations in the Brazilian Amazon region. The study found that employees with higher engagement scores, as measured by the Q12, demonstrated greater loyalty, and created more effective collaborative work environments.

This study explores how individual factors such as tenure, gender, age, household size, and pet ownership relate to the Q12 engagement dimensions (basic needs, individual contribution, teamwork, and growth) within the context of RHS. By examining these relationships, the goal is to better understand how personal and organizational elements interact to shape engagement. The findings aim to support the development of more effective strategies for nurturing engagement across different work environments.

Hence, an empirical study was conducted to answer the following research question: What factors explain engagement levels among employees in the public sector in RHS?

1.3 General and specific objectives

The primary aim of this study is to investigate the key factors that influence engagement levels among public employees working in remote and hybrid work settings (RHS).

The research is guided by the following specific objectives:

a) measure the engagement level among public employees working in RHS utilizing Gallup's Q12 framework;

b) identify the principal components underlying employee engagement through factor analysis;

c) examine how individual demographic characteristics (e.g., tenure, gender, age, household size, pet ownership) relate to the Q12 dimensions in RHS settings.

d) classify public servants working in RHS into homogeneous groups based on their engagement patterns, using cluster analysis;

e) design group-specific strategies aimed at fostering engagement among segmented public servant groups.

1.4 Methodology

This research was designed as a quantitative study, and employed descriptive and explanatory methods to investigate the factors influencing employee engagement in RHS at the public sector. The Gallup Q12 instrument was used to measure engagement levels, providing a

robust framework for assessing critical dimensions such as basic needs, individual contribution, teamwork, and growth.

Data collection was conducted through an online questionnaire that was distributed to eligible participants, with the aim of achieving a representative response rate. Statistical analyses, including factor analysis, non-hierarchical clustering, t-tests, and regression analysis were applied to identify key patterns, examine the relationships between independent variables and the dependent variable (employee engagement), compare groups, and group employees into distinct engagement profiles. These methods enabled a comprehensive understanding of the engagement dynamics in remote environments, offering practical takeaways for enhancing organizational performance and employee well-being.

1.5 Justification/relevance

The significance of this study is rooted in the profound transformations experienced by public sector organizations in recent years. The absence of adequate strategic planning to implement sustainable RHS after the COVID-19 pandemic, interfered with internal organizational dynamics and endorsed earlier calls for new strategies to prevent isolation and its associated negative impacts (Galanti et al., 2023).

Primarily, most of the studies on engagement have been conducted in the private sector (Jin; Mcdonald, 2016). However, as society and institutions continue to evolve, scholars increasingly recognize that public administrators must develop strategies that improve employee engagement (Kişi, 2024). Considering these unique challenges and growing academic interest on the subject, formulating competitive strategies to increase employee engagement and keep engaged talents has emerged as a central point in public administration (OECD, 2015; Kişi, 2024).

Further, Hair et al. (2009) argues that the relationship between remote work, burnout syndrome, the workload, and what it means to "turn off" from work are essential issues to be addressed. Yet, few studies have explored risks of this isolation and their consequences (Galanti et al., 2023; Wang et al., 2021; Spagnoli; Militello; Galanti, 2022). Notably, in the public sector, those who report higher levels of engagement tend to show greater job satisfaction and feel more connected to their organizations (Borst et al., 2019).

In fact, Lopes (2016) points out the need to deepen the research on work engagement in Brazil, as the national literature is still very limited, calling for more exploration into how individual, organizational, and labor-related factors shape the way people connect with their

work.

As for this research, the use of Gallup's Q12 instrument was justified for its strong validation and its effectiveness in measuring critical aspects of engagement, including: satisfaction, organizational support, and commitment (Gallup, 2024). Recognized for its simplicity and actionability, Gallup's 12-item instrument has been extensively validated and reliably captures workplace conditions that predict key business outcomes (Harter et al., 2016).

Recently, the 2025 Gallup report indicated that global engagement has dropped to 21%, its lowest point since the height of COVID-19 lockdowns, with only 44% trained managers, and those without training are twice as likely to be actively disengaged (Gallup, 2025). The report also points out that effective coaching and basic role training can raise engagement by up to 22% among managers and up to 18% among their teams, suggesting that manager development is a necessity for reversing workplace disengagement and sustaining productivity (Gallup, 2025). In 2024, this drop in global employee engagement cost the world economy an estimated US$438 billion in lost productivity (Gallup, 2025), suggesting the urgent need to reassess engagement strategies in RHS.

Thus, engagement plays a central role in employee well-being, as 50% of engaged employees report thriving in life overall, compared to only one-third of their disengaged peers (Gallup, 2025). This connection becomes even more critical when considering remote work realities: 30% of exclusively remote workers reported feeling sadness on the previous day, the highest among all work settings (Gallup, 2025). In this sense, this study offers applicable knowledge to inform policy development, aiming to enhance performance, engagement, and the management of remote teams, ultimately contributing to the continuous improvement of public service quality.

Historically, early studies on employee engagement mostly took a resource-based view, focusing on factors like job crafting, organizational support, opportunity to grow, and recognition. Personal traits such as hope and self-efficacy were also seen as important (Xanthopoulou et al., 2007). However, one key area was often left out: demographic differences. Despite how much of these factors could shape engagement, we still do not have a clear picture of how demographics relate to organizational engagement, and this gap calls for more research on the topic (Sharma; Rajput, 2021).

It is true that a few studies have attempted to address the topic, suggesting that employee engagement may vary according to demographic factors such as age, gender, educational background, and tenure. However, their findings are still inconsistent, and no definitive patterns have been established (Schaufeli et al., 2002; Chaudhary; Rangnekar, 2017; Sharma; Rajput,

2017). For instance, Schaufeli et al. (2002), conducting a cross-national validation study across ten countries, reported only a weak and ambiguous association between engagement and gender. Similarly, Chaudhary and Rangnekar (2017), analyzing a sample of 404 business-level executives in India, found no statistically significant differences in engagement between men and women.

This pattern of inconclusive findings continues when looking at tenure. Xu and Cooper-Thomas (2011) found no relationship between years of experience and engagement among employees at an insurance company in New Zealand. Likewise, Sharma and Rajput (2017) found no significant differences in engagement levels based on tenure among employees in the Indian IT sector. However, some studies have suggested an inverse relationship between tenure and engagement (Brim, 2002; Robinson; Perryman; Hayday, 2004). Brim (2002), analyzing data from employees across 66 countries, observed that engagement tends to decline as tenure increases. Robinson, Perryman, and Hayday (2004) also reported that employee engagement is typically highest in the first year of employment and gradually decreases over time. As employees remain longer within organizations, they may encounter more instances of contract breaches and unmet expectations, which can affect engagement (Robinson; Rousseau, 1994).

Further, Dua et al. (2022) show that men (61%) are offered remote work options more frequently than women (52%), and that younger employees tend to have greater remote work access than older employees. Similarly, Gómez et al. (2022) found that demographic characteristics, such as education level, gender, and managerial position, influenced public employees' experiences in RHS during the COVID-19 pandemic, especially employees with lower education levels, women, and non-managers who had significantly less experience in RHS, which affected their adaptation process (Gómez et al., 2022).

Sharma and Rajput (2021) suggested that demographic factors such as age, job designation, employment, and marital status have a noticeable impact on employee engagement. Yet, engagement is not a consistent phenomenon across employee groups and appears to shift according to personal and professional variables that, in many cases, do not fit into standardized frameworks (Sharma; Rajput, 2021). This variation challenges conventional strategies that seek uniform solutions. Therefore, the present research also focuses on variables including tenure, gender, age, household size, and pet ownership, elements that, taken together, may shed additional light on the ways employee engagement unfolds in RHS.

1.6 Structure of this research

This research is organized into five main chapters that together build its theoretical, methodological, and analytical framework.

The first chapter introduces the topic of employee engagement in RHS. It explains why the study was done, what it aims to discover, and how it plans to achieve these goals. It also presents the main research question and highlights the importance of age, gender, and length of service in engagement.

The second chapter explores the central ideas, the studies that support this research, and an introduction to Gallup's Q12 model, the main instrument to measure engagement used in this research. Then, the research discusses what employee engagement means, how it applies to the public sector, and how remote and hybrid work are changing the way people connect with their jobs.

The methodological approach is detailed in the third chapter, outlining the study's quantitative approach, the use of surveys, and the statistical techniques employed, including factor and cluster analysis to identify patterns in the data. This chapter also discusses the ethical considerations involved in doing research with public servants.

Empirical findings are presented in the fourth section, beginning with a descriptive overview of the participants and exploration of key results from factor and cluster analysis, revealing how demographic characteristics influence the public servants experience in RHS.

The final chapter offers reflections and conclusions, synthesizing the main contributions of the study, its implications for public management, and human resource practices, offering suggestions for future research. It also acknowledges the study's limitations while proposing paths forward for deepening our understanding of engagement in RHS work models.

2 LITERATURE REVIEW

The literature review was compiled from November, 2024 through June, 2025 through targeted searches in both the Periódicos Capes database and Google Scholar, which helped gain access to a broad range of studies. This approach enabled a systematic exploration of current scholarly discussions related to RHS, public sector, organizational engagement, and associated constructs. By employing strategically chosen keywords such as work engagement, remote work, hybrid work, public sector, the Gallup's Q12 questionnaire, and applying methodological filters aligned with the study's objectives, the review established a solid theoretical foundation for the subsequent analysis.

2.1 Organizational engagement

Kahn (1990) was among the first to conceptualize engagement as the harnessing of the self in work roles, emphasizing the integration of physical, emotional, and cognitive dimensions, believing that individual and organizational factors influence employee behavior.

Next, Schaufeli et al. (2002) expanded the engagement concept by identifying key components such as vigor, dedication, and absorption. Vigor is associated with high-levels of energy and the willingness to invest effort in one's work, while dedication reflects a sense of significance and enthusiasm. Absorption, in turn, refers to full immersion and focus on the task. Subsequently, Schaufeli et al. (2002) suggested that work engagement is a dynamic process that shows the interplay within the employee-organization relationship, where characteristics of the work environment and organizational practices are important determinants for strengthening employee engagement (Eldor; Vigoda-Gadot, 2016).

These dimensions resonate with Rothbard's (2001) interpretation of engagement as psychological presence, that includes attention, cognitive availability, and the amount of time one spends thinking about a role (absorption). These dimensions point towards a multidimensional view of engagement, making it a distinct construct, characterized by the integration of these elements into the individual's role performance.

In 2006, Saks (2006) also defined engagement as an unique construct, made up of cognitive, emotional, and behavioral elements, each linked to how people carry their roles. Later, Shuck et al. (2017, p. 954) reviewed the scattered literature on engagement and proposed a broader view, describing engagement as "a positive, active, work-related psychological state operationalized by maintenance, intensity, and direction of cognitive, emotional, and behavioral energy". This conceptual evolution depicts how the idea has gradually expanded, moving from the emphasis on role-based components to a more dynamic understanding of the employee experience in organizations (Sharma; Rajput, 2021).

While these and other studies measure constructs labeled as "engagement," the definitions used vary, to the point that engagement has been questioned as a rebranding of other constructs (Macey; Schneider, 2008). Christian, Garza, and Slaughter (2011) state that, while empirical evidence confirming engagement as a distinct concept is limited, through the application of a conceptual framework, it has been determined that its core characteristics distinguish it significantly from traditional job attitudes.

In comparison to job conditions or loyalty to the employer, engagement goes beyond mere satisfaction, which are often linked to compensation, benefits, and equitable treatment.

Satisfaction is concern for sufficiency, engagement is passion and commitment, and the willingness to invest discretionary effort to support the employer's success (Erickson, 2005). Engagement varies moderately from day-to-day (Sonnentag, 2003), and it relates strongly to various key causes and effects (Christian; Garza; Slaughter, 2011).

Additionally, work engagement differentiates from traditional job attitudes. Although it shares some of the same territory, especially in its relation to performance, it shows incremental criterion-related validity over these attitudes in predicting performance (Christian; Garza; Slaughter, 2011). Engagement reflects full investment of a person in his or her work, one that brings physical, emotional, and cognitive energy to the role (Kahn, 1990).

Conceptually, work engagement has been introduced in occupational health psychology as part of the positive psychology movement, in which the focus is to investigate the positive characteristics of employees (such as well-being, human strengths, optimal functioning, and flow) as opposed to negative states (such as burnout and weaknesses) (Bakker et al., 2008). This growing interest is due, in part, to the positive psychology movement initiated by Martin E.P. Seligman (Seligman; Csikszentmihalyi, 2000).

Furthermore, engaged employees develop a strong bond with their work and are oriented towards accomplishing work-related goals, which ultimately enhances their goal performance (Christian; Garza; Slaughter, 2011). They are also efficient in reaching these objectives, and this allows for more time to take on additional responsibilities that transcend their formal job description (Christian; Garza; Slaughter, 2011). More positive emotions, better health, and more resourcefulness characterize engaged rather than disengaged employees, qualities that also enhance the performance of those around them (Bakker; Oerlemans, 2011). Conversely, inconsistent levels of engagement translate into losses of up to $550 billion per year in productivity for U.S. businesses (Gallup, 2013).

Harter, Schmidt and Hayes (2002) also relate employee engagement to relevant organizational outcomes, defining it as the individual's involvement and satisfaction with, as well as enthusiasm for, work, that leads to retention and productivity, as well as customer satisfaction and profitability. Engagement is therefore characterized by more energy, resilience, and absorption, experiencing meaning, excitement, and pride at work. This profound immersion makes it hard to detach, and time seems to pass unnoticed (Demerouti, Mostert, and Bakker, 2010).

In addition, engaged employees are more committed to their organization and have a lower intent of voluntary turnover (Kang; Busser, 2018). People who feel supported by their environment tend to be better performers, pointing to a mutually beneficial relationship where

support from the organization leads to employees giving more of themselves at work (Kang; Busser, 2018).

Moreover, work engagement is the high-level connection between a person and their work (Christian; Garza; Slaughter, 2011). This high engagement is far beyond contentment or allegiance to the organization, as it represents an active relationship in psyche, energy, and enthusiasm that leads to higher productivity, morale, and organizational loyalty (Dhiman, 2021; Kahn, 1990). As a result, engaged employees exhibit superior performance and contribute to a thriving organizational culture, by embodying a deeper and more holistic commitment to their roles (Harter; Schmidt; Hayes, 2002).

Finally, Christian, Garza, and Slaughter (2011) point out that employee engagement is also conceptualized through strategic selection and job design, as both influence how employees connect with their roles and the organization. Saji (2014), who studied the changes implemented at Taj Hotels in the aftermath of the Mumbai attack, also underscored the importance of recruiting those who prioritize respect and service. Value-based selection and supportive management practices foster meaningfulness and resilience among employees (Anand; Acharya, 2021), further reinforcing the idea that job design and hiring strategies shape engagement and workplace experience.

Yet, there is still no single definition for what we call engagement (Rodríguez et al., 2016), suggesting that it should be treated as an evolving construct that emphasizes a multidimensional connection between individuals and their work.

2.2 Engagement in the public sector

In the public sector, high-levels of engagement are associated with higher quality service delivery, greater customer satisfaction, and higher productivity (Borst et al., 2019). It is worth noting that employee engagement is still a relatively recent construct in administration and public management (Jin; Mcdonald, 2016). Consequently, studying engagement in the public sector (EPS), often characterized by greater demand and less resources, is important for both theoretical and practical reasons, and indispensable for overcoming adversities (Fletcher et al., 2020).

First, research on employee EPS provides insights into effective management practices, helping public organizations build more motivating and satisfying work environments that enhance operational efficiency and long-term sustainability (Borst et al., 2019; Fletcher et al., 2020). Equally important, EPS is also a vital predictor of employee well-being, enhancing job

satisfaction, organizational commitment, and the reduction of turnover intention, which all lead to organizational success (Borst et al., 2019). Aspects including autonomy, convenience, and psychological safety also play a significant role in enhancing employee EPS (Fatima et al., 2024).

The next point to consider is the shift to RHS in the public sphere during COVID-19, introducing, unexpectedly, a major shift in people management (Gómez et al., 2022). Although Gómez et al. (2022) observed that most public servants expressed satisfaction with remote work conditions, their findings also point to persistent difficulties, especially with the loss of human interaction and the challenge of maintaining a clear boundary between work and personal life. Further, groups that had no experience with RHS, such as women, employees with lower levels of education, and non-managerial public servants, were forced to adapt to the new work conditions, with fewer resources. These patterns suggest that public organizations need to acknowledge these different starting points in RHS, and create strategies to improve engagement (Gómez et al., 2022).

Civil servants also experience varying stages of engagement over the course of their careers, depending on the resources available and the demands of their work environment (Camões et al., 2023). It is important to note that, due to the disruptive nature of political transitions, maintaining high-levels of engagement among public servants is hard to achieve (Jin; McDonald, 2016). These conditions make it hard for supervisors to motivate employees and create a stable work environment. As a result, fostering engagement in the public sector requires alternative strategies that emphasize interpersonal support and organizational culture. For example, elected or politically appointed leaders, including legislators, have, in general, brief tenures. Without any real succession planning, the political turnover makes it difficult to sustain engagement (Jin; Mcdonald, 2016). These difficulties are reflected in the declining interest, among new professionals, to become public servants. In the U.S., a national survey revealed that only 6% of recent college graduates planned to pursue careers in government (Jin; Mcdonald, 2016).

Leadership quality is also a critical determinant to EPS, and contributes directly to the organizational results (OECD, 2019). Quality leaders are described as those capable of creating environments that empower employees, value their contributions, and align institutional goals with individual purpose. Conversely, abusive supervision harms EPS, increasing stress and turnover intention, with engagement playing a mediating role in the relationship (Oliveira, 2023).

In Brazil, leadership appointments often lack criteria, creating barriers to innovation

and weakening morale among public servants (OECD, 2019). Merit-based recruitment and leadership competency frameworks are fragmented throughout Brazilian federal structures (OECD, 2019). Still, a supply of good leaders is not sufficient, as they need authority and institutional backing to influence engagement and affect change (OECD, 2019).

Finally, EPS is a strategic area for enhancing service delivery, retention, and regaining the confidence of citizens in public institutions (Lavigna, 2019). Feeling genuinely valued for their work is a key influencer of engagement among public servants, being closely tied to voluntary turnover. Research shows that up to 79% of employees who resign do so because they feel unappreciated (Lavigna, 2019). Yet, superficial engagement initiatives, such as surveying employees without follow-up actions, can diminish trust and increase frustration among staff (Lavigna, 2019). These findings suggest that engagement, in the public sector, represents an ongoing development rooted in active listening, authentic recognition, and significant organizational change.

2.3 Remote and hybrid work

The first traces of what is now known as remote work emerged in the early 1970s, under the term teleworking, which allowed employees to do their work off site using information technology. Mainly, this method relied on IT devices to complete tasks and deliver results remotely, primarily through the internet. Over time, the advances in technology and widespread internet access transformed teleworking into the broader concept of remote work as it is known today (Wontorczyk; Rożnowski, 2022).

Initially, academics have become interested in the well-being of RHS employees due to early conflicting studies and inconclusive findings (Boell et al., 2016). Though some literatures linked remote work to work-life conflict, exhaustion, lower engagement (Sardeshmukh et al., 2012), and key issues such as social interaction and defective social communication (Fatima et al., 2024), others associated it with higher job satisfaction, low level of stress and improved performance (Wheatley, 2016; Delanoeije; Verbruggen, 2020).

In addition, remote working carries physical implications, particularly the heightened risk of musculoskeletal disorders resulting from prolonged sitting and reduced movement (Yadav; Madhukar, 2024). These conditions are some of the leading work-related illnesses in many countries and are frequently neglected in remote settings, where there is a lack of infrastructure. Ideally, remote employees should take regular breaks, stretch, and maintain

physical activity, with employers playing a crucial role by providing resources to help prevent long-term health issues (Yadav; Madhukar, 2024).

Nonetheless, a meta-analysis on remote work conducted by Gajendran and Harrison (2007) indicated a positive relationship between remote work, job satisfaction, and a lower intent to turnover, contributing to a reduction in work-family conflict while fostering greater involvement in work. This reflects other findings on the effects of remote work, which show a variety of positive results, such as decreased work-family conflict, higher job involvement, and benefits to the employee's well-being and performance (Golden; Gajendran, 2018). Still, the inability to mentally or technologically disconnect from work can lead to sustained stress and compromise overall well-being (Yadav; Madhukar, 2024).

Further, although remote work offers flexibility and balance between professional and personal life, research indicates that employees engaged in RHS report greater levels of psychosocial stress, perceiving remote work as less engaging compared to on-site roles (Wontorczyk; Rożnowski, 2022). This perception is, in part, motivated by the challenges of establishing good team dynamics, live support, and the more subtle realities of RHS employees, such as the dichotomy of autonomy and isolation (Wontorczyk; Rożnowski, 2022). Yet, a Gallup study found that 58% of RHS employees felt less burned out working from home than in the office (Gallup, 2022).

Moreover, there are significant challenges in respect to communication, collaboration, and emotional well-being in RHS (Rathi, 2024). Difficulties, such as no work-life boundaries, lack of human contact and camaraderie, are commonly reported and can erode trust and morale. In order to reduce these issues, clear lines of communication and organizational support structures need to be present (Rathi, 2024), as well as strong support systems, and concentrated efforts to maintain the workforce work-life balance (Shokrollahi, 2023).

Meanwhile, RHS has a special appeal to the millennials who value autonomy and work-life balance, fostering a work culture that aligns more with their unique expectations. This appeal has pushed companies to rethink how they attract and keep employees, especially as younger generations become most of the workforce (Canedo et al., 2017). Thus, human resources practices are expected to match the values of millennials, who give higher priority to flexibility, technology, and meaningful work (Canedo et al., 2017).

Collectively, the literature suggests that remote and hybrid work are not inherently engaging or disengaging and are conditional to design and support, with benefits emerging when communication, boundaries, and health resources are intentionally structured. Further, evidence shows that most studies treat employee engagement typically as a dependent variable,

suggesting a complicated and nuanced connection between employee engagement and remote work (Fatima et al., 2024).

2.3.1 Engagement disparities between RHS

Distinguishing between remote and hybrid work is important because they create different conditions for collaboration, autonomy, and employee support (Arvindh et al., 2024). Hybrid work was early defined by Halford (2005) as a mix of organizational and domestic workspaces. The term has since evolved to encompass workspaces beyond the office and home (Hislop; Axtell, 2009). Hybrid work offers a middle ground between remote and on-site settings, combining flexibility with collaboration. According to Rathi (2024), most employees prefer hybrid settings for comfort and productivity.

First, employees working under hybrid models reported higher engagement levels than those in strictly on-site roles (Gallup, 2024). Additionally, hybrid employees are 1.7 times more likely to be fully engaged than on-site employees and 1.9 times more likely engaged than fully remote employees (ADP, 2023). Also, employees working in hybrid models report notably higher levels of team collaboration ($t = 0.705$) and engagement ($t = 1.532$) compared to those in non-hybrid settings (Annanya; Hemakumar, 2023).

RHS are no longer just temporary adaptations, they have become a permanent part of today's workplace and have a significant impact on how engaged employees feel, are satisfied, and their overall well-being (COOLPO, 2022). As of 2022, 58% of workers in the U.S. can now work remotely at least one day a week, which equals about 92 million people across different industries. When offered remote-work options, 87 percent prefer flexible arrangements, indicating a strong preference for flexible work (Dua et al., 2022).

2.4 Challenges of work engagement in RHS

Employee engagement serves as a critical determinant of organizational success in RHS, with evidence showing that it is shaped by each generation's expectations, values, and communication preferences, which moderate how engagement is sustained in these contexts (Grant, 2024). The problem is that remote work has a dual effect on employee engagement. While remote work can enhance autonomy and enjoyment, it also poses challenges, especially the risk of isolation due to reduced physical presence (Fatima et al., 2024).

First, effective communication is critical to engagement in RHS, as remote working

communication satisfaction and employee disconnection are negatively correlated. (Fatima et al., 2024). Yet, digital communication tools can lead to information overload, expectations of constant connectivity, pressures for immediate responses, and technical difficulties, all of which negatively affects workplace well-being (Bordi et al., 2018). Additionally, supervisors may view remote employees as not being as invested and consider them less committed to their work, interpreting their absence from the office as a deviation from traditional expectations of workplace dedication (Bourdeau; Ollier-Malaterre; Houlfort, 2019).

Thereafter, evidence suggests that remote work negatively affects career advancement as remote employees often experience less visibility and limited access to promotion opportunities (Campbell; Eley; Mcallister, 2016). Thus, remote work might act as a barrier to career advancement and limit opportunities for personal growth (Golden; Eddleston, 2020).

Further, social support significantly shapes organizational results, as its presence or absence alters how remote work relates to performance in RHS (Golden; Gajendran, 2018). Yet, family-based disruptions during work can drain energy and focus, reducing employee engagement and spouses' satisfaction (Perry et al., 2023).

In general, literature on remote work has primarily focused on job characteristics, like autonomy and social support, while work engagement received relatively limited attention (Mäkikangas et al., 2022). Nonetheless, previous studies have also claimed that organizational support (OS) leads to increased emotional commitment (Mäkikangas et al., 2022) as well as work engagement (Kinnunen; Feldt; Mäkikangas, 2008). OS has also been associated with lower emotional exhaustion among service industry employees during the COVID pandemic (Chen; Eyoun, 2021) and among university employees working remotely (Mäkiniemi; Ahola; Joensuu, 2019).

Currently, there is no simple formula to achieve engagement in remote settings. It takes more than just having the right technology. Cultural and physical experiences also count, emphasizing the need for strategies that create a genuine sense of belonging between employees in different work settings (Lee; Kim, 2023).

2.5 Gallup meta-analysis

Gallup's Q12 questionnaire was created based on three decades of quantitative and qualitative research. It all started with Don Clifton, in the 1950s, studying about learning environments in the workplace. Clifton's focus was on identifying factors that foster success, with particular attention to individual strengths and talents. In the 1980s, Gallup began studying

high-performance groups using qualitative analysis, interviews, and focus groups, that led to hypotheses on what is unique about successful teams (Gallup, 2024).

Gallup's first version of the Q12, also known as the Gallup Workplace Audit, was developed in the 90s, based on thousands of focus groups and comprehensive analysis of a range of instruments. Gallup conducted quantitative and qualitative studies such as factor and regression analyses to validate hypotheses and refine the questionnaire items. These studies confirmed the criterion validity of the Q12 items, establishing a direct relationship between the twelve questions and organizational performance in terms of productivity, profitability, and employee retention (Gallup, 2024). The last version of Q12, introduced in 1998, underwent validation in multiple sectors and cultures and became a critical tool for monitoring the degree of engagement at the workplace (Gallup, 2024).

Gallup's Q12 is designed to assess various dimensions of employee engagement, including:

     a) Basic needs;

     b) Individual contribution;

     c) Teamwork;

     d) Growth;

Gallup's Q12 items, and their corresponding dimensions, are outlined below.

Figure 1 - The twelve Gallup questions and their respective dimensions

No	Question	Dimension
Q1	I know what is expected of me at work.	Basic needs
Q2	I have the materials and equipment I need to do my work right.	Basic needs
Q3	At work, I have the opportunity to do what I do best every day.	Individual contribution
Q4	In the last seven days, I have received recognition or praise for doing good work	Individual contribution
Q5	My supervisor, or someone at work, seems to care about me as a person.	Individual contribution
Q6	There is someone at work who encourages my development.	Individual contribution
Q7	At work, my opinions seem to count.	Teamwork
Q8	The mission or purpose of my organization makes me feel my job is important.	Teamwork
Q9	My associates are committed to doing quality work.	Teamwork

Q10	I have a best friend at work.	Teamwork
Q11	In the last six months, someone at work has talked to me about my progress.	Growth
Q12	This last year, I have had opportunities at work to learn and grow.	Growth

Source: Gallup, 2024.

The use of the Gallup Q12 in this study is justified by its alignment with the challenges of remote work that started during the COVID-19 crisis. Questions like "do I have the materials and equipment needed to do my work properly?" resonates with other studies like Liebermann et al. (2021), which states that leaders, in virtual settings, encounter significant communication barriers, lack of authorization and technical tools for video conferencing. This reaffirms the critical importance of technological infrastructure, trust, and team effectiveness in RHS.

The Q12 tool categorizes employees into three primary engagement groups: engaged, not engaged, and actively disengaged, based on responses to the employee engagement survey. This survey employs a Likert scale ranging from 1 to 5, where 1 represents "strongly disagree" and 5 represents "strongly agree" (Gallup, 2024). The average of the cumulative results of these responses determines the level of engagement (Gallup, 2018), grouped into three bands (4.00–5.00, 3.00–3.99, 1.00–2.99), following the meta-analytic practice of comparing top and bottom quartile engagement units to demonstrate organizational effects (Gallup, 2024; Harter et al., 2016).

On the Q12 measurements, engaged employees are the ones that indicate their strong emotional alignment with the organization, fostering high productivity and contributing to a positive workplace culture. The not engaged employee group are the ones who score average. While they fulfill their responsibilities, these individuals lack an emotional connection to their work, performing the bare minimum without investing additional effort. This behavior often results in average performance, with minimal contribution to organizational growth (Gallup, 2024). Lastly, actively disengaged employees, who score significantly low, are dissatisfied with their work and actively express their dissatisfaction. Actively disengaged employees undermine the team's morale and productivity (Gallup, 2024), resulting in an estimated $483 to $605 billion in lost productivity in 2019 (Cassidy, 2019).

Gallup's meta-analysis results indicate that organizations with high Q12 engagement levels demonstrate superior performance across key indicators such as productivity, quality, and profitability with high Q12 scores, being directly associated with greater employee loyalty, lower turnover rates, and improved business outcomes (Gallup, 2024).

In the Brazilian context, Gallup's Q12 engagement assessment tool has been validated through studies underscoring its applicability across various organizational sectors. Lopes (2016) explored spirituality and work engagement in non-governmental organizations in the Amazon region of Brazil, confirming the effectiveness of Q12 in measuring internal stakeholders' engagement. This study revealed that work engagement is a significant predictor of strong organizational performance, with a grand mean of 3.89. Employees with higher engagement levels, as measured by the Q12, demonstrated greater loyalty to the organization, contributing to a more collaborative and productive work environment. Therefore, the Q12 tool has been validated in the Brazilian national context as an engagement assessment instrument, promoting more connected and productive workplaces in Brazil (Lopes, 2016).

Although Gallup's Q12 rates and categorizes employee engagement using a proprietary method, the instrument has been applied and validated in Brazil (Lopes, 2016), making it appropriate for this study. For this research, following data collection, Q12 was utilized as an instrument in RHS through psychometric validation, clustering, and regression, to validate interpretable profiles, providing the empirical foundation for interpreting engagement in this sample.

3 METHODOLOGY

This study employs a quantitative approach, combining descriptive and explanatory research methods to investigate the factors influencing employee engagement in RHS in the public sector. In general terms, Creswell (2014), described quantitative research as one that tests a theory and examines the relationships among variables. It is explanatory, because it aims to explain the relationships between engagement levels among employees at the public sector by testing hypotheses derived from theoretical frameworks.

Quantitative research is characterized by objectivity and precision in data collection, enabling researchers to identify patterns and correlations between variables and to develop models capable of systematically and measurably explaining complex phenomena (Marconi; Lakatos, 2003). Creswell (2014) reinforces this perspective by asserting that quantitative research is essential for testing theories through the analysis of relationships between variables. This data, usually numerical, is subjected to statistical procedures to test previously formulated hypotheses, quantifying behaviors, opinions, and attitudes of individuals (Creswell, 2014).

Regarding methodological procedures, field research was conducted through survey, as the data collection technique, and a questionnaire, as the instrument. In alignment with the

proposed objective, explanatory research was chosen. Explanatory research aims to provide a deeper understanding and familiarity with the investigated problem, clarifying it and facilitating the construction of preliminary concepts and hypotheses (Gil, 2007).

Public servants, working in RHS, are the focus of this study. The survey was administered as an online questionnaire built on Google Forms. The instrument captured Gallup Q12 items, basic sociodemographic questions, and two open questions on perceived obstacles and ideas for improvement. Access to respondents occurred through WhatsApp and e-mail dissemination in private and professional channels. To ensure sample adequacy, interns were excluded. Participants held an active employment link within public institutions and operated under remote or hybrid work arrangements. The sample size is 178 respondents, which aligns with the recommended minimum ratio of observations per variable for conducting factor analysis, as outlined by Hair et al. (2009).

Data collection remained open from early September 2024 through late March 2025. Responses were exported to a spreadsheet for cleaning and consolidation. No personally identifying information was required to complete the form, and responses were analyzed in aggregate, consistent with research-ethics protocols.

In practice, the dissemination of the survey depended on gatekeepers' willingness to forward the link and the organizations' email and WhatsApp list policies. These factors, combined with the voluntary nature of participation, may have introduced self-selection and agency-level imbalances typical of online surveys in the public sector. The resulting frame is therefore best interpreted as a broad cross-section of RHS public servants rather than a probability sample.

For data analysis, factor analysis was used to identify and group the most relevant dimensions for employee engagement in remote work, reducing the number of variables and facilitating the understanding of the determinants of this engagement. Factor Analysis (FA) is a widely used statistical technique for identifying underlying structures within a dataset and determining the relationships between observable variables. FA reduces data complexity and simplifies the structure, representing the studied phenomenon, as simply as possible, without sacrificing critical information (Hair et al., 2009).

In FA, variables are grouped into factors, which are linear combinations of these variables and represent common, non-directly observable traits (Fávero, 2017). The process involved dimensionality reduction, enabling a small number of factors to explain a substantial portion of the observed variance (Hair et al., 2009).

The sample adequacy for FA is assessed through tests such as Bartlett's test of

sphericity and the Kaiser-Meyer-Olkin (KMO) measure, which indicate whether the correlation matrix is suitable for analysis (Fávero, 2017). A KMO value above 0.7 and significance in Bartlett's test suggested the feasibility of factor analysis. Subsequently, factor rotation techniques, such as Promax, maximize variance among the extracted factors, making the results easier to interpret (Hair et al., 2009). The data utilized in this study consisted of responses to Gallup's Q12 questionnaire, as referenced in this article.

Additionally, cluster analysis was employed to segment employees into homogeneous groups, providing a more detailed view of engagement profiles in RHS. This methodological combination simplifies and enhances data interpretation, allowing for a more precise analysis of the factors explaining engagement in the investigated context.

Cluster analysis, also known as grouping or conglomerate analysis, allows the aggregation of cases or variables into homogeneous groups based on participant similarity, supported by predefined variables. The primary goal is to define the underlying data structure in a way that clusters similar observations within the same group (Fávero et al., 2009), thereby facilitating a clearer visualization of the sample distribution.

A non-hierarchical approach was adopted using the K-means method for cluster formation, which is based on representing k groups formed by observations closest to their means (Williams, 2011). According to Fávero et al. (2009), non-hierarchical procedures are applied to group human participants, rather than variables, with the initial number of clusters defined by the researcher.

Lastly, this study employed a Student's t-test to assess whether engagement levels varied significantly across demographic subgroups, including gender, pet ownership, and work setting. Following the recommendations of Haukoos and Lewis (2005), bootstrapping procedures (1,000 resamples; 95% BCa confidence interval) might be used to address issues of non-normal data distribution and unequal group sizes, thereby enhancing the reliability of the statistical results. JASP was the software employed for the exploratory factor analysis. IBM's SPSS Statistics was used to perform the Two-Step cluster, the Student's t-tests analysis, including the bootstrap resampling routines, and a multiple linear regression analysis, to examine the extent to which Gallup's Q12 dimensions influenced this study's levels of engagement.

4 RESULTS

4.1 Descriptive analysis of the sample

Engagement was measured with a Q12-based composite score, fulfilling specific objective (a), and providing the foundation for the subsequent analysis. The analysis began with a characterization of the sample, composed of 178 participants. Males represented the majority (60.1%, n = 107), while females accounted for the minority (39.9%, n = 71). Regarding household composition, the highest proportion of respondents reported living with three people (29.8%, n = 53), followed by those living with four (25.8%, n = 46) and two individuals (27.0%, n = 48). A smaller portion reported living alone (6.7%, n = 12), and 10.7% (n = 19) resided with five or more people.

With respect to the work arrangement, 59.6% (n = 106) of the participants reported working remotely, whereas 40.4% (n = 72) work in a hybrid model. Pet ownership was reported only by 47.8% (n = 85) of the sample. Table 1 presents the main results obtained from the sociodemographic variables.

Table 1 – Sociodemographic data

Variable	Response	Count	%
Gender	Female	71	39.9
	Male	107	60.1
	Total	178	100
Household Size	2 People	48	27
	3 People	53	29.8
	4 People	46	25.8
	5 People or more	19	10.7
	Live Alone	12	6.7
Work Setting	Hybrid	72	40.4
	Remote	106	59.6
Pet Ownership	Yes	85	47.8
	No	93	52.2
	Total	178	100
Length of Service	Up to 10 years	44	24.7
	Between 11 and 20 years	82	46.1
	Between 21 and 30 years	32	18
	More than 30 years	20	11.2

| | Total | 178 | 100 |

Still, according to Table 1 and regarding length of service, most participants reported having between 11 and 20 years of professional experience (46.1%, n = 82), followed by those with up to 10 years of service (24.7%, n = 44). The groups with 21 to 30 years and 30 years or more of experience, represent 18.0% (n = 32) and 11.2% (n = 20) of the sample, respectively.

With respect to the descriptive analysis of the Q12 variables, Table 2 presents the means and standard deviations obtained.

Table 2 – Mean and standard deviation of the variables

Variable	Quantity										Mean	Standard
	1	%	2	%	3	%	4	%	5	%		Deviation
Q1 - I know what is expected of me at work.	1	0,6	6	3,4	6	3,4	77	43,3	88	49,4	4.38	0.76
Q2 - I have the materials and equipment I need to do my work right.	0	0,0	6	3,4	13	7,3	64	36,0	95	53,4	4.39	0.77
Q3 - At work, I have the opportunity to do what I do best every day.	6	3,4	7	3,9	26	14,6	67	37,6	72	40,4	4.08	1.01
Q4 - In the last seven days, I have received recognition or praise for doing good work.	18	10,1	26	14,6	54	30,3	43	24,2	37	20,8	3.31	1.24
Q5 - My supervisor, or someone at work, seems to care about me as a person.	1	0,6	3	1,7	23	12,9	51	28,7	100	56,2	4.38	0.82
Q6 - There is someone at work who encourages my development.	2	1,1	8	4,5	27	15,2	70	39,3	71	39,9	4.12	0.91
Q7 - At work, my opinions seem to count.	0	0,0	2	1,1	21	11,8	79	44,4	76	42,7	4.29	0.71
Q8 - The mission or	4	2,2	7	3,9	18	10,1	78	43,8	71	39,9	4.15	0.92

purpose of my organization makes me feel my job is important.											
Q9 My associates are committed to doing quality work.	3	1,7	2	1,1	22	12,4	86	48,3	65	36,5	4.17	0.81
Q10 I have a best friend at work.	17	9,6	26	14,6	40	22,5	40	22,5	55	30,9	3.51	1.32
Q11 In the last six months, someone at work has talked to me about my progress.	17	9,6	32	18	46	25,8	40	22,5	43	24,2	3.34	1.28
Q12 This last year, I have had opportunities at work to learn and grow.	5	2,8	9	5,1	23	12,9	70	39,3	71	39,9	4.08	0.99

Source: prepared by the author (2025).

Additionally, the Q12 variables, assessed using rating scales, presented mean scores that vary from 3.31 to 4.39, with standard deviations between 0.71 and 1.32. The variables Q1 (I know what is expected of me at work) and Q2 (I have the materials and equipment I need to do my work right) showed the highest means, both close to 4.4, indicating a positive perception among participants regarding these aspects.

Conversely, variables Q4 (in the last seven days, I have received recognition or praise for doing good work) and Q10 (I have a best friend at work?) reported the lowest mean scores (3.31 and 3.51, respectively) and higher standard deviations (1.24 and 1.32, respectively). These results suggest that perceptions of positive feedback and workplace friendships vary somewhat among respondents. Also, the high standard deviation of the variable Q10 indicates that, while some employees report frequent recognition, others may feel that their contributions are not equally valued.

4.1.1 Interpreting the descriptive data and engagement signals

This section explores the participants' descriptive data and how these findings relate to their engagement at work. Despite the positive climate the average scores suggest (above 4.0), the high standard deviations (up to 1.32) reveal the presence of individuals or subgroups worth investigating. In the public arena, this is an important signal that leaders need to address through

strategies to improve visibility, recognition, and peer connection.

Although most respondents live with three or four people, only a small portion (6.7%) live alone. This suggests that many employees may benefit from social support at home, potentially buffering remote work's isolating effects. In terms of engagement signals, the highest average scores (around 4.4 on a five-point scale) are found in the basic needs dimension (Q1 and Q2). However, the lowest means and highest variability appear in questions related to dimensions such as individual contribution (Q4, average 3.31) and teamwork (Q10, average 3.51). These results suggest that, while basic needs are being met, a significant number of public servants lack consistent recognition or close peer relationships, which impact organizational results, as additional aid from colleagues and superiors improves performance in RHS (Golden; Gajendran, 2018).

Nearly half of the respondents (46%) reported having 11 to 20 years of service, which places a significant portion of the sample in a mid-career stage. This suggests that most participants are neither new to their roles nor close to retirement, in a period where expectations for professional development tend to grow. At the mid-lower stage, employees are likely to seek recognition for their contributions and opportunities for continued growth, rather than basic support or onboarding (Buckingham; Coffman, 1999). Therefore, engagement strategies aimed at this group should prioritize professional development and recognition.

Supervisors were rated positively overall (Q5, mean = 4.38), but gave lower ratings regarding recognition of their work (Q4, mean = 3.31), indicating that, although supervisors are generally supportive, they may not clearly acknowledge employees' accomplishments. The high variability in responses to Q10 (I have a best friend at work) could reflect significant differences among departmental cultures, or, perhaps, indicate a generational gap in how workplace relationships are perceived.

Since only 6.7% of respondents live alone, future research might explore how household composition influences workplace social interactions, providing a possible correlation between domestic contexts and employee engagement.

4.2 Exploratory factor analysis (EFA)

The exploratory factor analysis identified the principal components underlying the Q12 items, directly addressing specific objective (b). EFA was employed to identify which variables are truly important in the model and according to the sample, and to verify the arrangement of data into factors (Hair et al., 2009). The number of factors was based on eigenvalues, the type of rotation chosen was oblique PROMAX, and the estimator was weighted least squares (WLS). In

total, two EFAs were conducted. Table 3 presents the adequacy tests and assumptions of the first EFA.

Table 3 - Sample adequacy tests and assumptions of the first EFA

Tests	Values
Bartlett's Test	0.001
KMO	0.86
Chi-square	84.01
DF	41
Chi-square/DF	2.04
P value	0.00

Source: prepared by the author (2025).

The adequacy of the data for conducting the exploratory factor analysis (EFA) was assessed using Bartlett's Sphericity Test and the Kaiser-Meyer-Olkin (KMO) measure. Bartlett's test was significant ($p = 0.001$), indicating that the correlation matrix is not an identity matrix and thus there are sufficient correlations between the variables to justify applying EFA. The KMO measure was 0.86, a value considered adequate (Hair et al., 2009).

The chi-square test presented a value of 84.01 with 41 degrees of freedom, being statistically significant ($p < 0.001$). Moreover, the chi-square/degrees of freedom ratio was 2.04, remaining below the limit of 3.0, which is indicative of a good data fit (Hair et al., 2009). These results attest to the validity of the assumptions necessary for conducting EFA. Thus, the results of the first EFA are shown in the table below.

Table 4 – Exploratory factor analysis (model 1)

Variable	Factor 1	Factor 2	Uniqueness	Communality
Q11	0.934		0.367	0.633
Q12	0.770		0.448	0.552
Q4	0.722		0.539	0.461
Q6	0.657		0.429	0.571
Q7	0.502		0.499	0.501
Q1		0.651	0.606	0.394
Q3		0.550	0.604	0.396

Q2	0.518	0.825	**0.175****
Q8	**0.471***	0.559	0.441
Q9	**0.464***	0.744	0.256
Q5	**0.438***	0.421	0.579
Q10	**<0.03***	0.923	0.077

Note: * = Low factor loading (<0.5).

** = Low communality.

Source: prepared by the author (2025).

Based on the results of Table 4, it is observed that the Q12 variables were grouped into two factors. Additionally, the results indicate the need for adjustments in the model. According to the literature (Hair et al., 2009), variables with low factor loadings (< 0.5) should be excluded, and a new EFA should be conducted.

The variables Q5 (my supervisor, or someone at work, seems to care about me as a person), Q8 (the mission or purpose of my organization makes me feel my job is important), Q9 (my associates are committed to doing quality work) were therefore removed. Next, the variable Q2 (I have the materials and equipment I need to do my work right) was also excluded due to low communality. Thus, the adequacy test results for the second EFA can be found in Table 5.

Table 5 - Sample adequacy tests and assumptions of the second EFA

Tests	Values
Bartlett's Test	0.001
KMO	0.86
Chi-square	10.128
DF	13
Chi-square/DF	0.78
P value	0.00

Source: prepared by the author (2025).

The adequacy of the data for conducting the second EFA was assessed using Bartlett's Sphericity Test and the KMO measure. Bartlett's test was significant ($p = 0.001$), indicating that the correlation matrix is not an identity matrix and thus there are sufficient correlations between the variables to justify applying EFA. The KMO measure was 0.86, considered adequate (Hair et al., 2009).

The chi-square test presented a value of 10.128 with 13 degrees of freedom, being statistically significant ($p < 0.001$). Furthermore, the chi-square/degrees of freedom ratio was 0.78, remaining below the limit of 3.0, which indicates a good data fit (Hair et al., 2009). These results attest to the validity of the assumptions necessary for conducting the second EFA. Thus, the results of the second EFA are shown in the table 6 below.

Table 6 – Exploratory factor analysis (model 2)

Variable	Factor 1	Factor 2	Uniqueness	Communality
Q11	0.874		0.376	0.624
Q12	0.772		0.455	0.545
Q4	0.692		0.502	0.498
Q6	0.682		0.432	0.568
Q7	0.566		0.562	0.438
Q1		0.606	0.581	0.419
Q2		0.553	0.757	0.243
Q3		0.531	0.565	0.435

Source: prepared by the author (2025).

The results in Table 6 indicate that all variables presented satisfactory factor loadings (> 0.5). Additionally, it was observed that the number of factors remained constant (two factors). The next step consisted of segmenting the respondents' profiles through the Two-Step algorithm, which is ideal for identifying distinct groups of individuals based on continuous (such as scales or frequency) and categorical variables (such as gender, social class, work regime, etc.) (Tkaczynski, 2017). For the present study, based on the results provided by the second EFA, the Q12 variables Q1, Q3, Q4, Q6, Q7, Q11, and Q12 were used. Variables that showed low factor loading (as evidenced in the first EFA) were excluded from subsequent analyses. Regarding the categorical variables, the following sociodemographic variables were included: gender, age, number of people living in the same house, pet ownership, length of service, and work regime.

4.2.1 Interpretative analysis of the exploratory factor results

By narrowing on the most important factors (factor one and factor two), the EFA actually revealed two foundations of engagement in the referred sample. The first factor, included items related to recognition, encouragement, personal development, and growth (Q4, Q6, Q7, Q11, Q12), suggesting a dimension focused on the employees' feelings of support and value in their development. These elements point to a relational engagement factor, reflecting

the social and psychological side of work engagement. Additionally, the first factor items have higher communalities, which means people responded to them in a more consistent way, suggesting a shared experience regarding feedback, support, and organizational development.

The second factor, formed by items related to role clarity, use of personal strengths, and access to necessary materials (Q1, Q2, Q3), reveal more basic and structural elements, addressing a more operational kind of engagement, where employees feel they have the work conditions to do their jobs well. Conversely, this factor showed more variability, especially in items like Q1 and Q3. This suggests that basic work conditions, like knowing what is expected or having the right tools to do the job, might differ across teams or roles, depending on how each area is managed.

This aligns with theoretical models that separate organizational motivation in two factors, such as Herzberg's hygiene and motivators factors (Herzberg, 1966), or Bakker and Demerouti's (2007) job resources and personal development drivers. In Herzberg's Two-Factor Theory, hygiene factors such as working conditions are essential to avoid dissatisfaction but do not, by themselves, generate motivation. This corresponds closely to the second factor identified in the analysis, which captures basic conditions needed to perform well but does not necessarily drive deeper emotional engagement. Conversely, motivators such as recognition, achievement, and growth are directly tied to the first factor, called intrinsic motivators (Herzberg, 1966), which reflects the employees' sense of being valued and encouraged to grow.

In the job demands and resources model, work conditions can be categorized as a balance between job demands and the resources available to meet them (Bakker; Demerouti, 2007). Job demands refer to aspects of the job that require sustained physical or mental effort, such as high workload, time pressure, or emotional demands. On the other hand, job resources are elements that help employees achieve their goals, reduce job strain, and stimulate personal growth (such as autonomy, support, and feedback). In this context, work engagement is most likely to occur when job resources are abundant, even in demanding environments (Bakker; Demerouti, 2007).

Notably, four of the twelve factors did not show relevance in the two EFA resulting factors and had to be excluded: Q5 (supervisor care), Q8 (sense of mission), Q9 (coworkers' commitment), and Q10 (best friend at work). Since these are four of the twelve core items in Gallup's Q12 index, their exclusion is meaningful, possibly indicating that in the public sector's RHS, employees have different perceptions of leadership, purpose, and relationships. For instance, the very low loading of Q10 suggests that having strong personal bonds at work is

not a common or consistent experience, possibly due to the isolating nature of remote work or fragmented team cultures.

Another important point is that Q2 (I have the materials and equipment I need to do my work right) had also to be excluded in the second model due to low communality. This might reflect that while many employees feel they have the tools they need, this perception isn't stable or meaningful enough to group them into broader patterns of engagement. These findings show that not all of the Q12 index items hold together statistically when applied in public RHS.

Lastly, the EFA results suggest that engagement in RHS rests on a two-factor foundation (structural and relational). The exclusion of important Q12 variables (owing to low factor loadings or communality) suggests that these experiences are not shared uniformly across the sample. That disconnect might be a valuable direction for further studies, especially on how these elements are approached, or become diluted, in complex work environments.

4.3 Cluster analysis

The cluster analysis was conducted using the Two-Step Cluster method. In this stage, the number of clusters was automatically determined by the algorithm itself. Based on the distribution and characteristics of the variables in the sample, the algorithm indicated that the optimal solution consists of two distinct clusters (Tkaczynski, 2017; Aşkan; Topcu; Sahin, 2021), that enabled a clearer analysis of the characteristics associated with each cluster.

Next, figure 2 shows the quality of the clusters, which was found to be low, meaning that the categorical variables need to be adjusted to improve the results.

Figure 2 - Cluster Quality – Model 1
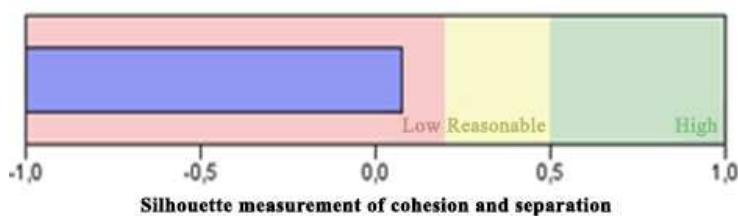
Source: prepared by the author (2025).

As the quality of model 1 did not reach a satisfactory standard, each categorical variable was individually removed, revealing that the variables 'length of service' and 'age' significantly compromised the quality of the clusters. Consequently, a second model was

tested using the Two-Step Cluster algorithm, this time retaining all Q12 and categorical variables except for those identified as problematic. Following the exclusion of 'length of service' and 'age', the algorithm determined that the sample would be best represented by three clusters.

Figure 3 - Cluster quality – model 2
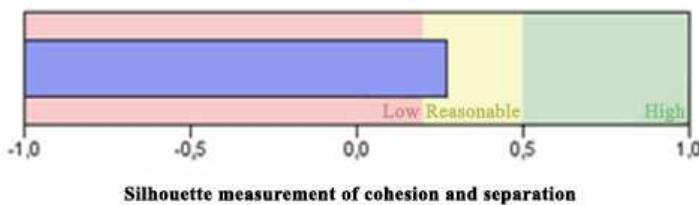
Source: prepared by the author (2025).

Removing the length of service showed a fair improvement in how the data was grouped, although the overall quality is still not high. Nevertheless, the result was good enough for exploratory analysis (Aşkan; Topcu; Sahin, 2021). The identification of three distinct clusters addresses specific objective (d). Table 7 summarizes the cluster distribution.

Table 7 – Cluster distribution

	Nº	%
Cluster 1	52	29.2
Cluster 2	37	20.8
Cluster 3	89	50.0
Total	178	100.0

Source: prepared by the author (2025).

Table 7 indicates that cluster 3 comprises most respondents (50%), highlighting its central role in the sample distribution. To better understand these groups, Table 8 details the cluster profiles by presenting the variables, means, and their standard deviations (SD).

Table 8 – Cluster profiles

Variable	Cluster 1	Cluster 2	Cluster 3

Q1. I know what is expected of me at work.	Mean 3.96 SD 0.88	Mean 4.35 SD 0.72	Mean 4.63 SD 0.57
Q3. At work, I have the opportunity to do what I do best every day.	Mean 3.46 SD 1.04	Mean 3.89 SD 0.97	Mean 4.52 SD 0.77
Q4. In the last seven days, I have received recognition or praise for doing good work	Mean 2.44 SD 0.94	Mean 3.11 SD 1.22	Mean 3.90 SD 1.08
Q6. There is someone at work who encourages my development.	Mean 3.46 SD 0.92	Mean 3.86 SD 0.75	Mean 4.62 SD 0.63
Q7. At work, my opinions seem to count.	Mean 3.81 SD 0.69	Mean 3.97 SD 0.64	Mean 4.70 SD 0.49
Q11. In the last six months, someone at work has talked to me about my progress.	Mean 2.48 SD 0.96	Mean 2.81 SD 1.27	Mean 4.06 SD 1.03
Q12. This past year, I have had opportunities at work to learn and grow.	Mean 3.60 SD 1.01	Mean 3.49 SD 1.02	Mean 4.62 SD 0.61

Source: prepared by the author (2025).

Based on the findings illustrated in Table 8, three respondent profiles emerge. These profile patterns provide the empirical basis for the specific objective (e). Cluster 3 represents the public servants with the highest levels of positive perceptions, suggesting more engaged respondents. These individuals seem to have a clearer role understanding, as it is shown in Q1 (I know what is expected of me at work). They also scored consistently high on Q3 (at work, I have the opportunity to do what I do best every day), Q4 (in the last seven days, I have received recognition or praise for doing good work), and Q6 (there is someone at work who encourages my development). Altogether, this points to a work environment where people feel seen, supported, and allowed to develop.

Cluster 2, in contrast, shows mid-range average scores across nearly all items. Participants in this group express moderate perceptions about items such as knowing what is expected at work (average = 4.35) and having the opportunity to do what they do best (average = 4.07). Compared to Cluster 3, this reflects a generally positive, and less intense view of their work environment.

Members of cluster 1 stand out as the lowest average scores group. Their answers reveal limited clarity of expectations (average = 3.96), low recognition for good performance (average = 2.44), and modest support for development (average = 3.40), suggesting that these

individuals are working in uninspiring RHS with little praise and encouragement.

In general, the results point to three public servant profiles: a highly engaged group (cluster 3), a moderate group (cluster 2), and a group that feels largely unsupported and unappreciated at work (cluster 1). These differences provide opportunities to shape new management strategies that are more sensitive to the demands and circumstances of public organizations. To make the findings easier to follow and give the groups identity, short names were assigned to each profile. Cluster 1 was labeled disconnected, cluster 2 balanced, and cluster 3 engaged. These names reflect the general tone of each group's responses and help bring out who these people are beyond the numbers. Table 9 presents the data for all categorical variables, segmented by cluster.

Table 9 - Frequency of clusters

Variable			Clusters			
			Disconnected	Balanced	Engaged	Total
Gender	Female	Frequency	6	15	50	71
		Percentage	8,5%	21,1%	70,4%	100,0%
	Male	Frequency	46	22	39	107
		Percentage	43,0%	20,6%	36,4%	100,0%
Work Setting	Hybrid	Frequency	23	28	21	72
		Percentage	31,9%	38,9%	29,2%	100,0%
	Remote	Frequency	29	9	68	106
		Percentage	27,4%	8,5%	64,2%	100,0%
Pet Ownership	No	Frequency	47	0	46	93
		Percentage	50,5%	0,0%	49,5%	100,0%
	Yes	Frequency	5	37	43	85

		Percentage	5,9%	43,5%	50,6%	100,0%
	2 people	Frequency	12	8	28	48
		Percentage	25,0%	16,7%	58,3%	100,0%
Number of Residents in Household	3 people	Frequency	21	0	32	53
		Percentage	39,6%	0,0%	60,4%	100,0%
	4 people	Frequency	11	21	14	46
		Percentage	23,9%	45,7%	30,4%	100,0%
	5 people or more	Frequency	1	4	14	19
		Percentage	5,3%	21,1%	73,7%	100,0%
	Live alone	Frequency	7	4	1	12
		Percentage	58,3%	33,3%	8,3%	100,0%

Source: prepared by the author (2025).

Table 9 outlines the frequency distribution across clusters and the sociodemographic profile of participants (disconnected, balanced, and engaged). The engaged cluster includes 70.4% of all female participants, while 43% of all male participants belong to the disconnected cluster. The balanced cluster includes 21.1% of females and 20.6% of males.

When looking at gender differences, women had a higher presence in the engaged and balanced clusters (91,5%) than men (57%). One possible reason is that gender norms may influence how men and women benefit differently from RHS. Similarly, Rodríguez-Modroño (2022) found that, in remote work settings, women reported slightly higher engagement than men, and that gender and remote work intensity are linked to engagement levels. Additionally, according to the OECD (2023), women's employment has expanded more than men's since the beginning of the pandemic, reflecting gendered differences in labor market recovery.

Hence, the gender engagement gap in RHS may reflect how women adjusted to social expectations, using remote work to manage both professional and domestic demands. In other words, higher engagement could be less about personal preference and more about necessity,

resilience, and adaptation within an unequal system.

These results are also a reminder that there is a risk in assuming that engagement is experienced in the same way by different groups. In fact, the variation within each group, such as among women or among men, may be greater than the differences between them. This aligns with earlier findings from the EFA, which showed that engagement in RHS doesn't follow clear or consistent patterns. Further studies could focus on strategies to improve engagement at the personal and situational factors that shape each person's RHS experience.

In terms of work arrangement, 64.2% of employees who work remotely belong to the engaged cluster, suggesting a strong association between remote work and higher engagement levels. Among hybrid employees, 38.9% are part of the balanced cluster, while 31.9% are in the disconnected cluster, showing a more even distribution across engagement profiles.

Regarding pet ownership, every respondent in the balanced cluster reported having a pet (100%), making it a unique group. Most of the engaged cluster respondents also own pets (50.6%), whereas in the disconnected cluster, 94% stated they do not have any.

Looking at household size, the engaged cluster includes most of the respondents living with either two (58.3%) or five or more (73.7%) people. The disconnected cluster, on the other hand, has a larger proportion of individuals living with three people (39.6%), while the balanced cluster stands out for having the highest share of participants living with four others (45.7%).

Living alone appears to be a defining trait of the disconnected, with 58.3% of individuals in this group reporting that they live by themselves. This contrasts with the engaged cluster, where only 8.3% live alone. The difference might suggest a potential connection between shared living arrangements and stronger work engagement.

Finally, figure 4 shows the importance level (GI) of the variables represented across the clusters. The GI ranges from 0 to 1, with variables scoring below 0.3 considered irrelevant to the model (Tkaczynski, 2017).

Figure 4 – Variable importance level
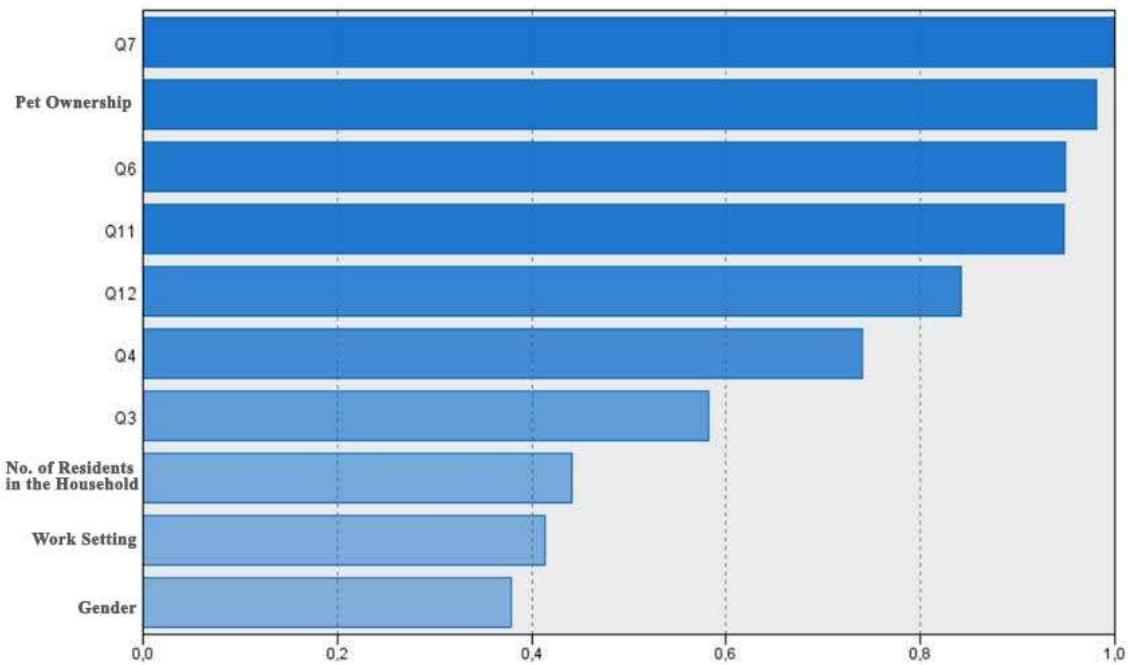
Source: prepared by the author (2025).

Based on Figure 4, which shows each variables' importance (GI) for the formation of clusters, the variables with the greatest discriminating power, that is, those that most contributed to differentiating among the three clusters, are Q7 (at work, my opinions seem to count), with GI = 1.00; pet ownership (GI = 0.98); Q6 (there is someone at work who encourages my development), with GI = 0.95; and Q11 (in the last six months, someone at work has talked to me about my progress), with GI = 0.95. All of these variables presented importance values close to 1, which underscores their high relevance in segmenting participants.

Next, comes Q12 (this last year, I have had opportunities at work to learn and grow), with GI = 0.84, and Q4 (in the last seven days, I have received recognition or praise for doing good work), with GI = 0.74. Although slightly lower, these values are still well above the 0.30 cutoff, also indicating a relevant contribution to distinguishing the clusters.

Finally, there were no variables with a GI below 0.30. Although Q1 (I know what is expected of me at work) is not shown in figure 4, it has a GI of 0.38. Overall, Q12 variables were the main drivers behind the identified profiles, whereas sociodemographic factors had little to no impact on how the groups were classified.

4.3.1 Interpreting the profiles and patterns identified in the cluster analysis

The sample's cluster analysis was largely driven by the Q12 variables, identifying

patterns that pointed to differences in relational climate, feedback availability, and developmental support. Although the categorical variables did not directly determine the clusters, some interesting patterns were observed when the variables were explored independently. For instance, the engaged cluster is composed mostly of women, while the balanced cluster is predominantly pet owners, indicating that engagement experiences may differ by demographic characteristics.

Further, there's a subtle issue with cluster 2, as shown in table 8. The standard deviations in items like Q4 (1.22) and Q11 (1.27) are high. Since the algorithm flattens those differences, engagement in this group could be more fragmented than it appears, making cluster 2 more of a residual space, where the outliers from both extremes were pushed together. This suggests caution in treating cluster 2 as a distinct profile of its own.

Surprisingly, Q1 had low importance in the cluster analysis, reaching a GL of 0.38, above the threshold for relevance but still lower than the top variables like Q6, Q7, or Q11. This is unexpected, considering Q12's basic needs dimension, and is consistently seen in engagement literature as a key job resource that supports work engagement (Bakker; Demerouti, 2007).

This outcome may be attributed to the fact that most samples' participants have over 10 years of service and have moved beyond the stage when responsibilities are less defined. Buckingham and Coffman (1999) support this view, explaining that the Q12 questions should be seen as a series of stages, illustrated with a mountain-climbing metaphor in which each stage, or question, builds on the previous one.

This suggests that the differences in each item's importance, found in this study, are consistent with Gallup's hierarchical model. As it is shown in figure 5, each question is more strongly associated with one of the stages, in which reaching the summit means being fully engaged, sharing purpose and enthusiasm with colleagues. Although it is difficult to remain at this stage for long, it is highly meaningful for the organization (Buckingham; Coffman, 1999).

Figure 5 – Gallup's hierarchical model
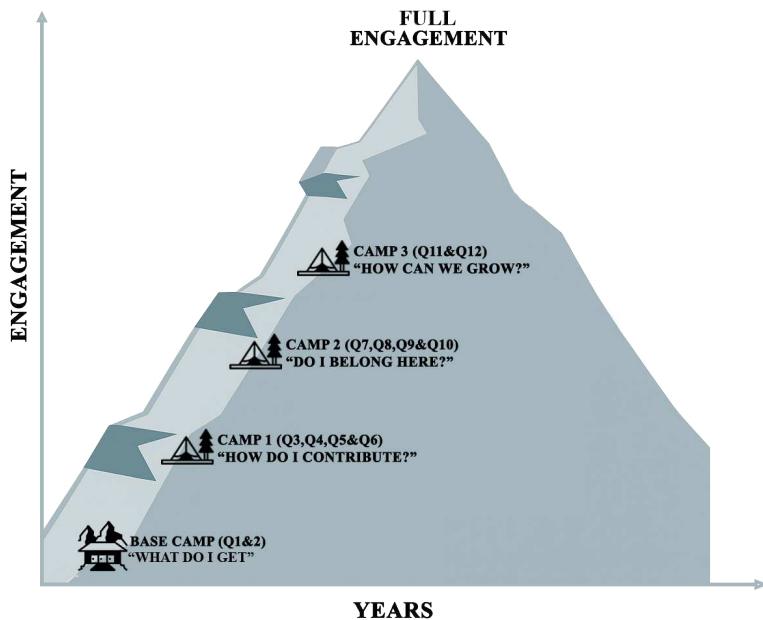
Source: prepared by the author (2025).

Consequently, as the cluster analysis data suggests, knowing what's expected in RHS doesn't necessarily lead to engagement. That reading fits with Herzberg's Two-Factor Theory (Herzberg, 1966), in the sense that having clear expectations helps avoid dissatisfaction, but doesn't ignite interest. The drivers that do (recognition, autonomy, and growth) have also stood out in the analysis.

Another possibility is that some excluded variables, such as age and length of service, introduced noise into the model. Their removal improved the clustering because their relationship to engagement might be non-linear or inconsistent. For instance, both early, and late-career employees could report lower engagement, but for different reasons and on different items. This kind of curvilinear pattern doesn't align well with the cluster model, which tends to group individuals based on more consistent trends across variables. Overlooking this dynamic might limit the discussion, especially when it comes to understanding the boundaries of demographic variables as reliable engagement predictors in complex work environments.

Nonetheless, in cluster 3, there's a noticeable sense of support and recognition, which challenges the assumption that RHS leads to a disconnect (Galanti et al., 2023). This suggests that some teams have developed work cultures that function well under these conditions. In fact, recent research shows that certain leaders seem to create real team-connection even from afar, having a significant positive effect on work engagement, despite the absence of face-to-face interaction (Boccoli; Gastaldi; Corso, 2024). This could point to the presence of

microcultures of real support systems, regardless of being RHS. Further research could explore what makes RHS support systems effective.

Lastly, the engaged group is predominantly female and working remotely, while the disconnected group is mostly male. This contrast may reflect structural differences in how support, visibility, and trust are distributed across the sample, raising an important question: are some groups less seen, recognized or supported in RHS? These shifting states emphasize the importance of recognition, feedback, and development, essential signals of how employees are perceived and supported in RHS.

4.4 T-Test: difference between means

The first student's t-test for independent samples was performed to investigate the extent to which engagement scale levels differed between male and female genders in addition to the 107 sample size for group 1 (males) and the 71 sample size for group 2 (females).

Data normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The assumption of variance homogeneity was evaluated using Levene's test. As the data were not normally distributed, bootstrapping procedures (1,000 resamples; 95% BCa CI) were conducted to obtain greater result reliability, correct distribution normality deviations, account for differences between group sizes, and provide a 95% confidence interval for the mean differences (Haukoos; Lewis, 2005).

The results in Table 10 showed that the male gender had a higher score (M = 4.08; SD = 0.62) than the female gender (M = 3.94; SD = 0.55) (t(176) = -1.78). However, the difference between groups is not statistically significant (p = 0.169).

Table 10 – T-test results for engagement levels between male and female groups

		Scores		t-test Statistic (Bootstrapping sample)					
		M	SD	t	DF	p-value	Mean Difference	Confidence Interval of the Mean Difference (95%)	
								Lower Limit	Superior Limit
Engagement	Male	4.08	0.62	-1.78	176	0.169	-0.134	-3.21	0.03
	Female	3.94	0.55						

Source: prepared by the author with the aid of SPSS 22.0 software.

A second Student's t-test for independent samples was conducted to investigate the

extent to which engagement levels differed between two groups: pet owners (N = 85) and non-pet owners (N = 93). As the data were not normally distributed, bootstrapping procedures (1,000 resamples; 95% BCa CI) were applied for greater result reliability, to correct for non-normality, group size differences, and to present a 95% confidence interval for mean differences (Haukoos; Lewis, 2005).

The results in Table 11 demonstrated that individuals who own pets had a higher score (M = 4.03; SD = 0.66) than those who do not (M = 3.96; SD = 0.66) (t(176) = 0.69). However, the difference between groups is not statistically significant (p = 0.497). This test further addresses specific objective (c).

Table 11 – T-test for engagement levels of pet owners vs. non-owners

		Scores		t-test Statistic (Bootstrapping sample)				Confidence Interval of the Mean Difference (95%)	
		M	SD	t	DF	p-value	Mean Difference	Lower Limit	Superior Limit
Engagement	Pet Owner	4.03	0.66	0.66	176	0.497	0.06	-2.33	0.13
	Non Owner	3.96	0.66						

Source: prepared by the author with the aid of SPSS 22.0 software.

A third Student's t-test for independent samples was conducted to examine whether engagement levels differed between two groups: remote work regime (N = 106) and hybrid work regime (N = 72). As the data were not normally distributed, bootstrapping procedures (1,000 resamples; 95% BCa CI) were applied for greater result reliability and to correct for deviations and group size differences (Haukoos; Lewis, 2005).

The results in Table 12 demonstrated that individuals working remotely had a statistically higher score (M = 4.03; SD = 0.64) than those working in a hybrid regime (M = 3.95; SD = 0.64) (t(176) = 0.74). However, the difference between groups is not statistically significant (p = 0.52).

Table 12 – T-test for engagement levels by work regime (remote vs. hybrid)

	Scores	t-test Statistic (Bootstrapping sample)

		M	SD	t	DF	p-value	Mean Difference	Confidence Interval of the Mean Difference (95%)	
								Lower Limit	Superior Limit
Engagement	Remote	4.03	0.64	0.74	176	0.52	0.07	-0.15	0.29
	Hybrid	3.95	0.64						

Source: prepared by the author with the aid of SPSS 22.0 software.

Next, a one-way ANOVA was conducted to assess whether there were differences in engagement levels among people with different work tenure (up to 10 years, 11–20 years, 21–30 years, and over 30 years). Normality was assessed using Kolmogorov-Smirnov and Shapiro-Wilk tests. Homogeneity of variance was evaluated through Levene's test.

Bootstrapping procedures (1,000 resamples; 95% BCa CI) were performed to improve the reliability of the results, correct deviations from normality in the sample distribution and differences in group sizes, and to provide a 95% confidence interval for the differences between means (Haukoos; Lewis, 2005). Considering the heterogeneity of variances, Welch's correction was applied and post-hoc comparisons were conducted using the Games-Howell method (Field, 2012).

The Kolmogorov-Smirnov and Shapiro-Wilk tests showed that the engagement variable did not follow a normal distribution for any group ($p < 0.05$). Levene's test showed that the groups lacked variance homogeneity [Levene (3, 174) = 3.85, $p < 0.05$]. Descriptive results of the differences between groups are presented in Table 13.

Table 13 - Descriptive statistics of engagement level by tenure group

			Bootstrap[a]		
				Confidence Interval of 95% BCa	
			Standard Deviation	Inferior Limit	Superior Limit
Up to 10 years	Mean	4.20	0.64	3.90	4.40
11 to 20 years	Mean	3.98	0.64	3.84	4.11
21 to 30 years	Mean	3.81	0.83	3.51	4.09
More than 30 years	Mean	3.93	0.51	3.70	4.15

Source: prepared by the author (2025).

The ANOVA results showed no significant differences between groups [Welch's $F(3, 61.92) = 2.05$; $p = 0.11$; Welch's $\omega^2 = 0.025$]. Although Welch's ANOVA indicated no statistically significant overall difference, post-hoc tests were conducted to examine potential

specific pairwise differences.

Table 14 shows that the Games-Howell post-hoc analysis with Bootstrapping revealed that, despite the absence of a statistically significant overall difference, there was a statistically significant difference between the groups categorized by length of service. This difference occurred between individuals with "Up to 10 years" of service (M = 4.20) and those with "21 to 30 years" (M = 3.81), since the 95% confidence interval did not include zero, suggesting a localized effect between these two groups.

Table 14 - Games-Howell post-hoc test with Bootstrapping (95% BCa CI)

Engagement			Bootstrap[a] 95% BCa Confidence Interval	
			Inferior	Superior
Games-Howell	Up to 10 years	Between 11 and 20 years	-.02881	.44688
		Between 21 and 30 years	.01537	.75738
		More than 30 years	-.03597	.56700
	Between 11 and 20 years	Between 21 and 30 years	-.14126	.52293
		More than 30 years	-.22040	.32427
	Between 21 and 30 years	More than 30 years	-.47589	.23758

Source: prepared by the author (2025).

4.4.1 Demographic influences on engagement: patterns, variability, and theoretical implications

The t-test analysis surfaced interesting patterns about how engagement is experienced across different groups, suggesting cultural and psychological dynamics, addressing the study's specific objective (c).

There were statistically insignificant differences in engagement of women over men, pet owners over non-pet owners, and remote over hybrid public servants. Although these trends are small and should be interpreted cautiously, they are consistent with the idea that groups, typically associated with stronger social and emotional anchoring (e.g., women, pet owners) or greater autonomy (e.g., remote public servants), may experience somewhat higher engagement. The positive association between pet ownership and engagement may reflect the behavioral routines and emotional regulation involved in caring for an animal, which provide structure, predictability, and emotional stability (Addictions Training Institute, 2022).

Further, the difference in average engagement scores between remote and hybrid was minor (M = 4.03 vs. 3.95), challenging the narrative that hybrid is the best model for fostering engagement in RHS (ADP, 2023) and the way forward for public settings.

The only statistically significant difference identified across all demographic comparisons concerned length of service (up to 10 years and 21 to 30 years of service), suggesting that engagement in RHS tends to decline after the first decade of service, possibly reflecting the cumulative effects of organizational fatigue, limited advancement opportunities, and shifts in motivational priorities over time.

Finally, the lack of statistical significance in these observed differences, might reveal a gap between what is being measured and what truly influences engagement in RHS, suggesting the need for more meaningful questions, such as how gender norms, coping mechanisms for solitude, and the absence of a time structure affect experiences in RHS.

4.5 Analysis according to Gallup's Q12

Table 15 shows Q12 responses grouped into three bands (4.00–5.00, 3.00–3.99, 1.00–2.99), following the meta-analytic practice of comparing top and bottom quartile engagement units to demonstrate organizational effects (Gallup, 2024; Harter et al., 2016).

Table 15 - Q12 means and standard deviations

Range	Absolute Frequency (n)	Relative frequency (%)
4 - 5	98	55,06%
3 - 3.99	71	39,89%
1 - 2.99	9	5,06%
Total	178	100%

Source: research data (2025).

This scoring pattern is uncommon in recent engagement studies. According to Gallup's latest global reports, only about 20% of workers were engaged in 2024, a decline from 2023 (Gallup, 2025), which contrasts sharply with the sample's 55% of over 4 scores.

As Brazilian public agencies have not yet largely adopted the Q12 to investigate engagement, it makes sense to compare these results to public organizations in the United States, the country where the instrument was developed and most widely applied, to help put the findings in perspective. The U.S. Indiana Department of Health runs a Q12 pulse survey across state agencies and reports an overall mean a little above 4 in 2024 (Indiana Department Of Health, 2024). The Federal Aviation Administration Mike Monroney Aeronautical Center

reported a Q12 grand mean of 4.29 in 2023 (United States. Federal Aviation Administration. Mike Monroney Aeronautical Center, s. d.). The U.S. Oregon Metro's 2023 findings show means of above four for remote and hybrid employees, at 4.16 and 4.09 respectively (Oregon. Metro, 2023). Putting aside differences in the level of support available to Brazilian and United States public employees, taken together, these cases suggest that values above four align with the desired average in public organizations that use the Q12 as a measurement tool for engagement.

As it was the case with this study's EFA results, the USDA Farm Service agency's Q12 2008 report also scored lower in recognition and best friend at work than clarity of expectations, materials and equipment (United States. Department of Agriculture. Farm Service Agency, 2006), echoing this study's EFA that excluded Q10 (I have a best friend at work) and Q4 (in the last seven days, I have received recognition or praise for doing good work) as a pattern. This suggests a possible common thread in public organizations, often worrying more about structural basics than structures of recognition and close social bonds.

Given the declining global engagement levels since 2023, maintaining a highly engaged public workforce will depend on consistent investment in leadership training that translates into better everyday organizational practices (Gallup, 2025). As it is in the U.S., a viable approach for Brazilian public management would be to institutionalize the use of the Q12 instrument. In Oregon, Q12 evolved into a structured cycle of engagement management, enabling systematic action planning and leadership development (Oregon. Department of Administrative Services, 2023).

4.6 Multivariate analysis (regression)

A multiple linear regression analysis (enter method – Bootstrapping) was conducted to examine the extent to which Gallup's Q12 dimensions influenced this study's levels of engagement. The results revealed a significant influence of the dimensions: basic need, individual contribution, teamwork, and growth ($F(5, 173) = 1711$, $p < 0.001$; adjusted $R^2 = 0.96$). The engagement variable was measured through the average results of the items from Gallup's Q12 questionnaire, answered on a 5-point Likert scale, where higher values indicate higher levels of engagement. Table 10 displays the coefficients for all predictors. As shown, the variable with the strongest impact on engagement levels was individual contribution ($b = 0.499$, $p < 0.001$). The only variable that showed a negative, yet statistically significant coefficient, was work setting (dummy variable) ($b = -0.025$, $p < 0.05$).

Table 16 - Predictor variables of engagement

Model	Variable	Standardized Coefficients (Beta)	t	p	VIF
M$_1$	(Constant)	-	6.973	0.00	
	Basic needs	0.182	15.077	<0.001	1.276
	Individual contribution	0.499	30.760	<0.001	2.294
	Teamwork	0.151	11.191	<0.001	1.599
	Growth	0.382	26.021	<0.001	1.877
	Work setting (dummy)	-0.025	-2.338	<0.005	1.019

Source: prepared by the author (2025).

The results of table 16 indicate no evidence of collinearity (VIF < 10). In addition, fewer than 5% of the cases were identified as outliers. Given this low rate, no adjustments to the sample were necessary (Hair et al., 2009).

The multiple regression results also point to a negative and statistically significant effect of remote work on engagement (β = –0.025; p < 0.05). This suggests that, when controlling for the influence of the other variables, remote work is slightly associated with lower levels of participant engagement. This analysis addresses specific objective (c).

4.7 Qualitative analysis

This study also collected open-ended responses to two questions, aiming to capture the perceptions of public servants regarding the challenges that hinder engagement and their suggestions to improve it. The analysis of these responses complements the statistical findings by providing a more nuanced understanding of how employees interpret and experience engagement in RHS.

In response to the first open-ended question (in your opinion, what are the challenges or difficulties in your organization that may reduce engagement?), several participants mentioned dissonance between leadership discourse and daily practice, lack of recognition, absence of transparent communication, and inconsistent or politically-driven decisions. Recurring themes also included excessive workload, understaffing, rigid hierarchies, and insufficient training.

Also, respondents frequently cited remote work-related challenges such as feelings of disconnection, diminished team identity, and skepticism from supervisors about productivity

in remote arrangements. Additionally, some comments highlighted structural barriers to engagement, such as organizational centralization in Brasília, geographic distance from decision-makers, and limited autonomy in regional units. Few respondents expressed that they did not encounter significant barriers in RHS, suggesting variability in how challenges are perceived, depending on context, location, or role.

To visualize these qualitative insights of the first open ended question, figure 6 presents a word cloud generated from the translated responses to the question: in your opinion, what challenges or difficulties in your organization can reduce engagement? The most frequent terms, such as work overload, centralized decision-making, disengagement, pointless efforts, physical distance, inadequate staffing, incongruence, lack of recognition, toxic environment, and political interference, confirm the misalignment between leadership practices and public servants' expectations in RHS.

Figure 6 - Word cloud of perceived organizational barriers to engagement
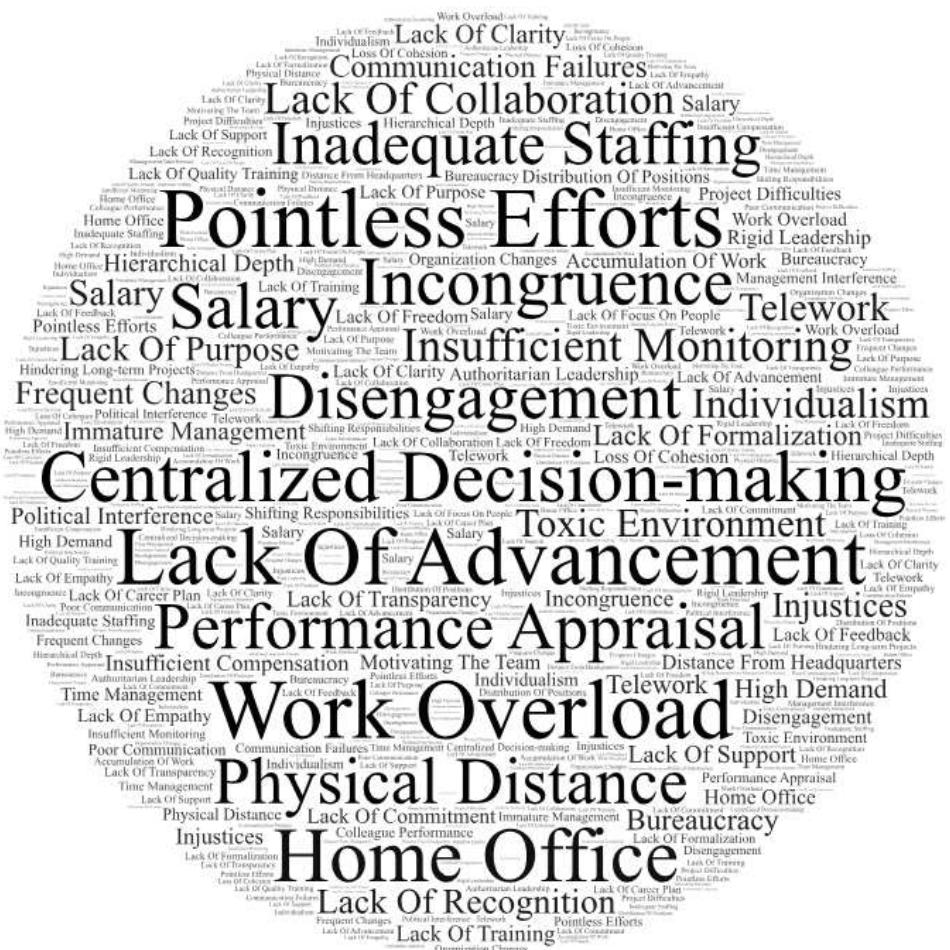
Source: prepared by the author in wordart.com (2025).

In response to the second open-ended question (what changes would you suggest to increase engagement in your organization?), several respondents emphasized the importance of leadership that listens and provides regular feedback. Also, there were suggestions to improve clarity and transparency in communication, recognition of work well done, and a better distribution of workload. There were also frequent appeals for greater flexibility in remote work policies, investment in professional development, and the promotion of integration events to reinforce the sense of connection and belonging.

Figure 7 presents a word cloud summarizing the respondents' suggestions to increase engagement in their organizations. This new set of terms emphasize collaboration, performance evaluation, investment in professional development, and an overall more inclusive, people-centered approach to managing work in RHS.

Figure 7 - Word cloud of respondents' suggestions to increase engagement


Source: prepared by the author in wordart.com (2025).

Some responses indicated a desire for structural and cultural transformation, including decentralization, reduction of political influence, and a shift toward more collaborative and purpose-driven practices.

To improve this scenario, a possible reference is Julian Birkinshaw's framework of four levers for organizational behavior: boundaries, space, direction, and support (Birkinshaw, 2003). In that, Birkinshaw describes space as the degree of freedom people have to experiment, boundaries as the limits in which the organization operates, direction as the organization's strategy, and support as the systems that help people do their jobs well (Birkinshaw, 2003). If any of these elements is out of balance, the context shifts toward constraint or chaos, as described in figure 8.

Figure 8 - Model of corporate entrepreneurship
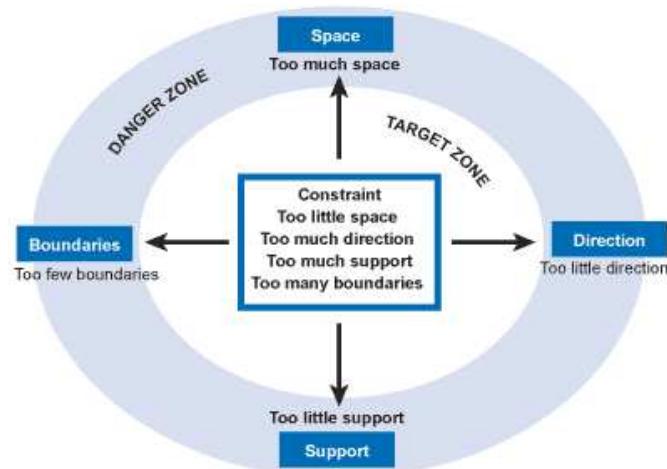
Source: Birkinshaw (2003).

The respondents' complaints and suggestions, such as: absence of transparent communication and insufficient training (too little direction), excessive workload and understaffing (too little support), rigid hierarchies (too many boundaries), and limited autonomy in regional units (too little space), resemble the constraints or danger zones described by Birkinshaw in figure 8. This lack of space, as described by the respondents, also hinders innovation, as excessive control leads to an environment where there is no benefit to innovating, only significant risk to one's own career (OECD, 2019).

Engagement tends to flourish when employees are granted adequate space for autonomy, appropriate stretch through challenging goals, and visible organizational support (Syrett, 2007). This tension between role clarity and relational experience could be an

interesting topic for further research.

Together, these points suggest that employee engagement in RHS relates to trust, leadership coherence, and relational dynamics, underscoring that engagement depends on an environment where work has meaning and support. These qualitative insights provide the basis for specific objective (e), suggesting group-specific strategies aimed at fostering engagement among segmented employee groups.

5 CONCLUSION

While engagement is typically treated as a stable construct, this research's findings suggest that its expression varies in RHS, and it is directly related to the level of leadership, communication, and support systems available.

Hence, this study's findings are an invitation to a critical look at leadership and organizational culture in RHS, indicating that the distance does not necessarily jeopardize engagement. Effective "e-leadership" requires a mix of digital communication skills, social awareness, and credibility to engage in virtual environments. The engagement levels observed in cluster 3 support this view, and suggest the existence and impact of such leadership, one that is capable of institutionalizing good practices that foster engagement in RHS.

Significantly, the evidence suggests that Gallup's Q12 framework for engagement does not fit completely in the reality of public servants working in RHS. Items such as supervisor care (Q5), sense of mission (Q8), coworkers' commitment to quality (Q9), best friend at work (Q10), and availability of materials and equipment (Q2), performed poorly in the EFA analysis. This suggests that, in Brazilian public RHS, experiences of purpose, friendship, and basic infrastructure vary and do not form a single, stable dimension of engagement. This does not invalidate the Q12 instrument in the Brazilian public RHS system, but presents its contextual limits.

Maintaining engagement in RHS is less about replicating in-office routines online and more about creating intentional rituals of connection and follow-up. Regular one-on-one meetings, structured feedback routines, and clear communication about expectations appear to be central levers for sustaining engagement, especially for mid-career public servants who demand recognition and development, as much as stability.

Simultaneously, as it was shown in the cluster analysis, it is crucial to segment strategies by engagement profile, including policies that support vulnerable clusters with closer managerial feedback. For public servants in RHS, what truly distinguishes engagement

profiles is the quality of feedback, voice, and growth experiences, reinforcing the idea that engagement in RHS is closely related to daily, managerial practices.

Moreover, gender, pet ownership, and other seemingly minor variables showed unexpected relevance, suggesting that even small differences in a personal context may interact with how remote work is perceived and lived in the public servant's daily life.

As the study provides relevant insights, its limitations must be acknowledged. Some variables that might influence engagement in RHS, such as leadership quality or digital communication competence, were not included. Additionally, the study captures engagement at a single point in time, not assessing engagement variations in response to policy changes or political transitions. Finally, all responses are self-reported and therefore susceptible to bias, particularly in environments where public servants may fear potential retaliation for expressing dissatisfaction.

Future research could adopt a longitudinal design to explore how engagement evolves over time in RHS. It may also be productive to investigate how public servants negotiate meaning and identity in remote contexts that lack immediate feedback, peer connection, and clear boundaries between work and life. Experimental studies could test the impact of managerial interventions such as regular feedback interactions, providing evidence that complements the correlational insights presented here. Together, these elements can help bridge theory and practice by clarifying which combinations of structural and relational conditions sustain public servants in RHS over time.

The challenges of sustaining engagement in public settings are complex, often marked by political transitions, short term leadership, and shifting priorities, conditions that make it difficult to preserve it over time. Under these circumstances, engagement may be nurtured through the practices suggested in this research, creating a buffer against the uncertainty that characterizes much of the public service sphere.

Finally, this dissertation does not offer a blueprint for remote engagement, but invites public managers to reflect on the importance of leadership and individualized routines, designed to provide follow-up with public servants working in RHS. Engagement resides in the ongoing balance between structure and freedom, solitude, and connection. Recognizing this tension, and responding to it with intelligence and humanity, may be the real task of the leadership that bridges the distance, and drives public servant engagement in remote and hybrid settings.

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APPENDIX I - SURVEY

Prezado(a) Participante,
Este questionário faz parte de uma pesquisa elaborada no programa de Mestrado Profissional em Administração e Controladoria (PPAC Profissional) da Universidade Federal do Ceará (UFC) com o objetivo de avaliar as dinâmicas de engajamento de funcionários em ambiente de trabalho remoto na administração pública e privada brasileira.

O anonimato dos respondentes será preservado e os dados aqui coletados serão utilizados exclusivamente para fins acadêmicos. O tempo médio estimado para completar o questionário é de cerca de 3 minutos.

Indique seu nível de concordância com as afirmações a seguir, usando a escala de 1 a 5, em que:
1 – Discordo totalmente | 2 – Discordo | 3 – Nem concordo, nem discordo | 4 – Concordo | 5 – Concordo totalmente.

BLOCO 1 – Perfil do Respondente

1. Gênero (obrigatória)

Feminino

Masculino

Não optar

2. Idade (obrigatória)

Dropdown de 18 a 75 anos.

3. Quantas pessoas residem em sua casa (incluindo você)? (obrigatória)

Moro sozinho(a)

2 pessoas

3 pessoas

4 pessoas

5 pessoas ou mais

4. Você tem animal de estimação (cachorro, gato, etc.)? (obrigatória)

Não

Sim, 1

Sim, 2

Sim, 3 ou mais

5. Tempo de serviço na organização (obrigatória)

Até 5 anos

Entre 5 e 10 anos

Entre 10 e 15 anos

Entre 15 e 20 anos

Entre 20 e 25 anos

Entre 25 e 30 anos

Mais de 30 anos

6. Em qual tipo de organização você trabalha? (obrigatória)

Pública

Privada

7. Em que tipo de regime você trabalha? (obrigatória)

Presencial

Híbrido

Remoto

BLOCO 2 – Engajamento (Q12)

(1 = Discordo totalmente | 5 = Concordo totalmente)

Eu sei o que é esperado de mim no trabalho.

Eu tenho os materiais e equipamentos necessários para fazer o meu trabalho.

No trabalho, eu tenho a oportunidade de fazer o que eu faço melhor.

Na última semana, eu recebi reconhecimento ou elogio por ter feito um bom trabalho.

Minha chefia imediata se importa comigo como pessoa.

Existe alguém no meu trabalho que encoraja o meu desenvolvimento.

No trabalho, minhas opiniões contam.

A missão/propósito da minha organização me faz sentir que meu trabalho é importante.

Meus colegas de trabalho estão comprometidos em fazer um trabalho de qualidade.

Tenho um melhor amigo no trabalho.

Nos últimos 6 meses, alguém no trabalho falou comigo sobre meu progresso.

Neste último ano, tive oportunidades de aprender e crescer no trabalho.

BLOCO 3 – Questões Abertas

20. Em sua opinião, quais são os desafios ou dificuldades presentes em sua organização que podem diminuir o engajamento?

21. Que mudanças você sugeriria para aumentar o engajamento em sua organização?