VNIVERSITAT DE VALÈNCIA

**Doctoral Programme in Psychology of Human Resources**

# Telework leadership: Analyzing and training competences for improving the performance and well-being of teleworkers.

DOCTORAL DISSERTATION


Presented by

Felipe Esteban Bravo Duarte

**Directors:**

Núria Tordera Santamatilde, PhD

Isabel Rodríguez Molina, PhD


April 2025

This work was supported by the Ministerio de Ciencia e Innovación of Spain, project "Development of leadership competences to improve well-being and performance of teleworkers: evaluation of a web and app-based training (DIGYLID)" (PID2020-116742RB-100).

© Felipe Bravo Duarte, 2025

No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying, recording, or any other information storage or retrieval system, without the prior permission of the author.

*To my mother*

*Your efforts have brought me here*

**ACKNOWLEDGEMENTS**

Making a turn in your life is not easy. Embarking on a new path in academia -departing from consultancy- has been challenging. I had to change the way I see things, the way I think, analyze, and also conceive my life and my professional future. I believe this has been one of the greatest learnings I had. This doctoral journey has been unique, not exempt from complicated moments, but these are very few compared to the joy it has given me.

First and foremost, I am grateful for meeting such a wonderful group of people so welcoming and willing to share their knowledge and wisdom, such as the IDOCAL team. They welcomed me from the first moment and have been an important pillar during these three years. I have created beautiful bonds, but above all with my supervisors, Núria Tordera and Isabel Rodríguez, who have always been there, supporting and giving life to this challenging project. It was difficult at first, but it has also yielded good results, making it a very interesting and enriching experience. Without doubt, without the dedication, guidance, experience, patience, and knowledge of both of them, this could not have been achieved.

I believe this doctoral thesis tries to reflect a bit of that, though it will certainly fall short in conveying all the work and effort we put in, which has been enormous. This all started from my dream of being able to conduct my doctoral research on an applied experience, a concrete program that would also be useful for organizations, that would be a real contribution. This was a dream, a project that started in 2020 during the pandemic, and that now has come to life years later. Therefore, I also want to express my gratitude to the whole Digylid team for the collaboration and compromise regarding this initiative. This thesis shows just a glimpse of that.

I also feel enormously grateful for the support and affection of my doctoral colleagues and coworkers: Alexandra, Baltasar, Danila, Sedi, Milena, Viky, Magdalena, Emiliano, Marija, Aleksandar, Nina, Aida, Esther, Matías, Glauco, Lucía, Harlen, Marius, Giuliano, Lina, Simone, among others. We created a warm and welcoming environment, and without it this never could become possible.

I would also like to thank the rest of the professors who, although not directly part of my thesis, have been a great help in advancing my work, such as José María Peiró, Vicente González Romá, among others, with whom I have been able to interact and who have also contributed valuable ideas to help me move forward and shape the analysis and conceptualization of the framework of this project. Also, I want to express my gratitude to the visiting scholars with whom I have had the joy to interact and learn from. I believe this has also been fundamental because I came without background or research experience, and I believe I have now learned greatly.

Of course, and finally, I want to thank my family who have given me unconditional support since I started with this whole idea. Despite the distance, they have always been there encouraging me to finish, and that gives me the energy to continue and to be now completing this process. I believe that the love they provide is fundamental, and without that support, I could not have achieved this either.

From the bottom of my heart, I hope that this thesis is just the beginning of a long research career, of academic and professional growth, and also that it is just the start of the bonds and collaboration I have made with this beautiful group of people who have been here in Valencia, and that they are the foundation for many future works and collaborations.

# INDEX

**INTRODUCTION** ..... 11
**CHAPTER 1: LEADERSHIP IN TELEWORK** ..... 18
**1.1. TELEWORK** ..... 19
1.1.1 Theoretical models about telework ..... 22
1.1.2 Telework and workers' outcomes ..... 30
**1.2. THE ROLE OF LEADERSHIP IN TELEWORK** ..... 36
1.2.1 Contemporary leadership approaches and telework ..... 36
1.2.2 Competency-based approaches to leadership ..... 39
1.2.3 Virtual and e-leadership models ..... 44
1.2.4 Digitalized leadership competencies framework ..... 52
1.2.5 (Digitalized) leadership competencies and teleworkers' outcomes ..... 54
1.2.6 The leadership competencies for telework model (LCT) ..... 57
**1.3 MEASURING LEADERSHIP COMPETENCIES FOR TELEWORK** ..... 60
1.3.1 Existing measures ..... 60
1.3.2 Current challenges in measuring leadership competencies for telework ..... 65
**1.4. DEVELOPING DIGITALIZED LEADERSHIP COMPETENCIES FOR TELEWORK** ..... 67
1.4.1 Empirical research of leadership training for telework ..... 68
1.4.2 The Digylid training program ..... 73
**1.5. EVALUATION OF LEADERSHIP TRAINING IN TELEWORK CONTEXTS** ..... 76
1.5.1 The Kirkpatrick's framework ..... 76
1.5.2 Considerations for telework leadership training evaluation ..... 78
**CHAPTER 2: OBJECTIVES AND METHODOLOGY** ..... 80
**2.1 OBJECTIVES** ..... 81
**2.2. PROCEDURE** ..... 84
**2.3. SAMPLES** ..... 86
2.3.1. Participants in Study 3 (Chapter 5) ..... 87
2.3.2. Participants in Studies 4 and 5 (Chapters 6 and 7) ..... 87
**2.4. VARIABLES** ..... 89
2.4.1. Leadership Competencies for Telework (LCT) ..... 89
2.4.2. Performance Variables ..... 91
2.4.3. Well-being Variables ..... 92
2.4.4. Variables related to leadership ..... 94
2.4.5. Process and Mechanism Variables ..... 94
2.4.6. Control Variables ..... 95
**2.5. ANALYSIS** ..... 96

**CHAPTER 3: OVERCOMING VIRTUAL DISTANCE: A SYSTEMATIC REVIEW OF LEADERSHIP COMPETENCIES FOR MANAGING PERFORMANCE IN TELEWORK** ..... 101
**3.1. INTRODUCTION** ..... 102
**3.2 METHODS** ..... 106
**3.3 RESULTS** ..... 108
3.3.1 Theoretical and methodological approaches ..... 108
3.3.2 What leadership competencies are most relevant for performance in telework arrangements? ..... 111
3.3.3. What mechanisms and boundary conditions intervene in the relationship between leadership competencies and performance in telework? ..... 118
**3.4 DISCUSSION** ..... 122
**CHAPTER 4: WELL-BEING IN TELEWORK: A SYSTEMATIC REVIEW OF LEADERSHIP COMPETENCIES** ..... 131
**4.1 INTRODUCTION** ..... 132
**4.2 METHODS** ..... 135
**4.3 RESULTS** ..... 137
4.3.1 Theoretical and methodological approaches ..... 138
4.3.2 What leadership competencies are related to teleworkers' well-being? ..... 140
4.3.3 How and when do leadership competencies show stronger relationships with teleworkers' well-being? ..... 146
**4.4 DISCUSSION** ..... 149
**CHAPTER 5: LEADING FROM AFAR: DEVELOPMENT AND VALIDATION OF THE LEADERSHIP COMPETENCIES FOR TELEWORK (LCT) SCALE** ..... 158
**5.1. INTRODUCTION** ..... 159
**5.2. SUB-STUDY 1: LCT SCALE CONTENT VALIDITY** ..... 165
5.2.1 Method ..... 165
5.2.2 Results ..... 166
**5.3 SUB-STUDY 2: LCT SCALE VALIDITY AND RELIABILITY** ..... 170
5.3.1 Method ..... 170
5.3.2 Results ..... 175
**5.4 DISCUSSION** ..... 180
**CHAPTER 6: VALIDATION OF THE LEADERSHIP COMPETENCIES FOR TELEWORK SHORT-SCALE (LCT-S) IN SPANISH AND COLOMBIAN POPULATIONS** ..... 184
**6.1 INTRODUCTION** ..... 185
**6.2 METHODS** ..... 189
**6.3 RESULTS** ..... 194

6.3.1 Spanish Validation of LCT-S scale ..... 195
6.3.2 Colombian Validation of LCT-S scale ..... 198
6.3.3 Cross-national invariance analysis ..... 200
**6.4 DISCUSSION** ..... 201
**CHAPTER 7: EFFECTS OF A TELEWORK LEADERSHIP TRAINING INTERVENTION ON LEADERS AND THEIR EMPLOYEES: A MULTILEVEL STUDY.** ..... 205
**7.1 INTRODUCTION** ..... 206
7.1.1 The intervention: a telework leadership training program ..... 208
7.1.2 Training evaluation ..... 211
**7.2 METHODS** ..... 215
**7.3 RESULTS** ..... 220
7.3.1 Effects of the training on leaders' learning ..... 221
7.3.2 Effects of the training on transfer ..... 222
7.3.3 Effects of the training on results (outcomes) ..... 224
**7.4 DISCUSSION** ..... 227
**CHAPTER 8: GENERAL DISCUSSION** ..... 235
**8.1 SYNTHESIS OF MAIN RESULTS** ..... 236
**8.2 THEORETICAL IMPLICATIONS** ..... 239
**8.3 PRACTICAL IMPLICATIONS** ..... 243
**8.4 LIMITATIONS AND FURTHER RESEARCH** ..... 246
**8.5 CONCLUSIONS** ..... 249
**RESUMEN GLOBAL - LIDERAZGO EN TELETRABAJO: ANÁLISIS Y FORMACIÓN DE COMPETENCIAS PARA MEJORAR EL DESEMPEÑO Y BIENESTAR DE LOS TELETRABAJADORES** ..... 253
**INTRODUCCIÓN** ..... 254
**OBJETIVOS** ..... 257
**METODOLOGÍA** ..... 258
**RESULTADOS** ..... 264
**CONCLUSIONES** ..... 268
**REFERENCES** ..... 272
**APPENDIXES** ..... 324
Appendix 1: Quantitative papers analyzing the relationship between leadership for telework and performance indicators ..... 325
Appendix 2: Qualitative papers analyzing the relationship between leadership for telework and performance indicators ..... 329
Appendix 3: Quantitative papers analyzing the relationship between leadership for telework and well-being indicators ..... 331

Appendix 4: Qualitative papers analyzing the relationship between leadership for telework and well-being indicators ..... 335
Appendix 5: Final selection of items of the LCT scale (in Spanish) ..... 336

**List of Tables:**

Table 1: LCT Scale factor definitions ..... 163
Table 2: Final selection of translated items and content validity results ..... 167
Table 3: Descriptive statistics for the LCT Scale. ..... 175
Table 4: Multiple regressions for well-being and extra-role performance outcomes for LCT Scale. ..... 179
Table 5: LCT Short Version (LCT-S) items ..... 190
Table 6: Descriptives and mean comparisons between countries ..... 194
Table 7: Multiple regressions for well-being and performance outcomes for lct short scale in the spanish population ..... 197
Table 8: Multiple regressions for well-being and performance outcomes for lct short scale in the colombian population ..... 199
Table 9: Factor loadings for each country ..... 200
Table 10: Contrast of each invariance model ..... 201
Table 11: Descriptives and correlations between variables - leaders ..... 220
Table 12: Descriptives and correlations between variables – subordinates ..... 221
Table 13: Effect of the changes in the perception of the subordinates of the leadership competencies on the changes in subordinates' outcomes at individual and team levels ..... 225
Table 14: Effect of the changes in the self-perception of the leadership competencies on the changes in leaders' outcomes ..... 226

**List of Figures:**

Figure 1: The LCT model (Rodríguez et al., 2023) ..... 59
Figure 2. Inclusion of studies according to PRISMA Guidelines. ..... 106
Figure 3. Composition of the sample of articles reviewed related to year of publication. ..... 108
Figure 4. Inclusion of studies according to PRISMA guidelines. ..... 136
Figure 5. Composition of the sample of articles reviewed related to year of publication. ..... 138
Figure 6: LCT scale CFA with standardized factor loadings per item and factor ..... 177
Figure 7: Subordinates' perceptions of leaders' competencies moderated by leaders' participation in interactive sessions ..... 223

# INTRODUCTION

This doctoral thesis addresses the assessment and development of leadership competencies in telework. This type of working arrangement has experienced unprecedented growth in recent years, significantly transforming global work dynamics. Before the COVID-19 pandemic, the International Labour Organization (ILO) estimated that approximately 260 million people worked from home, representing 7.9% of the global workforce (International Labour Organization, 2020). However, this trend accelerated dramatically during 2020, increasing the figure to 557 million people, equivalent to 17.4% of the global workforce (Benavides & Silva-Peñaherrera, 2022).

Spain has followed a similar pattern to the global trend, but with its own characteristics. Key indicators show an evolution from 4.8% of workers regularly teleworking before the pandemic (2019) to 16.2% during the pandemic's peak (Q2 2020) (Observatorio Nacional de Tecnología y Sociedad, 2020). Current data from 2024 indicates that 15.1% of employed individuals aged 16-74 worked from home at least once a week (Instituto Nacional de Estadística, 2024). According to the National Observatory of Telecommunications and Information Society (ONTSI), total telework in Spain has grown from 13.2% in the first quarter of 2023 (2,725,100 people) to 14.4% in the same period of 2024 (3,057,400 people) (ONTSI, 2024).

Despite this apparent growth, the implementation of telework still faces significant backlash. For example, several major corporations, including Amazon and Google, have recently struggled to manage remote work effectively and have required employees to switch from full-time teleworking to other work arrangements (Perman, 2023). These facts raise a critical question in contemporary work research regarding the factors determining the success or failure of telework arrangements.

When this question is considered, the inconsistent research findings regarding telework efficacy (Athanasiadou & Theriou, 2021; Gajendran et al., 2024) and its impact on well-being (Beauregard et al., 2019; Crawford, 2022) suggest that key organizational functions—particularly leadership—may play a decisive role (Athanasiadou & Theriou, 2021; Efimov et al., 2020; Gajendran et al., 2024; Gohoungodji et al., 2022). Indeed, previous research indicates that successful telework implementation depends more on effective organizational leadership than on technological infrastructure (Beauregard et al., 2019; Wang et al., 2020).

This recognition of the crucial role of leadership highlights a significant challenge: traditional leadership approaches developed for face-to-face contexts appear insufficient for telework environments (Avolio et al., 2009; Bell et al., 2023; Cortellazzo et al., 2019). Leaders managing teleworkers face unique obstacles in maintaining performance and well-being when face-to-face interaction possibilities are reduced, and communication is primarily technology-mediated (Bell et al., 2023). In this context, previous research highlights that leaders must deal with the virtual distance created by telework, which refers to the multifaceted separation encompassing physical, operational, and affinity dimensions, transforming how leadership functions are developed (Lojeski & Reilly, 2020).

Therefore, addressing these challenges requires reconceptualizing leadership competencies for digital environments. Peiró and Martínez-Tur (2022) identify the relevance of different types of competencies for facing the challenges of digital transformation: digital competencies (technical skills for using digital tools) and digitalized competencies (traditional leadership behaviors adapted for technology-mediated contexts). While both are important, the latter is critical for maintaining effective people management in remote settings. This also aligns with Spain's digital strategy for 2025. This directive points out the importance of enhancing digital skills and emphasizes the need to develop personal competencies for the digital era as a national priority, complementing technological competencies (Ministerio de Ciencia e Innovación, 2020).

Responding to this request, the present doctoral thesis is developed in the context of and contributing to the development of the Digylid project (Leadership training program for teleworking through web and app "Digylid", ref. UV-MET-202327R coordinated by Isabel Rodriguez and Núria Tordera). This project aimed to establish foundations for developing and training digitalized leadership competencies, positively impacting teleworkers' performance and well-being by appropriately managing the virtual distance that leaders and teleworkers might face in this work arrangement. This project included the development of a specific intervention aimed at training leaders in digitalized competencies for teleworking environments, to improve the performance and well-being of teleworkers. The Digylid training program was created, employing an innovative

methodology integrating web-based learning, mobile application support, and interactive sessions to develop the digitalized leadership competencies (Rodríguez et al., 2023).

As part of this general project, the present doctoral thesis addresses several interconnected research gaps: First, while studies have begun examining which leadership approaches positively affect teleworker outcomes (Brown et al., 2021; Cortelazzo et al., 2019; Lundqvist et al., 2023), empirical evidence about which specific competencies shorten virtual distance and enhance performance and well-being in teleworking contexts remain insufficiently identified and understood. Moreover, the mechanisms and contextual factors that influence these relationships require systematic investigation (Inceoglu et al., 2018). Two systematic reviews contributed to developing the model of leadership digitalized competencies for telework.

Second, validated measurement instruments specifically designed for assessing telework leadership competencies are notably scarce. Despite some scales having been developed to measure e-leadership (Roman et al., 2018) or similar constructs (Batırlık et al., 2022; Gonzáles & Durán, 2021; Miranda et al., 2024), there is a need for a scale that addresses the specific digitalized competencies that can positively impact the performance and well-being of teleworkers. The scale was developed to assess the Digylid conceptual model of leadership digitalized competencies for telework.

Furthermore, as telework facilitates global collaboration across geographical boundaries (Schulze & Krumm, 2016), leadership assessment instruments must demonstrate cross-national validity. This need becomes particularly relevant when developing tools in languages like Spanish, which are used across diverse Spanish-speaking countries (e.g., Spain and Colombia). Measuring scale invariance across countries enables the scales to be used by teams across different countries, thereby increasing the possibility of measuring leadership competencies in international environments, which is common in organizations offering teleworking arrangements.

Finally, despite growing recognition of the importance of telework leadership competencies, empirically validated training programs designed to develop these competencies remain exceptionally rare (Arora & Suri, 2020; Gohoungodji et al., 2022). As the initial implementation of the Digylid training program was conducted as a beta version, evaluating its effectiveness and substantial impact on the performance and well-

being of teleworkers and the leaders is crucial. This will establish empirical evidence of its effect and set the basis for future editions of the intervention.

In response to all the gaps cited above, the main objective of this doctoral thesis is to **conceptualize, assess, and develop leadership competencies for telework that enhance teleworkers' performance and well-being.** To accomplish it, the research progression follows a logical sequence: first identifying which digitalized leadership competencies influence teleworkers' performance (Study 1) and well-being (Study 2) through systematic reviews; second contributing to the development of the Leadership Competencies for Telework (LCT) model; then developing and validating a measurement scale (LCT) for these competencies in a Spanish population (Study 3); third, validating a short-form version of the LCT scale across Spanish and Colombian samples to ensure cross-cultural applicability (Study 4); and finally evaluating the effectiveness of the training program in developing these competencies and improving outcomes for both teleworkers and leaders (Study 5).

This doctoral research makes several significant contributions to both academic and organizational practice. First, it addresses critical gaps in leadership research by empirically identifying specific competencies required for effective telework leadership, considering potential mechanisms and boundary conditions. Second, it provides researchers and practitioners with valid measurement instruments to assess and develop leadership capabilities directly linked to teleworker outcomes. Third, cross-cultural validation enhances the applicability of these instruments across diverse contexts, contributing to their generalizability. Fourth, evaluating a targeted training program offers evidence-based approaches for leadership development designed explicitly for telework settings. Nielsen and Taris (2019) note that while the effects of leadership training on worker performance have been well-documented, there remains a gap in research regarding how leadership training positively impacts employee well-being. Therefore, this research aims to expand knowledge on the effects of leadership training on workers and leaders, focusing on both performance and well-being outcomes. Consequently, it also contributes to the development of healthy and resilient organizations by fostering the development of their members (Salanova et al., 2016). This focus is critical in remote work environments, where promoting healthy organizational practices through leadership is essential for improving the occupational health of teleworkers (Rinker et al., 2024).

The thesis is structured in eight chapters. Chapter 1 presents the theoretical foundation, establishing the conceptual framework for teleworking and the role of leadership in this context. It examines the applicability of existing leadership theories to teleworking environments, leading to the development of a leadership model based on digitalized competencies that shortens the virtual distance generated by teleworking. It also critically evaluates current measurement approaches and the challenges of measuring leadership in the context of telework. The theoretical framework also examines current approaches to leadership training in teleworking contexts, presenting the Digylid training program as the first approach to training digitalized leadership competencies for telework. In the final part of this first chapter, we provide the foundation for evaluating the Digylid training program using Kirkpatrick's training evaluation framework.

Chapter 2 details the comprehensive methodology employed across all studies, including the development process for the leadership training program. It explains how the program explicitly targets the competencies identified in systematic reviews and measures them using the developed scales, thereby creating coherent connections between research components.

Chapters 3 and 4 present systematic reviews identifying leadership competencies enhancing teleworker performance and well-being, respectively. These reviews provide the empirical foundation for the LCT model, which integrates findings from both performance and well-being perspectives.

Chapter 5 describes the validation of the LCT scale in Spain, detailing item generation, content validation, factorial structure, and psychometric properties. Chapter 6 extends this work by validating the short-form version across Spanish and Colombian populations, examining measurement invariance and predictive validity across cultural contexts.

Chapter 7 evaluates the effectiveness of the training program, focusing on remote goal management and remote relationship development competencies. It analyzes changes in pre- and post-intervention outcomes and their subsequent impacts on teleworker outcomes.

Finally, Chapter 8 synthesizes findings across all studies, discussing theoretical and practical implications, acknowledging limitations, and suggesting future research directions. This integrated discussion demonstrates how the research collectively advances understanding of effective leadership in telework environments and provides practical guidance for organizations navigating the challenges of remote work.

Through this comprehensive research, the thesis aims to contribute to developing effective telework arrangements that enhance teleworkers' performance and worker well-being across diverse geographical contexts, addressing one of the most significant workplace transformations of the current century.

# CHAPTER 1: LEADERSHIP IN TELEWORK

The study of leadership has evolved significantly over time, adapting to changing organizational contexts and new forms of work, such as telework arrangements. This chapter explores the theoretical foundations of leadership as it applies to the emerging domain of telework environments. This introduction begins by examining the concept of telework and its various manifestations, followed by a discussion of contemporary leadership models and their applicability in telework settings. It then explores specialized frameworks for virtual and digital leadership before delving into digitalized leadership competencies that specifically address the challenges of virtual distance in telework. The chapter further analyzes how these digitalized competencies influence teleworkers' performance and well-being, culminating with the presentation of the Leadership Competencies for Telework model. Additionally, it addresses the measurement of leadership competencies in telework contexts and explores approaches to leadership training and its evaluation in these specific environments.

## 1.1. TELEWORK

The notion of telework originated in the second half of the 20th century, with seminal works by Nilles et al. (1976) and Toffler (1980) proposing that technological advancements would facilitate the decentralization of work from traditional office spaces to residential and local settings (Messenger & Gschwind, 2016), an putting the focus of the definition of telework in the fact that working was location-independent (Vartiainen, 2024). However, this type of work arrangement has been evolving over the years. Understanding telework requires recognizing its evolutionary trajectory through distinct stages characterized by technological developments and organizational implications. Following Messenger and Gschwind (2016) and Vartiainen (2024), we could consider five important stages for understanding its evolution:

*First Stage: Home-based telework (1970s-1990s):* In this initial stage, Nilles et al. (1976) posited a transformative shift in the work locus, envisioning a mass migration of jobs from centralized workplaces to distributed home offices and neighborhood telework centers. The first generation of telework, often referred to as "telecommuting", was primarily home-based, utilizing stationary information and communication technologies such as personal computers and telephones for remote work (Nilles et al., 1976). During

this period, the primary focus was on reducing commuting costs and addressing environmental concerns related to transportation.

*Second Stage: Mobile work (1990s-2000s):* The second stage emerged with the proliferation of portable devices like laptops and mobile phones, allowing work to be carried out in various "third spaces", including cafes, transportation hubs, and other public venues (Messenger & Gschwind, 2016). This modality afforded greater locational flexibility and was often associated with remote part-time work arrangements. However, workers' main tasks in this generation remained primarily connected to their default workplace (Messenger & Gschwind, 2016). The mobile office concept expanded the potential locations for work while maintaining organizational connections through increasingly portable technologies.

*Third Stage: Virtual teams and global collaboration (2000s-2010s):* This subsequent stage witnessed the emergence of "virtual teams" as a concept, driven by globalization and enhanced digital connectivity. These developments enabled organizations to assemble teams across geographic boundaries, creating new forms of collaboration that transcended traditional spatial limitations (Gilson et al., 2014). The "digital online telework" concept also emerged as a global form of employment that utilizes online platforms to enable individuals, teams, and organizations to access other individuals or organizations to solve problems or provide services in exchange for payment (Vartiainen, 2021). This period saw the development of sophisticated collaboration tools and practices designed explicitly for geographically dispersed teamwork.

*Fourth Stage: Ubiquitous connectivity (2010s-2019):* The fourth stage was catalyzed by the massification of smartphones and tablets, facilitating work execution in transitory spaces such as streets, corridors, elevators, and parking lots. These technologies provided constant access to information and communication resources, untethering work from fixed locations (Messenger & Gschwind, 2016). Before the COVID-19 pandemic, telework was already gaining traction, driven by technological advances, changing worker preferences, and the growing recognition of its potential benefits (Belzunegui-Eraso & Erro-Garcés, 2020).

*Fifth Stage: Pandemic, post-pandemic and hybrid work (2020 – Present):* The classification of Messenger and Gschwind (2016) reached the development of telework until the middle of the 2010s decade. However, the sudden arrival of the pandemic and resulting lockdowns forced organizations worldwide to rapidly shift to remote work arrangements (Brynjolfsson et al., 2020), marking a significant milestone in adopting telework. The post-pandemic period has witnessed substantial shifts in worker values, with increased emphasis on work-life balance and flexibility (Chan et al., 2022), resulting in the widespread adoption of hybrid work arrangements that combine remote and in-office work. This progression reflects the transformative impact of technological advancement on the conceptualization and implementation of telework, from the initial focus on reduced commuting costs to the contemporary temporal and spatial complexity of work being performed in multiple places, enabled by the usage of advanced technologies that allow multi-presence and collaborative work between in-presence and remote workers (Vartiainen, 2021; 2024).

This evolutionary trajectory has resulted in conceptual diversity regarding what constitutes telework. Academia has employed multiple labels to characterize work outside conventional office environments, including *telework, telecommuting, virtual work, home-based work, mobile work, digital work,* and *remote work* (Bailey & Kurland, 2002; Nakrošienė et al., 2019). Nevertheless, at its core, telework can be defined as **"a form of organizing and/or performing work, using information technology, in the context of an employment contract/relationship, where work that could be performed at the employers' premises is carried out away from those premises on a regular basis"** (European Trade Union Confederation, 2002 in Eurofound, 2021). Therefore, telework constitutes a work arrangement where employees operate beyond the geographical confines of their employers' primary worksite (Mokhtarian, 1991; Nakrošienė et al., 2019; Vartiainen & Vanharanta, 2024). It is important to acknowledge that teleworkers can be self-employed or organizationally dependent if a default workplace can be identified (Vartiainen & Vanharanta, 2024).

Although most research has been focused on comparing telework with co-located or office work, different authors have advocated for the importance of attending to different dimensions or facets of telework research besides this dichotomic unidimensional differentiation (Athanasiadou & Theriou, 2021; Martinolli, 2024;

Vartiainen, 2021). For example, the temporal dimension of telework adds another layer of complexity. Telework can be conducted during traditional business hours, aligning with the organization's standard workday, or during non-traditional hours, such as evenings or weekends. The latter arrangement, known as "flextime" or "flexible working," enables employees to tailor their work schedules to accommodate personal obligations or preferences, provided they fulfill their job responsibilities and meet performance expectations (Nakrošienė et al., 2019). The duration of telework arrangements can also vary considerably, from short-term or project-based agreements to long-term or open-ended contracts (Gajendran & Harrison, 2007).

These dimensions interact with each other, shaping different types of telework, each with specific particularities and challenges (Vartiainen & Vanharanta, 2024). Different actors, such as leaders, should consider this complexity and adapt the most suitable configurations based on specific tasks or organizational situations. Research has provided some conceptual and theoretical models that explore the complexity of telework. They provide comprehensive frameworks to understand how telework impacts individuals, groups, and organizations, as well as its implications for leadership.

### 1.1.1 Theoretical models about telework

As organizations increasingly adopt telework practices, various models have emerged to conceptualize and guide the implementation of effective telework strategies. These models offer frameworks for understanding how telework impacts individuals, groups, leaders, and organizations, providing practical suggestions for designing and implementing these work arrangements. This section explores three models to comprehend telework: the Telework Systematic Model (Stoian et al., 2022), the Hybrid Work Model (Vartiainen, 2024), and the Virtual Distance Model (Lojeski & Reilly, 2020). Each model offers a unique perspective on understanding and managing the complexities of telework arrangements.

*Telework Systematic Model*

The telework systematic model (TSM) proposed by Stoian et al. (2022) is a comprehensive and practical framework for understanding and implementing telework effectively. The model is grounded in expectancy, boundary, management, control, and

social exchange theories to analyze how telework challenges might differ from traditional work arrangements (Stoian et al., 2022). The TSM considers three factors to analyze how the design of telework affects organizational outcomes. Thus, the authors propose a sequential flow in which adequate *inputs* of telework lead to effective *outputs*, which ultimately affect some *outcomes* of teleworkers and organizations. These three categories are detailed as follows:

A) The ***input*** category encompasses factors that can either favor or hinder the implementation of telework, such as resource availability, digital infrastructure, and professional relationships. *Resource availability* includes information availability, leaders' and team members' availability, and managing interruptions from coworkers or family members. *Digital infrastructure* encompasses the usage of workers and leaders of tools such as email, video conferencing, scheduling software, project management software, cloud storage platforms, and collaborative whiteboard software. *Professional relationships* consider the quality of relationships, decision-making processes, and international collaboration in telework settings. Regarding this, a trust-based employee-manager relationship is considered a key factor in ensuring a positive impact on job performance and attitudes toward work.

B) The ***output*** category encompasses the effects that telework can promote or hinder. These immediate results are a direct consequence of the inputs and are closely linked to leadership. *Knowledge exchange* refers to the processes through which information, expertise, and insights are shared among team members in the virtual environment. *Work-life balance* considers flexibility, time for personal life, increased creativity, and the ability to disconnect from work. *Professional isolation* encompasses challenges like a lack of interaction, monitoring difficulties, anxiety, and pressure experienced by teleworkers. As relevant input, leadership is expected to facilitate communication and knowledge transfer, establish or apply policies that facilitate work-life balance, and maintain the people socially and professionally connected m.

C) The ***outcomes*** category constitutes the sustained telework implementation's strategic and far-reaching consequences. These results reflect significant organizational changes and are strongly influenced by leadership decisions.

Creating a *hybrid work culture* addresses unplanned encounters and the concept of "work camps," which are periodic in-person gatherings designed to strengthen team cohesion and facilitate complex decision-making. *Innovation* considers using social media platforms, team collaboration software, specialized digital tools, and employee monitoring software to drive innovative work practices. *Business opportunities* include enhanced time management, increased productivity, cost savings, and access to global talent from different locations. Thus, effective leadership is expected to play a crucial role in all these results through its contribution to implementing the appropriate inputs ( e.g., planning frequency, format, and objectives of interactions, selecting appropriate technologies, and modeling their effective use), and generating those processes (e.g. knowledge transfer, social connectedness) that lead to higher levels of hybrid work culture, innovation and business opportunities.

As can be seen, it is important to acknowledge that leadership emerges as a crucial factor in the TSM framework, as leaders manage many of these resources (inputs) and significantly influence both outputs and outcomes (Stoian et al., 2022). Leaders influence various aspects of work design, making their role essential for successfully implementing transformations and improving worker outcomes (Nielsen & Taris, 2019). Therefore, as telework is a significant transformation in work design, their role is essential in this context.

*Hybrid Work Model*

While TSM provides an explanatory model about the links between telework resources, outputs, and outcomes, other models address how telework's spatial and temporal flexibility has impacted organizations and the multidimensional nature of these new working arrangements. Going beyond the dichotomy between remote and co-located work, the hybrid work model (HWM) by Vartiainen (2024) offers a framework that focuses on the different dimensions that define hybrid work in organizations. This makes it applicable to the different forms of work currently being implemented, encompassing it as a hybrid work arrangement. More concretely, Vartiainen (2024) defines hybrid work within four dimensions or spatial elements: physical, virtual, social, and temporal, with an additional integrative mental space component. These elements interact and influence

each other to shape the overall hybrid work experience and define how hybrid work might be designed.

A) *Physical space* relates to where work is performed, encompassing sub-elements such as location, workplace design, mobility, and infrastructure. This element acknowledges the diverse range of potential work locations, from traditional offices to homes, vehicles, customer premises, and even "third places" such as cafes or hotels. A key aspect is the emphasis on workplace quality across all locations, acknowledging that while employees might be location-independent, they remain dependent on the quality of their workspace.

B) *Virtual space* represents the digital layer of the work environment, encompassing tools for information search, processing, communication, and collaboration. This element highlights the need for both asynchronous and synchronous tools to support various work modes. It also considers emerging technologies such as artificial intelligence, virtual worlds, and the metaverse, recognizing their potential to reshape the digital workplace. Robust digital infrastructure and connectivity are emphasized as a foundational aspect of hybrid work.

C) *Social space* encompasses the complex social contexts and relations that hybrid workers navigate. This includes face-to-face and online interactions with colleagues, superiors, clients, family members, and friends

D) *Temporal space* addresses when, how long, and how often work is performed. It includes sub-elements of work schedules, synchronicity, time allocation, work-life boundaries, and global collaboration. This element is crucial in understanding how hybrid work impacts work-life balance and how organizations can structure time to optimize both productivity and workers' well-being.

E) Finally, *mental space* serves as an integrative element in this model, acting as a lens through which workers perceive and experience their hybrid work environment, influencing how they interpret and respond to the other four spaces. This element is crucial in understanding the psychological impacts of hybrid work, including potential benefits such as increased autonomy and challenges like isolation or blurring of work-life boundaries.

A key strength of this model is its recognition of the interconnectedness of these elements. For instance, the choice of physical location can significantly impact social interactions and the use of virtual tools (Vartiainen & Vanharanta, 2024). Similarly, temporal flexibility can influence how physical and virtual spaces are utilized (Vartiainen & Vanharanta, 2024). This interplay underscores the complexity of telework arrangements and the need for a holistic approach to their design and implementation.

Managing this complexity requires a paradigm shift from traditional direct supervision toward objective-based management accompanied by supportive leadership emphasizing trust-based relationships and remote workers' empowerment (Vartiainen, 2024). Organizational control mechanisms diversify, incorporating behavioral control through procedures, outcome control through measurable objectives, peer control, self-control, and shared control based on group norms and values.

Vartiainen (2024) also posits that leaders in hybrid environments assume a significant dual role, as they must adapt personally to telework while simultaneously directing other teleworkers. This duality involves experiencing challenges like those of their subordinates while developing specific competencies for managing distributed teams. Leadership functions are distributed across two main phases: the *transition phase* (implementation), which includes mission definition, expectation setting, work structuring, and feedback; and the *action phase* (use), which focuses on monitoring, boundary management, problem-solving, and supporting the social climate. To effectively manage hybrid work, Vartiainen (2024) proposes that leaders must establish trust relationships through dialogic interactions, build shared understanding about organizational goals, maintain close contact with workers providing emotional support rather than tight supervision, master collaboration technologies, foster healthy boundaries between work and personal life, promote community spirit, implement wellness practices, and develop self-leadership capabilities in their employees.

*Virtual Distance Model*

The virtual distance model (VDM), developed by Lojeski and Reilly (2020), focuses on virtual distance as the primary mechanism to explain telework complexities and potential risks, such as social isolation, lack of commitment, or lack of common identity. Virtual distance refers to the psychological gap that arises when work is

conducted remotely and mediated by technology. It emphasizes the subjective experience of separation rather than just the physical arrangement of remote work. This model directly addresses telework's design and implementation aspects, where leadership plays a significant role. Moreover, it is a comprehensive model considering different types and levels of virtuality or teleworking, from mostly co-located situations to completely remote and hybrid models. According to the VDM, three main dimensions contribute to the sense of separation experienced in virtual work environments: physical distance, operational distance, and affinity distance.

A) *Physical distance* refers to the spatial and structural separation that virtual work produces, encompassing three sub-elements: geographic separation, temporal distance, and organizational distance. *Geographic separation* refers to the physical distance between team members, ranging from different rooms within the same building to different countries or continents. *Temporal distance* refers to differences in time zones that can complicate synchronous communication, potentially leading to delays in decision-making and challenges in building team cohesion. *Organizational distance* refers to the separation that results from different departmental or hierarchical affiliations, which can create differences in goals, priorities, and work cultures.

B) *Operational distance* refers to the day-to-day challenges in virtual collaboration, encompassing three sub-elements: communication distance, multitasking, and readiness distance. *Communication distance* refers to difficulties conveying and interpreting messages through digital channels, where nonverbal cues may be lost or misinterpreted. *Multitasking* is the tendency to engage in multiple tasks simultaneously during virtual interactions, potentially leading to reduced attention and engagement. *Readiness distance* refers to gaps in technological infrastructure or skills that hinder effective collaboration, such as inconsistent internet connectivity, incompatible software versions, or varying levels of digital literacy.

C) *Affinity distance* encompasses social and relational aspects of virtual work and includes four sub-elements: cultural distance, social distance, relationship distance, and interdependence distance. *Cultural distance* refers to differences in values, norms, and communication styles that can arise when team members

come from different cultural backgrounds. *Social distance* refers to the lack of informal, spontaneous interactions that build rapport and trust among team members. *Relationship distance* refers to the absence of shared history or personal connections among team members. *Interdependence distance* refers to the lack of understanding about how a teleworkers' work impacts others on the team.

By addressing all three components, the model offers a nuanced understanding of the challenges in telework beyond the focus on physical separation and technological solutions. Acknowledging virtual distance allows organizations to develop comprehensive strategies for managing different virtual, remote or hybrid work situations.

Regarding the leadership role, Lojeski and Reilly (2020) emphasize that leaders must develop new skills to manage virtual distance and effectively foster cohesion within their teams, considering the barriers that digital tools may bring. This is englobed in the concept of *soul-based leadership*, which focuses on restoring the sense of "aliveness" and human connection that often diminishes when people work virtually. The authors posit that leaders must create experiences where team members can tangibly feel each other's presence as living beings, even when physically separated. To do this, leaders must create context (i.e., repeatedly reinforce vision, mission, and goals), cultivate community (i.e., encouraging perspective-sharing), and co-activate new leaders (i.e., promoting shared leadership) (Reilly & Lojeski, 2009). By this, leaders create a more profound sense of genuine human connection, sharpen the understanding of what truly matters in work, and, with intentional care and mindfulness, address and counteract the impacts of virtual distance on remote workers (Lojeski & Reilly, 2020)

In summary, TSM, HWM, and VDM offer unique yet complementary perspectives on understanding and managing telework arrangements. One key commonality among the models is their emphasis on the multidimensional nature of telework. For example, while the VDM emphasizes the interaction of physical, operational, and affinity factors (Lojeski & Reilly, 2015), the HWM recognizes the interconnectedness of physical, virtual, social, temporal, and mental spaces (Vartiainen & Vanharanta, 2024). All three models underscore the complexity of teleworking and the

need for a holistic approach beyond just technological solutions or physical arrangements to understand teleworking environments and provide adequate designs.

Another critical insight from these models is the importance of social and relational factors for teleworking success. The TSM identifies professional relationships as a key input factor (Stoian et al., 2022), while the VDM emphasizes affinity distance, which encompasses cultural, social, and relationship aspects (Lojeski & Reilly, 2015). The HWM also highlights the social space and the concept of "*multipresence*" in navigating the complex web of social interactions in hybrid environments (Vartiainen & Vanharanta, 2024). These insights suggest that organizations must prioritize strategies that foster social connection, trust, and cohesion among teleworkers.

Finally, the models also highlight the crucial role of leaders in effectively managing teleworking. The TSM model identifies leadership practices in virtual environments as an area for further development, as they can provide essential inputs for effective telework, such as connections and collaboration, and impact on some outputs, such as professional isolation and work-life balance (Stoian et al., 2022). Meanwhile, the VDM suggests that leaders need to restore the *"aliveness"* of work by developing new skills to manage virtual distance and foster cohesion in teleworkers (Lojeski & Reilly, 2015). The HWM also highlights the need for leaders to align hybrid work arrangements with organizational goals, individual needs, and job demands (Vartiainen & Vanharanta, 2024). These insights underscore the importance of developing telework-specific leadership competencies, which can help teams navigate the complexity of teleworking and its consequences for the performance and well-being of teleworkers. As organizations continue to adopt various telework arrangements, leadership emerges as a critical factor in determining their success and sustainability.

Besides the theoretical conceptualizations about telework, empirical research has also examined the relationship between telework and the main organizational outcomes considered in organizational psychology research: performance and well-being. Thus, the following section will examine empirical evidence on this issue, laying the groundwork for understanding the relationship between telework and these two outcomes.

### 1.1.2 Telework and workers' outcomes

Understanding the impact of teleworking on workers' outcomes has been a primary concern for research in this area. Initially, most studies focused predominantly on performance implications, with increased attention on well-being mainly emerging during and after the COVID-19 pandemic (Charalampous et al., 2019; Wang et al., 2020). Moreover, both outcomes —performance and well-being— represent the core organizational priorities that leadership must address, reflecting the classic dual focus on task accomplishment and relationship management that defines effective leadership (Yukl, 2012).

*Telework and performance*

Understanding the relationship between telework and performance has emerged as a critical area in contemporary work dynamics. Researchers have postulated divergent perspectives on how telework arrangements might affect performance. Meta-analysis by Gajendran et al. (2007) and systematic reviews such as Allen et al. (2015) and Mutiganda et al. (2022) indicate that telework can enhance performance by eliminating commuting, favor flexibility, and offering opportunities to tailor work environments to individual preferences. Conversely, other research suggests that telework may lead to performance decrements due to more interruptions (Kazekami, 2020), reduced communication quality, coordination difficulties (Charalampous et al., 2019; Wang et al., 2020), absence of spontaneous interactions that catalyze teamwork outcomes (Bailey & Kurland, 2002), and challenges associated with varying telework arrangements among co-workers (Van der Lippe & Lippényi, 2019). These factors can potentially diminish teleworkers' performance, particularly for those with limited prior remote work experience (Offstein et al., 2010).

Moreover, empirical research has approached this relationship primarily through two methodological strategies. Comparative studies have examined performance differences between teleworkers and office-based employees (e.g., Bloom et al., 2014; Vega et al., 2014), while intensity-focused investigations have analyzed the relationship between telework frequency and various performance outcomes (e.g., Golden & Veiga,

2008; Kazekami, 2020). This also affects how the relationship between telework and performance is interpreted.

This complexity is further evident when examining how specific aspects of telework design might affect different performance dimensions. Regarding productivity—defined as the ratio of outputs to inputs or the efficiency with which resources are used to produce benefits for the organization (Tangen, 2005)—research has found that telework can enhance this outcome (Bloom et al., 2014; Mutiganda et al., 2022), with Kazekami (2020) noting that appropriate telework hours can increase productivity only up to certain thresholds. Martinolli et al. (2024) established a relationship between teleworking flexibility and scientific productivity. On the other hand, when performance is conceived as task performance—defined as the proficiency with which employees carry out their core technical duties and responsibilities (Carpini et al., 2017)—results are mixed. Some studies show that telework intensity favors task performance through reduced work overload (Silva et al., 2022) and increased autonomy (Gajendran et al., 2014), while others find that it diminishes team task performance (Van der Lippe & Lippényi, 2019) or has no significant effect (Golden et al., 2008; Nemțeanu et al., 2021; Varotsis, 2022).

For contextual performance, which includes behaviors that support the organizational, social, and psychological environment, Vega et al. (2014) found that employees reported higher creative performance when teleworking compared to office-based work, attributing this to reduced distractions and greater autonomy. However, Gajendran et al. (2014) found no associations between telecommuting intensity and contextual performance, operationalized as job dedication and interpersonal facilitation.

Regarding adaptive performance—an individual's ability to respond effectively to changing work conditions (Ramos-Villagrasa et al., 2019)—recent research by Halmen et al. (2024) confirmed that in telework arrangements, organizational culture, work practices, structure, and technology positively influence adaptive outcomes, regardless of geographical location. For counterproductive work behavior—actions that harm organizational effectiveness (Rotundo & Sackett, 2002)—Nemțeanu et al. (2021) found that telework autonomy and interaction reduction positively influenced such behaviors

during the pandemic, with professional isolation having a weaker but still positive influence on counterproductive actions.

The mixed findings across studies suggest that telework may not directly determine performance outcomes. Recent meta-analyses have attempted to synthesize these findings, with Gajendran et al. (2024) conducting a comprehensive review of remote work intensity and performance, and Purvanova and Kenda (2022) analyzing the impact of virtuality on team effectiveness. These reviews suggest a more complex relationship than initially theorized, indicating that the association between telework and performance may vary depending on mediating mechanisms (Gajendran et al., 2024) and team characteristics (Purvanova & Kenda, 2022). Gajendran et al.'s (2024) dual-path model indicates that telework may simultaneously activate competing mechanisms that affect performance in opposing ways. On one hand, telework can enhance autonomy, job satisfaction, and work-life balance, positively influencing performance (Allen et al., 2015; Gajendran & Harrison, 2007). On the other hand, it may increase professional isolation, reduce knowledge sharing, and diminish coordination, negatively impacting performance (Golden et al., 2008). These mechanisms are supported by research outside the telework context, demonstrating that job resources like autonomy and social support significantly predict performance (Bakker & Demerouti, 2017). Moreover, Wang et al. (2020) identified individual differences in communication skills, self-regulation, and adaptability as significant factors influencing performance in telework. Additionally, job characteristics appear crucial, with Mutiganda et al. (2022) finding that telework significantly enhances job performance, particularly for complex, problem-solving-oriented roles.

Given these complex pathways, leadership is a critical factor influencing whether telework enhances or diminishes performance. Leaders can significantly shape the resources and demands experienced by teleworkers (Contreras et al., 2020; Gajendran et al., 2014), providing clarity regarding goals and expectations, facilitating communication, promoting autonomy while ensuring coordination, and helping prevent professional isolation (Kozlowski et al., 2021). Leadership approaches that effectively manage the challenges of remote work can potentially maximize telework's positive aspects while minimizing negative impacts on performance (Cortellazzo et al., 2019). This suggests that

leadership quality, rather than telework itself, may determine performance outcomes in remote work settings (Bell et al., 2023; Peiró et al., 2024).

*Telework and well-being*

Telework introduces significant considerations for well-being, mirroring the complexity observed in performance outcomes. Empirical evidence on the impact of telework on well-being and its rationale presents contrasting views. Research suggests teleworking could enhance well-being through reduced commuting stress, greater flexibility, and improved work-life integration (Beauregard et al., 2019; Gajendran & Harrison, 2007; Kelliher & Anderson, 2009). Conversely, critics argue that telework may undermine well-being due to professional and social isolation (Golden et al., 2008), blurred work-life boundaries (Charalampous et al., 2022), reduced organizational identification (Bartel et al., 2012), and technostress from constant connectivity (Tarafdar et al., 2017) and digital fatigue (Fauville et al., 2021). In fact, the study by Olafsen et al. (2024) comparing a large sample of Norwegian workers and non-teleworkers found that teleworkers suffered from more work stress, work-home conflict, poor sleep quality, depression, and anxiety compared to non-teleworkers.

These contradictions have prompted extensive empirical research examining the relationship between telework and different dimensions of well-being. As it was the case on the study of the relationship between telework and performance research, these studies have employed two primary methodological approaches: comparative studies examining differences between teleworkers and office-based employees (i.e Kelliher & Anderson, 2009; Mann & Holdsworth (2003; Morganson et al., 2010), and research analyzing the relationship between telework intensity and well-being outcomes (i.e. Golden & Veiga, 2005; Nagata et al., 2021).

This dual approach has produced varied findings across different dimensions of well-being. Well-being research typically distinguishes between two main conceptualizations: hedonic and eudaimonic well-being (Peiró et al., 2014). Hedonic well-being focuses on experiencing pleasure and avoiding pain (Ryan & Deci, 2001), while eudaimonic well-being emphasizes achieving one's potential and finding meaning in life (Peiró et al., 2014).

For hedonic well-being, research presents mixed evidence. Regarding affective well-being, Sardeshmukh et al. (2012) found that the extent of telework is significantly associated with reduced exhaustion, suggesting potential benefits for emotional states. However, Mann and Holdsworth (2003) reported that teleworking employees experienced more stress-related mental health symptoms compared to office-based workers, attributing this to isolation and reduced social support. Henke et al. (2015) identified more nuanced effects, with teleworking associated with lower depression risk for employees teleworking eight hours or less weekly, but increased stress risk for those teleworking more extensively. This pattern suggests the relationship may be curvilinear rather than linear. Job satisfaction, a key component of subjective well-being, has also been extensively studied in teleworking contexts. Studies such as Suh and Lee (2017) and Virick et al. (2009) report positive associations between telework intensity and job satisfaction; however, studies such as Alfaleh et al. (2021) found that on-site workers have higher levels of job satisfaction compared to remote workers. Golden and Veiga (2005) identified a curvilinear relationship, with job satisfaction highest at moderate telework levels (approximately 40% of working hours) and declining at higher intensities due to reduced social interaction and increased isolation.

Concerning eudaimonic well-being, the impact of telework appears equally complex. Regarding work engagement, Sardeshmukh et al. (2012) also found positive effects of the extent of telework on engagement. Nagata et al. (2021) discovered that high-intensity telework (4 or more days per week) was not associated with high engagement, whereas low-intensity (monthly to weekly) and moderate-intensity telework (2-3 days per week) showed positive associations. At the opposite, Wang et al. (2023) identified negative indirect effects of home-based telework on engagement through "workplace isolation–negative emotion" and "telepressure–negative emotion" mediating chains. However, considering specific components of telework, Martinolli et al. (2024) found that in teleworking contexts, flexibility had a positive relationship in eudaimonic well-being through its positive effects on organizational climate.

The inconsistent findings across studies suggest that telework itself may not directly determine well-being outcomes, but rather operates through intervening mechanisms, like performance outcomes. Gajendran et al.'s (2024) dual-path model again provides a useful framework for understanding these contradictory results, positing that

telework simultaneously activates competing mechanisms that affect well-being in opposing ways. Their meta-analysis confirms that while intensive remote work generally improves job satisfaction and organizational commitment, it also increases the risk of professional isolation, with the net effect determined by how these competing pathways are balanced. Moreover, the significant role of mediating factors such as autonomy (Beckel & Fisher, 2022), social support (Bentley et al., 2016), and boundary management (Basile & Beauregard, 2016; Symeonidou & Mihail, 2022) underscores the importance of thoughtful implementation that addresses potential factors that can favor or diminish teleworkers' well-being.

Among these influencing factors, and as well as with performance, leadership emerges as particularly critical in shaping telework impact on well-being, as leaders directly influence many of the mechanisms that determine telework outcomes (Wang et al., 2020; Mutiganda et al., 2022), potentially enhancing or diminishing employee well-being by establishing appropriate work structures, fostering team connections, and supporting healthy boundary management (Beauregard et al., 2019; Bentley et al., 2016). Gajendran et al. (2024) suggest that leaders can optimize well-being outcomes by implementing practices that enhance autonomy (evaluating results rather than monitoring behaviors) while reducing isolation (through regular structured meetings and social connection opportunities). This balance allows organizations to maximize telework benefits while minimizing its drawbacks.

In summary, research has shown that teleworking itself is neither inherently beneficial nor detrimental to performance and well-being. Its impact depends substantially on implementation approach, individual characteristics, job design, and—critically—how it is managed. The varying and sometimes contradictory findings across studies highlight the contextual nature of teleworking effects, with optimal arrangements potentially involving balanced approaches rather than extreme positions (Golden & Veiga, 2005; Nagata et al., 2021). Therefore, given the significant role of job resources and demands in shaping telework outcomes, leadership emerges as a determinant factor in whether telework enhances or diminishes employee outcomes. By effectively managing the resources and demands experienced by teleworkers, leaders can promote positive outcomes even in challenging remote work contexts.

The following section examines these leadership dynamics in greater detail, exploring leadership models and their connection with telework, as well as how effective leadership can optimize telework arrangements for the benefit of teleworkers.

## 1.2. THE ROLE OF LEADERSHIP IN TELEWORK

Leadership represents "the process of influencing others to understand and agree about what needs to be done and how to do it" (Yukl, 2006, p.8), in order to achieve shared goals through vision, guidance, and support (Bass, 1990). It has also been defined as a central process in organizations for the achievement of organizational outcomes, facilitating both individual and collective efforts (Yukl, 2006). Indeed, leadership and leadership development have been found to be related to most organizational processes and outcomes (Avolio et al., 2009; Day et al., 2014; Day & Dragoni, 2015).

Examining different theoretical frameworks and their application to telework contexts is essential to understanding how leadership can most effectively contribute to teleworkers' performance and well-being. The exploration begins with general leadership frameworks that have been applied to the study of telework (e.g., Bass & Avolio, 1994), continues highlighting the usefulness of adopting a competency-based approach to the analysis of leadership in telework (e.g., Boyatzis, 1991; Quinn et al., 2011), examines digital and telework leadership models that have emerged in response to most recent technological advancement (e.g., Avolio et al., 2000; Kozlowski et al., 2021), discusses digitalized leadership competencies as a framework for understanding effective leadership behaviors (Peiró & Martínez-Tur, 2022), and concludes with the telework leadership model adopted in the present study, which integrates these perspectives into a comprehensive framework for leading in teleworking contexts.

### 1.2.1 Contemporary leadership approaches and telework

Leadership theory has evolved through distinct approaches and leadership models over the decades. Contemporary predominant approaches to leadership, such as transformational leadership, leader-member exchange, or servant leadership approaches, have tried to some extent to address how leadership can address the challenges of telework and/or electronic and digital mediated communications.

Transformational leadership theory emerged as a prominent framework throughout the last decades of the 20th century and has prevailed until nowadays, gathering significant research attention. Burns (1978) initially conceptualized the differentiation between transactional and transformational leadership, which Bass (1985) later developed into a comprehensive model. Transactional leadership is based on establishing clear expectations, incorporating contingent rewards and corrective actions, and focusing on short-term goals and maintaining the status quo. On the contrary, transformational leadership inspires followers through shared vision and emotional connection. Transformational leaders exhibit idealized influence (serving as role models), inspirational motivation (communicating a compelling vision), intellectual stimulation (encouraging creativity), and individualized consideration (attending to the unique needs of followers) (Bass & Avolio, 1994). However, transactional and transformational leadership are not seen as opposed styles but as complementary levels of leadership efficacy, as is explained in the full range theory of leadership developed by Bass & Avolio (1994). Research in co-located work arrangements has consistently found increased levels of effectiveness in leadership to be positively correlated with increased job satisfaction, organizational commitment, and performance (Judge & Piccolo, 2004).

Despite the widespread literature on transformational leadership, few studies addressed how transformational leadership might be relevant for telework. Joshi et al. (2009) found a positive relationship between inspirational leadership and individuals' commitment to the team and trust in team members, which are positively related to the team's overall performance. Ben Sedrine et al. (2020) found that both transformational and transactional leadership are related to virtual team performance, via trust and operational cohesion. Ben Sedrine et al. (2020) also found a positive relationship between transactional and transformational leadership and satisfaction with the team. Qualitative research also supports this positive relationship. Concretely, Maduka et al., (2018) found that team members considered transformational leadership traits (being motivational, visionary, leading by example, focusing on relationships, and managing change) to be associated with high team performance. Kelley and Kelloway (2012) found that transformational leadership mediated the relationship between contextual job factors (like perceived control, communication, and prior knowledge of the team) and job satisfaction of both remote and proximal workers. Nevertheless, the contextual factors had a stronger

influence on perceptions of transformational leadership for remote compared to proximal employees. Also, the study of Mutha and Srivastava (2021) found that the two dimensions of transformational leadership considered in their study (idealized influence and inspirational motivational inspiration) were related to teleworkers' engagement.

Concurrent with the development of transformational-transactional leadership, the Leader-Member Exchange (LMX) theory emerged in the 1970s to focus on the quality of dyadic relationships between leaders and followers, characterized by varying levels of trust, respect, and obligation (Graen & Uhl-Bien, 1995). This relational perspective on leadership recognizes that leaders engage in different types of exchanges with their followers, leading to the formation of in-groups and out-groups. High-quality LMX relationships have been found to be positively related to increased support, resources, opportunities, job satisfaction, commitment, and performance (Gerstner & Day, 1997), underscoring the importance of personalized leader-follower connections. Also, some empirical support has been found for the importance of this approach in teleworking contexts. Kuruzovich et al. (2021) found LMX was significantly related to followers' individual-level overall performance (rated by supervisors) and job satisfaction for both remote and non-remote workers. Golden and Veiga (2008) found similar results related to individual task performance, highlighting even stronger relationships for those who worked extensively in virtual mode (compared to hybrid work). They also found a significant positive relationship between LMX and job satisfaction for both remote and non-remote workers. Moreover, LMX has also been found to be related to team innovation in dispersed teams. Gajendran and Joshi (2012) found in a panel study that LMX was more beneficial for team innovation (process and outcome) in highly dispersed teams when communication frequency was also high; moreover, they also found LMX to increase the leaders' influence on team decisions.

In the 1970s, Greenleaf (1970, 1996, as cited in Alimo-Metcalfe, 2013) introduced the concept of servant leadership, which prioritizes the needs and well-being of followers, emphasizing empowerment and personal development. This approach inverts the traditional leadership hierarchy by positioning leaders as servants first, focusing on helping followers grow and succeed. Servant leaders exhibit listening, empathy, healing, awareness, persuasion, conceptualization, foresight, stewardship, and a commitment to people's growth and community-building (Van Dierendonck, 2010), fostering a

supportive environment that enhances individual and organizational outcomes. To some extent, research has also considered this approach in telework settings, although in a limited number of studies. Regarding this approach, Hu et al. (2022) investigated the moderating effect of servant leadership in remote work settings between state anxiety and job engagement and prosocial behavior among workers in telework settings. They found that this relationship was lower when perceived servant leadership was higher. Furthermore, they also found that state anxiety was lower when perceived servant leadership was higher. However, the leaders' humility, one central characteristic in the servant leadership concept, was not found to affect team performance in virtual workers in Swain's (2018) study.

In summary, while contemporary leadership models offer valuable insights for leading teleworkers, none provides a comprehensive framework that explains why or when certain behaviors contribute more effectively to telework leadership. These models inadequately address how leadership functions might be reconfigured in digitalized and virtually distant contexts. As research extends into digital and telework leadership domains, existing models serve as foundational knowledge while highlighting the need for specialized approaches in remote work environments. A behavioral or competency-based approach to leadership might offer a more nuanced examination of which leadership behaviors are valuable in emerging contexts and how traditional leadership functions require adaptation. Building upon this foundation, competency-based leadership approaches may provide more precise frameworks for understanding leadership in digital and remote contexts (Bauwens & Cortellazzo, 2024; Peiró, 2024). This will be explored in the following section.

### 1.2.2 Competency-based approaches to leadership

Competency leadership models have been advantageous in leadership and organizational development because they identify effective leadership behaviors and provide applicable models to measure and train leaders (Hollenbeck et al., 2006). This approach effectively operationalizes leadership theory by systematically identifying and categorizing specific behaviors, skills, and attributes that correlate with leadership effectiveness across various organizational contexts, providing valuable frameworks for

developing and training leadership (Hollenbeck et al., 2006). Thus, it can be especially useful when considering the measurement and development of leadership for telework.

The competency concept originated with McClelland (1973), who challenged traditional intelligence testing by arguing that specific personal characteristics better predicted job performance. This perspective shifted focus from general abilities to concrete behavioral capabilities that could be developed through targeted interventions. Competence represents "*an underlying characteristic of a person which results in effective and/or superior performance in a job*" (Boyatzis, 1991, p. 21). These underlying characteristics encompass a person's motives, traits, skills, self-image, social roles, and specific knowledge they apply in work contexts. Competencies are causally related to effective performance, representing what a person can do rather than what they consistently demonstrate across all situations (Boyatzis, 1991). This distinction is fundamental in teleworking contexts, where situational factors may significantly influence behavioral expression.

Leadership competency models emerged in the late 1970s, with Klemp (1980) defining leadership competencies as characteristics resulting in superior leadership performance (as cited in Boyatzis, 1982). Boyatzis (1982) extended this concept through his Leadership Competency Assessment method, identifying characteristics of superior managers through behavioral event interviews. This approach focused on actual behaviors demonstrated in critical situations rather than theoretical knowledge or self-reported capabilities. The methodology revealed specific thought patterns and actions distinguishing high-performing leaders, providing a foundation for competency-based development.

During the 1980s-1990s, organizations widely adopted leadership competency models encompassing multiple capability domains. Conger and Ready (2004) noted that these frameworks typically included cognitive abilities (strategic thinking, analysis), emotional intelligence factors (self-awareness, empathy), social skills (networking, influencing), personal traits (adaptability, integrity), and specific knowledge domains. This multidimensional approach recognized that effective leadership requires an integrated set of capabilities spanning intellectual, emotional, and interpersonal domains. Although leadership competency models can be specifically adapted to the specific needs

and requirements of a focus organization, research has also provided generic leadership competency models that try to respond to the general needs of leadership competencies for most organizations.

One of the most influential models, Quinn's competing values framework, offers a comprehensive approach for understanding leadership competencies (Quinn et al., 2011). The framework organizes leadership competencies into four quadrants configured along two primary dimensions: First, the internal-external focus determines whether leadership attention is directed inward toward organizational processes and people (internal) or outward toward market position and external stakeholders (external). Second, the flexibility-control orientation distinguishes between emphasis on adaptability and dynamism (flexibility) versus stability and predictability (control). These two dimensions create four quadrants representing different and sometimes competing leadership values, each one with two roles:

A) Human relations quadrant (internal focus, flexible). This quadrant emphasizes collaboration, cohesion, and morale, focusing on human development. The *facilitator role* fosters collective effort, builds cohesion, manages interpersonal conflict, and creates environments where people can express opinions. The *mentor role* concentrates on developing people through empathetic support, active listening, fair treatment, and guiding professional growth.
B) Open systems quadrant (external focus, flexible). This quadrant emphasizes adaptation, growth, and resource acquisition, focusing on innovation and change. The *innovator role* encourages adaptation and change, envisioning needed transformations, tolerating uncertainty, and inspiring creative thinking. *The broker role* concentrates on maintaining external legitimacy through building and maintaining a power base, negotiating agreements, and securing resources from the outside.
C) Rational goals quadrant (external focus, control). This quadrant emphasizes productivity, achievement, and profit, focusing on goal clarity and direction. The *producer role* involves focusing on tasks, accomplishing work efficiently, fostering a productive work environment, and driving toward goal achievement. The *director role* encompasses defining roles, establishing clear objectives, setting expectations, and organizing through planning and prioritizing work.

D) Internal processes quadrant (internal focus, control): This quadrant emphasizes stability, control, and continuity, focusing on information management and coordination. The *monitor role* focuses on tracking details, managing information flow, conducting analysis, and ensuring compliance with rules and procedures. The *coordinator role* involves maintaining structure, scheduling, organizing logistical matters, and coordinating interdependent activities across different functions.

The value of Quinn's framework lies in its recognition of the inherent contradictions in leadership (need for flexibility versus control; internal versus external focus), its suggestion that effective leaders must develop competencies across all quadrants rather than only those that align with their personality, and its provision of a situational and adaptive framework for leadership competencies development (Quinn et al., 2011). In telework, some previous research has analyzed how the competing values framework can apply to remote or telework contexts. For instance, Wakefield et al. (2008) found that director and producer leadership roles had the strongest relationship with teleworkers' perception of team performance, compared to other roles (e.g., monitor, coordinator). These roles included behaviors related to providing direction, prioritizing, planning, and initiating action. However, they also found a relationship between internal leadership roles (i.e., facilitator and mentor) with perceived leader effectiveness and team overall performance rated by teleworkers. Kashive et al. (2022) found that behaviors of the external leadership roles (director, producer, innovator, and broker) were positively related to perceived team overall performance. Thomas and Bostrom (2011) also found that control-oriented behaviors (Theory X) of the leader (i.e., monitoring goal achievement, enforcing rules, and reassigning people) had a direct and positive relationship with the accomplishment of the team's project outcomes in the teleworking context by increasing trust and cooperation.

Leadership competency frameworks could offer several advantages for leadership development. First, they provide clarity and common language around effective leadership, creating shared understanding within organizations (Hollenbeck et al., 2006). This transparency helps communicate expectations across organizational levels, which is particularly valuable in large, complex organizations with diverse leadership roles. Second, competency models serve as developmental roadmaps for aspiring leaders,

highlighting specific capabilities requiring development (Hollenbeck et al., 2006). This targeted approach enhances the efficiency of development efforts by identifying precise growth areas.

From a strategic perspective, competency models align leadership development with organizational priorities. Many organizations regularly update their frameworks to reflect evolving strategic objectives (Hollenbeck et al., 2006), ensuring that leadership capabilities support current and future organizational needs. Additionally, competency models provide an integrative framework spanning multiple HR systems, from selection and performance evaluation to succession planning (Hollenbeck et al., 2006). This integration creates consistency across talent management processes, reinforcing organizational values and expectations.

However, Hollenbeck et al. (2006) identify several critical weaknesses. These frameworks often oversimplify leadership complexity by reducing multifaceted roles to standardized capabilities while ignoring situational factors that influence effectiveness across contexts. They frequently reinforce a "great person" leadership perspective that limits diversity in leadership approaches, focuses excessively on individual attributes rather than organizational outcomes, demonstrates concerning rigidity by presenting competencies as fixed rather than adaptive, and lacks substantial empirical validation despite widespread adoption. This balanced assessment suggests that competency frameworks offer valuable organizational tools but require contextual application and ongoing development to address their inherent limitations in dynamic environments such as telework settings.

Therefore, the competency approach provides a structured framework for identifying and developing leadership capabilities, but existing models have not adequately addressed the unique demands of telework contexts. This gap between general leadership competencies and specific telework requirements necessitated the development of specialized frameworks addressing remote leadership challenges. Virtual and e-leadership models arrived to solve this gap and will be described in the next section.

### 1.2.3 Virtual and e-leadership models

Building upon prevailing leadership models and competency frameworks, contemporary workplace transformations demand new frameworks tailored to digital and remote contexts. This section examines how leadership models have addressed the technological impact on leadership function and roles. In the following sections, first, the virtual leadership model is analyzed (Kozlowski et al., 2021), as one of the first models that addresses leadership in digital contexts. Then, we cover the e-leadership model (Avolio et al., 2000) that broadly addresses technology-mediated leadership. Finally, we examine the framework developed by Peiró and Martínez-Tur (2022) for examining digitalized leadership competencies in the telework context (Peiró & Martínez-Tur, 2022).

*Virtual team leadership*

Research on virtual leadership has significantly evolved over the past two decades, with Kozlowski and his collaborators' contributions particularly relevant to understanding the unique challenges of leading teams virtually (Bell & Kozlowski, 2002; Hoch & Kozlowski, 2014; Kozlowski et al., 2021). Analysis of their publications reveals an important contribution to leadership theory regarding how leadership should be exercised when team members are geographically dispersed and depend on technology to coordinate their work. While this virtual team leadership model does not directly address telework (as virtual teams may work from office locations but collaborate with colleagues in different geographic locations), it offers valuable insights on managing virtual distance.

In their seminal work, Bell and Kozlowski (2002) established that virtual teams are distinguished from traditional ones primarily by spatial distance and the use of mediated communication technologies. These authors argued that task complexity is a critical factor that moderates the relationship between virtual team characteristics and their implications for leadership. Teams can operate effectively for less complex tasks with sequential or additive workflow interdependencies across time and space. However, virtual teams need more synchronous operations and more structured leadership when tasks become more complex and require reciprocal or intensive interdependencies.

Advancing this theoretical framework, Hoch and Kozlowski (2014) empirically examined how different leadership mechanisms relate to team performance at varying levels of virtuality. According to Hoch and Kozlowski's (2014) empirical research, there are three distinct mechanisms for leading virtual teams:

A) *Hierarchical leadership* refers to the traditional leadership model where influence flows from a formally designated leader to team members. In their study, Hoch and Kozlowski conceptualized hierarchical leadership comprising three core elements, departing from traditional leadership models. *Transformational leadership* involves behaviors aimed at inspiring follower motivation and stimulating them to stretch their capabilities beyond typical performance, including inspirational communication, idealized influence, intellectual stimulation, and individualized consideration. *Leader-member exchange (LMX)* represents the quality of the dyadic relationship between the team leader and each member, primarily developed through face-to-face context, describing how these relationships impact team performance. C*areer mentoring* is a leadership function that helps strengthen a leaders' influence on team members by providing an alternative mechanism for influence when interpersonal relationships must develop with limited face-to-face contact.

B) *Structural support* represents a form of indirect leadership influence where leaders create structures and routines that substitute for direct leadership influence and regulate team behavior. In the study, structural supports included two key components. *Reward management* encompasses systems for evaluating the quality and fairness of reward distribution, including performance evaluation, pay, and promotion systems, particularly focusing on whether these systems are perceived as fair, transparent, and motivating. *Communication and information management* involve the infrastructure and quality of information received and the transparency and adequacy of communication, addressing how information is coordinated, shared, and managed across the team to facilitate effective collaboration despite geographical dispersion.

C) *Shared team leadership* describes a mutual influence process characterized by collaborative decision-making and shared responsibility, where team members lead each other toward achieving goals. Hoch and Kozlowski (2014) measured

shared team leadership in three dimensions. *Cognitive leadership learning* is represented by team learning behaviors, where members actively obtain feedback to improve their performance and the team searches for performance deficits. *Affective team support* refers to the extent to which team members support each other and care about each other's well-being. Finally, *behavioral member exchange* applies the concept of leader-member exchange to the team context by measuring the quality of relationships between team members rather than with the leader.

Their research with 101 teams confirmed that traditional hierarchical leadership (transformational, leader-member exchange, and mentoring) had weaker relationships with team performance as virtuality increased. On the other hand, structural support (reward systems and information and communication management) showed more substantial relationships with team performance as virtuality increased. Surprisingly, shared leadership maintained a positive relationship with performance regardless of the degree of virtuality (Hoch & Kozlowski, 2014).

Kozlowski et al.'s subsequent work (2021) integrates these observations into a lifecycle framework that addresses the temporal dynamics absent in previous models. Their approach identifies three critical phases for leading virtual teams, which follow a sequential development: building the team, accomplishing work, and leading for the long term.

*A. Phase 1 - building the team:* In this initial phase, leaders must implement four fundamental behaviors to establish the foundation for virtual collaboration and set up the team for success. A.1. *Ensure technological fluency:* Leaders assess work requirements, select appropriate communication tools, establish technological standards, and provide training. This behavior recognizes that technical competence varies significantly among team members and seeks to establish a standard skill level for effective communication.A.2 *Establish ground rules and norms:* Leaders develop explicit communication protocols that might naturally evolve in face-to-face settings but require intentional development in virtual environments. This includes defining expectations about response times,

meeting participation, information-sharing protocols, and decision-making processes, while maintaining flexibility to adapt to real-world challenges. A.3.*Establish a shared knowledge base:* Leaders ensure that all members clearly understand their roles, responsibilities, and the team's mission. This is particularly important in cross-functional or multicultural teams where different forms of expertise often entail different goals, viewpoints, and jargon. A.4. *Build trust and team cohesion:* Leaders develop explicit norms and, when possible, facilitate strategic face-to-face interactions, recognizing that psychological safety underpins the performance of all high-performing virtual teams.

*B. Phase 2 - accomplishing work:* In this execution phase, leaders must implement two main behaviors to enable effective task completion through appropriate coordination mechanisms and shared responsibility. B.1. *Provide structural support:* Leaders implement interlocked goal setting, fair evaluation systems, and strategic communication management. They implement both synchronous and asynchronous coordination mechanisms tailored to task interdependence levels. This behavior helps the team accomplish its tasks by establishing clear roles, formulating goals, tracking deadlines, and coordinating efforts. B.2. *Institute shared leadership:* Leaders empower self-management through compelling vision and routine operations, recognizing that distributed authority better leverages diverse expertise across virtual boundaries. This behavior distributes responsibilities for critical functions to team members, which constitutes another way for leaders to augment their influence.

*C. Phase 3 - leading for the long haul:* In this sustainability phase, leaders must implement three additional behaviors to maintain team effectiveness over time, focusing on team dynamics, integration of new members, and prevention of burnout. C.1.Maintain trust and team cohesion: Leaders organize periodic in-person meetings or virtual social events that strengthen interpersonal bonds beyond task-focused interactions. This behavior recognizes that trust that has developed initially must be maintained for continued team functioning. C.2.. Socialize new members: Leaders

implement mentorship and contextual onboarding processes that preserve team culture despite geographical dispersion. This behavior helps effectively integrate new members into the virtual team. C.3 Address work-life balance: Leaders establish consistent schedules, model healthy boundaries, and resolve competing demands between virtual and local commitments. This behavior helps prevent burnout and maintain team engagement over the long term.

This theoretical framework recognizes that leadership needs evolve as teams mature, addressing sustainability concerns often neglected in other approaches. Therefore, Kozlowski and his collaborators provide a solid conceptual foundation for understanding and practicing leadership in virtual environments. They highlight the importance of adapting leadership approaches to the specific characteristics of virtual environments and recognizing the dynamic nature of these challenges over time.

Other authors have also contributed to the development of virtual leadership models. For instance, expanding on these ideas, the multilevel leadership model of Liao (2017) for virtual teams provides a multilevel framework examining both team and individual processes. The model identifies task-oriented and relationship-oriented behaviors that influence outcomes at multiple organizational levels. At the team level, effective leaders facilitate virtual collaboration, shared mental models, trust-building, conflict management, and shared leadership. At the individual level, they develop quality exchange relationships and shape cognition, affect, and motivation. This multilevel approach bridges the gap between organizational and individual concerns, recognizing that virtual leadership operates simultaneously across different levels of analysis.

Although the virtual team leadership framework offers substantial insights into leadership processes within fully virtual environments, it presents certain limitations in addressing the complexities of telework intensity, spatial flexibility, or electronic communication challenges. Consequently, the subsequent e-leadership paradigm provides a more comprehensive theoretical lens for examining these phenomena.

*The e-leadership model*

Electronic leadership (e-leadership) has been defined as a social influence process mediated by advanced information technology (AIT) that changes attitudes, feelings, thinking, behavior, and performance (Avolio et al., 2000). The authors posited that AIT proliferation necessitates rethinking traditional leadership theories. They depart from studies of transactional and transformational leadership applied in contents mediated by AIT, in which the authors proposed that "there is a need to examine how existing leadership styles and cultures embedded in a group and/or an organization affect the appropriation of advanced information technology systems" (Avolio et al., 2000, p.661) The authors posit that both leadership types generate different effects on trust among virtual team members depending on media richness (referring to the type of communication technology that they use). Therefore, the effects of leadership are different when using electronic media compared to face-to-face contexts.

Therefore, e-leadership involves more than using technology for communication; it represents a fundamental shift in leader-follower interactions, decision-making, and goal achievement in virtual environments (Avolio et al., 2000). The model draws on Adaptive Structuration Theory (DeSanctis & Poole, 1994, in Avolio et al., 2000), positing that AIT effects emerge from the interplay between technology and human agency, with both technological features and organizational social structures shaping leadership impact. In summary, the model is based on the interaction between leadership and digital technology. The e-leadership framework encompasses three dimensions: the leader, the followers, and technology (Avolio et al., 2014). This dynamic, reciprocal relationship requires understanding how technology shapes and is shaped by behaviors, cognitions, and affects. The framework emphasizes context importance, with e-leadership embedded in both proximal (team, organizational) and distal (cultural, societal) contexts that enable or constrain AIT use. Although the authors propose a pioneering model that considers digital media in the exercise of leadership, updating it with new trends such as gamification and the use of web tools for leadership development (Avolio et al., 2014) and positioning it as a reference model in leadership theory, they do not explicitly propose a measure for this type of leadership.

In response to this gap, Roman and Van Wart et al. (2017) further developed the construct, including constructing and validating a measure of e-leadership. They note that contemporary leadership requires blending traditional and electronic communication methods, responding to the contemporary mixed approaches of in-person and digital work (like starting with face-to-face meetings, using digital tools throughout a project, and concluding in person) and taking into account that leaders are responsible not just for using technology but for making decisions about which technologies to adopt (Van Wart et al., 2017). Therefore, the authors operationalized this in the model by developing their E-Leadership Competency Framework. The framework is developed through qualitative analysis in a case study of a public university. They conducted structured interviews, focus groups, self-administered surveys, and participant observation. Results were grouped around relevant issues related to e-leadership and included the identification of six skill-based competencies that successful e-leaders should aim to master (Roman et al., 2019; Van Wart et al., 2017).

- *E-communication:* The ability to communicate effectively using digital technologies, demonstrating clarity, responsiveness, active listening, and adaptability to different media.
- *E-social skills:* The ability to build relationships, foster collaboration, and manage conflicts virtually, utilizing empathy, emotional intelligence, conflict management techniques, and networking across boundaries.
- *E-team building:* The ability to create effective virtual teams through goal setting, role clarification, trust building, and performance management adapted to digital environments.
- *E-change management:* The ability to lead change in virtual environments through vision communication, stakeholder engagement, resistance management, and continuous improvement processes.
- *E-technology skills:* The ability to use and manage digital technologies effectively, including technology literacy, selection, integration, and innovation appropriate to organizational needs.
- *E-trustworthiness:* The ability to build trust virtually by demonstrating integrity, competence, benevolence, and reliability despite limited face-to-face interaction.

The authors consider that these six core competencies offer a comprehensive framework for effective digital leadership because they enable leaders to navigate virtual environments and foster innovation, collaboration, and trust (Roman et al., 2019). However, Van Wart et al. (2017) emphasize that developing these competencies transcends mere technical training, requiring a mindset of continuous learning, adaptation, and technological experimentation. First, e-leaders must maintain contextual awareness, recognizing how organizational culture, team structure, and technological infrastructure enable or constrain their effectiveness in virtual contexts. Second, they must commit to ongoing self-reflection and self-awareness, examining their assumptions and biases while seeking feedback for improvement. Third, successful e-leaders model expected behaviors and values, holding themselves accountable for their actions. Fourth, they recognize that developing e-leadership capabilities is a constant process that needs to be improved over time. Finally, as digital technologies continuously transform work environments, e-leaders must consistently adapt and innovate to remain effective.

Similarly, Mourão et al. (2021) developed a model based on pandemic lessons that identifies three critical elements for effective e-leadership, identifying e-leadership competencies that support teleworkers and generate positive impacts for organizations. The first element focuses on *context dynamics*, requiring leaders to monitor environmental changes and provide clear guidance in uncertain situations. The second element emphasizes *resource importance*, particularly providing and promoting adequate technological tools and skills. The third element addresses *team member support* through a combination of support competencies regarding hard (e.g., e-tech skills, e-multilateral communication) and soft (e.g., e-social, e-professional development) skills. Therefore, this model emphasizes the importance of contextual awareness, which becomes increasingly critical as remote work environments rapidly evolve during contingent crises such as the COVID-19 pandemic.

Bauwens and Cortellazzo (2024) expanded the understanding of e-leadership even more through a comprehensive systematic analysis of 257 peer-reviewed studies. Rather than proposing a restrictive typology, they identified nine thematic categories of leadership in the context of digital technologies: transformational leadership, leader communication skills, informal leadership, leader technological and business skills, traditional leadership, relational leadership, leadership for creativity and innovation,

leadership and diversity, and leadership for health and well-being. Their analysis revealed that e-leadership has evolved from primarily focusing on leadership in virtual environments to a more sophisticated understanding encompassing virtual leadership (focused on geographically dispersed teams), digital leadership (centered on implementing digital transformation at the organizational level), and a broader conception acknowledging technological mediation across all leadership levels. This model highlights the need to move beyond the dichotomy of virtual leadership versus e-leadership, developing a conceptual model that captures the complex reciprocal relationships between leadership, digital technologies, and organizational contexts (institutional properties). They also emphasize the development of leadership competencies across multiple dimensions that enable leaders to effectively navigate both proximal and digitally mediated interactions within evolving organizational structures.

In summary, e-leadership (Avolio et al., 2000) moves beyond traditional leadership approaches to address the specific challenges of leadership using electronic media but it has limitations for telework leadership. E-leadership's broad focus on digital tools and technology-mediated influence processes does not adequately distinguish between in-office and remote contexts, needing a more sophisticated framework, as also Bauewns and Cortellazo (2024) indicate. As Vartiainen (2024) HWM highlights, while this model primarily addresses the technological space, it does not sufficiently analyze social and temporal dimensions. Moreover, as Contreras et al. (2020) noted, "*Teleworking is more than just the use of ICTs to perform work remotely; it involves a complete reconfiguration of work processes, communication patterns, and management approaches*" (p. 3). Finally, these models inadequately address specific telework challenges, such as work-life balance and social isolation (Bell et al., 2023), necessitating more specialized frameworks that consider the unique aspects of remote work environments, and the specific competencies needed for leadership.

### 1.2.4 Digitalized leadership competencies framework

As seen in the previous sections, while models of virtual team leadership or e-leadership contribute to understanding leadership for telework, a crucial distinction for understanding effective leadership in telework environments involves recognizing the difference between digital and digitalized competencies. Peiró and Martínez-Tur (2022,

2024) highlight that while digital competencies (e.g., using software, programming) are important, equally critical are "digitalized competencies"—traditional competencies that undergo profound transformation when applied in digital contexts.

Digitalized competencies are defined as "*non-digital competencies that, when carried out in digital contexts (e.g., telework or virtual teamwork) and/or in cooperation with digital devices or 'actors' (e.g., cobots, or artificial intelligence algorithms), are deeply transformed in order to be effective*" (Peiró & Martínez-Tur, 2022, p. 191). They emerge as an integration of "psychosocial skills" with the actions required to perform them in digital contexts and interact with digital devices. This transformation impacts the knowledge, skills, attitudes, and behaviors required to enact competencies in digital environments effectively.

Peiró (2024) argues that competence in today's work environment involves more than mechanically applying digital technology. It requires thoughtfully selecting and creatively implementing digital tools to modify tasks and increase added value. This non-deterministic view acknowledges that there is no correct way to incorporate digital technology, and that effective performance depends on making appropriate choices about how digital tools can enhance traditional competencies.

Peiró and Martínez-Tur (2022) state that leadership roles and team management in digital and virtual contexts undergo subtle yet profound transformations, even when fulfilling functions like those in face-to-face settings. While mastering digital tools is necessary (including selecting appropriate media for different purposes and using them proficiently), digital skills alone do not ensure effective remote work. They emphasize that digitalized leadership competencies extend beyond merely transferring existing skills to digital/virtual environments; they involve reconceptualizing leadership processes, considering the unique dynamics of these work arrangements.

Peiró and Martínez-Tur (2022) indicate that the essence of digitalized leadership competencies lies in their transformative nature. When traditional leadership functions, such as communication, relationship building, goal setting, and conflict management, occur in telework/virtual settings, they require not just proficiency in digital tools but fundamentally different approaches and behavioral patterns. For example, creating trust virtually demands more explicit, consistent, and deliberate behaviors than face-to-face

leadership, where trust often develops through casual interactions. Similarly, providing direction and feedback in telework requires greater clarity, structure, and intentionality to overcome the limitations of mediated communication.

Therefore, leaders in telework contexts require mastering these digitalized competencies, as they must create cohesion among geographically distant followers, foster initiative, and change the attitudes of teleworkers while handling complex problem-solving in remote settings (Peiró & Martínez-Tur, 2022). These digitalized leadership competencies represent a crucial evolution beyond both traditional leadership models and purely digital skills. They also represent a crucial evolution in leadership theory that bridges traditional approaches with the distinct requirements of telework contexts.

Moreover, these digitalized competencies can also be understood as mechanisms for reducing the virtual distance that telework produces (Lojeski & Reilly, 2020). Digitalized leadership competencies target reducing distance elements, as leaders can consciously develop them, thereby mitigating the challenges of physical distance and creating psychological proximity despite physical separation. This understanding of digitalized competencies as distance-reducing mechanisms represents a crucial evolution in telework leadership theory, bridging leadership competencies with the distinct requirements of telework contexts.

Building on this perspective, research has identified several relationships between digitalized leadership competencies and employee outcomes, particularly in performance and well-being. The following sections will explore these relationships.

### 1.2.5 (Digitalized) leadership competencies and teleworkers' outcomes

Understanding the empirical evidence supporting the use of digitalized competencies as a lens for studying leadership in telework settings is a crucial task. This section addresses research examining how leadership competencies influence performance and well-being outcomes in telework environments, as an approach to provide an overview of how digitalized competencies are being (or could be) studied in research.

Research examining the relationship between leadership and teleworkers' outcomes—both performance and well-being—has identified several key competencies that contribute to effectiveness in remote settings (Brown et al., 2021; Cortellazzo et al., 2019). Some of this research has tried to understand these competencies in the context of digitalization and telework. To some extent, these competencies can be understood as traditional leadership behaviors that have been "digitalized" to address the specific challenges of technology-mediated work environments (Peiró & Martínez-Tur, 2022). In other cases, they highlight how traditional behaviors or competencies might be key factors in the telework context.

Among them, effective **communication** emerges as a consistent competence across studies. Shockley et al. (2021) demonstrated that both the quality and frequency of managers' communication are directly associated with increased work performance among teleworkers, while Kelley and Kelloway (2012) extended this understanding by revealing that spontaneous communication through digital media indirectly enhances job satisfaction in virtual environments. Related to these findings, Hambley et al. (2007) found that leaders who utilize multiple channels with varying levels of richness foster team cohesion and performance in remote settings. job satisfaction in virtual environments. Roman et al. (2018) discovered that leaders who communicate effectively through technology significantly positively impact performance in remote contexts. Complementing these findings, Jawadi et al. (2013) established that clear communication norms within virtual teams successfully foster trust, favoring individual performance. The technological dimension of communication further amplifies these effects, with Chaudhary et al. (2022) revealing that leadership behaviors specifically supporting communication media usage significantly increase teleworkers' well-being, while Staples et al. (2001) confirmed that leaders who effectively leverage communication technology enhance teleworkers' job satisfaction.

**Relationship development** also emerges as an essential leadership competence in telework environments. Brown et al.'s (2021) meta-analysis demonstrated that relationship-focused leadership had stronger effects on virtual team performance than task-focused approaches, underscoring the paramount importance of establishing positive interpersonal dynamics in remote work settings. Expanding on these insights, Efimov et al. (2020) discovered that leaders who deliberately develop trusting relationships

eliminate persistent questions about work performance and create effective substitutes for traditional control mechanisms, reducing employee stress in remote settings. This relationship development extends to remote organizational culture. Thus, Collins et al. (2016) found that leaders who create permissive environments, avoiding the "us and them" dichotomy between remote and on-site workers, significantly increase job satisfaction across both groups. Krug et al. (2021) further reinforced these findings by demonstrating that leaders who consistently uphold group norms and values help reduce burnout symptoms among teleworkers, creating a unified team identity despite physical separation.

**Monitoring** is another critical leadership competency that balances the need for oversight with employee empowerment in remote work contexts. Lautsch et al. (2009) discovered the nuanced relationship between monitoring and performance, finding that while consistent monitoring can enhance performance, excessively controlling behaviors frequently undermine trust and diminish telework benefits. To do this, Efimov et al. (2020) indicated that developing trusting relationships can eliminate questions about work performance and serve as a substitute for control mechanisms, potentially reducing employee stress (Efimov et al., 2020). Extending this understanding, Carte et al. (2006) revealed that high-performing virtual teams typically feature elevated levels of autonomy, with monitoring responsibilities thoughtfully distributed among team members rather than concentrated solely with formal leaders. This shared accountability approach allows teleworkers to maintain independence while ensuring adequate coordination, creating a sustainable balance between freedom and structure in remote environments (Carte et al., 2006).

Leaders' **supportive behaviors** are also related to positive outcomes for teleworkers. Karácsony (2021) found that manager support directly associates with increased job satisfaction among teleworkers. Karani and Mehta (2022) extended these findings by discovering that supportive leadership behaviors enhance work engagement and overall well-being in remote work settings. The benefits of supportive leadership extend to psychological health. Supporting this research has found that such behaviors reduce symptoms of burnout among teleworkers (Lamprinou et al., 2021) and decrease depression and perceived stress in remote workers (Platts et al., 2022).

Finally, **boundary management** represents a distinct yet complementary leadership competency to supportive behaviors that addresses the unique work-life challenges inherent in telework. Bregenzer and Jimenez (2021) found that leaders who provide clear expectations and establish appropriate boundaries between professional and personal domains effectively help teleworkers avoid increased working hours, work-family conflicts, and consequent decreases in well-being. The critical importance of this competency became particularly evident during extraordinary circumstances, as Bjärntoft et al. (2021) demonstrated that during the COVID-19 pandemic, leaders who established explicit guidelines regarding working hours, breaks, availability requirements, and meeting protocols significantly enhanced teleworker well-being during a period of unprecedented work-life integration challenges. In addition, Schwarzmüller et al. (2018) found that leaders who model healthy behaviors, such as not sending emails outside working hours and explicitly communicating the value placed on work-life boundaries, contribute significantly to teleworkers' well-being by establishing sustainable work patterns that prevent burnout and promote long-term performance.

Despite this growing body of research, significant gaps remain in understanding the relationships between leadership competencies and teleworker outcomes. There is a need to adopt an integral approach to performance, considering leadership competencies that contribute not only to task but also to contextual or adaptive performance in telework contexts. Similarly, more nuanced investigations should differentiate between effects on hedonic and eudaimonic well-being to provide a more comprehensive understanding of how leadership influences these outcomes. Moreover, the specific mechanisms and boundary conditions that influence these relationships require further investigation. In response to these challenges, the systematic reviews of leadership competencies for managing performance (Chapter 3) and well-being (Chapter 4) in telework were conducted to advance knowledge in this area, highlighting the digitalized competencies that address the reduction of operational and affinity distances and the mechanisms that intervene in these relationships.

### 1.2.6 The leadership competencies for telework model (LCT)

As can be seen in previous sections, although there have been advances in digital leadership models and the detection of competencies that can favor telework performance

and well-being, existing frameworks do not fully encompass behaviors essential for effective telework leadership, as they often fail to distinguish between leaders' technology usage and actual telework management. Furthermore, current models inadequately address behaviors related to reducing identity distance created by telework (Lojeski & Reilly, 2020) or managing work-family conflicts in remote settings (Bell et al., 2023).

In answer to this, and considering the work done in the systematic reviews presented in Chapters 3 and 4, and qualitive analysis with three groups of stakeholders (Puentes et al., 2022), the Leadership Competencies for Telework (LCT) model has been created to address the specific challenges leaders face in telework environments (Rodríguez et al., 2023). The LCT model adopts the digitalized leadership competencies framework (Peiró & Martínez-Tur, 2022) to achieve the reduction of virtual distance (Lojeski & Reilly, 2020) and the promotion of performance and well-being in telework. The LCT model comprises five core competencies.

A) *Digital communication:* The leaders' ability to create and transmit messages through digital media, generate active listening spaces, and reduce virtual distance. This involves establishing interaction principles, planning meetings, managing synchronous communication, and conducting bidirectional feedback.

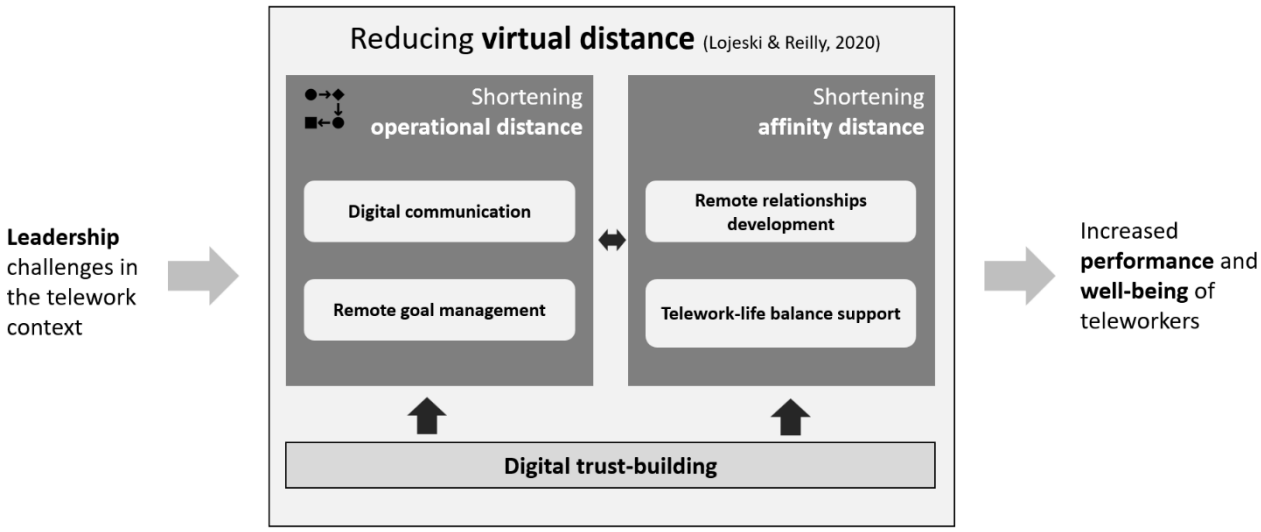
B) *Digital trust-building*: Leaders' ability to generate psychological safety through technology creates contexts where they trust that teleworkers will perform and know they will receive support. This includes promoting reliability, generating psychological safety spaces, and demonstrating professional competence.

C) *Remote goal management*: The leaders' ability to adapt task planning and monitoring to favor autonomy. This involves promoting self-management and commitment fulfillment, facilitating structural support, sharing leadership, establishing a telework structure, monitoring objectives, and promoting team autonomy.

D) *Remote relationships development:* The leaders' ability to foster team spirit virtually, unifying efforts toward shared goals, and generating quality interactions that strengthen cohesion and identity. This includes reinforcing mutual support, social cohesion, and team identity using available technologies.

E) *Telework-Life balance support:* The leaders' ability to identify emotional support needs and establish a balance between telework and personal life, considering individual needs and modeling appropriate work-life balance behaviors. This involves demonstrating empathy, creating balanced conditions, and modeling healthy work disconnection practices.

*Figure 1: The LCT model (Rodríguez et al., 2023)*




These competencies tackle specific challenges of leading in telework environments while minimizing the virtual distance that often arises in telework settings. The LCT model provides a comprehensive approach tailored to address the unique challenges of managing employees in telework. By developing these competencies, leaders can effectively navigate the complexities of telework environments and enhance the performance and well-being of their workers.

One critical aspect for developing the digitalized leadership competencies included in the LCT model is to count on appropriate measurement tools that capture their unique behavioral manifestations in telework contexts. The assessment of these competencies must incorporate consideration of all the telework-specific challenges for leadership discussed in previous chapters. Precise measures would allow for more targeted development of leadership capabilities that directly address the unique demands of teleworking work arrangements. Significant advances have been made in developing

measurement tools designed to assess leadership competencies in digital or virtual settings. These methodological developments will be addressed in the next section.

## 1.3 MEASURING LEADERSHIP COMPETENCIES FOR TELEWORK

Accurate leadership assessment represents a critical step toward developing its effectiveness in organizations. As the previous section established, specific leadership competencies and behaviors could significantly impact teleworkers' well-being and performance outcomes. However, to effectively develop and implement these competencies, organizations and practitioners must have reliable and valid measurement tools, designed specifically for the unique demands of telework contexts and the challenges of technology-mediated leadership environments (Gardner et al., 2020). The following sections address the existing measures and the current challenges in measuring leadership competencies in telework.

### 1.3.1 Existing measures

This section examines previous scales developed to measure e-leadership or virtual leadership competencies, considering their theoretical foundations, methodological approaches, and psychometric properties, while also addressing their limitations. Four scales have been identified in recent years to measure leadership competencies for e-leadership, virtual leadership, or managing work at home: the e-leadership scale (Roman et al., 2018), the skills for managing telework at home (CLETR) (Gonzáles & Durán, 2021), the global virtual team leadership scale (GVTLS) (Batırlık et al., 2022), and the scale of skills for managing telework at home (SMWFHS) (Miranda et al., 2024).

A) *The E-Leadership Scale (Roman et al., 2018)* is one of the most used scales in remote and telework leadership research. The scale was developed based on their Six E-Competency (SEC) Model (previously analyzed in section 1.2.3), which identifies six critical dimensions of e-leadership:
    a. *E-communication*: The ability to communicate clearly and effectively using information and communication technologies (ICTs*).*

b. *E-social skills*: The capacity to create a positive virtual work environment and enhance communication and collaboration through digital methods.
c. *E-change management skills*: The proficiency in managing change initiatives effectively through ICTs. E-team skills: The ability to build, motivate, recognize, and hold accountable teams in virtual environments.
d. *E-tech savviness*: The leaders' technological proficiency and awareness of relevant ICT developments and security concerns.
e. *E-trustworthiness*: The capacity to create a sense of trust in virtual environments by being perceived as honest, consistent, and fair.

The scales' validation was developed with a sample of 560 employees from San Bernardino County administration (USA), employing confirmatory factor analysis (CFA) to validate the model structure. The results showed good model fit and acceptable reliability across dimensions (Cronbach's alpha values ranging from .67 to .94). In terms of concurrent validity, Roman et al. (2018) found that e-team skills and e-tech savviness were significantly related to perceived leader effectiveness, but in a cross-sectional measure.

Despite its comprehensive approach, the E-leadership scale has notable limitations. First, its primary focus on technology-mediated leadership (e-leadership) rather than telework means that it may not fully capture the unique challenges of home-based or remote work. While technological competence is important in telework contexts, this focus may overlook critical aspects of managing employees working from home. Additionally, the scale does not adequately address critical telework-specific issues such as work-life boundary management, which research has identified as a key challenge in telework environments (i.e., Bregenzer & Jimenez, 2021). Finally, it does not consider the proper context of Spanish or Latin-American teleworkers and is not validated in the Spanish language.

B) *The skills for managing telework at home (CLETR)* scale was developed by Arias and Durán (2021) to measure leadership capacity in remote work environments. The final instrument comprises 20 items across five dimensions.

*a. Work organization:* Ability to structure and manage remote work effectively.

b. *Worker well-being:* Skills in maintaining employee health and satisfaction in remote settings.
c. *Capacity to encourage communication:* Fostering open and effective communication channels.
d. *Capacity to promote professional development:* Supporting career growth in virtual environments.
e. *Capacity to promote self-efficacy:* Encouraging independence and confidence in remote workers.

The development of the CLETR scale followed a structured approach that included initial item pool development based on literature review, expert judgment to assess content validity, pilot testing and item refinement, and a final validation study with 556 remote workers from ten companies across educational, textile, telecommunications, consultancy and commerce sectors in Peru. The validation process included exploratory factor analysis, which showed good construct validity (KMO = .98), and a reliability analysis using Cronbach's alpha and construct validity assessment through exploratory factor analysis, with the scale demonstrating high reliability (Cronbach's alpha = .96) (Arias & Durán, 2021).

The CLETR scales' significant strength lies in its multidimensional approach encompassing various aspects of remote leadership, including the important dimension of workers' well-being. Its validation across multiple sectors enhances its potential generalizability, and its strong psychometric properties support its use as a viable measurement tool. However, the CLETR scale has several limitations that restrict its comprehensive application. First, it does not adequately address critical telework issues such as virtual relationship development and work-life balance management, which previous research has identified as crucial aspects of effective telework leadership (Efimov et al., 2020; Bregenzer & Jimenez, 2021). Second, the scale's structural limitations include a relatively small number of items per dimension, particularly for the capacity to promote professional development (2 items), which may not fully capture the complexity of these constructs. Third, the reliance on exploratory factor analysis alone, without a confirmatory analysis, raises questions about the stability of the scale's factor

structure. Finally, despite the scale is created in Spanish language, it does not consider the proper context of teleworkers who live in Spain as it is not validated in this country.

C) *The global virtual team leadership scale (GVTLS)* was developed by Batırlık et al. (2022) to measure leadership characteristics in virtual teams within the context of multinational companies. The GVTLS addresses the unique challenges of leading geographically dispersed teams across different time zones and cultures, measuring six dimensions of virtual team leadership:

a. *Managerial qualities:* Skills related to coordinating, directing, and monitoring work.
b. *Interactivity:* Ability to engage team members and facilitate communication.
c. *Human Relations:* Skills in managing interpersonal aspects and team dynamics.
d. *Personal Traits:* Individual characteristics that contribute to effective virtual leadership.
e. *Rewards:* Ability to recognize and incentivize team members' contributions.
f. *Flexibility*: Adaptability in managing virtual teams and work processes.

The scales' development employed a mixed-methods approach incorporating a literature review, focus group interviews with multinational company employees, expert consultations for content validity, and a pilot study with 123 virtual team members from multinational companies in Turkeys' Marmara region. The initial 29-item scale underwent exploratory factor analysis (EFA) to assess construct validity, with the authors reporting good reliability (Cronbach's alpha = .94) and construct validity, with the original 36 items explaining 60% of the variance (Batırlık et al., 2022).

Despite its extension and emphasis on human relations in virtual contexts, the GVTLS scale has significant limitations for application in general telework contexts. First, the pilot study's relatively small sample size (N = 123) raises concerns about the stability of the factor structure. Second, and more critically, the scale was developed explicitly for virtual team contexts that may differ substantially from telework arrangements where employees navigate between remote and in-person work (Vartiainen & Vanharanta, 2024). This focus means

the scale may not adequately address telework-specific challenges, such as work-life balance management and remote goal setting for individual contributors. Third, the reliance on exploratory factor analysis alone, without a confirmatory analysis, raises questions about the stability of the factor structure. Finally, it also does not consider the proper context of Spanish or Latin-American teleworkers, and it is not validated in the Spanish language.

D) *Scale of skills for managing telework at home (SMWFHS)* was developed by Miranda et al. (2024) to measure leadership competencies in remote work settings, with particular attention to challenges that emerged during the COVID-19 pandemic. The scale incorporates eight key competencies:

   a. *Informing about changes*: Keeping teams updated on pandemic-related changes affecting work.
   b. *Locating information*: Proficiency in using digital tools to manage information and coordinate virtual groups.
   c. *Establishing priorities*: Setting clear priorities for teams in remote work contexts.
   d. *Setting and adapting goals*: Ability to set viable goals and adapt them to changing circumstances.
   e. *Evaluating work results*: Regular assessment of team results during mandatory remote work.
   f. *Distributing tasks*: Assigning tasks based on individual competencies and working conditions.
   g. *Providing constructive feedback*: Offering feedback indicating opportunities for improvement.
   h. *Managing work-family interference*: Addressing challenges of blurred work-life boundaries.

   The SMWFHS scale underwent a rigorous validation process using a large sample of 2038 managers from three Brazilian public organizations. This process included an expert review for content validity, exploratory factor analysis (EFA) to examine the scale's structure, confirmatory factor analysis (CFA) to validate the factor structure, and multi-group confirmatory factor analysis (MGCFA) to test for measurement invariance across gender and age groups. The scale

demonstrated excellent psychometric properties, with strong fit indices and measurement invariance across gender and age groups (Miranda et al., 2024). The SMWFHS scale highlights its large validation sample, rigorous validation methodology, and inclusion of work-family interface considerations—a dimension particularly relevant in home-based telework contexts. The demonstrated measurement invariance across gender and age groups enhances confidence in its applicability to diverse workforces.

However, the SMWFHS scale has limitations that affect its comprehensive applicability. First, it was developed and validated in a managerial sample, potentially limiting its generalizability to teleworkers. Additionally, while the scale addresses work-life balance issues, it lacks comprehensive coverage of competencies related to remote relationship development, an area that previous research has identified as crucial for teleworker well-being (Efimov et al., 2020; Chafi et al., 2021). Finally, it does not consider the proper context of Spanish or Hispanic Latin-American teleworkers, and it is not validated in Spanish language.

### 1.3.2 Current challenges in measuring leadership competencies for telework

Despite the valuable contributions of existing previous scales, some issues remain unsolved regarding the measurement of leadership competencies for telework.

First, many current scales have validation limitations regarding their target populations. For instance, the Global Virtual Team Leadership Scale (GVTLS; Batırlık et al., 2022) was validated with virtual team members but may not adequately address hybrid work arrangements, while the e-Leadership Scale (Roman et al., 2018) was validated with public administration employees without specifying their telework intensity, potentially limiting applicability to teleworking populations.

Second, none comprehensively covers all critical dimensions identified in research as essential for effective telework leadership (as mentioned in previous sections). For example, work-life boundary management, while included in the SMWFHS scale as *managing work-family interference*, is neglected by other scales despite extensive research highlighting its importance (Bregenzer & Jimenez, 2021). Another example is the interpersonal dynamics of building and maintaining relationships in virtual

environments, which require specific leadership competencies not fully captured in existing scales. While the E-Leadership Scale includes *e-trustworthiness*, other scales do not adequately address this dimension despite research identifying trust as fundamental in remote work contexts (Felstead et al., 2003; Efimov et al., 2020). Indeed, none of the scales encompasses all the competencies identified in the Leadership Competencies for Telework (LCT) model (Rodríguez et al., 2023), as each instrument lacks one or more critical competencies of the model. These limitations underscore the need for a more comprehensive instrument specifically designed to measure leadership competencies in telework contexts following the LCT model (Rodríguez et al., 2023). This instrument should address all critical dimensions of telework leadership identified in research, including work-life boundary management, remote relationships and trust development, support, and digital communication.

Third, there is a notable absence of scales validated within the Spanish context. Three of the four measures were developed and validated in languages other than Spanish. The scale by González and Durán (2021) was validated in Peru, reflecting cultural nuances potentially distinct from the Spanish work environment. Therefore, measuring the LCT digitalized competencies necessitates developing an instrument calibrated explicitly to the Spanish organizational context.

However, the rise of telework has fundamentally transformed leadership measurement by enabling leaders to manage team members distributed across multiple countries and cultures simultaneously (Raghuram et al., 2019). This global distribution presents significant challenges, as identical leadership behaviors may be interpreted differently depending on team members' cultural backgrounds (Zander, 2020). Reviews such as Zanders' (2020) indicate that national culture is empirically linked to leadership. The author suggests that, assuming primary socialization significantly influences mental schemata and, consequently, leadership prototypes, we can consider these leadership beliefs as "culturally anchored" or "culturally endorsed. Moreover, linguistic and cultural nuances introduce additional complexity to measuring cross-cultural leadership. For example, while Spanish may serve as the official language in different countries (Spain and Latin American countries), substantial regional variations exist due to historical and cultural factors. As Caycho-Rodríguez et al. (2021) note, Spanish is understood in a contextually different manner across various regions, directly affecting how scale items

are interpreted in different countries (e.g., Spain and Colombia). These linguistic variations can significantly impact measurement invariance—the statistical property ensuring that scale items are interpreted similarly across different groups (Chen, 2008). Without establishing measurement invariance, researchers cannot determine whether observed differences reflect genuine variations in leadership perceptions or merely differential item interpretations (Davidov et al., 2014).

To address these challenges, researchers have emphasized the need for leadership measures that are comparable across countries from the outset and culturally endorsed before implementation in multi-country studies (Zander, 2020). By employing these methodological approaches, researchers can develop leadership measures that remain valid and meaningful across diverse cultural contexts while addressing the unique demands of telework environments.

In sum, there is a need to develop an instrument that allows for the appropriate measurement of the LCT model of digitalized leadership competencies in telework contexts (specifically the Spanish telework context) and consider measurement invariance in its application in different countries. To address these needs, the Leadership Competencies for Telework (LCT) scale was developed, which aims to provide a comprehensive assessment of leadership competencies specifically tailored to telework contexts. The development and validation of this scale are presented in Chapter 5. The cross-cultural validation of its short version (LCT short scale) is presented in Chapter 6.

A comprehensive assessment of digitalized leadership competencies is essential for research advancement and practical application to evaluate leadership development and training in telework contexts, which is the core of the current research. The following section will address the state of the art of telework leadership training and present the Digylid training program, which was evaluated as part of this doctoral research.

## 1.4. DEVELOPING DIGITALIZED LEADERSHIP COMPETENCIES FOR TELEWORK

Leadership is key to promoting healthy organizations (Salanova et al., 2013). Indeed, leadership interventions have been highlighted as an important factor that promotes organizational transformation, creating conditions that enhance performance

and well-being in telework contexts (Inceoglu et al., 2018). The previous sections established the importance of comprehensive leadership competency frameworks and measures specific to telework environments. The emergence of telework also requires specialized approaches to leadership development (Arora & Suri, 2020; Gohoungodji et al., 2022). Therefore, it is essential to consider how to implement positive psychological interventions in the context of telework that address the relevant components of leadership. Thus, this section examines existing interventions designed to enhance leadership effectiveness in remote and hybrid work contexts.

### 1.4.1 Empirical research of leadership training for telework

Identifying and finding empirical evidence about organizational interventions to improve performance and work well-being is difficult. Research in this area is costly, and evaluations of training in real settings, which are published, are scarce. Nonetheless, three different training programs have been identified that directly address the training of leadership competencies for managing work in remote or telework settings: The digital stress-preventive management competencies (DMCs) (Toderi et al., 2025), the leader attentive communication training Decuyperes' (2023), and the digital leadership assistance platform *(DigiLAP) (*Krik et al., 2025). These contemporaries telework leadership training interventions draw from multiple theoretical traditions, such as stress management, communication theory, and digital workplace dynamics. All of them are directed to enabling leaders' capacity in this new context.

A) *The digital stress-preventive management competencies (DMCs).* This intervention builds on the Management Competencies for Preventing and Reducing Stress at Work (MCPARS) framework (Yarker et al., 2007), focusing on four competency areas: being respectful/responsible, managing work communication, handling difficult situations, and managing individuals within teams. While not explicitly designed for telework, MCPARS addresses relevant aspects of leadership for employee well-being (Donaldson-Feilder et al., 2009).

   Cioffi et al. (2025) from the University of Bologna, Italy, developed a focused intervention for hybrid work contexts, noting a gap in research on managers' roles in workers' well-being in this specific context. Building upon the

MCPARS framework, Cioffi et al. (2025) developed an intervention specifically addressing leadership in hybrid work contexts. Their approach focuses on developing digital stress-preventive management competencies (DMCs) for managers of remote workers in public administration settings. It extends traditional stress management competencies of the MCPARS framework to address the unique challenges of digital and hybrid work environments. Their intervention involved 50 supervisors from an Italian health unit in a three-phase program. First, a seminar introduced the participants to psychosocial factors and the supervisors' role in hybrid environments. Second, self-reflection was induced using the Stress Management Competency Indicator Tool (SMCIT) and keeping a behavior diary for one week. Third, in small group workshops, participants developed competencies and created action plans.

Their research identified two critical digital management competencies, which were trained in the program:

a. Supportive ICT-mediated interaction (SIMI): The ability to communicate clearly via ICT, choose correct interaction methods, provide feedback, foster collaboration, and be available for emergencies
b. Avoidance of abusive ICT adoption (AAIA): The ability to avoid sending work demands outside working hours or performing over-monitoring behaviors

Preliminary findings suggest that alignment between managers and teams on high levels of SIMI correlates with improved psychosocial environment perceptions (Cioffi et al., 2025). Conversely, when managers underestimate their tendencies toward AAIA compared to team perceptions, psychosocial environments are reported as better than when managers overestimate their performance in this area. Moreover, the manager–team agreement on SIMI was associated with higher role clarity, while the agreement on AAIA positively predicted job control. Additionally, research found that supervisors' self-awareness of their competencies fully mediated the relationship between

understanding the importance of their managerial role and the development of a satisfactory action plan.

This intervention represents one of the few empirically based approaches specifically addressing digital leadership competencies in hybrid work contexts, making it particularly relevant for telework leadership development.

B) *Leader Attentive Communication Training (LAC).* Decuypere (2023) from the University of Amiens (Belgium) developed an intervention for enhancing leadership communication skills, particularly relevant in hybrid and telework contexts. The training focuses on developing "an open, attentive attitude during a conversation with an employee" (Decuypere, 2023, p. 424), considering remote communications. The training was developed by integrating theoretical frameworks on attentive leader communication, empirical and theoretical research on attention, communication, and leadership, consultation with an advisory council of professionals (N=4), and applying research on effective training protocols. The pilot training was conducted with two groups of leaders (N=18) from Belgian public organizations. The LAC training consists of a two-day intensive, in-person workshop (approximately 16 hours total) organized into four progressive modules.

   a. The first day begins with a morning module focusing on *working with attention,* covering scientifically based attention skills, exercises for noticing judgments about others, body awareness, and recognizing physical sensations, and multitasking and active listening exercises. The afternoon module addresses *non-verbal aspects of communication*, including empirically supported communication techniques, basic posture during conversations, observing and mirroring non-verbal communication, and managing personal space in conversations.
   b. On the second day, the morning session concentrates on *verbal communication*, featuring communication bias awareness, positive and negative feedback delivery, developing personal feedback plans, and peer mentoring for difficult conversations. The afternoon concludes with an *integration* module encompassing learned concepts, continuity planning,

personal action plan development, and a "hot seat" evaluation exercise for feedback.

The study employed a longitudinal pre-test/post-test design without a control group. Data was collected at three time points: one week before the training (T1), two weeks after the training (T2), and two months after the training (T3). Both leaders and their collaborators participated in the study. The researchers measured multiple variables using validated questionnaires, including leader attentive communication (LAC), servant leadership, trust in the leader, mindfulness in communication, engagement, burnout, psychological need satisfaction, among others. As results, the training demonstrated several positive outcomes including increased attentive leader communication (according to employee perceptions), improved satisfaction with leader communication, enhanced trust in leadership, higher servant leadership scores, increased mindfulness in communication, positive effects on employee well-being (reduced burnout risk), and psychological need satisfaction among employees (Decuypere, 2023).

C) *Digital Leadership Assistance Platform (DigiLAP):* This training adopts an innovative approach to telework leadership development. Developed through a collaboration between Helmut Schmidt University and Bundeswehr University (Germany), DigiLAP offers a comprehensive online platform designed to support leaders and teams in digital and hybrid work environments (Krik et al., 2025). The platform's conceptual framework integrates established leadership theories with specific adaptations for digital contexts. Transformational leadership was selected based on extensive meta-analytic evidence demonstrating its effectiveness for engagement, commitment, organizational success, and innovation. Health-oriented leadership was incorporated to address significant health risks associated with home office work, focusing on leaders' ability to promote well-being through specific behaviors. DigiLAP serves three fundamental purposes: as a learning platform providing educational resources on digital and hybrid leadership; as a reflection and feedback tool enabling assessment of team dynamics and leadership practices; and as an assistance tool offering concrete recommendations and

practical exercises for leadership development. Therefore, DigiLAP is structured as an online platform with six interconnected modular areas. The basic module focuses on understanding work in home office environments, covering topics such as organizing hybrid work arrangements, identifying stressors and risks, utilizing opportunities and resources, assessing health impacts, evaluating motivation and performance, and addressing leadership challenges. Five advanced modules then expand on specific behaviors: promoting effective leadership in home office settings through transformational leadership behaviors; promoting health-oriented leadership by recognizing influence pathways and improving both self-leadership and employee leadership; considering individual differences in home office work; promoting effective collaboration through effective virtual meetings and team cohesion; and supporting organizational framework conditions. (Krik et al., 2025).

Fifty-seven experts from academia, research, and leadership evaluated the training. The platform received a mean rating of 4.37 out of 5, with qualitative feedback highlighting its intuitive design, flexibility, and the value of combining self-reflection with team assessment. The authors have not published their results, as the training is in development (Fröhlich et al., 2025).

As can be seen, research on leadership interventions designed explicitly for telework contexts is still in its early stages, with emerging approaches beginning to address this critical need. The interventions reviewed here—DMCs, LAC, and DigiLAP—each contribute valuable insights into how leadership development can be structured to enhance various competencies in remote environments. These pioneering efforts illustrate the growing recognition of telework leadership as a distinct domain requiring specialized training approaches.

While these interventions share common elements—particularly regarding communication skills and focus on well-being outcomes—they differ significantly in their specific focus and approaches. DMC emphasizes stress prevention and ICT-mediated interaction, LAC concentrates on attentive communication, and DigiLAP provides comprehensive digital training that integrates multiple leadership dimensions. This diversity of approaches reflects the various perspectives related to intervention

design and shows that a proper framework that gives a foundation for telework leadership training is needed.

Therefore, as this field develops, there remains a need for more comprehensive models that address the full range of competencies necessary to navigate the primary challenges of telework environments. The cultural context of telework leadership interventions also represents an area for future development, as approaches developed in specific regions may require adaptation for different cultural settings where leadership expectations and communication norms vary.

As an answer to this, the Digylid training program described in the following section builds upon the LCT framework to provide a comprehensive approach to telework leadership development in Spanish and Latin-american contexts, contributing to the growing body of knowledge in this emerging field.

### 1.4.2 The Digylid training program

The Digylid training program was developed as a comprehensive telework leadership intervention designed to address the development of digitalized leadership competencies for reducing virtual distance in telework (Rodríguez et al., 2023). A multisource, participative design process was followed to develop the Beta version of the program:

A) First, a multidisciplinary team formed by experts in work and organizational psychology, information technology, economics, and training design was constituted.
B) Second, the development involved multiple information sources to create both the program's contents and the learning methodology. The process began with a literature review on the development of leadership training programs and leadership competencies for telework. Moreover, two systematic reviews were conducted on telework leadership behaviors enhancing performance and well-being (Studies 1 and 2), and on effective online leadership training interventions (Puentes et al., 2023).
C) Third, a participatory co-design approach was implemented, with focus groups conducted with teleworkers (n=8), leaders (n=6), and HR directors (n=11) from

diverse sectors including technology, consulting, and digital marketing. Additionally, eight semi-structured interviews were performed with team leaders and teleworkers from an international service company based in Spain.

D) Before full implementation, a two-phase pilot test was conducted with initial testers to refine functionality, user experience, and content effectiveness. Feedback was collected on the initial modules, the intervention protocol, and the complete program.

E) Fifth, a partnership with a non-profit organization facilitated connections between academics and business professionals, who provided ongoing feedback during program development. Through this process, a team of academics and practitioners refined the contents of the training program.

The resulting Digylid program utilized a blended learning approach integrating web-based modules, a mobile application for behavior implementation, and synchronous interactive sessions. The five trained competencies follow the LCT model, described in Chapter 1, including one module for each competence (digital communication, digital trust-building, remote goal management, remote relationships development and telework-life balance support).

The program follows a structured methodology called AMENA (Acronym explained below; it refers to the different training and learning strategies used in the program), which the authors previously developed. This methodology guides participants through five learning phases for each competency:

A) **Learn (Aprender)**: Through theoretical content, leaders develop an awareness of their competency levels, implementation challenges, and the specific manifestations of these competencies in teleworking contexts. In addition to core content delivered in e-learning format, brief documents enable a deeper exploration of key aspects of each competence.

B) **Model (Modelar)**: Participants observe exemplary behaviors through video demonstrations showcasing the practical implementation of each competency.

C) **Exercise (Ejercitar)**: Leaders practice behaviors by applying their knowledge through case scenarios involving a fictitious teleworker. Each unit contains 5-6 exercises enabling the application of acquired knowledge.

D) **Name (Nombrar)**: Leaders identify specific behaviors they intend to implement in practice. The Digylid mobile application facilitates this process, enabling participants to select 2-4 behaviors for implementation following web-based training completion.

E) **Apply (Aplicar)**: Participants document implementation success in applying the selected behaviors, including facilitators and barriers encountered during the process. Subsequently, they receive automatic feedback based on their self-performance evaluation.

The beta version of the program was implemented in 24 companies between June 2023 and May 2024. After contacting each company's representative, team leaders (working at least 20% of their time remotely) were offered free enrollment in the leadership training program in exchange for their participation in the research study. The program was implemented over six weeks in eight separate editions, bringing together leaders from various companies simultaneously.

Training was delivered through a web-based platform and a mobile app. The web-based platform allocates six training modules: one introductory module and five modules corresponding to each of the five competencies. The total time to be dedicated to the five modules is between 60 and 90 minutes. After finalizing each module, participants use the Digylid mobile app to select and practice between 2 and 4 weekly behaviors.

Moreover, to facilitate sharing experiences regarding the transfer of competencies to the workplace, the program also includes interactive synchronic sessions of 30-45 minutes, during which participants share their progress during the training and the transfer process to the job. One of the members of the research team facilitated those sessions. One session was held in the third week after the beginning of the training, and another at the end, so the participants had space to share their practices concerning the five competencies included in the Digylid training.

## 1.5. EVALUATION OF LEADERSHIP TRAINING IN TELEWORK CONTEXTS

The increasing investment in leadership development necessitates rigorous evaluation approaches to determine the effectiveness of interventions (Nielsen & Taris, 2019). Although advances have been documented in evaluating the effects of leadership training and assessing interventions that promote positive organizational outcomes (Salanova & Ortega-Maldonado, 2019), considerable work remains to be done in this field. This gap is even more pronounced in telework environments, where there is a notable lack of empirical research on interventions (Bell et al., 2023). The scarcity of evidence-based evaluations in teleworking contexts poses significant challenges for organizations seeking to develop effective leadership capabilities tailored to the unique demands of distributed teams. In this context, Kirkpatrick's evaluation framework provides a valuable structure for systematically assessing telework leadership interventions across four critical levels: participant reactions, learning outcomes, behavioral changes, and organizational results (Kirkpatrick & Kirkpatrick, 2016).

### 1.5.1 The Kirkpatrick's framework

The training evaluation model founded by Donald Kirkpatrick in 1959, improved in its updated "New World" formulation (Kirkpatrick & Kirkpatrick, 2016), provides a foundational framework for evaluating leadership interventions. This model consists of four sequential levels of evaluation:

A) *Level 1: Reaction* assesses the degree to which participants find the training favorable, engaging, and relevant to their jobs. This entails measuring leader satisfaction with training content, engagement with learning activities, and perceived relevance to leadership challenges.

B) *Level 2: Learning* evaluates the degree to which participants acquire knowledge, skills, attitudes, confidence, and commitment. The New World model specifically emphasizes confidence *("I think I can do it on the job"*) and commitment (*"I will do it on the job"*) as critical bridges between learning and behavior.

C) *Level 3: Behavior* measures the degree to which participants apply their learning back on the job. The New World model enhances this level with three components: critical behaviors (specific actions that impact desired results), required drivers (processes and systems that reinforce behaviors), and on-the-job learning.

D) *Level 4: Results* assess the degree to which targeted outcomes occur due to the training and support. This includes measuring improvements in team performance, employee well-being, engagement, and organizational outcomes.

Kirkpatrick's model emphasizes planning in reverse order (starting with desired results) while evaluating in forward order, ensuring alignment between organizational goals and intervention design (Kirkpatrick & Kirkpatrick, 2016).

Moreover, research on training transfer offers critical insights for leadership intervention evaluation. As highlighted by Shann et al. (2019), three key domains influence the application of learning beyond the training context: a) learner characteristics, particularly pre-training motivation and perceived relevance; b) training design, including relevant examples, adult learning principles, and appropriate cognitive load, and c) work environment factors, especially opportunities to use new knowledge and organizational support.

Moreover, previous research emphasizes the importance of formulating action plans to promote the transfer of learning (Foxon, 1994) and understanding organizational factors that influence implementation success (Brinkerhoff, 2002), which also must be considered in measuring the transfer of training programs.

Regarding the evaluation of results, the systematic review by Cleary et al. (2020) of behavioral outcomes for leadership interventions among health professionals provides valuable methodological insights. The review distinguishes between subjective behavior outcomes (self-reported changes) and objective behavior outcomes (observed by others), highlighting the importance of triangulating data sources. It also identified several approaches that yielded positive behavioral outcomes, including personal development planning, self-directed learning, reflection activities, leadership action plans, and

practice-based action learning projects. These elements align well with adult learning principles and offer promising leadership intervention design and evaluation components.

### 1.5.2 Considerations for telework leadership training evaluation

While these evaluation frameworks were not explicitly developed for telework contexts, they offer promising approaches that can be adapted to assess leadership interventions in virtual and hybrid work environments. Several considerations are particularly relevant when applying these frameworks to telework leadership training, especially in Digylid, the current training program of this research.

Regarding Kirkpatrick's framework, it requires contextual adaptation for telework settings. Level 1 (Reaction) evaluation incorporates assessment of perceived relevance to virtual leadership challenges, and Level 2 (Learning) assessments measure knowledge and skills, particularly relevant to remote leadership contexts. Behavioral metrics at Level 3 should expand to include telework-specific leadership behaviors, such as effective use of digital communication tools, boundary management practices, and facilitation of virtual team coordination, captured through both self-reported and observed measures. The evaluation of training transfer must account for the technology-mediated nature of telework environments. Factors such as technological infrastructure, organizational digital maturity, virtual work policies, and team distribution patterns may significantly influence leaders' ability to apply new practices. Evaluators should examine whether virtual work environments provide sufficient opportunities for authentic application of leadership learning.

Moreover, it is important to consider contextual factors and organizational support for the transition to the workplace, particularly in terms of creating suitable conditions for the transfer of learning, even more so when digital leadership interventions are implemented (Peláez Zuberbühler et al., 2025). This is also supported by Nielsen and Abildgaards (2013), who indicate that an evaluation of an intervention should consider contextual mechanisms that also favor the effectiveness of the intervention, such as spaces for interaction between participants and knowledge sharing. Moreover, the updated research of Nielsen & Shepherd (2022) posits that contextual factors before and after training—both personal and organizational—determine how effectively training

mechanisms activate and enhance workers' well-being. In addition, they indicate that “trained workers must actively seek out situations in which they can practice learned emotions, cognitions, and behaviors” (p.386). The evaluation of the Digylid training (Chapter 7) considers some of these recommendations regarding training transfer and results, situating them into the context of intervention and documenting the design and implementation process, which is discussed in the following sections.

In summary, the present doctoral thesis documents the process of identifying, measuring, and training digitalized leadership competencies in telework contexts, aiming to improve teleworkers' performance and well-being (through the reduction of virtual distance). This research contributes to the empirical investigation of leadership development and interventions designed to foster more positive organizational environments, a current necessity in organizations nowadays (Salanova & Ortega-Maldonado, 2019). The thesis adopts a systematic approach that identifies essential leadership competencies through comprehensive literature reviews, develops and validates measurement instruments across diverse cultural contexts, and ultimately evaluates the effectiveness of a training program specifically designed to enhance these competencies. By addressing both theoretical foundations and practical applications, this research offers valuable insights for scholars and practitioners seeking to develop leadership in telework environments. The following chapter details the specific objectives of each study and the methodology employed to achieve them.

# CHAPTER 2: OBJECTIVES AND METHODOLOGY

## 2.1 OBJECTIVES

The main objective of the present thesis is to **conceptualize, assess and develop leadership competencies for telework that enhance teleworkers' performance and well-being.** As extensively examined in the first chapter, leadership represents a critical determinant of performance and well-being outcomes in telework environments. Effective digitalized leadership competencies (Peiró & Martínez-Tur, 2022) significantly reduce the virtual distance that emerges in telework contexts, particularly by mitigating operational and affinity distance between team members (Lojeski & Reilly, 2020). Consequently, identifying the optimal leadership competencies that enhance teleworkers' performance and well-being, as well as developing specific instruments to assess these competencies and evaluate the effectiveness of related training interventions, is imperative. These considerations inform the formulation of the following specific research objectives, which are delineated subsequently.

Firstly, it is necessary to identify which digitalized leadership competencies are most important to favor the performance of teleworkers. As we identified in Chapter 1, while several studies have examined these relationships over the past two decades (Bell et al., 2023; Brown et al., 2021; Cortellazzo et al., 2019; Efimov et al., 2022), this knowledge remains fragmented, and there is a lack of a clear framework for telework leadership at the individual and team levels (Cortellazzo et al., 2019). Therefore, the first specific objective of this thesis aims to *identify relevant leadership competencies that promote teleworkers' performance*. To achieve this, the study included in Chapter 3 is a systematic review of current research that examines the relationships between leadership competencies and different individual and team performance indicators in telework contexts. It has the following specific objectives: a) identify relevant leadership competencies for promoting performance in telework, considering different operationalizations of the construct (dimensions and level of analysis); b) analyze the mechanisms and contextual factors that might affect those relationships and c) propose general guidelines and recommendations for future leadership development interventions tailored to the teleworking context.

Second, it is also necessary to identify which digitalized leadership competencies are most important to favor the well-being of teleworkers. Taris et al. (2022) emphasize

the importance of conducting literature reviews that offer new perspectives on enhancing occupational health psychology, particularly about workers' well-being (e.g, Inceoglu et al., 2018). Despite similar systematic reviews that have been conducted, associating digital leadership with well-being (Caputo et al., 2024; Lundvist & Wallo, 2023), there is a need to focus on specific leadership competencies that favor the well-being of teleworkers, rather than general leadership styles, contributing this way to more precise behaviors and guidance for practice. Moreover, different dimensions and operationalizations of well-being and the mediating and moderating mechanisms also need more exploration. Therefore, the second specific objective of this thesis aims to *identify relevant leadership competencies that promote teleworkers' well-being.* To achieve this, the study presented in Chapter 4 is a systematic review of current research that examines the relationships between leadership competencies and well-being indicators in telework contexts. It has the following specific objectives: a) identify relevant leadership competencies for promoting well-being in telework, considering different operationalizations of the construct (dimensions and level of analysis); b) analyze the mechanisms and contextual factors that might affect those relationships and c) propose general guidelines and recommendations for future leadership development interventions tailored to the telework context.

Third, despite several scales having been developed for measuring leadership in the remote context (Batırlık et al., 2022; Arias & Durán, 2021; Miranda et al., 2024; Roman et al., 2018), none comprehensively covers the complete set of digitalized leadership competencies required to shorten the virtual distance that telework generates. Therefore, the third specific objective of this thesis aims to *develop and validate a scale to measure the Leadership Competencies for Telework (LCT) that positively impact the performance and well-being of teleworkers*. This objective serves as the starting point for the empirical part of the thesis, as it validates the LCT scale to measure the competencies proposed in the LCT model created by the research team of the Digylid project. So, in the third study (Chapter 5), we developed the scale and validated it in the Spanish context, establishing its reliability and validity for measuring the group of core behaviors leaders must exhibit in telework contexts to facilitate high levels of performance and well-being among their workers.

Fourth, as the LCT scale encompasses an extensive set of behaviors that leaders must exhibit in telework contexts, the importance of having a reduced version of the instrument becomes apparent. Additionally, leadership—as a globally studied phenomenon—requires the development of cross-validated measurement scales that ensure the validity and invariance across different samples. Even though certain leaders' characteristics are nearly universally accepted and considered effective, culture also affects which kinds of leaders' behaviors are deemed effective (Den Hartog & Den Hoogh, 2024), phenomena that can occur by comparing Spanish and Colombian populations. Therefore, the fourth specific objective of this thesis (Study 4, Chapter 6) aims *to develop and validate a LCT short form scale in Spanish and Colombian populations.* Developing a short form of the LCT scale (LCT-S) provides researchers and practitioners with a valuable tool for quickly assessing telework leadership competencies in organizations without overburdening respondents with an excessively lengthy survey. Also, the study provides evidence of its validity in both Spanish and Colombian populations.

Fifth, as research points out, there is a need for empirical evidence on the effectiveness of leadership development interventions in both traditional (Nielsen & Taris, 2019) and virtual contexts (Bell et al., 2023). Thus, the next objective of this thesis is related to the analysis of the effectiveness of the Digylid training program. This program was implemented in different organizations in Spain, Colombia, and Chile. Therefore, the fifth objective of this thesis aims to *evaluate the effectiveness of the Digylid leadership training program by analyzing learning, transfer, and results for both leaders and subordinates.* This last study (Study 5, Chapter 7) tests the efficacy of the training program (Digylid) focused on two competencies (remote goal management and remote relationships development), as this competencies are closely aligned with the traditional task and relationship leadership orientations established in foundational leadership theory (DeRue et al., 2011) and are closely related to performance and well-being indicators (Bravo et al., 2025a; 2025b). In this study, we analyze the effectiveness of the learning process of the participants, the transfer to the workplace, and the impact of changes in leaders' competencies on subordinates and leaders' outcomes.

In summary, the five main objectives of this thesis are:

Objective 1: Identify relevant leadership competencies that promote teleworkers' performance (Study 1, Chapter 3).

Objective 2: Identify relevant leadership competencies that promote teleworkers' well-being (Study 2, Chapter 4).

Objective 3: Develop and validate a scale to measure Leadership Competencies for Telework (LCT) that positively impact the performance and well-being of teleworkers (Study 3, Chapter 5).

Objective 4: Develop and validate the LCT short form scale in Spanish and Colombian populations (Study 4, Chapter 6).

Objective 5: Evaluate the effectiveness of the Digylid leadership training program by analyzing learning, transfer, and results for both leaders and subordinates (Study 5, Chapter 7).

## 2.2. PROCEDURE

Next, we will describe the procedure followed in the different studies, separating the procedure used in the first two theoretical studies from the rest of the empirical studies.

*Theoretical studies (studies 1 and 2)*

In the first and second studies, we conducted two structured literature reviews (SLR) following PRISMA guidelines. The SLR methodology allows for a comprehensive collection of literature that meets specific criteria to discover themes, patterns, trends, or gaps, especially in human resource development (Rocco et al., 2023). The following databases were included: Scopus, PsycARTICLES, PsycINFO, ABI/INFORM, and Web of Science databases. The requirements include encompassing quantitative and qualitative methods published in English, Spanish, and Portuguese.

*Empirical studies (studies 3, 4, and 5)*

For the third study, we developed the LCT scale using the findings from Studies 1 and 2 and a qualitative analysis of interviews and focus groups with teleworkers, leaders, and HR managers (Puentes et al., 2022). Based on these sources and according to Priors'

(2014) guidelines for content analysis, we identified 88 behaviors and converted them into scale items.

To conduct content validation, we executed two expert panels with a sample of academics and practitioners to ensure that the items created for each dimension were theoretically adequate and relevant to measure the construct (Leadership for Telework).

Afterwards, we examined the reliability and validity of the LCT Scale, conducting a pilot study within a Spanish sample of teleworkers. Participants were recruited through a professional panel company, and the survey was administered online using the company's platform. The panel company incorporated attention detection mechanisms (two items to verify attention) and identified speeders, eliminating individuals who failed to meet both criteria. The Digylid team supervised the collection procedure throughout the entire process.

For the fourth study, we developed the LCT short-version scale by selecting the five items with the highest factor loadings on each dimension based on the results from the pilot survey conducted in Study 3. This abbreviated version was administered to the subordinates of leaders who participated in the Digylid training program conducted in Spanish, Colombian, and Chilean companies. For the cross-national comparison, this sample was divided into two subsamples: Spain and Colombia. The Chilean sample, being too small, was excluded from this study and was only included in the subsequent study.

For the fifth study, we used the complete sample, including participants from Spain, Colombia, and Chile. We utilized the same pre-training baseline measurement from the previous study (T1). However, we conducted a new follow-up measurement two months after the training program completion to give leaders sufficient time to apply their newly acquired skills in their work settings and allow their subordinates to evaluate these behaviors. This measurement corresponds to T2 in this study and is considered the post-intervention measure. In this case, we also considered the leaders' own measures at both time points, in addition to those of their subordinates.

Leaders and their respective organizations were offered free enrollment in exchange for their participation in the research study. Both leaders and their team members

completed electronic questionnaires. All measurements were conducted online using the LimeSurvey platform.

*Ethical considerations*

For all three empirical studies, we ensured the anonymization of collected data and followed strict data protection protocols, according to the Declaration of Helsinki. Participants were informed about the purpose of the study, data handling procedures, and their right to withdraw without consequences. The Human Research Ethics Committee of the University of Valencia reviewed and approved the research protocols and gave permission to carry out the study (procedure number 1943262).

## 2.3. SAMPLES

As mentioned above, this empirical phase involved three distinct samples. The first sample (for Study 3) consisted of experts who participated in two validation panels, which allowed us to analyze the LCT scale's content validity. The second sample (also used for Study 3) comprises Spanish teleworkers who participated in a pilot study conducted through a panel company, which allowed us to analyze the LCT scale's validity and reliability.

For studies 4 and 5, we used data from a new sample: the leaders who participated in the Digylid training program and their subordinates. For the validation of the LCT scale short version (Study 4), we used only the data from the teleworkers (subordinates of leaders who participated in the training program). For the evaluation of the training program (Study 5), we used the data from both the leaders and the subordinates.

In the three studies, all teleworkers and their leaders had to meet the following criteria: a) working remotely for at least 12 hours per week (equivalent to 30% or more of a standard 40-hour workweek), and b) having a full-time or part-time employment contract with an organization. In the case of teleworkers in Study 3 and subordinates in Studies 4 and 5, we also ensured they had a direct supervisor.

### 2.3.1. Participants in Study 3 (Chapter 5)

Participants in the study's first phase (content validity) included 27 experts across two validation panels. The first panel comprised eight experts in leadership and digitalization from Spanish universities, recruited through the research institute network. The second panel comprised 19 practitioners and academics recruited from the research institute network, including senior HR professionals experienced in telework implementation and professors specializing in HR and/or leadership research.

For the second phase -pilot application of the scale- the sample consisted of 543 Spanish teleworkers: 50.5% women and 49.5% men, with a mean age of 40.3 years (SD = 9.65). 89.7% work full-time and 10.3% part-time. Regarding organizational tenure, 47.9% worked in their current organization for more than five years, 41.6% for between one and five years, and 10.5% for less than one year. The organizations represented in the sample operate across various sectors: IT (19.9%), industrial (11.8%), finance (10.1%), public administration (9.0%), consultancy (8.5%), marketing (8.1%), education (7.0%), health (4.4%), tourism (3.2%), and others (18.0%).

Regarding educational level, most participants held a university degree (52.1%), followed by those with a bachelor's or technical degree (22.7%), and postgraduate qualifications such as master's or doctorate degrees (21.7%). A smaller proportion reported secondary education (3.1%) or elementary education (.4%) as their highest educational level.

Related to telework patterns, participants had different remote work intensities: less than 50% of working hours (47.1%), between 50% and 69% (25.0%), between 70% and 89% (12.7%), and 90% or more (15.1%). Regarding weekly frequency during the three months before data collection, 41.1% worked remotely for an average of 2 days per week, 21.1% worked 3 days, and 37.8% worked four or more days remotely.

### 2.3.2. Participants in Studies 4 and 5 (Chapters 6 and 7)

For both studies, we used the sample collected during the implementation of the Digylid training program. For the validation of the LCT scale short version (Study 4), we used only the teleworkers sample (subordinates of leaders who participated in the training

program). For the evaluation of the training program (Study 5), we used both samples: the leaders and the subordinates.

*Leaders*

One hundred eighty-seven leaders were invited to the Digylid training program and requested to answer the surveys. Of them, 183 completed the pre-intervention measure (T1), and 85 responded to the follow-up measure for training evaluation (T2 used in Study 5).

Regarding the characteristics of this sample at T1, 91 leaders belonged to Spanish companies, 68 to Colombian companies, and 24 to Chilean companies. The sample was 52.5% women and 47.5% men, with a mean age of 40.1 years (SD = 8.48). As for educational level, 8.1% had technical education, 36.4% held university degrees, and 55.5% had completed postgraduate studies. The organizations represented in the sample operated across various sectors: information technology (50.8%), services (16.3%), industrial (12.6%), consultancy (10.9%), and education (7.6%).

Regarding telework variables, 43.2% of respondents worked remotely less than 50% of the time, 9.3% between 50% and 69%, 15.8% between 70% and 89%, and 31.7% teleworked more than 90% of the time. Concerning organizational tenure, 11.5% of participants had worked less than one year in their organization, 46.4% between 1 and 5 years, and 42.1% more than five years.

The final sample used in Study 5 (which completed the follow-up measure) is described in the specific chapter of that study.

*Teleworkers (subordinates)*

One thousand one hundred seventy-seven teleworkers from teams supervised by the leaders participating in the training were requested to answer the surveys. Of them, 911 completed the pre-intervention measure (T1), 737 responded to the mid-term measure for predictive validity of the LCT-S scale (T2 used in Study 4), and 326 completed the follow-up measure for training evaluation (T2 used in Study 5).

Regarding the characteristics of this sample at T1, 505 workers belonged to Colombian companies, 311 to Spanish companies, and 95 to Chilean companies. The

sample comprised 55.4% men and 44.6% women, with a mean age of 34.7 years (SD = 9.14). As for educational level, 1.1% had completed high school, 34.1% had technical education, 37.8% held university degrees, and 27% had completed postgraduate studies. The organizations represented in the sample operated across various sectors: information technology (65%), industrial (13.2%), services (12.5%), consultancy (6.1%), and education (3.2%).

Regarding telework variables, 29.4% of respondents worked remotely less than 50% of the time, 8.6% between 50% and 69%, 13% between 70% and 89%, and 49% teleworked more than 90% of the time. Concerning organizational tenure, 19.9% of participants had worked less than one year in their organization, 55.6% between 1 and 5 years, and 24.5% more than five years.

The final samples for each study (considering those who completed the mid-term and follow-up measures) are described in the specific chapter of each study.

## 2.4. VARIABLES

### 2.4.1. Leadership Competencies for Telework (LCT)

The Leadership Competencies for Telework (LCT) is the central variable of this thesis, defined as the group of core behaviors leaders must exhibit in telework contexts to facilitate elevated levels of well-being and performance among their workers. This construct was measured using the LCT scale, explicitly developed for this research, which employed a 6-point Likert response scale ranging from 1 (strongly disagree) to 6 (strongly agree). The Cronbach's alpha for the original 67-item scale (used in Study 3) was .94, and for the 25-item short-version scale (used in Study 4) was .98 for both Spanish and Colombian subsamples (T1 in Study 4).

Both scales measure five core competencies that leaders need to manage teleworking teams effectively:

*Digital Communication:* Leaders' ability to elaborate and transmit messages through digital media, generate spaces for active listening, and reduce the virtual distance with the work team. It involves establishing interaction principles, planning meetings, managing synchronous and asynchronous media, and performing bidirectional feedback

with the team. An example item is: "(The leader) knows how to choose the appropriate communication media for the type of message being conveyed". Cronbach's alpha for this factor was .94 on the original scale (14 items), .90 on the short version scale (5 items) for the Spanish subsample, and .92 for the Colombian subsample.

*Digital Trust-Building:* Leaders' ability to generate an environment of psychological safety through technology, i.e., a context in which leaders know that teleworkers will do their work and these, in turn, know that they will receive support from their leader. It implies promoting reliability (what is said is fulfilled), generating spaces of psychological security, and demonstrating professional competence. An example item is: "(The leader) treats people equally, regardless of geographic distance or mode of work." The Cronbach's alpha for this factor was .93 in the original scale (13 items), .93 in the short-version scale (5 items) for the Spanish subsample, and .95 for the Colombian subsample.

*Remote Goal Management:* Leaders' ability to adapt task planning and follow-up to favor teleworkers' autonomy. This involves promoting self-management, fulfilling commitments, providing structural support, and sharing leadership responsibilities. It also implies creating a structure for teleworking, following up on objectives and tasks, and promoting team autonomy. An example item is: "(The leader) uses the appropriate digital tools to organize work in the team". The Cronbach's alpha for this factor was .92 in the original scale (13 items), .91 in the short version scale (5 items) for the Spanish subsample, and .94 for Colombian subsample.". This factor was also used for Study 5 for both leaders and subordinates. For leaders, the items from the original scale were reworded in the second person. An example of an item is: "(You) use the appropriate digital tools to organize work in the team." This factor also showed good reliability in Study 5 for both leaders' ($\alpha$ = .89 at T1 and $\alpha$ = .88 at T2) and workers' ($\alpha$ = .94 at T1 and $\alpha$ = .95 at T2) versions.

*Remote Relationships Development:* Leaders' ability to foster team spirit through virtual means, unifying the efforts of all individuals towards a shared objective and generating high-quality interactions, will increasingly strengthen the team's cohesion and identity. It involves strengthening mutual support, social cohesion, and team identity using available technologies. An example item is: "(The leader) reinforces the importance

of cooperation within the team in virtual meetings". The Cronbach's alpha for this factor was .93 in the original scale (13 items), .94 in the short-version scale (5 items) for the Spanish subsample, and .95 for Colombian subsample.". This factor was also used for Study 5 for both leaders and subordinates. For leaders, the items from the original scale were reworded in the second person. An example of an item is "(You) reinforce the shared values of the team using virtual media". This factor also showed good reliability in Study 5 for both leaders' ($\alpha$ = .93 at T1 and $\alpha$ = .93 at T2) and workers' ($\alpha$ = .95 at T1 and $\alpha$ = .95 at T2) versions.

*Telework-Life Balance Support:* Leaders' ability to identify emotional support needs and generate conditions of balance between telework and personal life, considering individual needs and the demands of these areas. It also involves being aware of the importance of his/her behavior as a model of conciliation for the team. It implies showing empathy, favoring balanced conditions, and modeling (serving as an example for) work disconnection behaviors. An example item is: "(The leader) structures the work of the remote team in a way that facilitates work-life balance". The Cronbach's alpha for this factor was .94 in the original scale (14 items), .91 in the short-version scale (5 items) for the Spanish subsample, and .92 for the Colombian subsample.

### 2.4.2. Performance Variables

*Organizational Citizenship Behavior (OCB):* This variable was used in Studies 3 and 4 to assess the criterion and predictive validity of the LCT and LCT-short version scales. It is defined as "discretionary behavior that promotes the effective functioning of the organization by contributing to the maintenance and enhancement of the social and psychological context that supports task performance" (Organ 1988, 1990; in Henderson et al., 2020, p.1) It was measured with a six-item scale developed by Henderson et al. (2020), with a Spanish back-translation performed by the research team. A 5-point Likert scale ranging from 1 (Never) to 5 (Always) was used. A sample item is: "I took a personal interest in other employees." The Cronbach's alpha for this scale was .86 for Study 3 and .86 for Spanish and .82 for Colombian subsamples of Study 4 in T2.

*E-Work Productivity:* This variable was used in Studies 4 and 5 to measure the performance outcomes of teleworkers. It is defined as the effectiveness at performing

work using electronic technologies (Grant et al., 2019). It was assessed using the Productivity factor from the E-Work Life (EWL) Scale (Grant et al., 2019), which was specifically developed to measure productivity in e-working contexts. The factor comprises four items back-translated to Spanish by the research team. Respondents indicated their level of agreement with statements on a 6-point scale, ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item is "E-working makes me more effective in delivering against my key objectives and deliverables". The Cronbach's alpha for this scale was .90 for Spanish and .83 for Colombian subsamples of Study 4 in T2. For study 5, the scale shows good reliability for both leaders' ($\alpha$ = .93 at T1 and $\alpha$ = .93 at T2) and workers' ($\alpha$ = .88 at T1 and $\alpha$ = .91 at T2) versions.

### 2.4.3. Well-being Variables

*Job Satisfaction*: This variable was used across Studies 3, 4, and 5 as a primary measure of well-being for our study. It is defined as "positive evaluative judgment one makes about one's job or job situation" (Weiss, 2002, p. 175 in Kożusznik et al., 2015), with an affective component that is "the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs" (Spector, 1997, p.2 in Kożusznik et al., 2015). It was measured with the Spanish five-item scale developed by Bravo et al. (1993). Respondents indicated their level of satisfaction with statements on a 6-point scale, ranging from 1 (very dissatisfied) to 6 (very satisfied). A sample item is "The amount of pay I receive for the work I do". An additional item measuring general job satisfaction was included: "Overall, how satisfied are you with your job?". The Cronbach's alpha for this scale was .80 for Study 3, as well as .92 for Spanish and .88 for Colombian subsamples in T2. For study 5, the scale shows good reliability for both leaders' ($\alpha$ = .92 at T1 and $\alpha$ = .91 at T2) and workers' ($\alpha$ = .92 at T1 and $\alpha$ = .92 at T2) versions.

*Positive Emotions at Work:* This variable was used in Study 3 to assess the LCT scale's criterion validity. It was measured using a three-item factor from Warr's (1990) scale ("cheerful," "optimistic," "lively"), translated to Spanish through back-translation by two native English-speaking members of the research team. Respondents rated their work-related feelings over the past week on a 5-point scale from 1 (Nothing) to 5 (Much). Cronbach's alpha for this factor was .89.

*Negative Emotions at Work:* This variable was also used in Study 3 for the criterion validity assessment of the LCT scale. It was measured using another three-item factor from Warr's (1990) scale ("tense," "nervous," "anxious"), translated to Spanish through back-translation. The same 5-point response scale was used. Cronbach's alpha for this factor was .91.

*Professional Isolation*: This variable was also used in Study 3 for the criterion validity assessment of the LCT scale. It is defined as the feeling of being cut off from colleagues at work, where the workers' needs for support, understanding, and meaningful workplace connections remain unmet (Golden et al., 2008). It was measured using Golden et al.'s (2008) seven-item scale, translated to Spanish through back-translation. Respondents indicated their level of agreement with statements on a 6-point scale, ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item is "I miss the face-to-face contact with my co-workers". The Cronbach's alpha for this scale was .80.

*Telework-Life Conflict:* This variable was also used in Study 3 for the criterion validity assessment of the LCT scale. It is defined as the blurring of boundaries between remote e-working and personal domains, creating difficulty separating professional responsibilities from private life (Charalampous et al., 2022). It was measured using the six-item dimension from Charalampous et al.'s (2022) work-life interference factor from the revised E-work Life scale, back-translated to Spanish. Respondents indicated their level of agreement with statements on a 6-point scale, ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item is "When e-working remotely, I often think about work-related problems outside of my normal working hours". The Cronbach's alpha for this scale was .86.

*Work Engagement:* This variable was used in Study 4 to assess the predictive validity of the LCT Short-Version scale. It is defined as "a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli et al., 2002; in Schaufeli et al., 2006, p.2). It was measured with the Utrecht Work Engagement Scale Short Version (Schaufeli et al., 2006), comprising nine items across vigor, dedication, and absorption dimensions. Respondents indicated their frequency regarding the statements on a 7-point scale, ranging from 1 (never) to 7 (every day). A sample item

is "I am enthusiastic about my work". The Cronbach's alpha for this scale was .90 for Spanish and .93 for Colombian subsamples in T2.

### 2.4.4. Variables related to leadership

*Leader-Member Exchange (LMX):* This variable was used in Studies 3 and 4 to establish the convergent and divergent validity of the LCT and LCT short-version scales. It is defined as the dyadic relationship between subordinates (workers) and their immediate supervisors (leaders), where the quality of the relationship is based on mutual respect for each other's capabilities, mutual trust, and a sense of obligation or commitment to one another (Graen & Uhl-Bien, 1995). It was measured with the Spanish version of the seven-item scale developed by Scandura and Graen (1984), translated by Tordera et al. (2020). A 4-point Likert response scale was used. A sample item is "To what extent do you feel your supervisor recognizes your potential?". The Cronbach's alpha for this scale was .89 for Study 3, and .84 for Spanish and .81 for Colombian subsamples of Study 4 in T1.

*Family Supportive Supervisor Behavior (FSSB):* This variable was utilized in Study 4 to assess convergent and discriminant validity of the LCT Short-Version scale. It is defined as "behaviors exhibited by supervisors that are supportive of employees' family roles" (Hammer et al., 2009; in Hammer et al., 2013, p.3). It was measured with the Family Supportive Supervisor Behavior Short-Form (FSSB-SF) scale (Hammer et al., 2013), comprising four items that assess emotional support, instrumental support, role modeling, and creative work-family management. The scale was back-translated to Spanish. Respondents indicated their level of agreement with statements on a 6-point scale, ranging from 1 (completely disagree) to 6 (completely agree). A sample item is "Your supervisor makes you feel comfortable talking to him/her about your conflicts between work and non-work". The Cronbach's alpha for this scale was .94 for Spanish and .93 for Colombian subsamples in T1.

### 2.4.5. Process and Mechanism Variables

*E-Work Self-Efficacy:* This variable was used in Study 4 to assess the predictive validity of the LCT Short-Version scale. It is defined as an individual's belief in his/her

capability to effectively perform and manage remote work across multiple dimensions, including technical skills, relationship building, self-care, social interaction, and emotional regulation in a digital environment (Tramontano et al., 2021). It was measured with the e-Work Self-Efficacy Scale (Tramontano et al., 2021), comprising 15 items, translated to Spanish through back-translation. Respondents indicated their level of agreement with statements on a 6-point scale, ranging from 1 (Completely incapable) to 6 (Completely capable). A sample item is "(When work remotely, how well can you …) utilize a range of social networking tools to maximize your work relationships?". The Cronbach's alpha for this scale was .90 for Spanish and .83 for Colombian subsamples in T2.

*Leaders' Participation in Interactive Sessions:* This variable was utilized in Study 5 for evaluating training transfer. It represents the leaders' participation in at least one of the two interactive sessions conducted during the training program. It was coded as a dummy variable: 0 (not participating in the sessions) and 1 (participating).

### 2.4.6. Control Variables

Several control variables were included across studies 3 and 4 to account for potential confounding effects on the relationship between leadership competencies and teleworkers' outcomes, in the process of validating both the LCT and LCT-Short Version Scales. These variables are selected based on established research practice in organizational psychology and leadership studies.

*Gender:* It was coded as a dummy variable: 0 (male) and 1 (female). Gender was included as a control variable because previous research has documented gender-based differences in leadership perceptions (Eagly & Karau, 2002) and telework experiences (Sullivan & Lewis, 2001).

*Age:* Measured as a continuous variable in years. Age is commonly controlled for in organizational studies as it can influence leadership perceptions and performance outcomes, such as innovation (Ng & Feldman, 2012).

*Educational Level:* It was codified as a categorical variable with five categories. 1 (elementary education), 2 (secondary education), 3 (technical or college education), 4

(bachelor's degree), and 5 (master's degree or above). Educational level was included as it can influence leadership perceptions (Budur & Demir, 2019).

*Organizational Tenure:* It refers to participants' duration of employment in their current organization. It was codified as a categorical variable with three categories: 1 (less than 1 year), 2 (1-5 years), and 3 (more than 5 years). Research has pointed out that workers' experience can also influence workers' perceptions of their leaders (Budur & Demir, 2019).

*Percentage of Telework:* It refers to the proportion of work time spent teleworking. It was codified as a categorical variable with four categories: 1 (30%-49%), 2 (50%-69%), 3 (70%-89%), and 4 (90%-100%). This variable was included to control for potential differences in leadership perceptions and experiences based on telework intensity, as research indicates that this variable influences teleworkers' outcomes and their relationship with their leaders (Gajendran & Harrison, 2007).

## 2.5. ANALYSIS

In this section, we will separately describe the analyses conducted for the two theoretical studies (1 and 2) and the empirical studies (3, 4, and 5).

*Theoretical studies (1 and 2)*

For the systematic review of leadership competencies related to performance in telework, we employed the SLR method (Rocco et al., 2023). The review process involved several steps: a) defining the research questions and search strategy; b) conducting a comprehensive database search; c) screening articles based on predefined inclusion and exclusion criteria; d) extracting and coding data from selected articles; e) analyzing thematically leadership competencies related to performance, and f) synthesizing findings to identify key competencies and their effects.

Each article was coded according to methodology, leadership framework, analysis level, sample characteristics, sample size, leadership variables, and outcome variables. Similar behaviors were thematically grouped to derive a final set of leadership competencies related to individual or team outcomes.

*Analyses for Study 3*

For the content validity of the LCT scale, we conducted a two-panel expert evaluation. In the first panel, we assessed the level of agreement following Howard and Melloy's (2015) guidelines, on an index that ranged from 1 to 5. An agreement score greater than 2.5 was considered adequate. In the second expert panel, participants evaluated both the relevance and clarity of each item on a scale of 1 to 4, with scores greater than three considered adequate. Items failing to meet these thresholds were removed from the scale. Additionally, we incorporated new items based on expert suggestions from panel one and revised items considered unclear but relevant (scoring below 3 in clarity and above 3 in relevance) according to experts' scores in panel 2.

For the LCT scale's validation and reliability analysis, we conducted a series of statistical tests, including confirmatory factor analysis (CFA), internal consistency evaluation, convergent validity, discriminant validity, and criterion validity testing.

To assess the construct validity of our scale, we conducted a confirmatory factor analysis (CFA) comparing three models: a) a unidimensional model with all the LCT items, b) a five-factor uncorrelated model, and c) a second-order model with telework leadership as the underlying factor. Model fit was evaluated using $X^2$, CFI - TLI (adequate fit > .90), and RMSEA (adequate fit < .08).

The factors' internal consistency was assessed using Cronbach's alpha and composite reliability (CR) coefficients, with values above .70 considered sufficient (Cortina, 1993).

For convergent validity, we examined the correlation between LMX overall scores and our LCT scale overall score, where correlations between .50 and .80 indicate adequate convergent validity (Brown, 2015). For discriminant validity, we compared a one-factor model against a two-factor model through CFA: one treating LMX and LCT as a single factor, and the other treating them as separate factors.

Criterion validity was tested using hierarchical multiple regression analysis. In the first step, we entered demographic variables (gender, age, education, organizational tenure) and the percentage of telework as control variables. In the second step, we added the overall LCT scale score as a predictor of well-being measures (positive/negative

emotions, job satisfaction, professional isolation, and telework-life conflict) and extra-role performance, operationalized as organizational citizenship behaviors (OCB).

The analyses were conducted using IBM AMOS 28 for confirmatory factor analysis and Jamovi software (The Jamovi Project, 2022) for reliability and validity testing.

*Analyses for Study 4*

As stated before, we developed the LCT short-version scale (LCT-S) by selecting the five items with the highest factor loadings on each dimension based on the results from the pilot survey conducted in Study 3. Afterward, we divided the collected sample into Spanish and Colombian workers to validate the LCT-S scale in Spanish and Colombian populations and conduct the remaining analyses.

First, we conducted a confirmatory factor analysis (CFA) comparing three models: a first model with one factor, a second model with the theoretical five factors, and a third model with leadership as a second-order factor. The factors' internal consistency was evaluated using Cronbach's alpha, with values above .70 considered sufficient (Cortina, 1993).

To test the CFA, model fit was assessed using CFI (acceptable >.90, excellent >.95), TLI (acceptable >.90, excellent >.95), and RMSEA (close fit <.05, reasonable <.08) (Schermelleh-Engel et al., 2003).

For convergent validity, we conducted a correlation test between LMX and FSSB overall scores and the LCT-S scale overall score. Correlations between .50 and .80 indicate adequate convergent validity (Brown, 2015). For discriminant validity, we compared the fit between a model considering LMX/FSSB and LCT as one factor and a model considering them as separate factors. Fit indexes such as $X^2$, CFI, TLI, and RMSEA were compared. The model treating them as separate factors should demonstrate better fit indices, supporting discriminant validity (Brown, 2015).

For predictive validity, we conducted two-step multiple regressions between the overall LCT-S scale scores in T1 and outcome measures in T2 (job satisfaction, engagement, e-work productivity, and OCB). In the first step, we introduced

demographics (gender, age, education, and organizational tenure) and the percentage of telework. Then, in the second step, we included the LCT-S scale scores.

For testing invariance across the two country samples, we tested four measurement invariance models: configural (equal factor structures), metric (equal factor loadings), scalar (equal loadings and intercepts), and strict (equal loadings, intercepts, and uniqueness). Model fit was assessed using CFI, TLI, and RMSEA. All analyses were conducted using Jamovi software (The Jamovi Project, 2022).

*Analyses for Study 5*

To test the effectiveness of the leadership training program, changes in leaders' self-reported competencies (remote goal management and remote relationships development) from T1 to T2 were examined using paired-samples t-tests. Before analysis, confirmatory factor analysis (CFA) was conducted to validate the two-factor structure of leadership competencies. Due to violations of the normality assumption (Shapiro-Wilk, $p < .001$), Wilcoxon non-parametric tests were also used to validate the results. Effect sizes were calculated using Cohen's d for parametric tests and rank-biserial correlation for non-parametric tests. The same analysis was conducted to assess the training transfer hypothesis (H2), in which subordinates' perceptions of leaders' competencies were compared from T1 to T2.

A mixed repeated measures ANOVA was implemented to examine the moderating effect of leaders' participation in interactive sessions (H3). Leaders' participation (yes/no) was incorporated as a between-subjects factor, analyzing the time × participation interaction effect on subordinates' perceptions of each leaders' competencies.

To test if the changes in the perception that subordinates have of leaders' competencies affected the changes in subordinates' outcomes at both individual and team levels (H4), multilevel modeling was utilized. Teams with at least three responding members were included in this analysis. Intraclass correlation coefficients (ICC) were calculated to determine the proportion of variance explained by team-level factors. Two-level models were constructed for each competency and outcome, controlling for T1 measures at both individual and team levels. Model fit was evaluated using various

indices ($\chi^2$, RMSEA, CFI, TLI, and SRMR), following established recommendations (Hu & Bentler, 1999).

Finally, path analyses were conducted to examine whether changes in leaders' competencies predicted changes in their job satisfaction and productivity (H5). Separate models were analyzed for each competence, controlling for pre-intervention measures. Model fit was also evaluated using $\chi^2$, RMSEA, CFI, TLI, and SRMR.

Statistical analyses were performed using Jamovi (The Jamovi Project, 2022) and MPlus (Muethén & Muethén, 2022) software. Unstandardized coefficients were reported for regression analyses to facilitate the interpretation of effect magnitudes in the original measurement scales.

# CHAPTER 3: OVERCOMING VIRTUAL DISTANCE: A SYSTEMATIC REVIEW OF LEADERSHIP COMPETENCIES FOR MANAGING PERFORMANCE IN TELEWORK

Bravo-Duarte, F., Tordera, N., & Rodríguez, I. (2025a). Overcoming virtual distance: A systematic review of leadership competences for managing performance in telework. *Frontiers in Organizational Psychology, 2*, 1499248. https://doi.org/10.3389/forgp.2024.1499248

## 3.1. INTRODUCTION

In the current hybrid and virtual organizations, there is a growing need for training and developing leaders in competencies that are effective in telework (Arora & Suri, 2020; Gohoungodji et al., 2022). This type of work arrangement has gone from being rather exceptional to a new way of shaping labor markets worldwide (Moens et al.,2021). According to the World Economic Forum (2023), 20.5% of global companies indicated that offering more opportunities for telework is one of their short-term strategies, and remote job offers have increased compared to previous years (Aksoy et al., 2023).

These changes require HR professionals to re-skill and adapt different roles to the "new" working environment, especially in leadership (Bondarouk & Brewster, 2016). In fact, successful telework implementation has been suggested to depend more on how leadership is developed than on the correct use of technology (Beauregard et al., 2019; Bondarouk & Brewster, 2016).

Telework refers to work performed regularly outside the employers' location, at least once weekly, excluding business travel, mobile work across multiple sites, or client offices (Nakrošiene et al., 2019). It includes remote and hybrid setups, where employees alternate between working from home and the organizations' headquarters in varying proportions. In fact, as Vartiainen and Vanharanta (2024) state, the concept of hybridity refers to a temporal dimension that fluctuates between telework and onsite work.

The widespread adoption of telework has introduced unique challenges that can impact worker performance. These include blurred work-life boundaries, social and professional isolation, potential loss of tacit knowledge, and ergonomic difficulties (Beauregard et al., 2019; Waight et al., 2022). Additionally, teleworkers may face technological barriers and communication constraints (Shirmohammadi et al., 2022). These factors can affect teleworkers' performance and effectiveness, particularly for those unaccustomed to remote work arrangements (Offstein et al., 2010). This could be challenging for performance indicators beyond task performance that could be especially relevant for nowadays organizations, such as innovative or contextual behaviors.

In this context, understanding and measuring performance at multiple levels becomes crucial. Following Koopmans et al. (2011, 2014), we conceptualize work

performance as behaviors or actions contributing to organizational goals. At the individual level, this includes four dimensions: task performance (completing core work duties), contextual performance (behaviors supporting the organizational, social, and psychological environment), adaptive performance (adapting to changes in work roles or environment), and counterproductive work behavior (behaviors harmful to organizational well-being). At the team level, performance encompasses collective task accomplishment, team member behaviors that maintain the group's social context, and the team's ability to adapt to changes (Kozlowski & Ilgen, 2006).

The discussion about whether telework improves or worsens worker performance has continued for the past two decades, yielding inconsistent findings (Brown et al., 2021; Pyöriä, 2011). This may be due to the variability in the operationalization of performance measures (Brown, 2021), as well as other organizational factors that might influence those relationships, such as leadership. Thus, more research is needed to identify and design work environments that facilitate different types of performance during telework. In this context, leadership requires to be considered In fact, leaders have been pointed out to be a crucial factor for effective telework, as they can contribute to addressing telework challenges and supporting both individual and team performance (Avolio et al., 2009; Bell et al., 2023; Cortellazzo et al., 2019; Inceoglu et al., 2018; Kozlowski et al., 2021; Peiró et al., 2024; Zeike et al., 2019).

Recent research emphasizes that leadership in telework requires more than simply extending traditional leadership practices to virtual settings. Instead, it demands developing specific competencies to manage remote work effectively (Alkhayyal & Bajaba, 2023; Contreras et al., 2020; Delanoeije & Verbruggen, 2020). In this sense, Peiró and Martínez-Tur (2022) proposed that leaders must adapt their behaviors and develop new ones that respond adequately to a digitalized and geographically dispersed work environment.

There have been different attempts to establish specific leadership competencies models for the digital era (Avolio et al., 2000; Liao et al., 2024). In this context, research has defined e-leadership as "a social influence process mediated by AIT (advanced information technologies) to produce a change in attitudes, feelings, thinking, behavior, and performance with individuals, groups, and/or organizations" (Avolio et al., 2000, p.

617). When the focus is put on the spatial and temporal dimensions in which digital leadership occurs, digital leadership is considered as "social influence that occurs when leaders and followers are geographically dispersed, temporally asynchronous, and completely mediated by technology" (Banks et al., 2022, p. 2). Thus, leadership focus is set in its contribution to the reduction of virtual distance.

As a response to this challenge, the virtual distance framework (Lojeski & Reilly, 2020) suggests that leaders can improve performance in remote work or telework by implementing strategies that bring workers closer together. According to Lojeski and Reilly (2020), organizations need to overcome operational and affinity distance for effective performance in telework settings. Operational distance involves challenges in technology-mediated work coordination and information sharing, while affinity distance refers to the psychological and social separation that emerges from physical dispersion. Leaders might greatly contribute to both aspects by digitalizing the social process of influence. Beyond the development of specifc leadership competency models for this context, research needs also to ascertain which is the empirical evidence about how traditional, digital or digitalized competencies facilitate performance in telework contexts (Peiró & Martínez-Tur, 2022). Lack of clarity about which specific aspects of leadership need to be trained and developed in remote and hybrid workplaces could lead organizations to implement ineffective or less efficient interventions (Arora & Suri, 2020). Despite several studies indicating that telework leadership, as in face-to-face work, is fundamental for individual and team performance (Brown, 2021), there is still no consensus about the empirical relationship between specific leadership competencies and performance in telework.

Therefore, our study focuses on the need to identify and understand effective leadership competencies that are related to performance in telework. This leads to our main research question:

*RQ1: What leadership competencies are most relevant for performance in telework arrangements?*

Identifying the mechanisms through which leaders influence performance in telework settings is also crucial to better understand how leadership contributes to performance in these types of work arrangements. Moreover, leadership does not occur

isolated. Telework characteristics, contextual factors, leader characteristics, and team member attributes can significantly affect how leadership competencies influence performance outcomes. Thus, it is important to address and understand both the mechanisms and boundary conditions enabling or hindering leaders from demonstrating effective leadership in telework. This leads to our second research question:

*RQ2. What mechanisms and boundary conditions intervene in the relationship between leadership competencies and performance in telework?*

In summary, this study conducts a structured literature review (SLR) of the relationships between leadership competencies and different individual and team performance indicators in telework contexts. SLR is a comprehensive method for collecting literature that meets specific criteria to discover themes, patterns, trends, or gaps, especially in human resource development (Rocco et al., 2023). Over the past two decades, several studies have examined these relationships (Bell et al., 2023; Brown et al., 2021; Cortellazzo et al., 2019; Efimov et al., 2022). However, this knowledge remains fragmented, and there is a lack of a clear framework for telework leadership at the individual and team levels (Cortellazzo et al., 2019). Therefore, this study will contribute to the field by thematically analyzing the leadership competencies and components contributing to performance in telework contexts at both levels by exploring and analyzing the competencies presented in the literature.

Finally, this analysis will provide an initial understanding of effective telework leadership competencies applicable to teams and organizations in telework arrangements. As a result, for HR managers and practitioners, it could serve as a starting point for determining implications for future telework leadership training interventions, helping to build thriving and solid businesses and organizations (Di Fabio & Peiró, 2018).

Considering the above, the three main objectives of this research are:

1. Identifying relevant leadership competencies for promoting performance in telework, considering different operationalizations of the construct (dimensions and level of analysis).

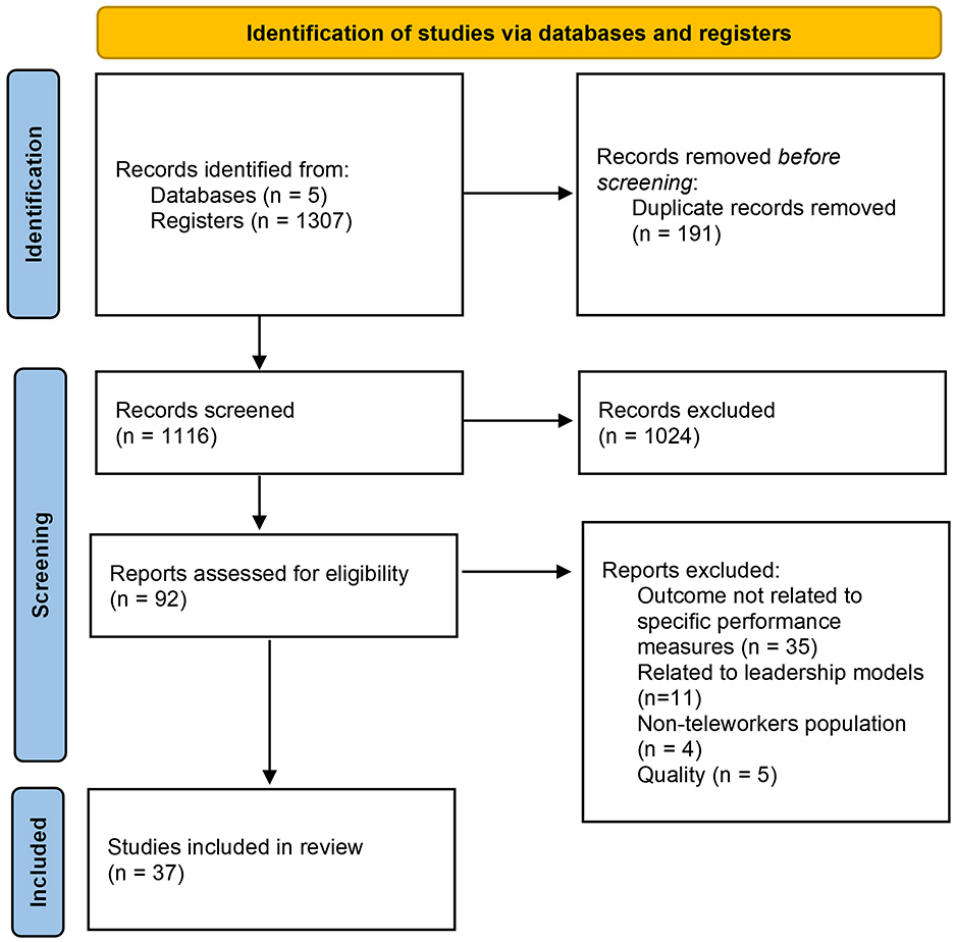
2. Analyze the mechanisms and contextual factors that might affect those relationships.

3. Propose general guidelines and recommendations for future leadership development interventions tailored to the telework context.

## 3.2 METHODS

To answer the research questions, we analyzed empirical research from January 2000 to June 2024, following PRISMA guidelines for systematic reviews (see Figure 2). We systematically reviewed empirical studies on Scopus, Psycarticles, PsycINFO, ABI/INFORM, and Web of Science databases, encompassing quantitative and qualitative methods published in English, Spanish, and Portuguese.

*Figure 2. Inclusion of studies according to PRISMA Guidelines.*




Search terms combined the different variables regarding the study: concepts of phenomenon (e.g., telework), population (e.g., leaders), competencies (e.g., competencies), and performance.

The search terms were organized into four conceptual categories with the following structure: *TITLE(Telework* OR "Remote Work*" OR "Smart work*" OR Telecommut* OR Virtual OR Digital*) AND ABSTRACT(Lead OR supervis* OR manag* OR e-leader*) AND ABSTRACT (Competenc* OR Practice OR Skill OR abilit* OR attitude) AND ABSTRACT("Performance" OR "productiv*" OR "counterproductive behavior" OR "OCB" OR "creativity" OR "innovation" OR "effectiveness" OR "efficien*" ).*

As inclusion criteria, we focused on peer-reviewed empirical research on real-world teleworking populations related to organizational psychology and HRM. As exclusion criteria, we excluded research that has not been carried out on teleworkers or teleworking contexts (students' samples were excluded) and research that does not address leadership as an independent or antecedent variable. We also excluded studies that did not directly examine specific leadership competencies (for example, studies that address leadership models such as LMX and transformational leadership).

*Study selection*

The database search yielded 1,307 initial results. Applying exclusions criteria, we left 92 articles for full-text review by two subject matter experts. Fifty-five articles were excluded for not meeting methodological criteria or lacking dependent variables related to performance.

A total of 37 articles were reviewed in full. Studies of virtual teams were included, as these comprise teleworkers by default. Experimental studies were also reviewed. Also, as telework is considered a continuum that can include on-site working days, research on hybrid arrangements was also included. Two experts confirmed consistency in applying the selection criteria.

A systematic assessment of publication bias was undertaken using an ad-hoc scale developed for this literature review, using guidelines from Acosta et al. (2020). This scale evaluated: (1) the comprehensiveness of the literature search strategy, including sources searched and search terms used; (2) the inclusion of significant findings; (3) the adequate sample (teleworkers and leaders from real organizations); and (4) the quality of the document. This scale was created to provide an indicator of publication bias tailored to the parameters and scope of this review.

This assessment provided an additional lens for readers to gauge the objectivity and perspective of the review critically. Each article was coded according to methodology, leadership framework, analysis level, sample characteristics, sample size, leadership variables, and outcome variables. According to the SLR method (Rocco et al., 2023), similar behaviors were thematically grouped to derive a final set of leadership competencies related to individual or team performance.

## 3.3 RESULTS

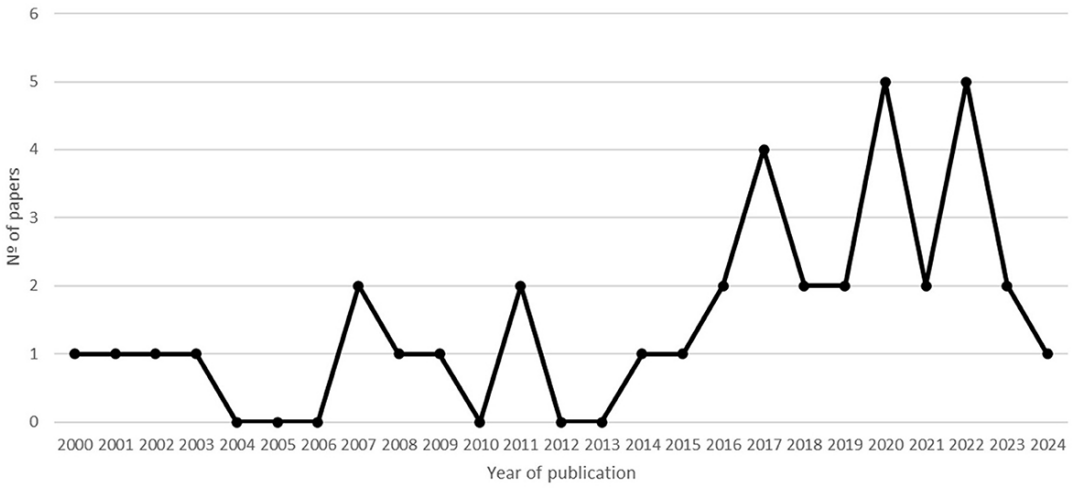
The systematic review results are presented in two sections. First, we describe the reviewed literature regarding theoretical and methodological approaches. Then, we address the research questions regarding the relationships between leadership and performance in telework.

### 3.3.1 Theoretical and methodological approaches

We found 22 quantitative, 15 qualitative, and one mixed method study (see appendix 1 and 2)

Most reviewed articles (25) were published within the last decade, with 15 published within the past 5 years (see Figure 3). Most papers were published in 2020 and 2022, coinciding with the beginning and end of the COVID-19 pandemic.

*Figure 3. Composition of the sample of articles reviewed related to year of publication.*



Regarding sample populations, most studies focused on the service sector and tech/finance workers. Geographically, most studies were conducted in the United States (14), North Europe (6), Asia (4 studies, mainly India), Canada (3), and Southern Europe (2). A few studies were conducted in other regions: Costa Rica (Latin America), New Zealand (Oceania), and Nigeria (Africa). Five of them were cross-national, considering distributed teams.

In quantitative studies, most of the data outcomes were gathered from the formal leaders' subordinates/followers (20 studies), except for Thomas and Bostrom (2011) who gathered data from leaders. In qualitative studies, 8 studies collected information exclusively from leaders, while 5 studies included both leaders and team members. Two studies employed case study designs.

Regarding sociodemographic characteristics of the samples, sex of respondents is reported (28) but primarily to describe the sample. However, many articles do not report it (9). Among those reporting sex, 12 studies had predominantly female samples, 8 had predominantly male samples, and 8 had relatively balanced gender distributions. Age was reported in 24 studies, typically as a mean ranging from 21 to 48 years old. Only three articles include sex and age as a control variable.

*Operationalization of performance*

Specific patterns regarding the conceptual and operational approach to performance can be identified in quantitative research. Eight studies defined and operationalized performance as task performance, which includes indicators such as quality of work, productivity, efficiency, planning, knowledge, decision-making, and communication. Six articles analyzed the relationship between leadership and contextual performance, such as helping behaviors (Lautsch et al., 2009), innovation (Karani & Mehta, 2022), creativity (Lee & Kim, 2022), initiative and adaptability (Solís, 2017), organizational citizenship behaviors (Flavian et al., 2019), and extra task choice (Karani & Mehta, 2022). Finally, 12 articles measured overall performance. Notably, no articles were found that explicitly considered adaptive performance or counterproductive work behavior in the context of telework leadership.

In terms of the level of analysis, 12 studies focused on individual-level outcomes, examining task performance (e.g., Challagalla et al., 2000; Bartsch et al., 2020) and contextual performance indicators (e.g., Karani & Mehta, 2022). Nine studies analyzed team-level performance, investigating outcomes such as team efficiency and innovation (Wakefield et al., 2008), project success (Thomas & Bostrom, 2011), team effectiveness (Soon & Salamzadeh, 2021), and goal accomplishment (Han et al., 2020). One study conducted multilevel analyses examining individual and team-level outcomes (Hill & Bartol, 2016). No studies were found examining organizational-level performance outcomes in telework contexts.

*Methodological approaches*

Most of the studies using quantitative data (22) were correlational (20), except for two experimental studies (Ernst et al., 2022; Swain, 2018). Moreover, most of the correlational studies used a cross-sectional design (19), except for two studies that used a panel design (Lautsch et al., 2009; Hill & Bartol, 2016) and a diary (weekly) study (Hodzic et al., 2023).

In general terms, the samples were composed of remote workers, but five studies included both remote and non-remote workers (Challagalla et al., 2000; Ernst et al., 2022; Lautsch et al.,2009; Solís, 2017; Staples, 2001).

Regarding the referent of the performance measures, seven studies used workers' perceptions about their team performance, and 1 used subordinates' self-reported performance. Three studies included workers' individual or team performance rated by their supervisors. Also, other measures of performance were included: Thomas and Bostrom (2011) measured project success from the leaders' perspective; Hill and Bartol (2016) included key team performance indicators; Swain (2018) conducted an online problem-solving activity, and Newman et al. (2020) used workers Balanced Score Card results.

In the case of qualitative studies, most of them (11) used individual semi-structured interviews, while two employed case study methodology and two combined interviews with questionnaires.

### 3.3.2 What leadership competencies are most relevant for performance in telework arrangements?

As indicated in the descriptive part of the results, research has analyzed several performance indicators in relation to leadership competencies in telework. Following the virtual distance framework, we have grouped the results into two types: competencies aimed to reduce operational distance and competencies aimed to reduce affinity (or relationship) distance.

*Competencies aimed to reduce operational distance*

Considerable research addresses the relationship between competencies directed to reduce operational distance and performance in telework (12 of 22 quantitative studies and 9 of 15 qualitative studies). Most of the research considers task performance as an outcome, but some also analyzed team innovation, prosocial behavior, or creativity.

First, 5 quantitative studies and 2 qualitative studies show evidence for the importance of goal management behaviors. They have been found to be relevant, especially for team-level performance 3 studies. Concerning team task performance, Wakefield et al. (2008) found that leadership roles emphasizing direction-setting and production—characterized by behaviors such as prioritizing, planning, and initiating action—showed the strongest correlation with teleworkers' perceived team performance, outweighing other managerial roles like monitoring and coordination, which were significative but less important.

On the contrary, in Kashive et al. (2022) both internal and external leadership roles positively influenced team performance; nevertheless, the association was stronger for internal roles (which include monitoring and coordinating). Thomas and Bostrom (2011) showed that forcing-oriented leadership behaviors (defined as "evidence of formal authority and control mechanisms to directly manipulate individuals' behavior.", p. 50), particularly monitoring goal achievement, rule enforcement, and personnel reassignment, were positively related to team project outcomes in virtual settings by fostering trust and cooperation.

This is complemented by the qualitative study of Maduka et al. (2018), which interviewed members from two virtual teams. They highlighted that leadership behaviors

aimed at clarifying the structure and goals, guidelines, and leader expectations to the team are conducive to better team performance in telework. They underlined that it is essential for leaders to structure work in remote arrangements, which is crucial for proper goal achievement in virtual contexts. Also, team leaders and members interviewed by Hambley et al. (2007) identified that providing clarity is the most important virtual leadership behavior to achieve team effectiveness.

Research on the relationship between individual level performance and goal management presents mixed findings (2 studies). Challagalla et al. (2000) found that leaders who excelled at task structuring and role clarification significantly enhanced individual task performance. Expressly, leaders who provided precise instructions, set specific goals, established structured work environments, helped workers understand their tasks, and reduced ambiguity were associated with higher self-reported task performance. Regarding goal monitoring and control, Solís (2017) analyzed differences between teleworkers or not-teleworkers in three indicators of individual performance (task, contextual, and adaptative performance) under different conditions of supervisory monitoring behaviors (high and low control). He found a direct negative relationship between supervisor control and two performance indicators: task performance, and adaptative performance. Interestingly, in terms of adaptative and contextual performance, teleworkers under low supervisor control showed significantly higher individual adaptative and contextual performance than non teleworkers.

No differences between both groups of teleworkers were observed for task performance. These findings suggest that leadership monitoring and control effectiveness may differ between traditional and telework contexts and for different dimensions of performance.

Seven quantitative studies explored the relationship between leaders' task-focused communication and task performance. Vătămănescu et al. (2022) found that leadership communication effectiveness—characterized by successful multi-channel information exchange, knowledge sharing for clarity, and empathetic relationship building—positively influenced team task performance.

Newman et al. (2020) also established that leaders who deliberately increased communication frequency and fostered information exchange among team members

achieved higher team task effectiveness (as perceived by members); nevertheless, the degree to which virtual team members perceived their leader to be an effective communicator was not related to an objective measure, in this case, a balanced scorecard performance score.

Replicating this finding at the individual level, Staples (2001) also found that frequent communication from the leader is positively correlated with trust in the leader, which is also correlated positively with individual perception of overall productivity. Nevertheless, Lautsch et al. (2009) found no correlation between supervisor communication frequency and task performance rated by the supervisor itself.

Regarding communication tactics, experimental research conducted by Ernst et al. (2022) did not find support for the relationship between charismatic leadership tactics (such as telling stories/anecdotes, enlisting tasks, enhancing body gestures, facial expressions, and using an animated voice tone) and individual task performance between the control and experimental group. Despite this, they make a difference in the perceived leaders' influence ability. On the opposite, and regarding to contextual performance, in Flavian et al. (2019) study, empathic communication of leaders and perceived justice were positively correlated with trust in leaders and commitment to the team, which also were positively correlated with individual organizational citizenship behavior (OCB).

Thus, hard measures of performance and leaders' rating of individual performance were not related to task-focused communication (mainly frequency), and nor verbal and nonverbal charismatic leadership tactics. However, a richer measure of communication that considers other aspects such as multi-channel use has been shown to be positively related to perceptual measures of team performance.

Quantitative research focused on specific e-leadership competency models found also contradictory results for the role of leader communication behavior. More concretely, Soon and Salamzadeh (2021) found that E-communication, one of the competencies of the six e-leadership competencies model proposed by Roman et al. (2018) (which includes message clarity, minimizing unintended communications, and managing information flow), significantly improved team effectiveness. However, grounding on the same model, Elyousfi et al. (2021) found that none of the e-leadership competencies positively affected team member performance. These contradictory results point out the

importance of understanding which specific aspects of leaders' communication or under which circumstances those behaviors might be more relevant for performance.

Qualitative research (7 studies) adds further insights on how task-oriented communication behaviors are related to performance in telework. Through interviews with virtual leaders, Pauleen (2003) and Morgan et al. (2014) identified the critical role of establishing regular communication channels and soliciting employee feedback for individual performance. These studies emphasized that effective leadership communication must be proactive, structured, and predictable to create a systematic information flow. Qualitative studies that interviewed virtual workers also highlighted the relevance of the correct usage of virtual communications and the timing of the information the leader needs to address. In Bonet Fernandez and Jawadi (2015), workers addressed the need to boost synchronous communications between the leader and collaborators instead of asynchronous communications such as emails or chats. The interviewed leaders indicated that synchronous communications are better for requesting information and favoring the flow of messages through virtual media.

Regarding team performance, virtual team members indicated that how changes are communicated makes a difference in peoples' cohesion and, thus, in their team success (Maduka et al.,2018). Moreover, through extensive interviews with virtual team members, Kreamer et al. (2021) identified three critical elements of successful leadership facilitation: adequate meeting planning, savvy technology usage, and connecting on a personal level with teleworkers. The importance of this facilitative leadership role is further corroborated by Ashmi (2017), who interviewed team members and stated that leaders who share knowledge, information, and assistance with the team favor team performance.

Also, the study of Al-Ani et al. (2011) with virtual workers found that performance depends on the leaders' usage and promotion of digital tools, where members can exchange messages and improve the flow of key information for teamwork. Finally, the qualitative study by Darics (2020) with virtual team members documented that the use of verbal and non-verbal online communication strategies (e.g., signals in writing, para verbal nuances in calls) also helps to improve the leader-team member exchange, so

leaders must be aware of the corresponding communicational cues and semiotics at each moment of connection with their teleworkers.

In summary, the reviewed literature shows empirical evidence for the importance of competencies oriented to reduce operational distance, such as goal setting, monitoring, and task-focused communication, in promoting individual and team performance in telework settings. However, they also show contradictory results, and the need to better understand the specific components of those characteristics that foster performance. Moreover, the review shows that research is mostly focused on team-level task performance, impairing our knowledge about the relationship between leadership and important aspects of individual and team performance such as innovation or contextual performance.

*Competencies aimed to reduce affinity (relationship) distance*

Twenty out of the 37 studies examined the relevance of affinity or relationship-oriented leadership for performance during telework (13 quantitative, 6 qualitative, and 1 mixed).

First, 5 studies examined the relationship between leaders' trust-building competencies and performance indicators. Regarding team performance, Wakefield et al. (2008) and Kashive et al. (2022) showed that internal/flexible leadership roles—particularly the facilitator and mentor roles—were positively related to team task performance. While facilitator role is associated with fostering collective effort, building cohesion and teamwork, facilitating participation, and resolving conflict (Denison et al., 1995 in Wakefield et al., 2008), the mentor role involves "the showing of empathy and concern, and treating each team member in a sensitive and caring way" (Denison et al., 1995, in Wakefield et al., 2008, p. 440). Also, Soon and Salamzadeh (2021) found that e-trust (defined as fostering team trust, respecting work-life boundaries, and managing diversity) was positively related to virtual team effectiveness. Contrarely, as mentioned before, Elyousfi et al. (2021) found that none of the e-leadership competencies, which includes e-trust, was positively related to team member performance. In the same way, when considering behaviors that create trust in workers, the experimental research by Swain (2018) found that the expression of humility from the leader was not found to be

related to team performance. Again, the conflicting results found can be explained by the analysis offered in qualitative research.

Five qualitative studies show additional evidence about the specific conditions under which trust building competencies could be especially important for telework. As indicated by the IT virtual leaders interviewed by Cripe and Burleigh (2022) at the beginning of team creation, building personal relationships with virtual workers is crucial to project goals' success. This is also highlighted by the virtual team leaders interviewed in Pauleen (2003). Relationship-building initiated before task execution was found to benefit the performance and effectiveness of teams. Qualitative research based on virtual team members' responses (Maduka et al., 2018; Norman et al., 2019) concludes that trust-building becomes critical in the initial stages of integrating workers into virtual teams and requires specific ways to develop trust that overcome the limitations and lack of bonding instances in telework. This is also pointed out in Malhotra et al. (2007). In this case, responses from both, team members and leaders, indicated the need to establish and maintain trust using communication technology, ensuring that diversity is understood and appreciated, enhancing the visibility of virtual members' contributions, and enabling individual members to benefit from the team.

Second, 5 quantitative studies examined the relationship of leadership competencies for social support with team and individual performance. In the case of teams, Thomas and Bostrom (2011) also found that leaders' facilitation and support behaviors, those that foster team openness, vulnerability, and commitment in teams were positively related to overall team performance. This is also supported by Hodzic et al. (2023) who found a positive relationship between supervisor social support, knowledge sharing and team overall performance. Moreover, Hodzic et al. (2023) found that supervisor social support moderated the relationship between amount of telework (days of telework per week) and knowledge sharing, which in turn was found to be related to team overall performance. When supervisor social support was higher the relationship between amount of telework and knowledge sharing was positive, while when supervisor social support was lower the relationship was negative.

Regarding individual performance, Haines et al. (2002) found that supervisor support for telecommuting was positively related to individual overall performance.

Haines et al. (2002) highlighted the importance influence of those leadership competencies for teleworkers' performance because they provide the type of social and emotional resources employees need to adapt and perform in dynamic environments.

Three studies examined the relationship of social support, with contextual dimensions of performance related to innovation. Lee and Kim (2022) revealed that family-supportive leadership behaviors, characterized by supervisors' active support of work-family balance, indirectly enhance teleworkers' creativity through positive emotional states and related mechanisms as we will analyze in the next sections. In a similar vein, Karani and Mehta (2022) found that supervisor support was related to innovative individual behavior through work engagement. Nevertheless, Lautsch et al. (2009), in their two-wave mixed-study, found that family-supportive supervisor behaviors aimed to requirement of separation between work and family reduced individual helping behaviors in telecommuters.

Third, empowering behaviors of leaders were explored in 2 studies in relationship to team and individual performance. By means of a multilevel panel design, Hill and Bartol (2016) showed that at the team level, team level-empowering leadership (sharing power with team members and creating facilitative environments) had a significant effect on team performance rated by the supervisor. Leaders empowering behaviors also enhance individual performance, operationalized as the perceived individual contribution to team task performance.

Focusing on individual performance, Bartsch et al. (2020) found that enabling leadership behaviors—characterized by promoting non-hierarchical teamwork, encouraging flexible work methods, and fostering experiment with new ideas- was positively and significantly related to individual task performance.

In line with the quantitative results, qualitative research also highlights the importance of empowering and providing autonomy in teleworking. In Hoegl and Muethel's (2016) research, managers, and workers concluded that leaders who monopolize decision making authority and provide insufficient autonomy for team members diminish virtual team performance.

Finally, Salvoni et al. (2024) found that when employees perceived their managers as having strong stress management competencies, they reported better overall job performance. These competencies describe the following behaviors: (a) being respectful and responsible, (b) managing and communicating existing and future work (which reported the strongest relationship), (c) reasoning and managing difficult situations, and (d) managing the individual within the team.

Overall, the findings underscore the importance of relationship-oriented leadership competencies, including support, trust-building, empowerment, and stress management, for fostering performance in remote work environments. Most of empirical evidence is focused on task performance at the team and individual level.

### 3.3.3. What mechanisms and boundary conditions intervene in the relationship between leadership competencies and performance in telework?

The importance of leadership for performance in telework settings is related to the potential of leadership to influence work related factors such as collaboration, communication, autonomy, work-life balance, that might be relevant for performance.

Besides their direct effect on employees through personal interaction, leaders have the capability to affect working conditions, offer or limit important resources, and favor individual or team processes (e.g., sense making). Moreover, leadership does not occur in a vacuum. Organizational, leaders and team member characteristics can have an important effect in how leader competencies for telework influence performance. Thus, in this review, we also analyze empirical evidence about the mechanisms and boundary conditions that mediate or moderate the relationship between leadership and the performance of teleworkers and teams. Sixteen of the 22 quantitative studies included mediation (12) and/or moderation (6) analyses. Fifteen of the 16 studies have a cross-sectional design, except for Hill and Bartol (2016) who conducted panel data with two measures.

*Team level mechanisms*

Three team mechanisms were found to mediate the relationship between leadership behaviors and team performance during telework (4 studies). They all refer to team processes expected to enable or facilitate team performance.

First, 1 study found that the relationship between leadership competencies and team performance was mediated by interpersonal trust within teams. Concretely, Kashive et al. (2022) found that team members' interpersonal trust mediated the relationship between internal leadership roles (monitor, coordinator, mentor, and facilitator behaviors) and overall team performance.

Second, another team mechanism, collaboration between members, was found to be relevant for team performance in 2 quantitative studies. Thomas and Bostrom (2011) found that both task-oriented and relationship-oriented behaviors were positively related to overall team performance through the development of higher levels of cooperation between team members. Hill and Bartol (2016) also found team virtual collaboration to mediate the relationship between empowering behaviors and team task performance, through a longitudinal panel design.

Finally, 2 studies found the use of media and technologies to mediate the relationship between task and relationship-oriented leadership and team-level performance. Thomas and Bostrom (2011) showed that team technology adaptation (changes in behavior when using new technologies and usage of new tools) mediated the relationship between support behaviors and team project outcomes evaluation. Also, Kashive et al. (2022) concluded that communication quality perceived by the team members (correct usage of technology, time and space, and patterns regarding the usage of synchronous and asynchronous media) mediated the relationship between task and relationships-oriented behaviors (monitoring, coordinating, and mentoring) and overall team performance. Qualitative research also supports this finding. Han et al. (2017) showed that leadership behaviors promoting teleworkers' effective use of technologies, in turn, contributed to enhance team creativity and success.

*Individual level mechanisms*

As it is the case for team mechanisms, only a limited number of studies (5) explored and found support for 5 mechanisms mediating the relationship between leadership competencies and individual performance in remote work.

Flavian et al. (2019) found subordinates' trust in leaders to mediate the relationship between leaders' perceived empathy and justice and teleworkers' organizational citizenship behaviors. In a comparative analysis, Staples (2001) found that trust in leaders mediated the relationship between communication frequency and individual overall productivity for remote workers, but not in traditional office settings. Lee and Kim (2022) also provided support for trust as a mediating mechanism with contextual performance, strengthening leader-employee relationship quality. They also studied other two mechanisms through which family-supportive leadership communication enhances employee creativity in work-from-home contexts designed to promote work-life balance: (a) Cultivating positive emotional states among employees and (b) Facilitating work-life enrichment (WLE), where positive experiences transfer between professional and personal domains.

Karani and Mehta (2022) also established that psychological contract fulfillment—defined as employees' perception that their employer will honor commitments, leading to reciprocal positive attitudes and behaviors—mediates the relationship between supervisor support and innovative behaviors in virtual work settings.

Finally, Bartsch et al. (2020) identified employee autonomy as a critical mediator between relationship-oriented leadership and perceived individual performance in remote settings.

*Moderators or boundary conditions*

We could not find much research investigating potential moderators of the relationship between leadership and performance during telework. Only two studies addressed moderators: First, the research developed by Haines et al. (2002) analyzed how subordinates' self-management orientations (the ability to discipline their own performance and manage time) could be moderating the relationship between supportive behaviors of leaders and telecommuters' behaviors. Concretely, they found that for

telecommuters with higher self-management skills (more autonomous, with higher capability to self-organize and self-direct), supportive behaviors of leaders were more strongly associated with their individual performance.

Hill and Bartol (2016) analyzed specific features of telework and showed that team geographical dispersion (as computed index point of the geographical distance between team members) strengthened the positive relationship between empowering team leadership and team virtual collaboration, which, in turn, was related to individual task performance. Empowering leadership was more strongly related to team performance through virtual collaboration when team members were more geographically dispersed.

Regarding qualitative studies, Hoegl and Muethel (2016) noted that teleworkers with a better fit with the job (job fit) reported more benefits from leadership actions, especially when their technical, digital, and self-leadership competencies are adequate for their roles. The qualitative research by Poulsen and Ipsen (2017) also supports this idea, showing that in telework, it is important to assign the appropriate tasks to each collaborator according to the competencies they have developed the most.

Qualitative research also has suggested some possible moderators of these relationships. As indicated previously, some researchers have highlighted that the stage of development of teams could influence the importance of leadership competencies such as trust building (Cripe & Burleigh., 2022; Maduka et al., 2018; Malhotra et al., 2007; Newman et al., 2020; Pauleen, 2003). Thus, in the initial stages of development of the relationship or when team members' visibility is needed this competency could have a stronger effect on results.

In summary, the reviewed literature reveals important patterns in how leadership competencies relate to performance in telework contexts. Quantitative research has identified specific leadership behaviors that enhance performance, while qualitative studies provide insights into how these behaviors are implemented effectively in practice. Research has examined to some extent potential mediators (trust, autonomy, collaboration, adequate use of technologies or WLE) and moderators (self-management and job fit) of the relationship between leadership competencies and performance in telework. However, there is still limited knowledge of how context might facilitate or impede the influence of leaders on teleworkers' performance. Moreover, more profound

knowledge of the mechanisms activated by different types of leadership competencies in telework is needed. Indeed, only one study used a longitudinal design for testing mediating mechanisms (Hill & Bartol, 2016). Thus, this area of research needs to be further developed.

## 3.4 DISCUSSION

This systematic review aimed to (a) identify key leadership competencies fostering performance in telework, (b) identify mechanisms and moderators influencing those relationships, and (c) provide suggestions for leadership competencies that should be addressed in leadership development programs considering telework.

Our review shows empirical evidence that leadership competencies aimed at reducing operational and affinity distance (Lojeski & Reilly, 2020) are associated with higher levels of individual and team performance in telework settings, especially task performance. Therefore, based on our systematic review, we have identified five key leadership competencies crucial for fostering performance in telework contexts.

Firstly, task-focused communication emerges in multiple studies (8 quantitative and 9 qualitative) emphasizing the importance of frequent, effective, and high-quality interaction between leaders and team members. In-depth, task-oriented communication related to clarifying information, providing task performance (e.g., Newman et al., 2020; Vătămănescu et al., 2022).

Secondly, goal management appears in seven studies. Delineating objectives and expectations emerge as a key leadership competency for enabling team performance (i.e., Kashive et al., 2022). Also, behaviors aimed to provide clear goals and expectations and monitor progress (Al-Ani et al., 2011) enable teleworkers to effectively self-manage and achieve better performance.

Third, leaders' social support, the ability to provide individualized concern and assistance to teleworkers through virtual media, emerges as a fundamental competency in six studies. Quantitative evidence demonstrates its significant effect on individual task and contextual performance (Hodzic et al., 2023; Karani & Mehta, 2022; Lee & Kim, 2022).

A fourth competence is trust-building, which also appears in six studies. It was reported significant relationships between leaders' trust-building competencies and various performance indicators (Kashive et al., 2022; Thomas & Bostrom, 2011), with qualitative research emphasizing its particular importance during team formation stages (Maduka et al., 2018).

Finally, a fifth competence is empowerment, which appears in four studies, regarding leaders' capability to grant autonomy, facilitate self-management, and promote collaboration among remote team members. This favors both team and individual performance (Hill & Bartol, 2016).

As can be seen, the results of our review largely align with traditional leadership research, suggesting that many fundamental principles of effective leadership apply across both co-located and virtual contexts. Some of the competencies identified in previous research are similar to those identified as necessary for the 21st-century overall work context, i.e., communication, goal planning/organization, and trust-building (Ngayo Fotso, 2021). This is aligned with traditional models, such as Leader-Member Exchange (LMX): our findings—for example- show that competencies related to the development of high-quality exchanges between leaders and team members—characterized by trust, mutual liking, and respect and the development of autonomy— enhance employee performance in telework settings (e.g., Bauer & Erdogan, 2015; Kuruzovich et al., 2021).

However, our findings also indicate that specific leadership competencies may be critical in telework settings (i.e., Challagalla et al., 2000; Kelley & Kelloway, 2012; Staples, 2001). For instance, digital communication may have heightened relevance for remote teams, even if they still provide value in co-located ones; also, leaders' social support becomes critical for addressing the blurred boundaries of teleworkers' personal and work lives. The qualitative research considered in this review offers some insights with specific examples of how communication or goal management competencies must be adapted when working remotely; for instance, establishing regular communication channels or boosting synchronous communications at certain key moments. In brief, the principles of good leadership fundamentally apply across contexts; however, virtual settings may require greater emphasis and intention in certain areas, incorporating digitally enabled management practices (Peiró & Martínez-Tur, 2022). With awareness

of the increased challenges inherent to virtual distance, successful telework leadership approaches can enrich the overall leadership theory.

Moreover, we also found some conflicting results. Some studies did not find significant relationships between the examined leadership competencies and performance. For instance, Newman et al. (2020), the only study with an objective performance indicator. found no relationship between leaders' communication and Team Balanced Scorecard. Also, Ernst et al. (2022) found no differences between leaders using charismatic or non-charismatic tactics and virtual workers' extra-role performance. Regarding the frequency of communication, while Staples (2001) found that frequent leader communication is related to perceived productivity, Lautsch et al. (2009) found no link between communication frequency and supervisor-rated task performance.

Research also shows contradictory results about the role of monitoring behaviors. While some researchers showed positive results on team performance (Thomas & Bostrom, 2011; Kashive et al., 2022) others found that initiating and structuring were more important than monitoring (Wakefield et al., 2008). Moreover, some research has shown that monitoring, meaning increasing levels of supervisory control, could be detrimental to contextual and adaptation behavior of teleworkers (Solís, 2017). Research focused on specific e-leadership competencies models also found contradictory results. Soon and Salamzadeh (2021) found support for e-trust and e-comunication competencies to be associated with performance indicators, while Elyousfi et al. (2021) found that none of the six e-leadership competencies was related to team member performance.

Moving forward, we also identified several mechanisms mediating the relationship between leadership competencies and performance in telework. Literature shows that leaders contribute to the achievement of team performance through the development of higher levels of trust (within the team and with the leader) (Kashive et al., 2022), team collaboration (Hill & Bartol, 2016), and adaptation to technologies (Thomas & Bostrom, 2011). The mechanisms linking affinity-oriented competencies to individual performance were autonomy (Bartsch et al., 2020), psychological contract fulfillment (Karani & Mehta, 2022) and work-life enrichment (Lee & Kim, 2022). Our review also highlighted a few studies examining potential moderators or potential boundary conditions, such as subordinates' characteristics (self-management) (Haines et al., 2002), geographical

dispersion (Hill & Bartol, 2016), and individual-job adjustment (job fit) (Hoegl & Muethel, 2016).

Despite these findings, we encountered important gaps in the literature exploring the relationship between leadership competencies and telework.

First, while task performance has been extensively studied, there is limited research examining other dimensions of performance such as organizational citizenship behaviors, creativity, and innovative performance (Koopmans et al., 2011, 2014). Counterproductive work behaviors in telework contexts are neglected.

Second, research relies mainly on subjective data for measuring performance (mostly self-reported), almost no research was found using hard data.

Third, literature has not sufficiently addressed how leaders should handle work-life interference challenges that teleworkers face, including supporting employees' right to disconnect and helping them maintain focus in home environments. Thus, leadership competencies related to work-life balance promotion and fostering healthy disconnection practices have received limited attention, despite their growing importance in remote work settings (Bhumika, 2020; Wang et al., 2023). Furthermore, the unique demands of hybrid work environments, where leaders must manage the interplay between physical and virtual spaces while maintaining social cohesion across both contexts, remain largely unexplored (Bell et al., 2023; Vartiainen & Vanharanta, 2024).

Fourth, most of the studies use cross-sectional designs which prevents the possibility to extract sound conclusions about causality and possible mechanisms influencing the studied relationships. Moreover, the mediating mechanisms explored do not consider some of the most prevalent challenges that have been pointed out about telework and that good leadership might contribute to face adequately (Beauregard et al., 2019; Shirmohammadi et al., 2022; Waight et al., 2022).

Fifth, we found literature that has developed leadership models more suited to digital and telework challenges, such as e-leadership. However, the initial empirical investigations using these models have yielded mixed results, showing significant findings for only some competencies (Soon & Salamzadeh, 2021) or none of the new leadership competencies at all (Elyousfi et al., 2021). Moreover, these models primarily

address digital leadership, which focuses on how leaders utilize digital media, rather than focusing on remote work. Consequently, further research on new leadership frameworks specific to telework is still needed.

Finally, contextual organizational factors must be considered. Leadership occurs in the context of organizations (Kozlowski et al., 2021). Thus, research should expand its focus to examine organizational mechanisms and explore additional moderating factors related to telework arrangements. For instance, the degree or intensity of telework, team size or interdependence between tasks may significantly influence leadership effectiveness (Bell et al., 2023), yet this relationship remains understudied. Organizational factors such as telework policies (e.g., flexibility or work-family balance practices), technological infrastructure, and organizational culture (e.g., regarding digitalization) could also shape how leadership competencies translate into employee outcomes (Gohoungodji et al., 2022) and, furthermore, how social influences could be managed in the digital workspace (Banks et al., 2022). Moreover, the interaction between these contextual elements and specific telework components—such as work scheduling flexibility, communication patterns, and virtual collaboration tools—requires further investigation to understand their combined effects on leadership effectiveness (Brown et al., 2021; Kozlowski et al., 2021; Martinolli et al., 2023). Understanding these conditions is essential to determine when, where, and for whom certain leadership styles are most effective, as highlighted by Nielsen and Taris (2019).

*Practical implications*

As organizations continue embracing hybrid and fully remote arrangements, there is a growing need to implement interventions tailored to the needs of these work designs, including developing and training digitalized leadership competencies (Peiró & Martínez-Tur, 2022). Our review highlighted key leadership competencies that drive better performance in telework settings. Based on these findings, we propose that leadership development programs should structure these competencies in the following way:

*Competencies for reducing operational distance in telework:*

• *Digital task-focused communication:* Facilitating remote coordination and interactions by improving asynchronous and synchronous communication abilities

through digital media (in the usage of collaborative tools, cloud computing, and email) so workers can self-direct with greater clarity and feel equally supported by leaders (Maduka et al., 2018; Vătămănescu et al., 2022). Also, leaders should provide guidelines for establishing communication rhythms, norms, and expectations around technology-enabled interactions (Maduka et al., 2018; Soon & Salamzadeh, 2021).

• *Remote goal management:* Promoting leaders' frequent task delegation and goal setting using digital tools, favoring teleworkers' self-organization and non-invasive monitoring. This also involves training behaviors and media usage to convey objectives and expected results to workers quickly and assertively, as Challagalla et al. (2000) and Wakefield et al. (2008) stated.

• *Teleworkers' empowerment:* This involves allowing workers to manage their agenda, be autonomous, arrange their tasks when working remotely, and collaborate freely with other members through virtual media by conveying autonomy and flexibility in how and when they complete tasks. As research has pointed out, this can improve both self-confidence and work-life balance (Hoegl & Muethel, 2016).

*Competencies for reducing relational distance in telework:*

• *Support through digital media*: Providing emotional support and facilitating the integration of teleworkers into remote teams is essential. This can be achieved through proactive check-ins on their physical and mental well-being, offering emotional assistance, and addressing feelings of isolation and disconnection in virtual settings (Haines et al., 2002).

Additionally, leaders should address work-family conflicts both individually and as a team. Establishing psychological contracts can help delineate boundaries and address issues that arise from remote work and personal life, such as disconnection times and responsibilities related to childcare or eldercare (Lee & Kim, 2022; Poulsen & Ipsen, 2017; Wang et al., 2023).

• *Digital trust-building as a base condition:* promoting virtual environments where workers can trust their leaders and team members (Malhotra et al., 2007), focusing on highlighting reliability on compromise achievement, openness, and psychological safety

when interacting with digital tools, addressing disagreements or critical issues. This can enable the positive effects of leadership on performance (Kashive et al., 2022).

Fostering these competencies represents an initial step toward a telework leadership development model for teams and organizations in today's rapidly evolving people management context (Arora & Suri, 2020; Bondarouk & Brewster, 2016; Gohoungodji et al., 2022). These interventions should aim to increase leaders' awareness of the new challenges of teleworking and the display of effective behaviors to face this digitalized workplace.

In addition, we must pay attention to possible intervening mechanisms and boundary conditions that may be key to developing leadership for telework contexts and the technological savviness of leaders (Maduka et al., 2018; Norman et al., 2019; Thomas and Bostrom, 2011). Leadership interventions must consider that under a higher degree of virtuality in the work arrangements, those programs should reinforce leaders' proactive behaviors to contact their teams and focus on the proficient usage of digital tools to manage goals and share leadership (Han & Hazard, 2022). Moreover, training should consider conditions that allow more contextualized telework leadership (i.e., job fit and worker autonomy). Furthermore, as McDonald et al. (2022) emphasize, in telework arrangements, it is crucial to integrate leadership into a broader organizational support system that favors sustainable careers for teleworkers. For example, the proposed interventions can be supplemented with additional programs focused on teams and collaborators (Han & Hazard, 2022) to establish work agreements and foster an environment that facilitates virtual interaction and participation.

Finally, leadership development for telework should comprehensively cover utilizing technology to enable teamwork, productivity, security, work-life balance, and an overall positive employee experience. Further research should examine the effectiveness of leadership development programs focused on these target areas.

*Further research*

While the research on leadership in telework contexts has grown considerably in recent years, our systematic review reveals that this area of research requires further scholarly attention.

First, as said before, research needs to address effective telework leadership competencies through a temporal lens. The field would benefit from longitudinal or multi-wave studies to understand how leadership dynamics evolve and adapt over-time in remote work settings.

Second, new investigation lines should expand to analyze the effect of organizational contexts and policies, with particular attention to regulations such as the right to disconnect, as well as cultural factors, task characteristics, and leader attributes that shape collective dynamics in dispersed contexts. This understanding would help explain varying research results and enable more targeted interventions, moving beyond one-size-fits-all approaches to telework leadership. Furthermore, traditional leadership concepts such as meaningful work, self-efficacy, justice perceptions, and psychological empowerment should be reexamined in remote settings to understand how their operation might differ in virtual environments.

Third, the relationship between leadership and non-task performance measures in telework contexts requires deeper investigation. This includes examining contextual and adaptive performance dimensions, as well as understanding how leadership can foster prosocial and creative behaviors in remote work environments. Additionally, research should consider the potential trade-offs between different types of performance and incorporate more objective outcome measures. The field would also benefit from experimental or quasi-experimental studies that manipulate leadership competencies in real telework scenarios to determine causal impacts on performance outcomes.

Finally, intervention studies are needed to verify whether developing specific leadership competencies actually improves performance in telework settings. Such research would establish causal relationships between specific leadership behaviors and outcomes, providing practical guidance for leadership development programs. These studies should also address how to manage key challenges inherent to remote work arrangements, including work-life boundary blurring, social and professional isolation, loss of tacit knowledge, and ergonomic difficulties (Beauregard et al., 2019; Shirmohammadi et al., 2022; Waight et al., 2022).

Through addressing these research lines, scholars can develop a more comprehensive understanding of effective leadership in telework contexts, ultimately

contributing to both theoretical advancement and practical applications in the evolving landscape of remote work.

*Limitations*

Regarding limitations of this review, first, given the high presence of qualitative studies and several variables operationalized differently in the research, it was not possible to calculate the size of the effect of each of the leadership skills or competencies on well-being and/or performance, which is an important metric to prioritize which have the most impact on these phenomena.

Therefore, a future study could be in the framework of a metanalysis, which will provide further insights. Another limitation is that many systematic reviews strive to stay current by focusing on only the last 10 years of research in a field. However, our review considers the previous two decades.

This decision was made due to telework research experiencing slower growth before the 2010s; consequently, covering the last 24 years allowed the inclusion of some seminal studies on virtual teams and leadership from the early 2000s that still feel relevant. Therefore, the 24-year period provided a rich foundation of relevant insights compared to a strict 10-year scope.

*Conclusion*

In sum, this literature review has identified relevant leadership competencies for promoting performance in the new era of remote and hybrid work. It provides a foundation for advancing leadership theory for virtual contexts and guiding the development of telework-specific leadership training. Moreover, it provides guidelines for organizations that aim to foster good leadership in those settings. By outlining research based leadership competencies, this review could bridge theory with practice and enhance leadership effectiveness in telework, considering the performance of teams and their leaders.

# CHAPTER 4: WELL-BEING IN TELEWORK: A SYSTEMATIC REVIEW OF LEADERSHIP COMPETENCIES

Bravo-Duarte, F., Tordera, N., & Rodríguez, I. (2025b). Wellbeing in Telework: A Systematic Review of Leadership Competences. *Frontiers in Organizational Psychology, 3*, 1576926. https://doi.org/10.3389/forgp.2025.1576926

## 4.1 INTRODUCTION

Industry 5.0 represents a paradigm shift that builds upon the digital transformation focus of Industry 4.0 by reintroducing a strong human element in organizations. While Industry 4.0 centered on digitalization, automation, and interconnectivity through cyber-physical systems, Industry 5.0 emphasizes human-machine collaboration, sustainability, and human-centricity (Breque et al., 2021). One of the key aspects of this shift is the transformation of work arrangements, particularly the rise of telework settings. Nowadays, the contemporary understanding of teleworking goes beyond its traditional definition of work performed outside the employer's location at least once a week. Modern telework now includes both remote and hybrid arrangements, characterized by dynamic transitions between home and an organization's headquarters (Nakrošiene et al., 2019; Vartiainen and Vanharanta, 2024).

This transformation introduces new challenges in maintaining sustainable well-being for workers (Peiró et al., 2014). Despite the apparent benefits of teleworking, such as enhanced flexibility and reduced commuting time, organizations face significant challenges in maintaining employee well-being in remote contexts, for instance, coping with social isolation and dealing with operational issues such as difficulties in monitoring work progress without micromanaging, coordination barriers when team members work asynchronously across different time zones, technology integration issues when systems are not optimized for remote access, reduced contextual cues in digital interactions, and communication breakdowns (Beauregard et al., 2019; Raghuram et al., 2019; Shirmohammadi et al., 2022; Waight et al., 2022). Moreover, the digital workplace has introduced additional complexities such as technostress (stress experienced by individuals due to their use of information and communication technologies; Tarafdar et al., 2017) and digital fatigue (a state of mental exhaustion and disengagement resulting from excessive screen time and constant connectivity, characterized by decreased attention span, cognitive processing difficulties, and emotional depletion; Fauville et al., 2021), particularly affecting those new to remote work environments (Offstein et al., 2010). Also, the reduction in face-to-face interactions significantly affects the development of workplace relationships (Watson, 2007) and the development of career

opportunities (Cullen-Lester et al., 2017), while the dissolution of work-life boundaries creates unique pressures in the remote work context (Bell et al., 2023).

Therefore, the new challenges that telework brings require a reconceptualization of leadership competencies (Alkhayyal & Bajaba, 2023; Contreras et al., 2020; Delanoeije & Verbruggen, 2020; Kozlowski et al., 2021; Pyöriä, 2011) to promote and ensure sustainable well-being levels in teleworkers. Traditional leadership research has identified several mechanisms that enhance well-being, including meaningful work, self-efficacy, motivation, justice, support, and empowerment (Nielsen & Taris, 2019). However, these mechanisms require reexamination in the context of technology-mediated work environments. Recent research highlights that effective leadership in telework involves more than just applying traditional leadership practices in virtual environments; it requires the development of specific competencies to manage remote work effectively (Alkhayyal & Bajaba, 2023; Bravo-Duarte et al., 2025; Contreras et al., 2020; Delanoeije & Verbruggen, 2020; Kozlowski et al., 2021; Ngayo Fotso, 2021; Peiró et al., 2024). In this context, Peiró and Martínez-Tur (2022) suggest that leaders must adapt their current behaviors and cultivate new ones suited to a digitalized and geographically dispersed work setting. This involves developing a new digital mindset, implementing effective communication strategies using digital media, supervising individuals in digital environments, navigating both, in-person and remote interactions, and selecting the media that best aligns with their objectives and goals.

For this purpose, the Virtual Distance Framework, developed by Lojeski and Reilly (2020), is a helpful framework for understanding the new leadership competencies required in a telework environment. Lojeski and Reilly (2020) highlight that for organizations to be effective in telework environments, they must tackle two main challenges: operational distance and affinity distance. Operational distance involves the difficulties of coordinating work and sharing information through technology. On the other hand, affinity distance refers to the psychological and social disconnection that can occur when team members are physically apart. Leaders play a crucial role in addressing both challenges and supporting the well-being of teleworkers. In the context of Industry 5.0, this framework is also useful to address the management of human-technology interactions and their effects on employee well-being (Adel, 2022). Considering this virtual distance framework, our systematic review aims to identify key leadership

competencies that promote well-being in telework settings either reducing operational or affinity distance. Additionally, we find it important to analyze the mechanisms and contextual factors that may influence these relationships, as they can impact the implementation of leadership competencies and their associated outcomes (Nielsen & Taris, 2019). Therefore, our research questions are the following:

*RQ1. What leadership competencies effectively reduce operational and affinity distance to enhance teleworkers' well-being?*

*RQ2. How and when do these leadership competencies most effectively promote teleworkers' well-being?*

To address the research questions, we conducted a structured literature review (SLR) focusing on the relationships between leadership competencies and well-being in telework contexts. An SLR is a thorough method for gathering literature that meets specific criteria, allowing us to identify themes, patterns, trends, or gaps, particularly in the field of human resource development (Rocco et al., 2023). Therefore, this review will provide an initial understanding of effective telework leadership competencies that can be applied to teams and organizations operating in full or hybrid telework arrangements, fostering well-being and enhancing workers' quality of life.

Furthermore, this systematic review uniquely contributes to the understanding of leadership in teleworking contexts. Despite similar systematic reviews that have been conducted on the associating leadership with well-being (Caputo et al., 2024; Lundqvist & Wallo, 2023) or performance outcomes (Bravo-Duarte et al., 2025), our research includes new contributions to the field. First, our study distinctively focuses on specific leadership competencies that favor teleworkers' well-being rather than general leadership styles, offering more precise behaviors and guidance for practice. Second, using the operational and affinity distance framework provides a theoretically grounded classification system for leadership competencies that enhances conceptual clarity. Third, our comprehensive analysis of both mediating mechanisms and boundary conditions represents a significant advancement, revealing how and when leadership influences teleworkers' well-being—an aspect largely underdeveloped in the existing literature. Fourth, by including qualitative research and distinguishing between different dimensions of well-being (hedonic, eudaimonic, and health-related), we provide a more nuanced

understanding of leadership processes in telework settings. Finally, we bring practical guidelines for HR managers and practitioners, to whom this review could serve as a foundational resource for determining the implications of future telework leadership training interventions, ultimately contributing to the creation of healthier organizations (Di Fabio & Peiró, 2018).

## 4.2 METHODS

To address the research questions, we analyzed empirical studies published from January 2000 to June 2024, following the PRISMA guidelines for systematic reviews. This broader temporal scope enabled us to track the evolution of leadership approaches from initial telework implementations through the expansion of virtual teams in the 2010s and into the rapid adoption during and after the COVID-19 pandemic. We obtained systematically reviewed research from Scopus, PsycARTICLES, PsycINFO, ABI/INFORM, and Web of Science databases, as they offered complementary strengths, minimizing the risk of overlooking relevant research. Scopus and Web of Science were chosen for their extensive multidisciplinary coverage and citation-tracking capabilities. PsycARTICLES and PsycINFO were selected to capture psychological aspects of telework leadership and well-being. This review included quantitative and qualitative English, Spanish, and Portuguese studies.

The search terms were organized into four conceptual categories with the following structure: *TITLE(Telework* OR "Remote Work*" OR "Smart work*" OR Telecommut* OR Virtual OR Digital*) AND ABSTRACT(Lead OR supervis* OR manag* OR e-leader*) AND ABSTRACT(Competenc* OR Practice OR Skill OR abilit* OR attitude) AND ABSTRACT("Well-being" OR Well-being OR "Occupational Health" OR "Quality of Life" OR Satisfaction OR "employee attitude" OR engagement OR affect OR stress).*

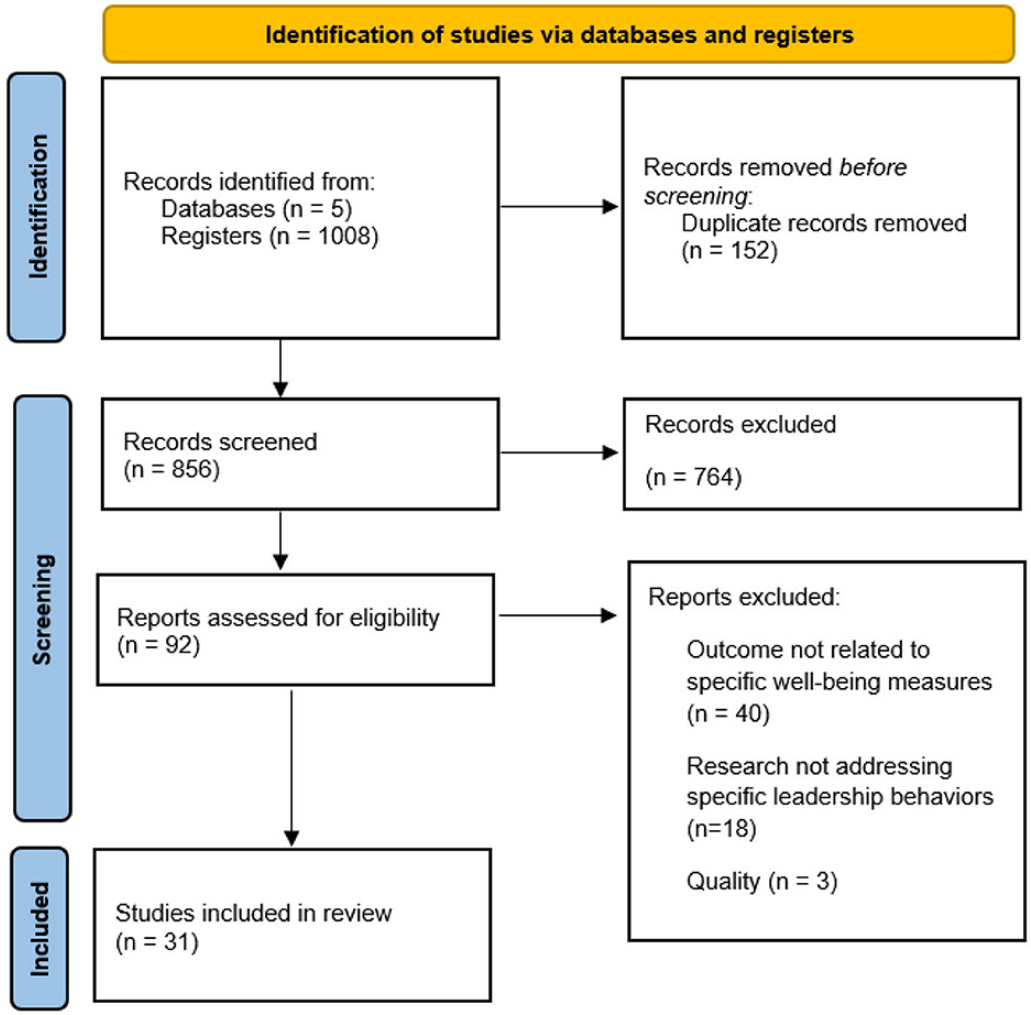
For our inclusion criteria, we focused on peer-reviewed empirical research involving actual teleworking populations within the fields of organizational psychology and human resource management (HRM). In our exclusion criteria, we omitted research that did not involve teleworkers or teleworking contexts—such as studies based on student samples—and studies that did not consider leadership as an independent or antecedent variable. We also excluded studies that did not specifically examine distinct

leadership competencies, for example, those focusing on general leadership models such as Leader-Member Exchange (LMX) or transformational leadership.

*Study selection*

The database search yielded 1,008 initial results. Applying exclusions criteria, we left 92 articles for full-text review. Two experts in the subject independently applied the selection criteria to ensure consistency in rating and reduce potential bias in study selection. These experts were researchers in organizational psychology with at least 5 years of experience in telework and leadership research. Forty articles lacking dependent variables related to well-being were excluded (see Figure 4).

*Figure 4. Inclusion of studies according to PRISMA guidelines.*




After this filter, a systematic assessment of publication bias was conducted using a tailored scale explicitly developed for this literature review, following guidelines from

Acosta et al. (2020). This scale evaluated: (1) the comprehensiveness of the literature search strategy, including the sources searched and the search terms used; (2) the inclusion of significant findings; (3) the adequacy of the sample, which consisted of teleworkers and leaders from actual organizations; and (4) the quality of the documents. This scale was designed to provide an indicator of publication bias that aligns with the parameters and scope of this review. This assessment served as an additional lens for readers to evaluate the objectivity and perspective of the review critically. As a result of this assessment, 18 articles were excluded for not including significant findings regarding leadership behaviors, and three for deficient quality regarding methodology or sample. Therefore, a total of 31 articles were reviewed. Studies on virtual teams were included, as they inherently involve teleworkers. Experimental studies were also considered. Additionally, since telework is seen as a continuum that can include on-site working days, research on hybrid arrangements was also incorporated. Two experts applied separately the selection criteria to confirm consistency in rating.

Each article was coded based on methodology, leadership framework, analysis level, sample characteristics, sample size, leadership variables, and the dimensions of well-being considered. We conducted our research according to the Systematic Literature Review (SLR) method outlined by Rocco et al. (2023), which involves a comprehensive, transparent, and reproducible search strategy to identify and synthesize relevant literature ensuring comprehensive coverage of the research topic. To systematize our findings, behaviors were thematically grouped to derive a final set of leadership competencies related to well-being outcomes.

## 4.3 RESULTS

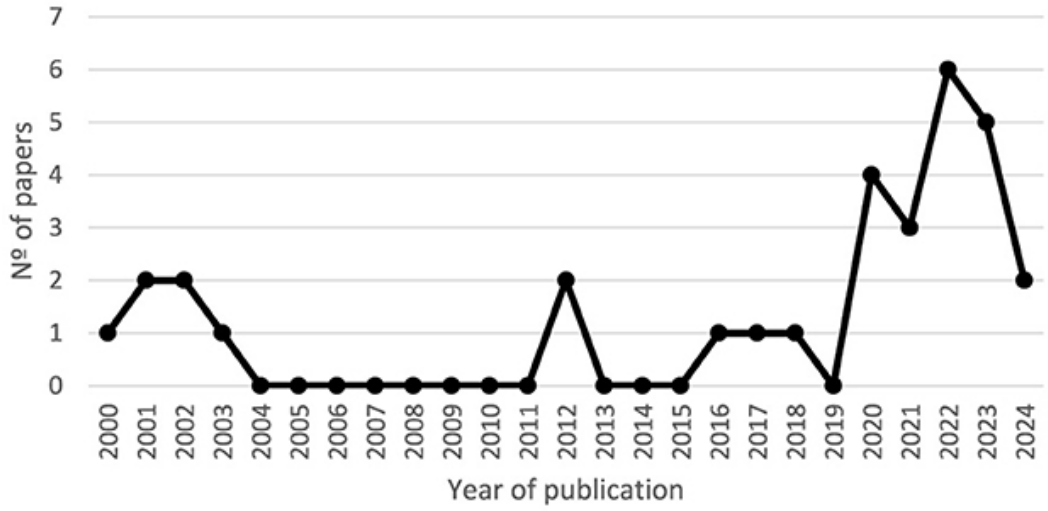
The systematic review results are presented in two sections. First, we describe the reviewed literature regarding theoretical and methodological approaches. Then, we address the research questions regarding the relationships between leadership and well-being.

### 4.3.1 Theoretical and methodological approaches

We found 23 quantitative and eight qualitative studies that specifically examined the relationship between leadership behaviors and well-being outcomes, showing a predominant focus on quantitative methodologies. More information is described in Appendixes 3 and 4

Most reviewed articles were published within the last decade, with a significant concentration during the COVID-19 pandemic, particularly in 2020–2023. Given that 2020–2022 were the pandemic years, some competencies could not be extrapolated to the current reality; however, significant research from 2023 to 2024 (post-pandemic years) has been conducted, contributing to understanding the relationships formed after the COVID-19 pandemic (see Figure 55).

*Figure 5. Composition of the sample of articles reviewed related to year of publication.*




Regarding geographic distribution, most studies were conducted in the United States (nine), followed by Asia (India with three studies and China with one), Southern Europe (Italy with three studies and Portugal with two), North Europe (Germany with three studies), and Canada (two). The remaining studies were distributed across different regions, including one from Australia (Oceania) and one from Romania (Eastern Europe).

In all, 23 quantitative studies, data sources were primarily from formal leaders' subordinates/followers. In qualitative studies, information was collected directly from leaders (e.g., Busse and Weidner, 2020), from both leaders and subordinates (e.g.,

Kurland and Cooper, 2002), or exclusively from subordinates (e.g., Yarberry and Sims, 2021). These studies typically involved smaller sample sizes (8–17 participants).

Regarding demographic considerations, while some studies achieved relative gender balance (e.g., Konradt et al., 2003, with 37 males and 35 females), others showed significant gender disparities. For example, Vătămănescu et al. (2022) reported 62.9% female participants, while Mutha and Srivastava (2023) had 75% male participants. Age reporting *was inconsistent, with mean ages typically ranging from 30 to 45 years.*

*Conceptual approaches*

Psychological well-being at work can be operationalized in different ways considering the hedonic, eudaimonic, or mental health-related dimensions (Warr & Nielsen, 2018). Specific patterns regarding the conceptual and operational approach to well-being can be identified. Most quantitative studies (12) approached it from a hedonic perspective, including satisfaction measures either with telework (one), supervisor (one), or the job itself (10). Other studies included psychological health-related aspects and operationalized them as tension/strain (three), stress/distress (two), emotions at work (two), exhaustion (one), anxiety, and depression (one). Six studies addressed it from a eudaimonic approach to well-being, operationalizing it as engagement during telework. Finally, four articles included measures of overall happiness or well-being.

*Methodological approaches*

The quantitative studies predominantly employed cross-sectional designs with individual-level analysis (20). The exceptions to this cross-sectional approach included Hodzic et al. (2024), who conducted a weekly diary study; Chambel et al. (2022), who employed a two-wave study design; and Salvoni et al. (2024), who conducted multilevel research.

In general terms, the samples were composed of remote workers, but some studies included both remote and non-remote workers (Challagalla et al., 2000; Konradt et al., 2003).

All studies utilized self-reported measures for the variables studied, such as satisfaction, engagement, and psychological health-related scales, operationalized at the individual level. No studies focused on the team level.

Finally, the qualitative studies (eight) employed various methodological approaches. Semi-structured interviews were the predominant data collection method used in most studies (six). Félix (2022) employed a case study methodology, while Hoegl and Muethel (2016) used individual questionnaires.

### 4.3.2 What leadership competencies are related to teleworkers' well-being?

We found 16 and 15 studies that, respectively, analyzed the relationships between teleworkers' well-being with leadership competencies aimed at reducing operational distance and aimed to reduce affinity or relational distance. Several well-being indicators have been considered: job satisfaction, job stress, work engagement, psychological strain, teamwork tension, satisfaction with telecommuting, work-life quality, exhaustion, and emotions. In the next paragraphs, we detail the main results of this review.

*Competencies aimed to reduce operational distance*

Our analysis identified two key competencies aimed at reducing operational distance that consistently demonstrated relationships with teleworkers' well-being: digital communication and goal management.

First, digital communication, defined as leaders' ability to effectively transmit information, provide feedback, and maintain presence through technology-mediated channels, appeared in seven quantitative studies: Five studies examined relationships with hedonic well-being (primarily job satisfaction), one with eudaimonic outcomes (engagement), one with psychological health (reduced stress), and two qualitative studies explored broader well-being impacts.

Regarding hedonic well-being outcomes, two studies focus on message delivery. Madlock (2012) identified a correlation between communication competence (maintaining appropriate conversational norms, encompassing both knowledge and skill in message delivery) and teleworkers' job satisfaction. In addition, Vătămănescu et al. (2022) concluded that effective usage of different channels, inspiring members via emphatic messages, clarifying misunderstandings and sharing knowledge between leaders and team members leads to increased satisfaction with telework, primarily by

improving team performance. Both studies consider the two communication modes: synchronous (video meetings, phone calls) and asynchronous (email, messaging).

Furthermore, two studies focus on communication frequency and planning, especially regarding asynchronous communications. Staples (2001) discovered that the frequency of communications from leaders showed a positive relationship with interpersonal trust between the manager and employee, which was positively and significantly related to job satisfaction. This is also corroborated by Kelley and Kelloway (2012), who found that both regularly scheduled (planned meetings and check-ins) and unplanned communication (informal interactions) from leaders significantly correlate positively to job satisfaction. Nevertheless, the authors found that unplanned communication showed a stronger relationship than scheduled communication, explained that it increases interaction frequency, and its spontaneous nature may make individuals feel more valued by their leader.

Moreover, Chaudhary et al. (2022) grounded on the e-leadership competency framework developed by Van Wart et al. (2017) to explore the relationship of communication skills with well-being. E-leadership is defined as the effective use and blending of electronic and traditional methods of communication (Van Wart et al., 2017). Chaudhary et al. (2022) found that three e-leadership competencies: e-communication skills (communicating clearly and effectively through virtual media while minimizing errors and miscommunication), e-change management skills (effectively managing change initiatives via digital channels), and e-technological skills (demonstrating technological fluency by staying updated on relevant technology developments and addressing ICT security concerns) were positively associated with emotional well-being, defined as factors such as optimism and interest in new experiences (Chaudhary et al., 2022).

Only one study considers eudaimonic measures of well-being, and another studied its relationship with psychological health. Mutha and Srivastava (2023) highlighted that speaking and listening skills, combined with fostering an environment of open communication, providing appropriate information, and effectively addressing issues, positively relates to trust which, in turn, enhances the engagement of teleworkers.

Regarding psychological health, Staples (2001) found a negative relationship between the frequency of communication between leaders and subordinates and job stress.

Two qualitative studies further reinforce the importance of digital communication in teleworking contexts. Félix's case study (2022) pointed out the importance of leaders giving key information and highlighting the achievements of teleworkers as a key competency to promote their engagement and retention in the company. The author also indicates that this set of behaviors promotes healthy relationships that generate satisfaction and a sense of fairness in the team. In addition, the leaders interviewed by Barhate et al. (2022) highlighted useful practices, such as improving communication and promoting virtual meeting platforms, to facilitate teleworkers' well-being.

Second, goal management competencies appeared in four studies specifically related to hedonic measures of job satisfaction. Challagalla et al. (2000) found that compared to collocated teams, in remote teams, the leaders' orientation on activities (specifying the goals and processes of daily activities) was positively related to higher satisfaction with the supervisor. In a sample of teleworkers, Ilozor et al. (2001) found that those teleworkers who rated their leaders as more effective at clarifying job responsibilities and providing clear deadlines and expectations were related to higher levels of job satisfaction. The authors explained that this clarity enhances work quality and employee loyalty over time, both related to job satisfaction. More recently, the research of Giacomelli et al. (2023) in Italian public organizations found that leadership behaviors aimed at clarifying the contribution to organizational goals, giving contingent rewards, feedback, and motivation were strong mediators in the relationship between teleworking conditions and job satisfaction. Beyond job satisfaction, this type of leadership behavior was also found to be related to psychological health. Konradt et al. (2003) found that quality of management by objectives (including providing clear goals and adequate feedback on progress) had a significant negative relationship with psychological strain and a positive one with job satisfaction.

However, one study by Bartsch et al. (2020), in a sample of service workers during to COVID-19 lockdown, found no relationship between operational competencies—defined here as enabling leadership roles that focus on structuring tasks and controlling work results—and psychological health, including individual and teamwork tension

among virtual workers. In this case, the authors concluded that managerial competencies were not related to affective processes in uncertain times, such as the pandemic emergency.

These findings are further qualified by qualitative research and extend the analysis to eudaimonic measures of well-being. In their interviews with leaders, Busse and Weidner (2020) suggest a U-shaped relationship between agile leadership—characterized by anticipating change, building confidence, initiating actions, freeing the mind, and evaluating results—and teleworker engagement. They found that moderate levels of agile leadership, combined with the appropriate use of digital tools, can enhance teleworker engagement. However, when leaders exhibit excessive presence and monitoring, engagement tends to decrease. Kurland and Cooper (2002) interviewed virtual leaders and found that managers who focus solely on results tend to make teleworkers feel more isolated, which negatively impacts their well-being. In this sense, qualitative research might help to better understand how this competence is displayed.

*Competencies aimed to reduce affinity (relationship) distance*

Our analysis identified three key competencies aimed at reducing affinity distance that consistently demonstrated relationships with teleworkers' well-being: leaders' support, work-life facilitation and participative leadership.

First, seven studies found that leaders' support is a key competence for hedonic and eudaimonic measures of teleworkers' well-being, particularly regarding job satisfaction and work engagement. For instance, Haines et al. (2002) found a positive relationship between managerial support (keeping teleworkers informed, taking home working schedules into account, checking their status, listening to their problems, and offering solutions) and satisfaction with telecommuting and work-life quality. Similarly, Soares et al. (2023) found that employees who perceive their supervisors as appreciative, supportive, and caring reported higher levels of job satisfaction.

In terms of work engagement, Karani and Mehta (2022) pointed out that supervisor support (giving feedback, learning, and development opportunities) favors psychological contract fulfillment and work engagement, which they also found to be positively related to other well-being indicators (emotional, psychological, work-related, and general well-

being). Boccoli et al. (2024), Hodzic et al. (2024), and Wang et al. (2023) also supported the positive relationship between perceived supervisor support and work engagement in remote work settings.

Moreover, Wang et al. (2023) found a negative relationship between leadership support and negative emotions, particularly focusing on feelings of anxiety, sadness, and other unpleasant emotions. Regarding mental health, Bartsch et al. (2020) found that leader-enabling behaviors—such as empowering and supporting employees, fostering their autonomy, promoting collaboration, and stimulating adaptability—can reduce tension levels within the team.

Qualitative research reinforces these findings. In their interviews with virtual team leaders, Efimov et al. (2020) found that generating conditions where teleworkers feel supported is critical. They reported that a practical way to act as supportive is to proactively monitor the emotional status of their teleworkers through “check-in” activities (structured and brief virtual interactions specifically designed to assess teleworkers' emotional and psychological states) and give them constant appreciation virtually, which is usually done naturally when arriving physically at the office. Yarberry and Sims (2021) also highlighted that virtual mentoring is essential for providing emotional support, creating opportunities for dialogue, and enhancing an overall sense of well-being and belongingness. Supporting this statement, Kurland and Cooper (2002) found that managers who mentor teleworkers and promote team synergy help prevent feelings of professional isolation among their employees.

Second, three studies found support for the relationship between leaders’ work-life facilitation competencies and teleworkers' well-being. Chambel et al. (2022) found that family-supportive supervisor behaviors (linked to emotional and instrumental support, giving creative suggestions to balance work and family, and acting as a role model for this balance) were negatively associated with exhaustion and positive engagement of teleworkers through reduced work-family conflict and increased work-family enrichment. Moreover, Lee and Kim (2022) also found that family-supportive leadership communication (including behaviors such as listening to family concerns, understanding family needs, acknowledging family obligations, caring about work-life effects, supporting work-family balance, and showing concern for employees' families) positively

influences employees' positive affect. Finally, Magnavita et al. (2021) found that intrusive leadership (described as a style that does not respect workers' privacy and demands off-time) is positively associated with teleworkers' anxiety, depression, and perception of work's effort-reward unbalance.

Additionally, the qualitative study by Poulsen and Ipsen (2017) with virtual teams documented that leaders who positively impact well-being develop the ability to get closer to their teleworkers, generating personalized meeting instances to talk about these issues and seek solutions to work-family conflicts.

Finally, Bhumika (2020), identified a negative relationship between participative leadership behaviors—defined as consulting subordinates about problems and potential solutions—and emotional exhaustion. However, this relationship was observed only through the mediating effect of reduced work interference with personal life (WIPL). This finding is also supported by qualitative research conducted by Hoegl and Muethel (2016), who interviewed virtual team leaders and members. They concluded that a management style that employs delegation principles and emphasizes autonomy has a positive impact on employees' well-being.

In conclusion, these findings show empirical support for the importance of relationship-oriented leadership competencies, such as providing support or facilitating work-life balance, in enhancing teleworkers' well-being, job satisfaction, and engagement. However, it is worth noting that research that has considered simultaneously leaders’ operational-oriented and relationship-oriented competencies has found the former to remain the main predictors of well-being. In Madlock's studies (2012, 2018), task-oriented leadership was the most significant predictor of job satisfaction, while a relationship-oriented leadership style showed weaker relationships and lost predictive power when considered simultaneously. Additionally, Chaudhary et al. (2022) also found that only the three operational-oriented competencies of the Roman et al. (2019) model (e-communication skills, e-change management skills, and e-technological skills) predicted emotional well-being when considered in the same model the relationship-oriented ones (e-social, e-team, and e-trust). These findings suggest that in telework contexts, clear direction and structure may be more crucial or necessary for job satisfaction or emotional well-being than relational aspects of leadership.

### 4.3.3 How and when do leadership competencies show stronger relationships with teleworkers' well-being?

For understanding the relationship between leadership competencies and teleworkers' well-being it is important to examine the mechanisms (mediators) and boundary conditions under which this relationship emerges. Empirical research has explored to some extent potential mechanisms. Less is known about the boundary conditions that facilitate or impede these relationships.

*Mediators*

The study of mediators is mainly directed to analyze the relationship between leadership support behaviors and hedonic and eudemonic measures of well-being (seven studies). Karani and Mehta (2022) found that fulfillment of the psychological contract between leader and employee mediates the relationship between supervisor support and work engagement. Satisfaction of basic psychological needs (autonomy, competence, and relatedness) was also found by Soares et al. (2023) to mediate the relationship between supervisor support and job satisfaction in telework settings. Supervisor support had the most significant impact on satisfying autonomy needs, with lower effects on competence and relatedness. This finding highlights how supervisor support indirectly enhances job satisfaction by fulfilling essential psychological needs, particularly the need for autonomy. Supporting this finding, Giacomelli et al. (2023) found that job autonomy mediates the relationship between supervisory support and job satisfaction in telework settings. They emphasize the importance of autonomy for knowledge teleworkers, allowing them to leverage their expertise and shape their work to meet personal needs and expectations.

Another mediator explored by research is trust, which is an essential mechanism related to the well-being of workers. Mutha and Srivastava (2023) explored the role of trust between team members as a mediator between leaders' communication effectiveness and work engagement. The authors concluded that digital communication plays a crucial role in fostering a climate of trust where virtual team members feel comfortable sharing ideas and concerns despite physical separation, which in turn favors team's engagement at work. Moreover, Staples (2001) found that trust in leaders also mediates the

relationship between communication frequency from leaders and job satisfaction (positively) and job stress (negatively). Therefore, trust in a leader could be an enhancer of positive well-being outcomes and act as a buffer to prevent job stress in scenarios when communication is reduced. Therefore, trust appears particularly vital in telework contexts where interactions are reduced, and employees must rely more heavily on leaders' and colleagues' integrity and consistency in conveying messages.

Regarding work-life balance, Chambel et al. (2022) found that work-to-family enrichment (WFE) and work-to-family conflict (WTC) mediate the relationship between supportive leadership and employees' well-being, decreasing exhaustion levels and increasing engagement. Thus, when leaders were more supportive, the level of enrichment was higher and the level of conflict was lower, which in turn was related to lower levels of exhaustion and higher engagement (Chambel et al., 2022). Finally, concerning measures related to psychological health, one study (Bhumika, 2020) found work interference with personal life (WIPL) to mediate the negative relationship between participative leadership and emotional exhaustion.

*Moderators or boundary conditions*

Only five studies explored under which conditions the relationship between leadership (mainly relationships-oriented competencies) and teleworkers' well-being could be strengthened or weakened. First, Lee and Kim (2022) supported the moderator role of workers' segmentation preference, defined as separation regarding work vs. life. For employees who prefer to segment their work and personal lives, the relationship between supportive leadership and positive affect was stronger.

Second, the intensity of teleworking—the proportion of work time spent in remote arrangements—represents a potentially critical boundary condition for leadership effectiveness. Chambel et al. (2022) found mixed results regarding its moderating role. Their research revealed that telework intensity did not moderate the indirect effect of family-supportive supervisor behaviors (FSSB) on exhaustion through work-to-family conflict (WFC) mediation. However, they found a significant interaction between FSSB and telework intensity on engagement in the work-to-family enrichment (WFE) mediation model. Specifically, FSSB had a significant direct effect on engagement only when telework intensity was low, becoming non-significant at higher intensity levels.

These findings highlight a potential challenge for leadership support as telework intensity increases.

Third, Boccoli et al. (2024) found that supervisors' digital skills moderate the relationship between perceived supervisor support and work engagement. These authors propose that proficient use of digital tools enhances supervisors' psychological presence, intensifying the positive effect of support on engagement.

Fourth, Chaudhary et al. (2022) identified leaders' emotional intelligence as an important moderator in the relationship between e-leadership skills and teleworkers' mental and emotional well-being. In this study, emotional intelligence was defined through four dimensions: self-awareness (understanding one's own emotions), self-management (regulating emotional expressions), social awareness (recognizing the emotional states of others), and relationship management (positively influencing others' emotions through interactions). The findings indicated that emotional intelligence significantly strengthened the positive link between e-leadership competencies (such as e-communication, e-change management, and e-technological skills) and the well-being of teleworkers. This implies that leaders' e-competencies can greatly enhance employees' well-being when paired with emotional intelligence. Consequently, leaders who effectively manage their emotions while using digital media are likely to be more successful in addressing employee well-being issues, which can be particularly challenging in telework environments.

Finally, Magnavita et al. (2021) found that teleworkers' workaholism positively moderated the relationship between intrusive leadership and the perception of balance between efforts and rewards, a variable that they also associated with job stress. The authors conclude that in presence of high levels of workaholism, intrusive leadership led to increased occupational stress and potential negative health effects compared to workers with lower levels of workaholism. This finding suggests that workaholism serves as a critical moderating variable that can amplify, rather than merely influence, the relationship between intrusive leadership and teleworkers' well-being.

In summary, research on mechanisms and boundary conditions of the relationship between leadership competencies and well-being in the teleworking context is scarce. However, some job and work-family balance resources, such as autonomy or WFE, could

explain the mechanisms linking those constructs. Contextual factors such as conditions of telework (intensity) or leaders' and employees' characteristics could play a relevant role in this process as boundary conditions.

## 4.4 DISCUSSION

This systematic review aims to identify relevant leadership competencies that promote teleworkers' well-being by addressing the challenges of operational and affinity distance in virtual work environments. In this sense, it aims to contribute to Industry 5.0′s objective of using new technology and production processes in service of well-being and social development (EU, 2024). Our findings reveal several key patterns regarding the specific competencies that effectively reduce these dimensions of virtual distance, as well as the mechanisms and boundary conditions under which they influence teleworkers' well-being outcomes. Addressing our first research question about relevant leadership competencies that reduce operational and affinity distance to enhance teleworkers' well-being, our review identified five key competencies that consistently emerged.

Two competencies were found to be relevant to reduce operational distance: digital communication, and goal management. Digital communication was examined in nine studies with two main components. The frequency component addresses the optimal cadence of communication, balancing sufficient contact to maintain presence without creating communication overload. In deep, research such as Ilozor et al. (2001), Staples (2001), and Kelley and Kelloway (2012) found that higher frequency of both, scheduled and spontaneous communications, positively affected satisfaction. However, unplanned interactions showed stronger benefits (Kelley and Kelloway, 2012), possibly because they replicate the natural workplace interactions that teleworkers often miss. Another relevant component. This factor becomes crucial, especially since reduced contextual cues in digital communication increase the risk of misinterpretation (Raghuram et al., 2019). Research by Madlock (2012) and Mutha and Srivastava (2023) has shown a correlation between leaders' competence in delivering messages—being aware of the communication goals, understanding the audience, and recognizing relevant norms—and the well-being of teleworkers. Together, these components play a significant role in determining whether digital communication effectively addresses the operational gaps that exist in remote work environments. Addressing these gaps is essential for successful telework leadership.

Goal management was considered in four studies. Establishing clear objectives, activities, and tasks appeared as actions that could favor well-being outcomes, especially job satisfaction (Challagalla et al., 2000; Ilozor et al., 2001; Giacomelli et al., 2023). Nevertheless, when related to measures such as work engagement, excessive goal management could also harm workers' eudemonic well-being, suggesting a U-shaped relationship (Busse & Weidner, 2020).

Regarding the reduction of affinity distance, three competencies were identified: supervisor support, teleworkers work-life facilitation, and participative leadership. Support emerged as one of the most consistently studied and impactful competencies, appearing in nine studies. While supportive leadership is valuable in all work contexts, the reviewed research suggests it takes on distinct characteristics in telework environments. Unlike face-to-face support, which often occurs spontaneously and relies heavily on non-verbal cues (Raghuram et al., 2019), supervisor support in virtual contexts requires more deliberate implementation through structured check-ins, explicit verbal affirmation, scheduled mentoring and proactive outreach (Efimov et al., 2020; Kurland and Cooper, 2002; Yarberry & Sims, 2021). Face-to-face support benefits from physical presence and shared environmental context, while virtual support must overcome the limitations of reduced social presence and increased psychological distance (Lojeski & Reilly, 2020). Therefore, effective remote support appears to place greater emphasis on explicit communication of appreciation, more frequent acknowledgment of achievements, and more intentional expressions of concern for well-being, which research has found to lead to higher job satisfaction and work engagement while reducing psychological distress (Soares et al., 2023; Boccoli et al., 2024).

Teleworkers' work-life facilitation is identified in four studies. Leaders who actively support work-life balance appear to have a significant positive impact on employee well-being outcomes. This is supported in quantitative research showing how family-supportive supervisor behaviors reduce work-family conflict and exhaustion while enhancing engagement (Chambel et al., 2022). It is also supported in qualitative studies emphasizing the importance of boundary management support (Efimov et al., 2020; Poulsen & Ipsen, 2017). Interestingly, the effectiveness of this support appears to vary based on individual preferences, with stronger positive effects for employees who prefer clear boundaries between work and personal life (Lee & Kim, 2022). This suggests that

leaders need to not only provide work-life support but also tailor their approach to individual employee preferences regarding work-life boundaries.

Finally, despite being noted by two studies only, participative leadership is identified as a competence that can favor teleworkers' well-being, especially with participative actions promoted by leaders (Bhumika, 2020; Hoegl & Muethel, 2016).

The results found reveal that reducing virtual distance requires a multifaceted approach. Leaders must simultaneously address both the technical and coordination challenges of operational distance and the psychological and social challenges of affinity distance to effectively support teleworker well-being, considering both types of behaviors (Lojeski & Reilly, 2020).

Regarding our second research question about mechanisms and boundary conditions, our findings reveal several important pathways through which leadership influences teleworkers' well-being. For example, trust between team members and leaders emerged as a mediating mechanism that effective communication is related to and contributes to positive well-being outcomes (Staples, 2001; Mutha & Srivastava, 2023). Moreover, some mechanisms were pointed out for supervisor support, which is linked to engagement through the fulfillment of the psychological contract (Karani & Mehta, 2022), and with exhaustion through the decrease of work-family conflict (Chambel et al., 2022). Therefore, there are variables at the individual and/or group level that can mediate between the leaders' competencies and well-being, an issue that is important to be addressed in this new context. Also, some research has initiated the study of boundary conditions that help to understand when these leadership competencies are most effective. Leader characteristics, particularly their emotional intelligence and digital communication skills, influenced how well they could implement these competencies in virtual settings (Chaudhary et al., 2022). Employee characteristics also mattered significantly—for instance, their preferences for work-life segmentation affected how they responded to different leadership approaches (Lee & Kim, 2022).

Interestingly, the intensity of telework emerged as a potentially critical factor influencing the relationship between leadership competencies and well-being outcomes, showing mixed results as a boundary condition. Chambel et al. (2022) found that the effectiveness of leadership behaviors remained relatively constant regardless of how

much time employees spent working remotely. This suggests that leadership behaviors may have varying impacts based on the amount of time employees spend in remote work arrangements. For instance, when employees engage in high-intensity telework—nearly full-time remote work—they might develop more autonomous coping strategies that lessen their dependence on leader support. Alternatively, full-time telework could introduce additional challenges that require different leadership behaviors, a topic that deserves further exploration in research, as only a few studies are addressing it.

Finally, the role of individual characteristics, particularly workaholism, emerged as another significant consideration. Magnavita et al. (2021) discovered that workaholic teleworkers suffered more negative effects of intrusive leadership styles (characterized by high control and micromanagement), presenting higher levels of anxiety and effort/reward imbalance. This highlights the importance of leaders being aware of employee working patterns, which can have a significant impact on their well-being.

*Theoretical implications*

Our findings suggest that, while general principles of effective leadership for well-being remain relevant for telework, these arrangements introduce unique challenges that require specific adaptations to address both operational and affinity distance. That is, telework environments requires not just learning new technologies but reconceptualizing core leadership behaviors.

For example, the evidence indicates that telework contexts demand a more deliberate and proactive leadership approach to reduce both operational and affinity distance, to maintain employees' well-being. Leaders must consciously bridge those physical distances through constant goal clarification, intentional communication, and planned relationship-building efforts. Furthermore, while supervisor support has long been recognized as crucial for employee well-being, our review suggests it takes on heightened importance in telework settings, particularly through mediating mechanisms such as work-family balance (Chambel et al., 2022) and psychological contract fulfillment (Karani & Mehta, 2022), and acting as a key competence to reduce affinity distance with teleworkers.

Moreover, how leaders communicate and support well-being must evolve to account for reducing virtual distance. For example, Bartsch et al. (2020) found that relationship-oriented leadership behaviors required different implementation strategies in telework settings to reduce teamwork tension effectively. Moreover, qualitative research (e.g., Magnavita et al., 2021) suggests that traditional monitoring practices could become particularly problematic for well-being in telework contexts, which requires new strategies to check teleworkers' well-being status.

Also, emerging research on e-leadership models has begun to address these unique demands. However, the results have been mixed. While some studies found positive effects of e-leadership competencies on emotional well-being (Chaudhary et al., 2022), others revealed more complex relationships moderated by factors such as digital communication skills and work-life preferences (Lee & Kim, 2022). This suggests that simply translating traditional leadership approaches to digital formats may not be sufficient and supports the idea of developing new behaviors to reduce virtual distance.

These findings highlight a critical gap in current understanding: while we know these competencies matter for teleworkers' well-being, we have limited knowledge about how they should be "digitalized" to maximize effectiveness in virtual or hybrid settings (Peiró & Martínez-Tur, 2022). The varied results across studies suggest that context and individual differences play crucial roles in determining leadership effectiveness for well-being outcomes, emphasizing the need for more nuanced theoretical frameworks specifically adapted to telework settings. More research is needed on this issue.

Finally, our findings indicate that operational and affinity distance reduction are not separate processes but interconnected dimensions of effective teleworking leadership, as both can enhance teleworkers' well-being and help to reduce overall virtual distance.

*Practical implications*

These findings have important implications for organizations developing leadership capabilities in teleworking contexts. The evidence suggests organizations should prioritize developing three key areas of leadership competence while considering relevant boundary conditions and mechanisms.

First, development programs should emphasize supervisor support as the primary focus, given its consistent relationship with well-being outcomes. This also can be related to telework-life promotion, another competence highlighted in the research. In this case, leaders could be trained to provide emotional support virtually, manage work-life boundaries, and address isolation concerns (Efimov et al., 2020). This includes developing skills in virtual check-ins and emotional assistance provision, particularly in supporting work-family balance as highlighted by Chambel et al. (2022) and Lee and Kim (2022).

Second, digital communication effectiveness training should also focus on improving communication strategies. As demonstrated by Ilozor et al. (2001) and Mutha and Srivastava (2023), leaders need to learn optimal communication frequencies and message clarity in virtual environments. The training should emphasize how communication builds trust in both leaders and members, which emerged as a crucial mediating mechanism in two studies (Staples, 2001; Mutha & Srivastava, 2023).

Third, regarding goal management, teleworking development programs should emphasize clear objective setting without micromanagement, also encouraging empowering behaviors that allow teleworkers to participate in decisions and be autonomous (Bhumika, 2020). For example, Konradt et al. (2003) suggest that structured goal-setting practices can help reduce uncertainty and anxiety in remote work settings while maintaining employee autonomy.

Fourth, work-life facilitation training should develop leaders' awareness of teleworkers' unique boundary challenges (Chambel et al., 2022), techniques for modeling boundaries (Lee & Kim, 2022), protocols for preventing work intrusion (Magnavita et al., 2021), and flexible scheduling approaches respecting individual circumstances (Poulsen & Ipsen, 2017).

Fifth, participative leadership development should create inclusive decision-making processes (Bhumika, 2020), establish decision-making frameworks that enhance autonomy (Hoegl & Muethel, 2016), and implement feedback channels encouraging employee input regardless of their location.

Finally, development programs should also address key boundary conditions, including adapting approaches based on employees' work-life segmentation preferences (Lee & Kim, 2022), adapting telework leadership behaviors according to telework intensity (Chambel et al., 2022), developing emotional intelligence for virtual contexts (Chaudhary et al., 2022), and enhancing digital skills to maximize benefits of digital media (Boccoli et al., 2024).

*Future research*

Despite the findings in the literature, there are gaps that further research needs to consider. First, the heterogeneity in well-being measures across studies made direct comparisons challenging. Studies used various constructs ranging from job satisfaction to psychological distress, limiting our ability to draw precise conclusions about the relative effectiveness of different leadership approaches, and their relationship with operational or affinity distance.

Second, most studies relied on cross-sectional designs and self-report measures. This limits our ability to make causal inferences about how leadership behaviors influence well-being over time. Future research should employ longitudinal designs to allow the study of time dynamics of these relationships.

Third, there is a notable geographic concentration of studies in certain regions, particularly in the USA. This may limit generalizability to other cultural contexts where telework and leadership practices might differ significantly.

Fourth, it is important to extend the analysis of well-being at the team level, which can provide interesting insights regarding how leadership can favor collective wellness across team members who work remotely.

Looking forward, several directions for future research emerge. Longitudinal studies are needed to understand how leadership influences teleworkers' well-being over time and how these relationships might evolve as organizations adopt more permanent hybrid work arrangements. Research should also examine how cultural and organizational contexts shape the effectiveness of different leadership approaches in telework settings.

Additionally, studies should explore a broader range of well-being outcomes beyond job satisfaction and stress. As suggested by recent work (Chambel et al., 2022;

Wang et al., 2023), examining eudaimonic well-being measures and team-level well-being outcomes could provide a more comprehensive understanding of leadership effects in telework contexts.

Finally, intervention studies are needed to test the effectiveness of leadership development programs targeting the competencies identified in this review, while research on boundary conditions (for example, telework intensity) requires substantial expansion beyond the limited moderators currently identified.

*Limitations*

This systematic review has some limitations which are important to address. The first one stems from methodological diversity in the analyzed studies, particularly the low number of qualitative investigations. Also, regarding quantitative methods, there are different approaches to operationalizing well-being variables. This heterogeneity made it unfeasible to conduct quantitative effect size calculations for specific leadership competencies' impact on well-being outcomes. Such calculations would have provided valuable insights into the relative importance and effectiveness of different leadership approaches in teleworking contexts.

A second consideration relates to the temporal scope. While many systematic reviews typically restrict their analysis to the past decade to ensure currency, we deliberately extended our review to encompass 24 years of research. This decision diverges from conventional practice but was chosen to capture the full evolution of teleworking leadership research. The fields' relatively slow development before 2010 meant that excluding earlier works would have omitted foundational studies that continue to offer relevant insights. The broader temporal scope allowed us to incorporate seminal works from the early 2000s that established crucial theoretical and empirical foundations for understanding leadership in virtual contexts, providing a more comprehensive understanding than a narrower timeframe would have permitted.

Finally, a significant limitation stems from the temporal concentration of studies during the COVID-19 pandemic (2020–2023). This period represented an unprecedented global experiment in forced telework under crisis conditions, potentially introducing

contextual factors that may not generalize to voluntary telework under post-pandemic circumstances.

In conclusion, this systematic review demonstrates that leadership competencies in telework settings significantly influence employee well-being by addressing both operational and affinity distance challenges that remote work brings. Our findings highlight five key competencies that leaders should develop to promote teleworker well-being: supervisor support, digital communication, goal management, work-life facilitation, and participative leadership. While traditional leadership skills remain relevant, they require substantial adaptation for telework environments. The review also reveals important gaps in current research, particularly regarding team-level outcomes and longitudinal effects of leadership on teleworker well-being, complemented with the analysis of telework conditions, such as telework intensity. As organizations continue to embrace hybrid and remote work arrangements, developing these specific leadership competencies becomes crucial for fostering sustainable well-being in telework environments. Future research should focus on understanding how these competencies can be effectively developed and implemented across different cultural contexts and organizational settings. By building on this foundation, researchers and practitioners can refine understanding of how leadership most effectively supports teleworker well-being in an increasingly digital work landscape, contributing to healthier organizational practices in the Industry 5.0 era.

# CHAPTER 5: LEADING FROM AFAR: DEVELOPMENT AND VALIDATION OF THE LEADERSHIP COMPETENCIES FOR TELEWORK (LCT) SCALE

## 5.1. INTRODUCTION

Telework and hybrid modalities have gone from a measure of flexibility to a new way of configuring organizations worldwide (Moens et al., 2021). According to the World Economic Forum (2023), 20.5% of global companies have indicated that offering more remote and hybrid work opportunities is part of their short-term strategies. In Europe, although the percentage of teleworkers decreased in 2023 compared to pandemic levels, it remains higher than in the pre-pandemic era (Eurostat, 2024). Thus, these changes imply several challenges for workplaces and, consequently, for leadership.

Leadership in telework plays a crucial role in supporting workers and maintaining their well-being during remote work (Peiró et al., 2024). Additionally, their role is essential in remote goal management, where granting autonomy and providing direct support is crucial for ensuring teleworkers' performance (Bravo-Duarte et al., 2025a) and helping the team by offering tools to transition to this new arrangement (Bartsch, 2020). Moreover, leadership is crucial in promoting positive attitudes toward including people from different cultures and locations (Lauring & Jonasson, 2018) and supporting workers' work-life balance through remote work modalities (Anakpo et al., 2023).

Nevertheless, several emerging challenges must be addressed. First, leaders must navigate a permanent continuum between telework and on-site work, which adds an extra burden to their responsibilities (Vartiainen & Vanharanta, 2024). In this scenario, leaders must ensure sustainable working conditions, prevent employee overload, and help them manage job demands within the context of limited face-to-face interactions (Hoch & Kozlowski, 2014; Lautsch & Kossek, 2011; Watson, 2007).

Second, research has emphasized the importance of developing strategies to help employees establish and maintain clear boundaries between work and personal life, particularly in high-intensity telework environments (Bell et al., 2023). This represents an additional challenge for leaders in promoting work-life balance within their teams in a remote setting (Bravo-Duarte et al., 2025b; Lundqvist & Wallo, 2023*).*

Third, in this new context, managers are responsible for equipping teams with appropriate technological infrastructure (e.g., media and digital tools) and knowledge to

enhance work system adaptability and maintain high performance levels (Bartsch, 2020; Bravo-Duarte et al., 2025a).

Fourth, leaders must provide both emotional and instrumental support for successful teleworking. Emotional support involves acknowledging personal issues that can make teleworking challenging and fostering autonomy, enabling employees to handle difficult situations independently (Bartsch, 2020). Instrumental support encompasses providing technical assistance and facilitating organizational connections through digital media (Bartsch, 2020; Bravo-Duarte et al., 2025a).

Fifth, the physical interaction space is replaced, at least in part, by a remote environment that requires leaders to consider the virtual distance between team members. According to Lojeski and Reilly (2020), virtual distance refers to the sense of detachment that individuals experience when they primarily use technology to communicate with others rather than engaging in face-to-face interactions. It can be specified as operational distance (e.g., lack of coordination), affinity distance (e.g., lack of personal interactions), and identity distance (e.g., lack of sense of belonging). Identity distance is especially significant in telework, as it becomes harder for workers to feel included and connected to their organization and teams (Lojeski & Reilly, 2020).

To face these challenges, leaders must acquire what Peiró and Martínez-Tur (2022) refer to as digitalized competencies: (re)learn how to manage misunderstandings, establish work-life boundaries, unify dispersed teams, and cultivate trust and engagement without in-person contact. It also requires leaders to know how to communicate effectively, develop a shared understanding of goals and tasks, collaborate, foster social cohesion, and coordinate work using available technologies, while overcoming the social challenges that arise (Bell et al., 2023; Bravo-Duarte et al., 2025a; Kozlowski et al., 2021).

Consequently, a critical aspect for organizations is measuring the extent to which leaders have developed or need to develop these competencies, for which new models and instruments have been developed.

One of the most spread models is *e-leadership*, developed by Avolio et al. (2004), who define it as “a social influence process embedded in both proximal and distal contexts

mediated by AIT [advanced information technology] that can produce a change in attitudes, feelings, thinking, behavior, and performance" (p.107). Roman et al. (2018) created a scale to assess *e-leadership* based on this model. However, it is important to distinguish between the leaders' usage of information technology and the actual management of teleworking. The use of technology for communication does not necessarily equate to effective leadership in telework or hybrid work arrangements, as digital tools can also be implemented in in-office settings.

Another example is the *virtual leadership* model, which focuses primarily on leading virtual teams, examining the impact of transformational and transactional leadership as the main theoretical frameworks (Gilson et al., 2014). In this context, Batırlık et al. (2022) developed the Virtual Team Leadership scale, which measures managerial qualities, interactivity, human relations, personal traits, rewards, and flexibility of leaders in remote work environments. However, this model is designed for team-level analysis, making it difficult to accurately measure individual issues. Additionally, it does not address behaviors aimed at reducing social and identity distance, such as promoting team identity and preventing worker isolation (Lojeski & Reilly, 2020). Furthermore, virtual team leadership can differ significantly from leadership in telework arrangements, where employees may follow hybrid work schedules that alternate between working from home and at the organization (Nakrošienė et al., 2019; Vartiainen & Vanharanta, 2024). The model also does not address work-life balance issues, which have become increasingly relevant due to the blurred boundaries between work and personal life in these new arrangements (Bell et al., 2023).

Traditional leadership models have also been employed to measure leadership in remote work or telework settings, such as transformational leadership (e.g., Meriyani et al., 2022; Tautz et al., 2024) or servant leadership (e.g., Lamprinou et al., 2021). Although these models may also offer useful frameworks for addressing leadership in telework, they neither capture the context sensitivity nor consider the communication media used for interactions, representing a significant change in leader-employee dynamics (Contreras et al., 2020). Furthermore, they do not address specific aspects of teleworking and the challenges presented by digital transformation in work contexts (Bauwens & Cortellazzo, 2024). For example, these models overlook critical behaviors related to media selection (particularly in hybrid arrangements) and trust-building through digital

media (especially in full telework settings) (Allen et al., 2015; Bell et al., 2023; Bravo-Duarte et al., 2025a; Peiró & Martínez-Tur, 2022). Moreover, they do not consider leaders' behaviors related to reducing the identity distance created by telework (Lojeski & Reilly, 2020) or capture the behaviors necessary to address work-family conflict issues that arise when employees work remotely (Bell et al., 2023), as previously mentioned.

Consequently, existing leadership models fail to comprehensively address the range of behaviors essential for effective leadership in telework environments. This limitation extends beyond merely adapting existing leadership models to remote contexts; leadership required in telework environments involves mastering digitalized competencies that differ substantially from traditional face-to-face leadership (Peiró & Martínez-Tur, 2022). These digitalized competencies emerge through integrating psychosocial skills with actions required in digital contexts and interactions with digital devices (Peiró, 2024). Furthermore, telework necessitates a complete reconfiguration of work processes, communication patterns, and management approaches (Contreras et al., 2020). This reconfiguration demands a fundamental shift in how leadership competencies are conceptualized in digital environments, necessitating a new expanded framework for measuring leadership in telework. This expanded framework should also address the fundamental behaviors that enhance teleworkers' well-being and performance, particularly considering the novel challenges and organizational dynamics that have emerged in the post-pandemic era (Bell et al., 2023).

Considering the limitations of existing models and the need for a more comprehensive instrument, we have developed the **Leadership Competencies for Telework (LCT)** scale. This scale comprehensively assesses leadership competencies for telework, defined as the group of core behaviors leaders must exhibit in remote contexts to facilitate high levels of well-being and performance among their workers. This scale also offers a framework to measure and train digitalized leadership competencies in response to this new context.

The development of the LCT scale departs from three previous qualitative studies, which provided the initial model and items: two systematic reviews identifying leadership competencies that favor teleworkers' performance (Bravo-Duarte, 2025a) and well-being (Bravo-Duarte, 2025b), and a study focused on interviews and focus groups with

teleworkers, leaders, and HR managers from various sectors, including digital marketing, sales platforms, publishing, technology, consulting, and government (Puentes et al., 2022). Based on these sources, we created a set of behaviors theoretically grouped into five competencies that emerged as critical factors for effective telework leadership (see Table 1).

*Table 1: LCT Scale factor definitions*

| Factor | Description | Item example |
|---|---|---|
| *Digital Communication* | Leaders' ability to elaborate and transmit messages through digital media, generate spaces for active listening, and reduce the virtual distance with the work team. It involves establishing interaction principles, planning meetings, managing synchronous and asynchronous media, and performing bidirectional feedback with the team. | "*[The leader] knows how to choose the appropriate communication media for the type of message being conveyed."* |
| *Digital Trust-Building* | Leaders' ability to generate an environment of psychological safety through technology, i.e., a context in which leaders know that teleworkers will do their work and these, in turn, know that they will receive support from their leader. It implies promoting reliability (that what is said is fulfilled), generating spaces of psychological security, and demonstrating professional competence. | *"[The leader] treats people equally, regardless of geographic distance or mode of work."* |
| *Remote Goal Management* | Leaders' ability to adapt task planning and follow-up to favor teleworkers' autonomy. This involves promoting self-management and fulfilling commitments, providing structural support, and sharing leadership responsibilities. It also implies creating a structure for teleworking, following up on objectives and tasks, and promoting team autonomy. | *"[The leader] uses the appropriate digital tools to organize work in the team."* |
| *Remote Relationships Development* | Leaders' ability to foster team spirit through virtual means, unifying the efforts of all individuals towards a shared objective and generating high-quality interactions, will increasingly strengthen the team's cohesion and identity. It involves strengthening mutual support, social cohesion, and team identity using available technologies. | *"[The leader] reinforces the importance of cooperation within the team in virtual meetings."* |
| *Telework-life Balance Support* | Leaders' ability to identify emotional support needs and generate conditions of balance between telework and personal life, considering individual needs and the demands of these areas. It also involves being aware of the importance of his/her behavior as a model of conciliation for the team. It implies showing empathy, favoring balanced conditions, and modeling (serving as an example for) work disconnection behaviors. | *"[The leader] structures the work of the remote team in a way that facilitates work-life balance."* |

Following the development of the LCT scale, this current research focuses on its validation through a process organized into two distinct studies. The first study involves content validation through assessment by academic experts and human resources professionals, providing evidence of construct validity. The second study consists of applying the final version of the instrument to a Spanish sample of teleworkers and examining its psychometric properties (construct, convergent, divergent, and concurrent validity). In this second study, we examined the LCT scales' convergent and divergent validity by comparing it with another leadership measure: Leader-Member Exchange (LMX). LMX has been shown to correlate with worker performance in both traditional (Scandura & Graen, 1984) and telework settings (Gajendran & Joshi, 2012; Golden & Veiga, 2008; Kuruzovich et al., 2021). This relationship stems from leader behaviors, including decision-making involvement, open communication, support of member actions, and member reciprocity, as well as increased availability and commitment from members (Scandura & Graen, 1984). However, telework leadership encompasses behaviors beyond the general exchange relationship, such as facilitating work-life balance and promoting media usage. Moreover, in hybrid contexts, certain aspects of LMX may differ from those in traditional in-office settings (Gajendran & Joshi, 2012), particularly in terms of leader communication patterns and member availability. Consequently, the LCT scale is anticipated to demonstrate measurable differences from traditional LMX scales. Thus, we used LMX to test the convergent validity (expected relationships) and divergent validity (distinct measurements) of our LCT scale.

Moreover, we tested whether our scale effectively correlates with variables associated with the well-being and performance of teleworkers, thereby assessing its criterion validity. We examined the association of our scale with well-being outcomes, including positive and negative emotions at work and job satisfaction, which have been identified as key areas of study in well-being within telework contexts (Dahlstrom, 2013). Moreover, given that professional isolation is a variable highly influenced by telework (Bentley et al., 2016; Bell et al., 2023), we also examined whether leadership competencies are negatively correlated with this variable. Additionally, as we have observed that one of the greatest challenges is work-life conflict in a telework context (Allen et al., 2015; Bell et al., 2023; Delanoeije et al., 2019), we also examined the association between our scale and this construct. In the performance case, we investigated

the association between our scale and an extra-role performance variable, organizational citizenship behavior (OCB). It has been observed that telework affects OCB by reducing opportunities for interaction among individuals (Gajendran & Harrison, 2007). This can be counteracted by leader actions that promote these behaviors. Therefore, we wanted to determine whether our LCT scale effectively correlates to OCB in this context.

In sum, the present research aims to validate a scale that measures the leadership competencies that positively impact the well-being and performance of teleworkers. By doing so, we intend to advance the field by addressing the new challenges and needs of remote work arrangements, such as reducing virtual distance and coping with work-family issues, while providing a valuable tool for organizations and researchers to assess and develop effective leadership practices in telework contexts, ultimately contributing to the performance and quality of life of this type of workers.

As stated before, we will describe the process through two sub-studies: the first focuses on the item creation process and content validation by experts, while the second examines the reliability analysis, and the construct, convergent, divergent, and concurrent validity of the LCT scale.

## 5.2. SUB-STUDY 1: LCT SCALE CONTENT VALIDITY

This initial study focuses on the content validation phase, which is critical to establishing the initial scale for measurement. It comprises two validation panels, which will be described in the following sections.

### 5.2.1 Method

*Sample*

A total of 27 experts participated in the study, which included two validation panels. The first panel consisted of eight experts in leadership and the digitalization of Spanish universities, who were recruited from the research institute network. The second panel consisted of 19 practitioners and academics, also recruited from the research institute network. The practitioners were senior HR professionals with proven experience in

implementing telework in their companies, while the academics were professors researching HR and/or leadership.

*Procedure*

For this content validation process, we executed two expert panels to ensure that the items created for each dimension were theoretically adequate and relevant to the measured construct (Leadership for Telework).

The first panel was asked to classify the 88 initial items that composed the first version of the LCT scale into one of the five defined factors and evaluate the adequacy of each item to the chosen factor. We assessed the level of agreement according to Howard and Melloys' (2015) guidelines, which have been demonstrated to improve previous methods for item sort tasks (Anderson & Gerbing, 1991). This approach is statistically accurate and provides robust criteria for determining item-factor agreement in scale development. With a sample of eight experts, six is the minimum number of attributions necessary to consider that an item statistically belongs to a specific dimension. This adequation index ranges from 1 to 5, and a score greater than 2.5 is considered adequate.

Then, we conducted a second expert panel, in which the experts were asked first to evaluate the relevance of each item and, secondly, the clarity of each one. Both indexes were asked on a scale of 1 to 4, and a score greater than three is considered adequate.

### 5.2.2 Results

In this first panel, three items were eliminated due to their low adequation to the factor (score below 2.5), and three items were added based on experts' recommendations, maintaining the same final number of items (88).

In the second panel, twenty-one non-relevant items (scores less than 3) were removed from the final scale. Three items considered relevant (score above 3 in relevance) but unclear (score below 3 in clarity) were revised based on the experts' suggestions. First, the item *"(The leader) establishes mechanisms to communicate with him/her in exceptional or emergency situations*." was reworded to *"(The leader) agrees with the team on how they should communicate in exceptional circumstances."* Second, the item *"(The leader) shows the team, in virtual and visible media, that it does what*

*he/she says"* was reworded to *"(The leader) shows the team that their own commitments are fulfilled"*. Third, the item *"(The leader) makes visible the competence of people to do their work"* was reworded to *"(The leader) highlights the capabilities of each member of the team"*.

Based on the results, 67 items were selected and constituted the LCT scale (see Table 2; for original Spanish version, see Appendix 5), which is validated in the next study.

*Table 2: Final selection of translated items and content validity results*

| **Item** | **English translation** | **Adequation index – First step (1 to 5)** | **Relevance index - Second step (1 to 4)** | **Clarity index - Second step (1 to 4)** |
|---|---|---|---|---|
| DComm1 | Knows how to choose the appropriate communication media for the type of message being conveyed | 4.30 | 3.53 | 3.35 |
| DComm2 | Ensures that the quantity of information received by the team is neither excessive nor insufficient | 4.40 | 3.53 | 3.41 |
| DComm3 | Agrees with the team on how they should communicate in exceptional circumstances | 4.13 | 3.21 | 3.53 |
| DComm4 | Ensures that new team members are aware of the digital media being used | Created after 1st step | 3.68 | 3.82 |
| DComm5 | Ensures that new team members are aware of the digital media being used | 4.30 | 3.26 | 3.71 |
| DComm6 | Plans group meetings to facilitate communication within the group | 3.70 | 3.58 | 3.94 |
| DComm7 | Shows a good use of non-verbal communication in the digital context (e.g., use of emoticons, gesticulation in front of the camera, tone of voice) | 4.00 | 3.53 | 3.29 |
| DComm8 | Promotes listening and respect each other's turns to speak in virtual meetings | Created after 1st step | 3.26 | 3.94 |
| DComm9 | Ensures active participation in virtual meetings | 4.00 | 3.53 | 3.94 |
| DComm10 | Makes sure to document and share whatever is agreed in important meetings and conversations | 3.40 | 3.26 | 3.47 |

| | | | | |
|---|---|---|---|---|
| DComm11 | Plans feedback opportunities using the most appropriate method of communication | 4.60 | 3.58 | 3.65 |
| DComm12 | Generates opportunities to receive feedback from the team | 4.50 | 3.58 | 3.65 |
| DComm13 | Agrees with the team on the principles for giving and receiving constructive feedback | 4.60 | 3.37 | 3.76 |
| DComm14 | Ensures that all team members can provide feedback | 4.10 | 3.26 | 3.65 |
| DTrust1 | Promotes that people fulfill the commitments made with the team | 3.90 | 3.53 | 2.71 |
| DTrust2 | Shows the team that their own commitments are fulfilled | 4.00 | 3.63 | 3.18 |
| DTrust3 | If he/she is unable to fulfill a commitment, gives sufficient warning | 4.30 | 3.58 | 3.71 |
| DTrust4 | Treats people equally, regardless of geographic distance or mode of work | 3.60 | 3.68 | 3.65 |
| DTrust5 | Uses methods of communication that allow confidentiality when dealing with delicate subjects or sensitive information | 4.00 | 3.74 | 3.71 |
| DTrust6 | Shows honesty to the group (e.g., by acknowledging when they don't know something or when a mistake is made) | 4.30 | 3.74 | 3.47 |
| DTrust7 | Promotes a climate in which everyone feels free to express their own points of view | 4.40 | 3.79 | 3.71 |
| DTrust8 | Generates sufficient trust for disagreements or conflicts to be voiced | 4.10 | 3.68 | 3.65 |
| DTrust9 | Establishes digital mechanisms so that people can ask for help if needed | 3.90 | 3.58 | 3.82 |
| DTrust10 | Has a level of competence at work that generates trust in the team | 4.50 | 3.00 | 2.94 |
| DTrust11 | Highlights the capabilities of each member of the team | 3.90 | 3.00 | 2.71 |
| DTrust12 | Shows competence in the use of digital tools | 3.60 | 3.16 | 3.88 |
| DTrust13 | Ensures that people are competent in the use of digital tools | 2.90 | 3.61 | 3.41 |
| RGoals1 | Uses the appropriate digital tools to organize work in the team | 4.30 | 3.63 | 3.65 |
| RGoals2 | Plans work to reduce interruptions and multitasking | 4.00 | 3.42 | 3.59 |
| RGoals3 | Ensures a simple and clear virtual work management system | 3.80 | 3.53 | 3.47 |
| RGoals4 | Checks, through digital tools, that the objectives and roles of each team member are clear to everyone | 4.30 | 4.00 | 3.76 |
| RGoals5 | Uses digital tools to track the accomplishment of objectives and tasks | 4.60 | 3.89 | 3.65 |
| RGoals6 | Regularly monitors the team's work using digital media | 4.00 | 3.68 | 3.76 |
| RGoals7 | Ensures that people have the necessary equipment for remote work | 4.40 | 4.00 | 3.88 |
| RGoals8 | Ensures that people have the software and documentation needed | 4.40 | 3.74 | 3.65 |
| RGoals9 | Detects difficulties that may affect remote work in advance | 4.00 | 3.58 | 3.76 |
| RGoals10 | Facilitates work that requires high concentration to be carried out without interruptions | 4.00 | 3.32 | 3.88 |
| RGoals11 | Agrees on work objectives that facilitate autonomy in remote working | 4.90 | 3.74 | 3.82 |

| | | | | |
|---|---|---|---|---|
| RGoals12 | Facilitates that people organize and manage their time when working remotely | 4.80 | 3.47 | 3.71 |
| RGoals13 | Facilitates people's autonomy to make decisions at work | 3.30 | 3.28 | 3.31 |
| RRelations1 | Reinforces the importance of cooperation within the team in virtual meetings | 3.80 | 3.63 | 3.65 |
| RRelations2 | Organizes virtual activities to develop cooperation and support among team members | 3.80 | 3.68 | 3.82 |
| RRelations3 | Makes sure that no one in the remote team is isolated | 4.50 | 3.79 | 3.65 |
| RRelations4 | Facilitates the integration of new members through virtual welcome activities | 4.60 | 3.84 | 3.94 |
| RRelations5 | Facilitates opportunities for interaction that recreate face-to-face situations (e.g., virtual cafes, online games) | 4.80 | 3.47 | 3.82 |
| RRelations6 | Plans virtual social events so that team members can get to know each other’s more human and personal sides | 4.60 | 3.37 | 3.59 |
| RRelations7 | Helps people to identify aspects they have in common with their teammates | 4.50 | 3.68 | 3.53 |
| RRelations8 | Performs actions, through digital media, to reinforce team membership | 4.40 | 3.74 | 3.65 |
| RRelations9 | Performs actions, through digital media, to reinforce belonging to the organization | 4.30 | 3.68 | 3.65 |
| RRelations10 | Celebrates group achievements using available media | 4.40 | 3.63 | 3.71 |
| RRelations11 | Reinforces the shared values of the team using virtual media | 3.80 | 3.42 | 3.59 |
| RRelations12 | Ensures that people are aware of how each person's work | 3.30 | 3.47 | 3.24 |
| RRelations13 | Facilitates virtual interaction with other teams to foster a sense of organizational belonging | 4.60 | 3.16 | 3.65 |
| TWLBalance1 | Builds trust so that personal issues can be dealt with virtually | 4.10 | 3.47 | 3.59 |
| TWLBalance2 | Shows interest in people´s needs in the context of remote working | 3.50 | 3.79 | 3.59 |
| TWLBalance3 | Stimulates empathy between team members in a virtual context | 3.90 | 3.26 | 3.59 |
| TWLBalance4 | Demonstrates concern for people's emotional state in digital interactions | 4.30 | 3.68 | 3.65 |
| TWLBalance5 | Ensures that the team is aware of the resources available to deal with emotional problems | 4.00 | 3.58 | 3.65 |
| TWLBalance6 | Shows people in their team that they can understand their personal situations | 4.30 | 3.89 | 3.82 |
| TWLBalance7 | Looks for alternatives, together with the team members, to resolve work-life conflicts | 4.50 | 3.58 | 3.41 |

| | | | | |
|---|---|---|---|---|
| TWLBalance8 | Shows conciliation behaviors between his/her personal life and teleworking | Created after 1st step | 3.74 | 3.47 |
| TWLBalance9 | Considers work-life balance needs in work planning | 5.00 | 3.84 | 3.82 |
| TWLBalance10 | Ensures that team members can access the organization's work-life balance practice | 4.80 | 3.63 | 3.76 |
| TWLBalance11 | Structures the work of the remote team in a way that facilitates work-life balance | 4.10 | 3.89 | 3.76 |
| TWLBalance12 | Agrees with the team rules for work disconnection | 4.90 | 3.89 | 3.88 |
| TWLBalance13 | Exemplifies, through their daily actions, respect for work disconnection | 4.80 | 3.79 | 3.88 |
| TWLBalance14 | Respects times when the team is disconnected from work | 4.60 | 4.00 | 3.94 |

*Note*. **DComm** = Digital Communication, **DTrust** = Digital Trust-Building, , **RGoals**= Remote Goals Management, **RRelations** = Remote Relationships Development, **TWLBalance** = Telework-life Balance Support

## 5.3 SUB-STUDY 2: LCT SCALE VALIDITY AND RELIABILITY

This second study examines the reliability and validity of the LCT Scale within a Spanish sample. First, the results of the Confirmatory Factor Analysis (CFA) are presented, followed by reliability analysis, convergent and divergent validity analysis, and finally, concurrent analysis examining the relationships between the LCT scale and positive and negative emotions at work, job satisfaction, professional isolation, telework-life conflict, and organizational citizenship behavior (OCB) outcomes.

### 5.3.1 Method

*Sample*

The participants were 543 Spanish workers who met the following criteria: a) working remotely for at least 12 hours per week (equivalent to 30% or more of a standard 40-hour workweek), b) having a full-time or part-time employment contract with an organization, and c) having a direct supervisor. We considered Spanish teleworkers as they represent a significant case in Europe's remote work landscape, particularly following the early implementation of comprehensive telework regulations (Gobierno de España, 2021). Additionally, this population was particularly suitable for our study as the

measurement scale was developed and validated in Spanish, ensuring linguistic and cultural appropriateness for the target population.

The sample consisted of 50.5% women and 49.5% men, with a mean age of 40.3 years (SD = 9.65). 89.7% work full-time and 10.3% part-time. Regarding organizational tenure, 47.9% had worked in their current organization for more than five years, 41.6% for between one and five years, and 10.5% for less than one year. The organizations represented in the sample operate across various sectors: IT (19.9%), industrial (11.8%), finance (10.1%), public administration (9.0%), consultancy (8.5%), marketing (8.1%), education (7.0%), health (4.4%), tourism (3.2%), and others (18.0%).

Regarding educational level, most participants held a university degree (52.1%), followed by those with a bachelor's or technical degree (22.7%), and postgraduate qualifications such as master's or doctorate degrees (21.7%). A smaller proportion reported secondary education (3.1%) or elementary education (.4%) as their highest educational level.

Related to telework patterns, participants were distributed across different remote work intensities: less than 50% of working hours (47.1%), between 50% and 69% (25.0%), between 70% and 89% (12.7%), and 90% or more (15.1%). In terms of weekly frequency during the three months prior to data collection, 41.1% worked remotely for an average of 2 days per week, 21.1% worked 3 days, and 37.8% worked 4 or more days remotely.

*Procedure*

The data collection employed a cross-sectional design, utilizing an online survey platform. Participants were recruited through random sampling from a professional panel company, and the survey targeted teleworkers from all regions of Spain. Before beginning the survey, participants provided informed consent through a checkbox form and were assured that their responses would be treated confidentially. The survey was conducted in December 2022.

*Measures*

*Leadership Competencies for Telework (LCT):* The measurement was based on the 67-item scale that resulted from Study One. It employs a 5-point Likert response scale,

with options ranging from 1 (completely disagree) to 5 (completely agree). The factors and their descriptions are presented in Table 1, while the items related to each factor are outlined in Table 2.

*Leader-Member Exchange (LMX):* Measured using the Spanish version of Scandura and Graen's (1984) seven-item scale. Respondents indicated their agreement with statements about their supervisor on a 4-point Likert scale. An example item is "*To what extent do you feel your supervisor recognizes your potential?*" The scale showed adequate internal consistency (Cronbach's α = .89; Cortina, 1993).

*Positive and negative emotions at work:* Assessed using Warr's (1990) six-item scale (Spanish translation), comprising two factors: positive emotions ("cheerful", "optimistic", "lively") and negative emotions ("tense", "nervous", "anxious"). Respondents rated their work-related feelings over the past week on a 5-point scale from 1 (Nothing) to 5 (Much). Internal consistency was strong for both positive (Cronbach's α = .89) and negative emotions (Cronbach's α = .91).

*Job Satisfaction:* Measured using Bravo et al.'s (1993) five-item Spanish scale. Respondents rated their satisfaction with various job aspects on a 5-point scale from 1 (Very dissatisfied) to 5 (Very satisfied). A sample item is "*Overall, how satisfied are you with your job?*" The scale demonstrated adequate reliability (Cronbach's α = .80).

*Professional isolation:* Assessed using Golden et al.'s (2008) seven-item scale, translated to Spanish through back-translation by two native English-spoken members of our research team. Respondents indicated their agreement with statements on a 5-point scale from 1 (Completely disagree) to 5 (Completely agree). A sample item is "*I miss the face-to-face contact with my co-workers*." The translated scale showed adequate reliability (Cronbach's α = .80).

*Telework-life conflict:* Measured using the six-item dimension from Charalampous et al.'s (2022) revised E-work Life scale, also back-translated to Spanish by our research team. Respondents rated their agreement with telework situations on a 5-point scale from 1 (Completely disagree) to 5 (Completely agree), with higher scores indicating greater conflict. A sample item is "*When e-working remotely I do often think*

*about work-related problems outside of my normal working hours*." The translated scale demonstrated good reliability (Cronbach's α = .86).

*Organizational Citizenship Behavior (OCB):* Assessed using Henderson et al.'s (2020) six-item revised scale, which was also back-translated into Spanish by our research team. Respondents indicated the frequency of specific workplace behaviors over the past month on a 5-point scale from 1 (Never) to 5 (Always). A sample item is "*I took a personal interest in other employees*." The scale showed good reliability (Cronbach's α = .86).

*Data analysis*

To ensure the reliability and validity of the Leadership Competencies for Telework (LCT) scale, we conducted a series of statistical tests, including confirmatory factor analysis (CFA), internal consistency evaluation, convergent validity, discriminant validity, and criterion validity testing.

Before conducting the study, Harmans' single-factor test was conducted to assess the potential presence of common method bias, including all items from the study. The results indicated that the first factor explained 35.76% of the total variance, while 14 factors with eigenvalues greater than one were identified, accounting for a cumulative 64.48% of the total variance. Since the first factor did not account for most of the variance (less than 50%), we can conclude that common method bias does not significantly threaten the validity of the results according to Podsakoff et al. (2003). Therefore, the rest of the study could proceed.

First, to assess the construct validity of our scale, it is important to note that research has consistently shown that leadership constructs often emerge as a second-order factor, as leadership scales typically capture various facets of a leaders' overall competency profile (Mumford et al., 2000). This hierarchical structure occurs because different leadership dimensions share common variance represented by a higher-order factor (Avolio et al., 1999). Based on this theoretical framework and previous validation studies (Carless, 1998), we hypothesized that different leadership competencies would serve as indicators of general leadership competence in telework contexts. To test this, and according to Anderson and Gerbing guidelines (1988), we conducted a confirmatory

factor analysis (CFA) comparing three models: a) an unidimensional model with all the LCT items, b) a five-factor uncorrelated model, and c) a second-order model with telework leadership as the underlying factor. Following established guidelines for CFA indexes interpretation (Brown, 2015), model fit was evaluated using $X^2$, CFI - TLI (adequate fit > .90), and RMSEA (adequate fit < .08).

Moreover, we assessed the internal consistency of the factors using Cronbach's alpha and composite reliability (CR) coefficients, with values above .70 considered sufficient (Cortina, 1993).

To test the convergent validity, we examined the correlation between LMX overall scores and our LCT scale overall score, where correlations between .50 and .80 indicate adequate convergent validity (Brown, 2015). To test the discriminant validity, we followed Anderson and Gerbings' (1988) recommendations by comparing a one-factor model with a two-factor model using CFA. The one-factor model treated LMX and LCT as a single factor, whereas the other treated them as separate factors. Fit indexes such as $X^2$, CFI, TLI, and RMSEA were compared. The model treating them as separate factors should demonstrate better fit indices, supporting discriminant validity (Brown, 2015).

Finally, we tested criterion validity using hierarchical multiple regression analysis. In the first step, demographic variables (gender, age, education, organizational tenure) and the percentage of telework were entered as control variables. In the second step, the overall LCT scale score was added as a predictor of well-being measures (positive/negative emotions, job satisfaction, professional isolation, and work-life conflict) and extra-role performance (OCB).

Regarding data analysis software, we used IBM AMOS 28 for confirmatory factor analysis due to its robust structural equation modeling. Jamovi software (The Jamovi Project, 2022) was selected for reliability and validity testing because it handles complex regression analyses efficiently.

### 5.3.2 Results

*Descriptive analysis*

The descriptive statistics for the LCT scale and its factors (see Table 3) show all mean scores above the midpoint of 3, indicating generally favorable evaluations. The highest mean was observed for Remote Goal Management (M = 3.97, SD = .70), potentially reflecting the heightened emphasis on goal-setting and monitoring in telework environments. In contrast, Remote Relationships Development had the lowest mean (M = 3.78, SD = .81), suggesting potential challenges in fostering interpersonal connections in remote settings. Skewness values were consistently negative (-.96 to -1.18), suggesting a tendency toward higher scale scores, while positive kurtosis values (.99 to 1.98) indicate responses clustered closer to the upper range of the scale. These patterns suggest participants generally provided favorable ratings. Standard deviations (.70 to .81) indicated moderate response variability across factors, with Remote Relationships Development showing the highest variability (SD = .81).

*Table 3: Descriptive statistics for the LCT Scale.*

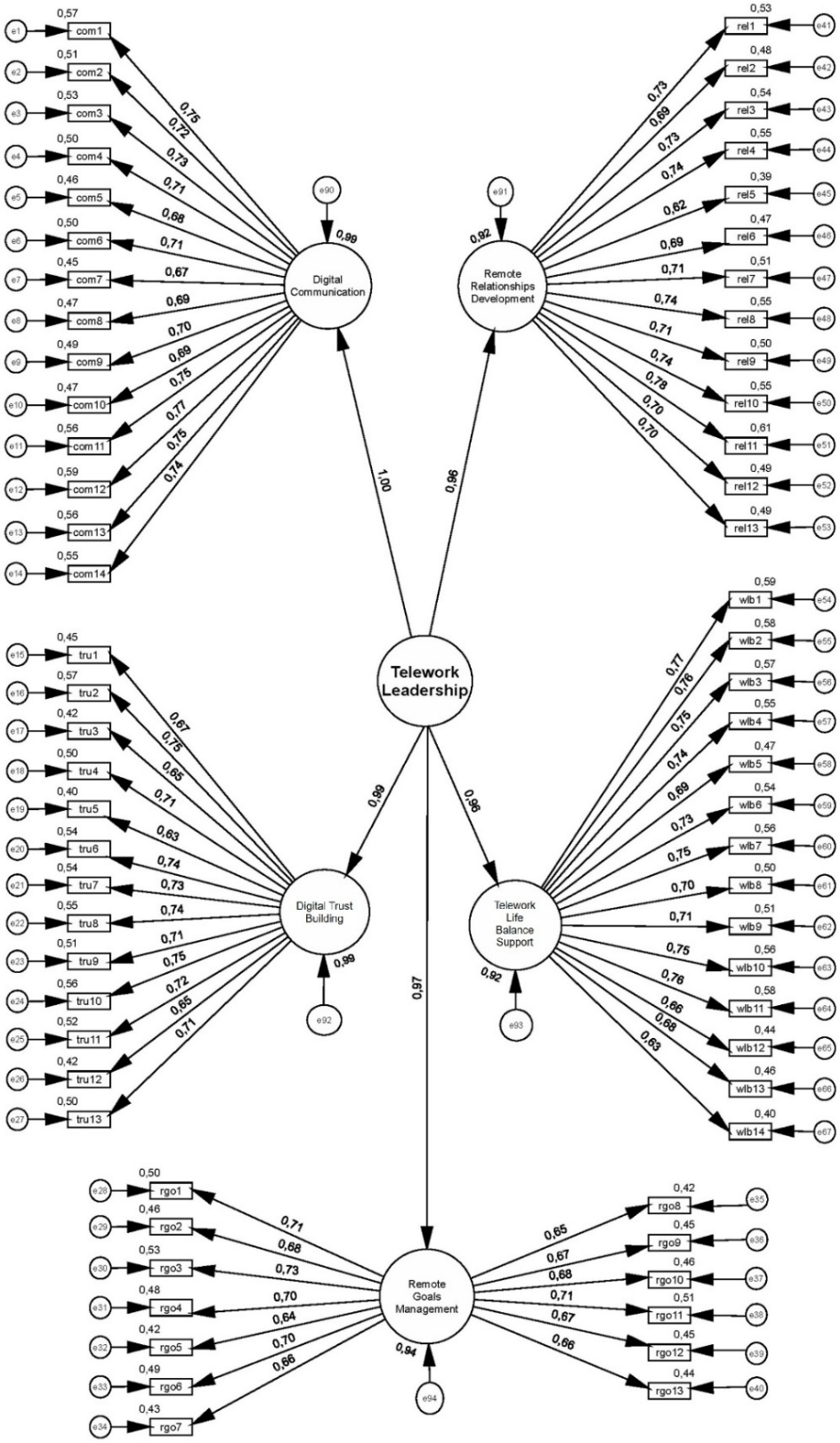
| | **LCT (overall)** | **Digital Communication** | **Digital Trust-Building** | **Remote Goals Management** | **Remote Relationships Development** | **Telework-life Balance Support** |
|---|---|---|---|---|---|---|
| N | 543 | 543 | 543 | 543 | 543 | 543 |
| Mean | 3.89 | 3.92 | 3.96 | 3.97 | 3.78 | 3.84 |
| Median | 3.97 | 4.00 | 4.08 | 4.00 | 3.92 | 4.00 |
| S.D | .72 | .75 | .74 | .70 | .81 | .80 |
| Asymmetry | -1.06 | -1.18 | -1.07 | -1.05 | -.97 | -.96 |
| Kurtosis | 1.56 | 1.98 | 1.49 | 1.68 | 1.14 | .99 |

*Confirmatory Factor Analysis (CFA)*

The CFA compared three models: (1) an unidimensional model with all items, (2) a five-factor model with uncorrelated factors, and (3) a model treating telework leadership as a second-order factor. The unidimensional model showed inadequate fit ($X^2$= 4812,

CFI = .891, TLI =.888, RMSEA = .048), falling below the recommended thresholds (Brown, 2015). In contrast, the five-factor model demonstrated adequate fit ($X^2$= 4412, CFI = .907, TLI = .904, RMSEA = .044). Nevertheless, the second-order factor model demonstrated an even better fit ($X^2$= 3470, CFI = .972, TLI = .971, RMSEA = .034). These results support the factor validity of the LCT scale, supporting the conceptualization of telework leadership as a higher-order construct comprising five distinct but related competencies. Factor loadings ranged from .65 to .89, exceeding the recommended threshold of .50 (Brown, 2015), further supporting the scales' factorial validity. The model with standardized factor loadings per item and factor is shown in Figure 6.

*Figure 6: LCT scale CFA with standardized factor loadings per item and factor*



*LCT Scale Reliability analysis*

The LCT scale demonstrated high reliability, with Cronbach's alpha values of .98 for the overall scale and above .90 for all factors: Digital Communication (α = .94), Digital Trust-Building (α = .93), Remote Goals Management (α = .92), Remote Relationships Development (α = .93), and Telework-life Balance Support (α = .94). Composite reliability (CR) coefficients were identical to Cronbach's alpha for each factor, providing additional evidence of strong internal consistency among indicators within each factor.

*Convergent and discriminant validity*

Convergent validity was supported by a moderate positive correlation between the LCT scale and the LMX scale (r=.62; p <.01), which falls within the recommended range of .50 to .85 (Brown, 2015). For discriminant validity, a one-factor model combining LCT and LMX ($X^2$= 6358, CFI = .861, TLI = .857, RMSEA = .051) showed a worse fit than a two-factor model treating them as distinct constructs ($X^2$=5511, CFI = .893, TLI = .889, RMSEA = .045). These results confirm that LCT and LMX measure distinct but related leadership constructs.

*Criterion validity*

The LCT scale demonstrated significant relationships with all the theoretically relevant outcomes (see Table 4). It showed the strongest correlations with job satisfaction and positive emotions, the lowest with organizational citizenship behavior (OCB), and significant negative correlations with negative emotions, professional isolation, and telework-life conflict. Although some control variables exhibited significant relationships, the variance explained in step 1 was not significant ($R^2$ ranging from .01 to .03). The substantial increase in explained variance after adding the LCT scale ($\Delta R^2$ ranging from .06 to .32, p < .001) provides strong support for the criterion validity of the LCT scale.

*Table 4: Multiple regressions for well-being and extra-role performance outcomes for LCT Scale.*

| | **Positive emotions at work** | **Negative emotions at work** | **Job Satisfaction** | **Professional isolation** | **Telework-life conflict** | **OCB** |
|---|---|---|---|---|---|---|
| **Step 1** | | | | | | |
| Constant | 1.75*** | 4.01 | 1.44*** | 4.30*** | 4.49*** | 2.25*** |
| | (.31) | (.40) | (.26) | (.37) | (.38) | (.26) |
| Gender | -.11 | .11 | -.02 | -.32*** | -.21** | -.04 |
| | (.07) | (.08) | (.05) | (.08) | (.08) | (.06) |
| Age | .00 | .00 | .00 | .00 | .01** | .00 |
| | (.00) | (.00) | (.00) | (.00) | (.01) | (.00) |
| Education | -.06 | .01 | .01 | .02 | .05 | .00 |
| | (.04) | (.05) | (.04) | (.05) | (.05) | (.04) |
| Organizational | -.01 | -.10 | .10* | -.07 | .03 | .11** |
| tenure | (.05) | (.07) | (.04) | (.06) | (.06) | (.05) |
| % of telework | -.07* | .09 | -.03 | .04 | -.05 | -.03 |
| | (.03) | (.04) | (.02) | (.04) | (.04) | (.03) |
| $R^2$ | .03 | .02 | .01 | .03 | .02 | .01 |
| **Step 2** | | | | | | |
| LCT scale | .53*** | -.40*** | .61*** | -.34*** | -.32*** | .31*** |
| | (.04) | (.06) | (.04) | (.05) | (.06) | (.04) |
| $R^2$ | .26 | .10 | .33 | .09 | .08 | .11 |
| $\Delta R^2$ | .27*** | .08*** | .32*** | .07*** | .06*** | .10*** |

*N =* 543. *Unstandardized regression coefficients are reported. Standard errors are reported in parentheses. Step 1 coefficients belong to the final model (including the LCT scale). Gender: 0=male 1=female. Education: 1=Elementary; 2=High school; 3= Technical or college; 4=Bachelors' degree; 5=Masters' degree or above; % of telework: 1=30%-49%; 2=50%-69%; 3=70%-89%; 4=90%-100%. Organizational tenure: 1= < 1 year; 2= 1-5 years; 3= >5 years. *p <. 05 (two-tailed); **p <. 01 (two-tailed); *** p <. 001 (two-tailed)*

## 5.4 DISCUSSION

The present study aimed to validate a scale that measures the leadership competencies that positively impact the well-being and performance of teleworkers.

The LCT scale demonstrated reliability and validity across multiple dimensions, including content validity, internal consistency, and structural validity through Confirmatory Factor Analysis (CFA), supporting its use in the Spanish population.

The five-factor structure of the LCT scale is particularly significant as it captures both traditional leadership dimensions (i.e., relationship development and trust) related to existing leadership measures such as transformational leadership and LMX. Nevertheless, it encompasses competencies uniquely suited to telework, such as telework-life balance support (Bell et al., 2023; Lundqvist & Wallo, 2023), as well as specific behaviors, including digital media promotion and facilitation (Bartsch, 2020; Bravo-Duarte et al., 2025). It aligns with previous models on e-leadership or digital leadership; however, it offers an alternative to them when practitioners or researchers want to focus on key competencies for managing virtual distance in telework and hybrid arrangements.

Additionally, the emergence of telework leadership as a second-order factor suggests that effective remote leadership necessitates a holistic integration of multiple competencies, rather than isolated skills, thereby contributing to a deeper theoretical understanding of leadership complexity in digital contexts. This also aligns with established leadership measurement models (Avolio et al., 1999; Carless, 1998), as the CFA supported the five-factor structure with telework leadership as a second-order factor.

The results also support the convergent and discriminant validity of the LCT scale with LMX measures, aligning with theoretical expectations that effective telework leadership competencies should relate to quality leader-member exchanges (Graen & Uhl-Bien, 1995; Martin et al., 2015). However, it also supports the statement that telework leadership, while related to traditional leadership measures, captures unique aspects of remote management.

Furthermore, the results also support criterion validity, demonstrating positive and significant relationships with well-being indicators, including job satisfaction and positive emotions at work, as well as extra-role performance measures such as

Organizational Citizenship Behavior (OCB). The scale also shows expected negative relationships with telework-life conflict and professional isolation. These results align with previous research on telework leadership (Bell et al., 2023; Cortellazzo et al., 2019; Gohoungodji, 2022; Inceoglu et al., 2018; Kozlowski et al., 2021), which has shown that leadership plays a crucial role in employee well-being and performance. Our results further support that leadership is a key factor influencing well-being and performance in teleworking environments.

*Theoretical implications*

Our research contributes to the growing body of literature on telework and leadership by proposing a comprehensive framework for measuring leadership competencies tailored to the telework context. The LCT model extends existing leadership theories by proposing a set of digitalized competencies essential for telework management.

It also underscores the evolving demands of leadership in digitalized work environments and advances the understanding of leadership competencies adaptation to telework and hybrid work arrangements, challenging traditional conceptualizations that may not fully capture the specific behaviors of remote leadership. The transformation of non-digital traditional competencies into digitalized competencies has received limited explicit and independent attention beyond purely digital aspects (Peiró, 2024). By explicitly operationalizing how traditional leadership competencies transform when exercised in digital environments, our LCT scale addresses this significant theoretical gap.

*Practical implications*

Organizations can utilize the LCT scale in several ways. First, they could use the LCT scale during leadership training to identify gaps in digital competencies, thereby tailoring programs to better prepare leaders for managing remote teams; for example, guiding them to maintain a strong identification with the team, ensure job satisfaction in remote, prevent members isolation or dealing with new work-life issues. Moreover, it can be incorporated into assessment processes for leadership positions involving remote team management and evaluating leadership effectiveness in virtual environments.

Additionally, the scale is particularly relevant for addressing hybrid work challenges, as it helps organizations evaluate and develop leaders' abilities to balance remote and in-office dynamics (Bell et al., 2023), manage virtual distance, and maintain team cohesion across different work arrangements.

Therefore, organizations can rely on the LCT scale to benchmark their leadership development initiatives and systematically enhance their remote leadership capabilities, ultimately supporting the well-being and performance of teleworkers in an increasingly teleworking landscape.

*Limitations and future research*

Despite its contributions, this study has some limitations that future research could address. First, the cross-sectional nature of our data limits causal inferences about the relationships between leadership competencies and outcomes. Longitudinal studies would provide more substantial evidence for these relationships and help establish the scale's predictive validity over time (Hu & Bentler, 1999). Second, our reliance on self-reported measures may introduce common method bias. Future research should incorporate multi-source ratings, including objective performance indicators and peer assessments.

Third, it is important to consider that validating the LCT scale in a Spanish context provides unique insights into the cultural dimensions of telework leadership. Spanish organizational culture, characterized by its tendency to avoid autonomous leadership (Dickson et al., 2003), high levels of improvisation (Aram & Walochik, 1996), and reliance on strong interpersonal relationships (Zander, 2024), may influence how leadership competencies manifest in telework settings. This cultural context potentially shapes the interpretation and application of specific competencies, particularly those related to remote goal management and remote relationships management. For example, individualist cultures have generally embraced remote work more readily than collectivist cultures, where in-person collaboration and group cohesion are highly valued (Peters et al., 2016). Additionally, cultural attitudes toward power distance might influence telework leadership's effectiveness. For instance, high-power-distance cultures may face more significant challenges in transitioning leadership authority to virtual contexts, where traditional symbols of hierarchy are less visible (Peters et al., 2016; Raghuram & Dong,

2013). These cultural differences may affect how telework leadership competencies are prioritized and expressed. Therefore, the generalizability of our findings to other cultural contexts requires further investigation. Future research should validate the scale across different cultural contexts, particularly in countries with varying hierarchies and relationship-building approaches.

Additionally, industry-specific validation, especially in sectors heavily dependent on remote work (e.g., IT, education), would enhance the scale's practical utility. Moreover, given the global nature of telework (World Economic Forum, 2023), validating the scale in English and Portuguese will enable organizations in diverse cultural and linguistic contexts to leverage this tool for leadership development.

*Conclusions*

In conclusion, the Leadership Competencies for Telework (LCT) scale provides a robust, evidence-based tool for assessing the competencies required to lead in telework settings. Its validation in a Spanish sample underscores its reliability and validity, while its five-factor structure bridges traditional leadership competencies with the emerging demands of the digital workplace. Future research should focus on cross-cultural validation and longitudinal studies to deepen our understanding of its predictive power. As telework becomes an integral component of modern work, the LCT scale offers a timely contribution to both research and practice, equipping leaders to navigate the complexities of remote team management effectively.

# CHAPTER 6: VALIDATION OF THE LEADERSHIP COMPETENCIES FOR TELEWORK SHORT-SCALE (LCT-S) IN SPANISH AND COLOMBIAN POPULATIONS

## 6.1 INTRODUCTION

The rapid advancement of digital technologies and the changes in social values and demands have significantly reshaped work, leading to the widespread adoption worldwide of telework arrangements (Kniffin et al., 2021; Wang et al., 2020). Unexpected events, such as the COVID-19 outbreak, have also sped up this process. Telework arrangements are related to performing job duties regularly from a location other than the main office, at least once per week, through the use of digital technologies of information and communication (Nakrošienė et al., 2019). This concept encompasses both fully remote arrangements and hybrid models, where workers split their time between home and the office in varying ratios (Vartiainen & Vanharanta, 2024).

This worldwide trend toward hybrid and remote arrangements is also found in Spain and other Latin countries, where a substantial proportion of the workforce has transitioned to fully remote or hybrid work settings (Eurofound, 2020; Observatorio Nacional de Tecnología y Sociedad, 2021). As organizations navigate this new reality, it is crucial to assess whether leaders possess the necessary skills to effectively manage employees and teams in telework arrangements (Bartsch et al., 2020; Contreras et al., 2020). Traditional leadership competencies may not fully address the unique challenges and dynamics of telework environments, highlighting the need for a tailored approach to evaluate and develop leadership capabilities in these contexts (Leonardelli, 2022), "digitalizing" traditional leadership behaviors (Peiró & Martínez-Tur, 2021).

Previous research has addressed this issue to some extent. Roman et al. (2019) built an e-leadership scale, defining it as a technology-mediated influence process that affects attitudes and performance (Avolio et al., 2004). However, using technology for communication differs from effectively leading employees and teams in telework and remote settings. Similarly, virtual leadership scales have also been developed (i.e, Batırlık et al., 2022); nevertheless, it is aimed at fully remote teams, which may exclude hybrid workers. Therefore, current scales overlook crucial leadership behaviors specific to telework contexts, such as promoting team identity by distance (Lojeski & Reilly, 2020) and managing work-family boundary issues (Bell et al., 2023). This suggests a need for a more comprehensive framework that addresses the unique challenges of leading in telework. To address this need, in previous research (Bravo-Duarte et al., 2025a), we have

developed the Leadership Competencies for Telework (LCT) scale, a comprehensive instrument designed to measure leadership behaviors aimed explicitly at reducing operational and affinity distance created by remote work contexts (Lojeski & Reilly, 2020). The LCT scale encompasses 67 items grouped into five core competencies:

A) *Digital Communication,* as the ability of the leader to elaborate and transmit messages through digital media, generating spaces for active listening, and reducing the virtual distance with the work team.
B) *Digital Trust-Building,* as the ability of the leader to generate an environment of psychological safety through technology, i.e., a context in which leaders know that teleworkers will do their work and these—in turn—know that they will receive support from their leader.
C) *Remote Goals Management*, as the ability of the leader to adapt the planning and follow-up of tasks in a way that favors teleworkers' autonomy.
D) *Remote Relationships Development,* as the ability of the leader to foster team spirit through virtual means, unifying the forces of all people towards a shared objective and generating quality interactions, which will increasingly strengthen the team's cohesion and identity.
E) *Telework-Life Balance Support,* as the ability of the leader to identify emotional support needs and generate conditions of balance between telework and personal life, considering individual needs and the demands of these areas.

These competencies reflect the essential digitalized behaviors (Peiró & Martínez-Tur, 2021) required for effective leadership in telework and hybrid work arrangements, as previous literature reviews and research stated (i.e., Bell et al., 2023; Bravo-Duarte et al., 2025b; Peiró et al., 2024).

*The LCT short-version scale (LCT-S)*

The complete version of the LCT scale allows for a comprehensive analysis, which is useful for companies and HR management who want to evaluate and develop leadership for telework environments. Nevertheless, for fast screenings or research with larger organizational samples, surveys can result in more missing data and higher rejection rates. Reducing the length of the scales can improve the response rate and the quality of the data collected (Stanton et al., 2002).

Therefore, recognizing the importance of having a reduced version of the instrument, we created a version that enables faster and more efficient assessments while maintaining the reliability and core properties of the original scale. The development of a short form of the LCT scale (LCT-S) would provide researchers and practitioners with a valuable tool for quickly assessing telework leadership competencies in organizations without overburdening respondents with an excessively lengthy survey.

To test the validity of the short version of the LCT-S scale, we conducted two different studies. First, as the full version of the LCT scale was validated in a Spanish sample, we analyzed the psychometric properties of the LCT-S scale in a new Spanish sample.

Second, leadership -as a globally studied phenomenon- has been validated across nations through various measurement scales. Research demonstrates that leader competencies and styles can be described consistently across different nationalities, despite variations in specific tactics and behaviors (Boehnke et al., 2003; Idrovo Carlier et al., 2012; Lapointe et al., 2016; Rodríguez-Carvajal et al., 2014; Schmidt & Ye, 1992; Zhu et al., 2017). However, these studies primarily focused on traditional workplace contexts, making cross-national comparisons of telework leadership an unexplored area. Therefore, it is important to examine whether leadership competencies persist across countries in remote work arrangements, as a phenomenon that extends globally (Bell et al., 2023; Eurofound, 2020).

In consequence, and as we intend to introduce the use of this scale in the Latin-American context, we tested measurement invariance between Spanish and Colombian samples to analyze the cross-national validity of the LCT-S scale, building on previous research supporting leadership measure equivalence across Spanish and Latin-American cultures (Boehnke et al., 2003; Idrovo Carlier et al., 2012; Rodríguez-Carvajal et al., 2014). Therefore, we analyze the psychometric properties of the LCT-S scale in a Colombian sample while providing empirical evidence of its cross-national applicability.

Additionally, we examined the relationships between the LCT-S scale and several variables across both countries. To assess the convergence/divergence validity of the scale we have compared it with two leadership related constructs. Given that the leader-subordinate relationship represents the most important interaction for teleworkers

(Gajendran & Harrison, 2007; Golden & Veiga, 2008; Lautsch et al., 2009), we selected Leader-Member Exchange (LMX) as our primary measure for assessing both convergent (expected relationships) and divergent validity (distinct measurements). Furthermore, since leadership supportive behavior can be specially relevant in telework settings (Bell et al., 2023), we incorporated Family Supportive Supervisor Behavior (FSSB) (Hammer et al., 2013) as an additional measure to evaluate the scale's convergent and discriminant validity.

Moreover, to test the predictive validity of LCT-S scale, we investigated its correlation with teleworkers' well-being and performance outcomes. In the case of well-being, we measured job satisfaction, which has been identified as an important factor in teleworkers hedonic well-being, mirroring the findings in traditional arrangements (Dahlstrom, 2013). Also, we tested the relationship with an eudaimonic well-being construct such as work engagement, which has also been linked to leadership in remote contexts (Contreras et al., 2020).

To measure task performance in teleworking settings, we used the e-work productivity scale, as a self-reported performance measure adapted to remote environments (Grant et al., 2019). For extra-role performance, we examined Organizational Citizenship Behavior (OCB) as a variable that can be affected by telework and can be counteracted by leader actions that promote these behaviors (Gajendran & Harrison, 2007). Finally, we also measured the relationship of the LCT-S scale with e-work self-efficacy, which is the belief of remote workers in their capability to perform successfully in a digital environment (Grant et al., 2019).

In sum, this research aims to examine the psychometric properties and measurement invariance of the LCT-S across Spanish and Colombian samples. Through this validation, we contribute to the field by providing a reliable and validated instrument for assessing leadership competencies for telework in two different Spanish-speaking countries.

## 6.2 METHODS

*Design*

This study employed a longitudinal design with data collection at two-time points in both Spanish and Colombian samples. At Time 1, we conducted confirmatory factor analysis (CFA), assessed reliability, and examined convergent and divergent validity. Six weeks later, at Time 2, we evaluated predictive validity. All participants who completed the initial assessment were invited to participate in the follow-up measurement.

*Spanish sample*

The sample comprised 268 workers from IT and service companies in Spain. Of them, 51.7% were female and 47.6% male, with a mean age of 37.5 years (S.D=9.95). As to the level of education, 0.8% declared to have graduated from high school, 22.5% attended a technical educational path, 42.4% graduated from university, and 34.4% completed a postgraduate path.

Related to telework variables, 68.4% of the respondents worked remotely less than 50% of the time, 6.3% between 50% and 69% of the time, 11.2% between 70% and 89%, and only 14.1% worked remotely above 90% of the time. Regarding organizational tenure, 20.8% of participants have worked less than one year in the organization, 42% between 1 and 5 years, and 37.2% more than five years.

For the second measurement for predictive validity (6 weeks later), there was a decrease of 161 participants, with 107 valid responses for this phase.

*Colombian sample*

The sample consisted of 469 workers from IT companies in Colombia. Of them, 61.6% were male and 37.7% female, with a mean age of 32.6 years (S.D=7.74). As to the level of education, 0.4% declared to have graduated from high school, 40.8% attended a technical educational path, 37.4% graduated from university, and 21.2% completed a postgraduate path.

Related to telework variables, 4.9% of the respondents worked remotely less than 50% of the time, 3.8% between 50% and 69% of the time, 14.5% between 70% and 89%, and 76.8% worked remotely above 90% of the time. Regarding organizational tenure,

22% of participants have worked less than one year in the organization, 61.6% between 1 and 5 years, and 16.4% more than five years.

For the second measurement for predictive validity (6 weeks later), there was a decrease of 294 participants, with 175 valid responses for this phase.

*Measures*

*Leadership Competencies for Telework:* This variable was measured with the Leadership Competencies for Telework Short-Version Scale (LCT-S). This 25-items version scale retains the original five factors of the LCT full scale but includes only the five items per factor that demonstrated the highest standardized loadings in the initial validation study. It uses a 5-point Likert response scale ranging from 1 = "Completely disagree" to 5 = "Completely agree". The items related to each factor are described in Table 5.

*Table 5: LCT Short Version (LCT-S) items*

| **Factor** | **Spanish version** *(En contexto de teletrabajo, mi supervisor(a)…)* | **English translation** *(In the context of telework, my supervisor...)* |
|---|---|---|
| **Digital Communication (DC)** | DC1 Sabe escoger el medio de comunicación adecuado para el tipo de mensaje a transmitir | DC1 Knows how to choose the appropriate communication media for the type of message being conveyed |
| | DC2 Acuerda cómo debe comunicarse el equipo en situaciones excepcionales | DC2 Agrees with the team on how they should communicate in exceptional circumstances |
| | DC3 Planifica encuentros grupales para facilitar la comunicación en el equipo | DC3 Plans group meetings to facilitate communication within the group |
| | DC4 Asegura que, en las reuniones virtuales, las personas participen activamente | DC4 Ensures active participation in virtual meetings |
| | DC5 Genera oportunidades para recibir feedback del equipo | DC5 Generates opportunities to receive feedback from the team |
| **Digital Trust-Building (DT)** | DT 1 Muestra al equipo que cumple con sus compromisos | DT 1 Shows the team that his/her commitments are fulfilled |
| | DT 2 Trata a las personas de manera equitativa, sin importar la distancia geográfica o modalidad de trabajo | DT 2 Treats people equally, regardless of geographic distance or mode of work |
| | DT 3 Muestra honestidad frente al equipo (p.ej., reconociendo cuando desconoce algo o comete algún error) | DT 3 Shows honesty to the group (e.g., by acknowledging when they don't know something or when a mistake is made) |

| | | |
|---|---|---|
| | DT 4 Genera la confianza suficiente para que se expresen desacuerdos o conflictos | DT 4 Generates sufficient trust for disagreements or conflicts to be voiced |
| | DT 5 Su nivel de competencia en el trabajo genera confianza en el equipo | DT 5 Has a level of competence at work that generates trust in the team |
| **Remote Goals Management (RG)** | RG 1 Usa las herramientas digitales adecuadas para organizar el trabajo en el equipo | RG 1 Uses the appropriate digital tools to organize work in the team |
| | RG 2 Asegura un sistema de gestión del trabajo virtual sencillo y claro | RG 2 Ensures a simple and clear virtual work management system |
| | RG 3 Hace seguimiento periódico del trabajo del equipo, utilizando medios digitales | RG 3 Regularly monitors the team's work using digital media |
| | RG 4 Facilita que el trabajo que requiere alta concentración se lleve a cabo sin interrupciones | RG 4 Facilitates work that requires high concentration to be carried out without interruptions |
| | RG 5 Acuerda objetivos de trabajo claros y medibles, que faciliten la autonomía en el teletrabajo | RG 5 Agrees on work objectives that facilitate autonomy in remote working |
| **Remote Relationships Development (RR)** | RR 1 En los encuentros virtuales refuerza la importancia de la cooperación en el equipo | RR 1 Reinforces the importance of cooperation within the team in virtual meetings |
| | RR 2 Está pendiente de que nadie se quede aislado dentro del equipo en remoto | RR 2 Makes sure that no one in the remote team is isolated |
| | RR 3 Facilita la integración de los nuevos miembros mediante actividades virtuales de acogida | RR 3 Facilitates the integration of new members through virtual welcome activities |
| | RR 4 Realiza acciones, a través de medios digitales, para reforzar la pertenencia al equipo | RR 4 Performs actions, through digital media, to reinforce team membership |
| | RR 5 Refuerza a través de los medios virtuales los valores compartidos del equipo | RR 5 Reinforces the shared values of the team using virtual media |
| **Telework-Life Balance Support (TL)** | TL 1 Genera confianza para poder tratar cuestiones personales de forma virtual | TL 1 Builds trust so that personal issues can be dealt with virtually |
| | TL 2 Estimula la empatía entre los miembros de su equipo en el contexto virtual | TL 2 Stimulates empathy between team members in a virtual context |
| | TL 3 Se asegura de que las personas del equipo puedan acceder a las prácticas de conciliación de la organización | TL 3 Ensures that team members can access the organization’s work-life balance practices |
| | TL 4 Estructura el trabajo del equipo en remoto de forma que facilita la conciliación | TL 4 Structures the work of the remote team in a way that facilitates work-life balance |
| | TL 5 Acuerda con el equipo normas de desconexión laboral | TL 5 Agrees with the team rules for work disconnection |

*Leader-Member Exchange (LMX):* This variable was measured with the Spanish version of the seven-item scale developed by Scandura and Graen (1984). A 4-point Likert response scale was used. An example of an item is "*To what extent do you feel your supervisor recognizes your potential?".* The scale showed adequate reliability (α = .84 for Spanish and α = .81 for Colombian samples in T1).

*Family supportive supervisor behavior (FSSB):* This variable was measured with the Family Supportive Supervisor Behavior Short-Form (FSSB-SF) scale (Hammer et al., 2013) of 4 items, measuring emotional support, instrumental support, role modeling, and creative work-family management. A 5-point Likert response scale was used. An example of an item is "*Your supervisor makes you feel comfortable talking to him/her about your conflicts between work and non-work".* The scale showed adequate reliability (α = .94 for Spanish and α = .93 for Colombian samples in T1).

*Job Satisfaction:* This variable was measured with the Spanish five-item scale developed by Bravo et al. (1993). It is a 5-point Likert response scale ranging from 1 (Very dissatisfied) to 5 (Very satisfied). Also, a final item of general job satisfaction was included *"Overall, how satisfied are you with your job?".* The scale showed adequate reliability (α = .92 for Spanish and α = .88 for Colombian samples in T2).

*Work Engagement:* This variable was measured with the Utrecht Work Engagement Scale Short Version (Schaufeli et al., 2006) of 9 items including vigor, dedication, and absorption factors. As for the response scale, a 7-point Likert was used. An example of an item is "*I am enthusiastic about my work".* The scale showed adequate reliability (α = .90 for Spanish and α = .93 for Colombian samples in T2).

*E-Work Productivity:* This variable was measured with the Productivity factor from the E-Work Life (EWL) Scale (Grant et al., 2019) of 4 items. As for the response scale, a 6-point Likert was used. An example of an item is "*E-working makes me more effective to deliver against my key objectives and deliverable".* Regarding the internal consistency of the scale, factor determinacy was calculated. The factor showed adequate reliability (α = .90 for Spanish and α = .85 for Colombian samples in T2).

*Organizational Citizenship Behavior (OCB):* This variable was measured with the six-item revised scale developed by Henderson et al. (2020), with a Spanish back

translation made by the research team. As for the response scale, a 5-point Likert one ranging from 1 (Never) to 5 (Always) was used. An example of an item is *"I took a personal interest in other employees".* The scale showed adequate reliability (α = .86 for Spanish and α = .82 for Colombian samples in T2).

*E-Work Self-efficacy*: This variable was measured with the e-Work Self-Efficacy Scale (Tramontano et al., 2021) of 15 items. As for the response scale, a 5-point Likert scale was used. An example of an item is "*Utilize a range of social networking tools to maximize your work relationships?".* The scale showed adequate reliability (α = .90 for Spanish and α = .83 for Colombian samples in T2).

*Procedure*

Data were collected through a virtual platform, and each participant signed informed consent. The surveys were conducted from June 2023 to January 2024. People involved in the study agreed to use the data for research purposes, and the permission of the Human Research Ethics Committee of the University was obtained (procedure number 1943262).

*Data analysis*

First, to assess the scale's psychometric properties, we conducted a confirmatory factor analysis (CFA) comparing three models: a first model with one factor, a second model with the theoretical five factors, and a third model with leadership as a second-order factor, as a tradition in leadership scales (Avolio et al., 1999). The factors' internal consistency was evaluated using Cronbach's alpha, with values above .70 considered sufficient (Cortina, 1993).

To test the Confirmatory Factor Analysis (CFA), model fit was assessed using CFI (acceptable >.90, excellent >.95), TLI (acceptable >.90, excellent >.95), and RMSEA (close fit <.05, reasonable <.08) (Schermelleh-Engel et al., 2003).

To test the convergent validity, we conducted a correlation test between LMX and FSSB overall scores and the LCT-S scale overall score. Correlations between .50 and .80 indicate adequate convergent validity between scales (Brown, 2015). To test the discriminant validity, we compared the fit between a model considering LMX/FSSB and

LCT as one factor and a model considering them as separate factors, which must have a better fit than the previous one.

For the predictive validity, we conducted two-step multiple regressions between the overall LCT-S scale scores in Time 1 and outcome measures in Time 2 (job satisfaction, engagement, e-work productivity, and OCB). In the first step, we introduced demographics (gender, age, education, and organizational tenure) and the percentage of telework. Then, in the second step, we included the LCT-S scale scores.

Finally, for testing invariance across the two country samples, we tested four measurement invariance models: configural (equal factor structures), metric (equal factor loadings), scalar (equal loadings and intercepts), and strict (equal loadings, intercepts, and uniqueness). Model fit was assessed using CFI, TLI and RMSEA.

Regarding data analysis software, we conducted all the analysis in Jamovi software (The Jamovi Project, 2022).

## 6.3 RESULTS

*Descriptives and mean comparisons across countries*

First, a comparative analysis was conducted using t-tests to identify significant differences in each studied variable between the Spanish and Colombian samples. The results and descriptive statistics are shown in Table 6.

*Table 6: Descriptives and mean comparisons between countries*

| | | | Spanish sample | | Colombian sample | | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Min** | **Max** | **Mean** | **Std. Dev.** | **Mean** | **Std. Dev.** | **T Student** | **p** |
| **Time 1** | | | | | | | | |
| Leadership Competencies for Telework (LCT) | 1 | 6 | 4.93 | .91 | 5.08 | .98 | -2.13 | .034* |
| Digital Communication (DC) | 1 | 6 | 5.03 | .92 | 5.08 | .98 | -.58 | .562 |
| Digital Trust-Building (DT) | 1 | 6 | 5.20 | .92 | 5.23 | 1.03 | -.38 | .705 |
| Remote Goals Management (RG) | 1 | 6 | 4.92 | .95 | 5.15 | .99 | -3.10 | .002** |
| Remote Relationships Development (RR) | 1 | 6 | 4.76 | 1.09 | 5.01 | 1.08 | -3.12 | .002** |
| Telework-Life Balance Support (TL) | 1 | 6 | 4.71 | 1.06 | 4.94 | 1.09 | -2.74 | .006** |
| Leader-Member Exchange (LMX) | 1 | 6 | 3.33 | .46 | 4.96 | 1.09 | -23.06 | < .001** |
| Family supportive supervisor behavior (FSSB) | 1 | 6 | 4.98 | .98 | 4.47 | 1.11 | 6.15 | < .001** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Time 2** | | | | | | | | |
| Job Satisfaction | 1 | 6 | 4.86 | .80 | 5.06 | .68 | 2.18 | .030* |
| Engagement | 0 | 6 | 4.53 | .92 | 5.01 | .69 | 4.96 | < .001** |
| E-Work Productivity | 1 | 6 | 4.78 | .99 | 5.40 | .68 | 6.25 | < .001** |
| Organizational Citizenship Behavior (OCB) | 1 | 5 | 3.82 | .80 | 3.67 | .82 | -1.55 | .123 |
| E-Work Self-efficacy | 1 | 6 | 4.99 | .65 | 5.16 | .52 | 2.43 | .016* |

The LCT-S scale overall scores differed significantly between countries ($p < .05$), with Colombian sample ($M = 5.08$, $SD = .98$) scoring higher than Spanish sample ($M = 4.93$, $SD = .91$). Three factors—remote goals management, remote relationships development, and telework-life balance—showed significant differences, with higher scores in Colombia.

Regarding concurrent measures, LMX demonstrated higher scores in the Colombian sample ($M = 4.96$, $SD = 1.09$) compared to the Spanish sample ($M = 3.33$, $SD = .46$). In contrast, family supportive supervisor behaviors scored higher in Spain ($M = 4.98$, $SD = .98$) compared to Colombia ($M = 4.47$, $SD = 1.11$).

In the case of studied outcomes, job satisfaction, engagement, e-work productivity, and e-work self-efficacy were significantly higher in Colombia ($p < .05$), while in OCB, there was no significant difference.

### 6.3.1 Spanish Validation of LCT-S scale

Next, we will show the results of the validation of the short version of the scale for the Spanish population:

*Confirmatory Factor Analysis (CFA)*

The confirmatory factor analysis was tested by comparing the one-factor model (model 1), the five-factor model (uncorrelated, model 2), and the model with telework leadership as a second-order factor (model 3). Model 1 shows the worst fit (CFI = .843, TLI = .829, RMSEA =.121, SRMR = .053). Both models 2 and 3 show adequate fit, with model 2 showing better results (CFI = .910, TLI = .898, RMSEA =.093, SRMR = .045) than model 3 (CFI=.900, TLI = .888, RMSEA = .098, SRMR=.048); nevertheless, comparing the differences does not trespass the significant thresholds in RMSEA, TLI

and SRMR (ΔRMSEA = .005, ΔCFI = .100, ΔTLI = .001, ΔSRMR = .003) (Chen, 2007). Consequently, the Leadership Competencies for Telework (LCT) can be analyzed either as separate factors (Model 2) or as a composite leadership score (Model 3). We utilized the composite leadership scores for convergent/discriminant and predictive validity analyses.

*Reliability analysis*

Regarding internal consistency, Cronbach's alpha for the overall scale was found to be .98, and all dimensions got indexes above .90 (DC=.90; DT=.93; TL=.91; RG=.91; RR=.94), affirming that the short version of LCT scale can be regarded as a reliable scale.

*Convergent and discriminant validity*

For testing convergent validity, we propose that LCT is positively related to, but distinct from, LMX and FSSB. The correlations between the mean of the LCT scale and both LMX (r=.62; p <.01) and FSSB (r=.82; p<.01) scales are positive and significant, supporting the convergent validity hypothesis.

For discriminant validity, we compared the fit between a first model considering LCT, LMX, and FSSB as one factor, a second model considering LCT and LMX as one factor, a third model considering LCT and FSSB as one factor, and a last model considering the three as separate factors. The results show that the three-factor model ($x^2$ = 1972, CFI = .849, TLI = .839, RMSEA = .093, SRMR= .051) shows the best fit, compared to the LCT + LMX model ($x^2$ = 2002, CFI = .804, TLI = .790, RMSEA = .111, SRMR= .066), the LCT + FSSB model ($x^2$ = 1830, CFI = .822, TLI = .808, RMSEA = .120, SRMR= .055) and the one-factor model ($x^2$ = 2515, CFI = .790, TLI = .777, RMSEA = .110, SRMR= .065), supporting the discriminant validity hypothesis for LCT Short-version scale.

*Predictive validity*

As shown in Table 7, our LCT-S scale acts as a significant predictor of the outcomes studied. The overall score of LCT-S scale is a significant predictor of job satisfaction (β = .23, p < .01), engagement (β = .18, p < .05), e-work productivity (β = .26, p < .01), OCB (β = .15, p < .05), and e-work self-efficacy (β = .20, p < .01).

*Table 7: Multiple regressions for well-being and performance outcomes for lct short scale in the spanish population*

| | Job Satisfaction | Engagement | E-Work Productivity | OCB | E-Work Self-efficacy |
|---|---|---|---|---|---|
| **Step 1** | | | | | |
| Constant | 3.82*** | 3.74*** | 3.89*** | 4.67*** | 4.35*** |
| | (.81) | (.92) | (.95) | (.80) | (.65) |
| Gender | .11 | .41* | .37 | .08 | .10 |
| | (.17) | (.20) | (.20) | (.17) | (.14) |
| Age | .00 | .00 | -.01 | -.01 | .00 |
| | (.01) | (.01) | (.01) | (.01) | (.01) |
| Education | -.01 | -.01 | -.12 | -.24* | -.08 |
| | (.11) | (.12) | (.12) | (.10) | (.08) |
| % of telework | .05 | .01 | .16* | -.02 | .04 |
| | (.05) | (.06) | (.06) | (.05) | (.04) |
| Organizational | -.14 | -.11 | -.07 | -.16 | -.05 |
| tenure | (.11) | (.13) | (.13) | (.11) | (.09) |
| $R^2$ | .03 | .07 | .10 | .10 | .04 |
| **Step 2** | | | | | |
| LCT-S scores | .23** | .18* | .26** | .15* | .20** |
| | (.08) | (.09) | (.09) | (.08) | (.06) |
| $R^2$ | .11 | .11 | .17 | .13 | .13 |
| $\Delta R^2$ | .08** | .04* | .07** | .04* | .09** |

*Unstandardized regression coefficients are reported. Standard errors are reported in parentheses. Step 1 coefficients belong to the final model (including the LCT-S scale). Gender: 0=male 1=female. Education: 1=Elementary; 2=High school; 3= Technical or college; 4=Bachelors' degree; 5=Masters' degree or above; % of telework: 1=30%-49%; 2=50%-69%; 3=70%-89%; 4=90%-100%. Organizational tenure: 1= < 1 year; 2= 1-5 years; 3= >5 years. *p <. 05 (two-tailed); **p <. 01 (two-tailed); *** p <. 001 (two-tailed)*

Regarding demographics, educational level negatively predicts OCB ($\beta = -.24$, $p < .05$), showing the highest coefficient for the OCB model. Moreover, gender positively predicts engagement ($\beta = .41$, $p < .05$) with female workers correlating positively to this outcome. Finally, the percentage of telework also predicts increased productivity ($\beta = .16$, $p < .05$). The models explain between 11% and 17% of the variance in the outcome variables, with e-work productivity showing the highest explained variance ($R^2 = .17$).

### 6.3.2 Colombian Validation of LCT-S scale

Next, we will show the results of the validation of the short version of the scale for the Colombian population:

*Confirmatory Factor Analysis (CFA)*

In the Colombian sample, the three models show a better fit than the Spanish sample, with model 1 also showing the worst fit (CFI = .897, TLI = .888, RMSEA = .105, SRMR = .034). Moreover, the differences between the five-factors and second-order models are narrowed (model 2: CFI = .939, TLI = .931, RMSEA =.082, SRMR = .028; model 3: CFI = .933, TLI = .926, RMSEA = .085, SRMR = .031), and they also do not trespass the theoretical thresholds (Chen, 2007) (ΔRMSEA = .003, ΔCFI = .006, ΔTLI = .005, ΔSRMR = .003). Therefore, the scale also has adequate internal validity for this sample in both models 2 and 3.

*Reliability analysis*

Regarding internal consistency, Cronbach's alpha for the overall scale was found to be .98, and all dimensions got indexes above .90 (DC=.92; DT=.95; TL=.92; RG=.94; RR=.95), affirming that the short version of the LCT scale (LCT-S) is a reliable scale in the Colombian context.

*Convergent and discriminant validity*

For convergent validity, the correlations between the mean of the LCT scale and both LMX (r=.60; p <.01) and FSLB (r=.84; p<.01) scales are positive and significant, supporting the convergent validity hypothesis.

For discriminant validity, the results show that the three-factors model (x2 = 2376, CFI = .900, TLI = .894, RMSEA = .080, SRMR= .038) shows the best fit, compared to the LCT + LMX model (x2 = 3083, CFI = .861, TLI = .852, RMSEA = .094, SRMR= .061), the LCT + FSLB model (x2 = 2938, CFI = .869, TLI = .861, RMSEA = .092, SRMR= .044) and the one-factor model (x2 = 3585, CFI = .833, TLI = .823, RMSEA = .104, SRMR= .061), supporting the discriminant validity hypothesis for LCT Short-version scale for Colombian population.

*Predictive validity*

The same outcomes from the previous study were tested for predictive validity. In this case, the regression analysis reveals that LCT-S scores show the strongest prediction for job satisfaction ($\beta = .24$, $p < .001$), followed by OCB ($\beta = .17$, $p < .05$), and both engagement and productivity ($\beta = .13$, $p < .05$). However, in contrast with the Spanish sample, it does not significantly predict e-work self-efficacy. Results are shown in Table 8.

*Table 8: Multiple regressions for well-being and performance outcomes for lct short scale in the colombian population*

| | **Job Satisfaction** | **Engagement** | **E-Work Productivity** | **OCB** | **E-Work Self-efficacy** |
|---|---|---|---|---|---|
| **Step 1** | | | | | |
| Constant | 4.10*** | 4.48*** | 3.56*** | 2.93*** | 4.69*** |
| | (.58) | (.63) | (.61) | (.76) | (.48) |
| Gender | -.19 | -.05 | -.04 | .04 | -.17* |
| | (.10) | (.11) | (.11) | (.14) | (.09) |
| Age | -.01 | .01 | -.00 | -.01 | -.00 |
| | (.01) | (.01) | (.01) | (.01) | (.01) |
| Education | -.05 | -.14 | -.01 | .03 | .04 |
| | (.07) | (.08) | (.07) | (.09) | (.06) |
| % of telework | .08 | -.03 | .21** | -.08 | .01 |
| | (.07) | (.07) | (.07) | (.09) | (.06) |
| Organizational | -.08 | .07 | .19* | .21 | .08 |
| tenure | (.09) | (.10) | (.09) | (.12) | (.07) |
| $R^2$ | .09 | .07 | .07 | .05 | .05 |
| **Step 2** | | | | | |
| LCT-S scores | .24*** | .13* | .13* | .17* | .07 |
| | (.05) | (.06) | (.06) | (.07) | (.04) |
| $R^2$ | .19 | .07 | .10 | .05 | .05 |
| $\Delta R^2$ | .10*** | .03* | .03* | .03* | .01 |

*Unstandardized regression coefficients are reported. Standard errors are reported in parentheses. Step 1 coefficients belong to the final model (including the LCT-S scale). Gender: 0=male 1=female. Education: 1=Elementary; 2=High school; 3= Technical or college; 4=Bachelors' degree; 5=Masters' degree or above; % of telework: 1=30%-49%; 2=50%-69%; 3=70%-89%; 4=90%-100%. Organizational tenure: 1= < 1 year; 2= 1-5 years; 3= >5 years. *p <. 05 (two-tailed); **p <. 01 (two-tailed); *** p <. 001 (two-tailed)*

The regression analysis for the Colombian population reveals several notable differences compared to the Spanish sample. In the Colombian sample, gender shows a significant negative prediction for self-efficacy ($\beta = -.17$, $p < .05$), with males related positively to this outcome. Also, organizational tenure positively predicts productivity ($\beta = .19$, $p < .05$). Similar to the Spanish sample, the percentage of telework positively predicts e-work productivity ($\beta = .21$, $p < .01$).

The explained variance ($R^2$) ranges from 5% to 19%, with job satisfaction showing the highest explained variance ($R^2 = .19$), which was higher than the Spanish sample.

### 6.3.3 Cross-national invariance analysis

To begin with the comparison between both samples, Table 9 shows the standardized factor loading of each item per country. All items demonstrated robust factor loadings ranging from .71 to .92 in Spain and .73 to .91 in Colombia. The factor loadings show minimal variation between countries, with differences typically within .05 points.

*Table 9: Factor loadings for each country*

| Item | Factor Loadings Spain | Factor Loadings Colombia | Item | Factor Loadings Spain | Factor Loadings Colombia |
|---|---|---|---|---|---|
| DC1 | .81 | .83 | RG4 | .74 | .86 |
| DC2 | .82 | .87 | RG5 | .80 | .87 |
| DC3 | .77 | .83 | RR1 | .88 | .89 |
| DC4 | .78 | .85 | RR2 | .85 | .88 |
| DC5 | .86 | .81 | RR3 | .81 | .84 |
| DT1 | .85 | .86 | RR4 | .88 | .89 |
| DT2 | .85 | .86 | RR5 | .92 | .91 |
| DT3 | .81 | .89 | TL1 | .84 | .84 |
| DT4 | .87 | .90 | TL2 | .90 | .91 |
| DT5 | .86 | .91 | TL3 | .85 | .84 |
| RG1 | .87 | .86 | TL4 | .81 | .88 |
| RG2 | .89 | .90 | TL5 | .71 | .73 |
| RG3 | .80 | .81 | | | |

Regarding the invariance analysis, in the first step, the configural invariance model (equal factor structures) demonstrated good fit ($\chi^2 = 1998$, df = 530, RMSEA =

.087, CFI = .928, TLI = .919), indicating that the basic factor structure holds across both countries. The metric invariance model (equal factor loadings) also showed good fit ($\chi^2$ = 2032, df = 550, RMSEA = .086, CFI = .927, TLI = .921), with minimal changes in fit indices (ΔRMSEA = .001, ΔCFI = .001, ΔTLI = .002), supporting the comparison of different scores between countries.

The scalar invariance model (equal loadings and intercepts) maintained good fit indices ($\chi^2$ = 2101, df = 570, RMSEA = .086, CFI = .921, TLI = .921), with acceptable changes in fit indices (ΔRMSEA = 0, ΔCFI = .006, ΔTLI = 0). Finally, the strict invariance model (equal loadings, intercepts, and uniqueness) also demonstrated good fit ($\chi^2$ = 2219, df = 595, RMSEA = .086, CFI = .921, TLI = .920), with minimal changes in fit indices (ΔRMSEA = 0, ΔCFI = 0, ΔTLI = .001). These results suggest that the LCT-S scale supports measurement invariance across Spain and Colombia, supporting the validity of cross-national comparisons. Results are shown in Table 10.

*Table 10: Contrast of each invariance model*

| **Model Description** | **$\chi^2$** | **d.f.** | **RMSEA** | **CFI** | **TLI** | **ΔRMSEA** | **ΔCFI** | **ΔTLI** |
|---|---|---|---|---|---|---|---|---|
| Configural Invariance | 1998 | 530 | .087 | .928 | .919 | - | - | - |
| Metric Invariance | 2032 | 550 | .086 | .927 | .921 | .001 | .001 | .002 |
| Scalar Invariance | 2101 | 570 | .086 | .921 | .921 | 0 | .006 | 0 |
| Strict Invariance | 2219 | 595 | .086 | .921 | .92 | 0 | 0 | .001 |

## 6.4 DISCUSSION

This research aimed to examine the psychometric properties and measurement invariance of the Leadership Competencies for Telework Scale Short version (LCT-S) across Spanish and Colombian samples. Our findings support the scales' validity and utility in multiple ways.

First, the LCT-S demonstrates robust psychometric properties in both samples, confirming that a more parsimonious scale can effectively measure the core construct (Stanton et al., 2002).

Second, the scale shows strong convergent validity with related measures such as LMX and FSSB while maintaining discriminant validity, indicating that the LCT-S

captures unique aspects of leadership despite its relationship with other proximal constructs.

Third, LCT-S scores significantly predict multiple well-being and performance outcomes, including job satisfaction, engagement, and e-work productivity. This suggests that leadership competencies in remote contexts, as well as traditional settings, can enhance worker well-being and different dimensions of performance, such as task performance and citizenship behaviors (Bell et al., 2023; Gajendran & Harrison, 2007). The scale also positively predicts e-self-efficacy in the Spanish sample, which can enhance teleworkers' remote work experience (Grant et al., 2019).

Fourth, notable differences emerged between the samples. The Colombian sample generally demonstrated higher scores in leadership, well-being, and performance measures compared to the Spanish sample, with OCB and FSSB being the exceptions. Moreover, in the Colombian sample, organizational tenure was a significant predictor of productivity, which is aligned with research showing that higher tenure favors in-role performance (Ng & Feldman, 2010). Regarding extra-role performance (OCB), higher educational levels in the Spanish sample negatively correlated with OCB. These results also align with previous research that found mixed effects on citizenship behaviors (Ng & Feldman, 2009). Another difference is found regarding the Colombian sample, in which gender was the only significant predictor of e-work self-efficacy. The results align with previous research stating that women report lower self-efficacy at work in the Colombian population compared to men (Cano et al., 2023; Muriel Ramírez, 2020).

Regarding e-work productivity, it is important to acknowledge that in both samples, higher teleworking days led to better-perceived productivity. This is aligned with systematic reviews such as Mutiganda et al. (2022) and Spanish research by Blahopoulou et al. (2022), which indicates that persons who work most of their hours from home generally reported higher levels of perceived job performance and productivity compared to those working in an office setting (Mutiganda et al., 2022). According to Blahopoulou et al. (2022) research, this could be explained as telework allows higher levels of concentration, fewer interruptions, and higher perceived control over work.

Finally, measurement invariance analysis confirmed the LCT-S scale cross-national applicability between Spanish and Colombian samples, aligning with previous research

on leadership measures across these cultures (Boehnke et al., 2003; Idrovo Carlier et al., 2012; Rodríguez-Carvajal et al., 2014). This extends existing research by demonstrating that telework leadership, as well as traditional leadership, can be measured consistently across different national contexts (i.e. Lapointe et al., 2016; Schmidt & Ye, 1992).

*Practical implications*

The development and validation of the short version of the LCT scale provides researchers and practitioners with a more parsimonious tool for assessing leadership competencies in telework settings. This makes it a suitable tool for more widespread use in assessing these competencies briefly and efficiently. By using the short version, organizations can quickly and accurately evaluate the leadership competencies of their managers, allowing them to identify areas for improvement and provide targeted interventions when time or survey length is a constraint.

Moreover, the invariance of the LCT-S scale in both Spanish and Colombian populations offers organizations a consistent approach to measuring telework leadership across Spanish-speaking countries. It facilitates benchmarking and talent management practices and supports cross-national research on telework leadership effectiveness.

*Limitations and further research*

Regarding limitations of our research, the first is related to the sample composition. In Colombia, the sample consisted solely of individuals from the IT sector with high telework levels and a majority in technical educational levels, which may limit the generalizability of the findings to other industries and teams. In contrast, the Spanish sample was more diverse in terms of sectors and education, and with more diverse degrees of telework. To address this limitation, future research should expand the sample to include participants from various sectors and industries in both countries, as well as with different degrees of teleworking and balanced educational levels. This would provide a more representative and comprehensive validation of the scales' applicability across different professional contexts and telework arrangements.

Furthermore, to strengthen cross-cultural validity, future studies should extend to other Latin American nations and explore translations in English and Portuguese, enabling broader international application.

*Conclusions*

In conclusion, the short version of the Leadership Competencies for Telework scale (LCT-S) has proven to be a reliable and valid instrument for evaluating the essential competencies and behaviors leaders require to manage remote teams effectively and enhance teleworkers' well-being and performance. This scale serves as a crucial tool for guiding the training and development of leaders amidst the ongoing digitalization of work and the rise of e-leadership. It addresses the unique challenges posed by new work arrangements. As telework continues to gain traction, the LCT-S scale provides researchers and practitioners with a timely and valuable resource to improve leadership effectiveness and support the success of teams operating in this evolving work environment.

# CHAPTER 7: EFFECTS OF A TELEWORK LEADERSHIP TRAINING INTERVENTION ON LEADERS AND THEIR EMPLOYEES: A MULTILEVEL STUDY.

## 7.1 INTRODUCTION

There has been a significant transformation in digital working arrangements in recent years, leading to the incorporation of different teleworking modalities. This process was subsequently accelerated by the global pandemic (Vartiainen, 2021). While full remote arrangements predominated during the pandemic, more recently, a shift towards hybrid arrangements has emerged, aiming to combine the benefits of both remote and in-office work environments (Jooss et al., 2021; Vartiainen, 2024; Wang et al., 2022).

However, the adoption of these types of flexible working arrangements has presented numerous challenges. A primary concern is the well-being of teleworkers, with conflicting findings regarding key outcomes, such as job satisfaction. Several studies indicate that telework can increase job satisfaction (Fonner & Roloff, 2010; Kazekami, 2020; Vega et al., 2015), while other research suggests negative impacts on this outcome (Golden, 2006; Suh & Lee, 2017), potentially through their effects on diminished social interaction and professional isolation (Charalampous et al., 2019).

Other challenges are related to the performance and productivity of teleworkers. Although some studies suggest that telework can lead to enhanced productivity (Kazekami, 2020; Martinolli et al., 2024; Mutiganda et al., 2022), other investigations indicate productivity decreases in remote work settings (Barrero et al., 2023; Tejero et al., 2021), leaving open the question of which conditions make a teleworker more productive.

Moreover, research that synthesizes the effect of telework on performance and well-being, such as Gajendran et al. (2024), identifies two pathways producing opposing results. While teleworking might increase performance and well-being through increasing autonomy, the contrary effects could be found due to the increase in social isolation. This may suggest that, depending on how certain work factors produce specific processes, telework may result in better or worse performance or better or worse well-being.

Research in office-based environments has previously demonstrated that one key work factor for worker performance and well-being is leadership and leaders' behaviors (Inceoglu et al., 2018). In telework environments, it is also reasonable to expect similar influences, and indeed, research suggests (Avolio et al., 2009; Beauregard et al., 2019; Bell et al., 2023; Contreras et al., 2020; Cortellazzo et al., 2019) and has provided

empirical evidence that leadership is a factor affecting teleworkers' performance and well-being (Hoch & Kozlowski, 2014; Peiró et al., 2024; Zeike et al., 2019).

Leadership developed in remote and digitalized environments also requires the development of classical leadership functions such as task and relationship management. However, this new context and the need to use digital means imply a new configuration of these functions. This has been highlighted by different leadership frameworks, such as e-leadership (Avolio et al., 2009) or virtual leadership (Kozlowski et al., 2021) models. For example, a significant concern involves ensuring that objectives and tasks are accomplished without physical monitoring (Narayanan et al., 2017). Furthermore, leaders must increasingly promote worker autonomy, creating space for self-management to achieve organizational goals (Parker et al., 2020). Another challenge is to develop a remote identity and foster a sense of belonging among teleworkers and their teams (Makarius & Larson, 2017). Leaders must also ensure that employees do not experience isolation and can effectively collaborate across distance (Feitosa & Salas, 2021).

To face these challenges, leaders must go beyond the wise usage of digital media, highlighting the need for traditional leadership competencies to be digitalized, adapting to the demands of this new context (González-Anta et al., 2024; Peiró, 2024; Peiró & Martínez-Tur, 2022). Peiró and Martínez-Tur (2022) called *digitalized* competencies to these competencies transformed when carried out in digital contexts and/or in cooperation with digital devices (Peiró & Martínez-Tur, 2022). Systematic literature reviews indicate that these digitalized competencies can indeed favor both well-being (Bravo-Duarte et al., 2025b) and performance (Bravo-Duarte et al., 2025a).

Therefore, it is important to train leaders in this new form of competencies and to do so using a diverse range of tools, platforms, and teaching methods. This is crucial to ensure effective learning, the transfer of knowledge, and the practical application of newly acquired skills in a teleworking context. As Mishra & Dholakia (2023) point out leadership training must be reframed to address the unique challenges of remote learning environments, as well as to facilitate the digitalization of competencies.

### 7.1.1 The intervention: a telework leadership training program

In response to these challenges, we have designed a comprehensive telework leadership training program (Rodríguez et al., 2023). The program aims to enhance digitalized leadership competencies for telework environments while improving teleworkers' well-being and performance in line with a sustainable perspective (Di Fabio & Peiró, 2018) and contributing to healthier organizations (Salanova et al., 2016). The program aims to achieve this improvement at an individual and team level through reflection, learning, and planning specific behaviors.

We developed this program following the recommendations of Nielsen and Christensens (2021), and Salanova et al. (2013) for positive organizational interventions, and it was created by integrating academic research and the active participation of practitioners, leaders, and teleworkers. We conducted an alpha version with human resource managers and practitioners who provided valuable input for program enhancement. Subsequently, we implemented a beta version of our intervention with leaders from various companies in Spain, Colombia, and Chile.

The theoretical foundation of this training rests on the virtual distance framework by Lojeski and Reilly (2020), which posits that leaders can mitigate virtual distance in their teams across three domains: physical (time zone differences and organizational affiliations), operational (communication problems, technological issues, and work overload), and affinity or relational (insufficient interpersonal relationships and shared values). To do this, leaders can shorten these distances by applying the digitalized competencies mentioned above (Peiró & Martínez-Tur, 2022). Building on these two frameworks, we developed the Leadership Competencies for Telework (LCT) model, which focuses specifically on digitalized competencies designed to reduce operational and affinity distance. The model development was also based on a literature review about leadership models in telework, the foundations of two systematic literature reviews (Bravo-Duarte et al., 2025a, 2025b), and qualitative research involving teleworkers, leaders, and HR managers (Puentes et al., 2022). The final model addresses five main competencies: digital communication, digital trust building, remote goal management, remote relationships development, and telework-life balance support.

In this research, we specifically focus on the evaluation of the program through the development of two key competencies: remote goal management and remote relationships development. These competencies are closely aligned with the traditional task and relationship leadership orientations established in foundational leadership theory (DeRue et al., 2011). Additionally, recent systematic reviews on telework leadership (Bravo et al., 2025a; 2025b) identify several important behaviors for remote leaders that can enhance well-being and performance in a teleworking environment, particularly those related to these two competencies. They are described as follows:

A) *Remote Goal Management:* Ability to adapt task planning and monitoring to enhance employee autonomy. In this competence, we trained the following set of behaviors:

- Generate a structure for teleworking using digital tools
- Clarifying and verifying understanding of goals, tasks, and roles
- Facilitating structural support (e.g., for technical challenges)
- Monitoring objectives and tasks through digital tools
- Promoting self-management and commitment fulfillment
- Fostering team autonomy and shared leadership

B) *Remote relationships development:* Ability to cultivate team cohesion through virtual channels, unifying individual efforts toward shared objectives, and generating meaningful interactions. In this competence, we trained the following set of behaviors:

- Promoting mutual support for task accomplishment
- Facilitating social cohesion and team affinity using digital media
- Implementing activities to welcome new members and prevent isolation
- Strengthening team identity and sense of belonging using available technologies
- Facilitating virtual interaction with other organizational teams

*Training methodology*

The program implements a comprehensive multi-platform learning strategy that integrates various media formats (text, videos, and interactive environments) and combines different learning instances (web-based platform, mobile app, and synchronous interactive sessions), an approach that could enhance learning effectiveness (Morrison et al., 2019). This design acknowledges that effective telework leadership development deserves multiple touchpoints and diverse learning experiences to accommodate different learning styles and facilitate knowledge transfer (Means et al., 2013).

We developed a multimodal training program with three main components. First, a web-based training platform delivers interactive e-learning modules, including video demonstrations of each behavior, case-based exercises, and supplementary learning materials. Second, a mobile application was developed to support behavior selection, track competency practice, and provide continuous feedback on practice attempts.

The third component consists of two interactive online synchronic sessions for participants. Each session lasted 45 minutes. The initial session occurs in the middle of the training, while the concluding session takes place at the end of the program. These sessions are designed to facilitate the exchange of best practices and reinforce learned behaviors among participants. Using online platforms, participants can share their best practices, allowing for comments and discussions about how they have implemented the trained competencies in the workplace. They also aim to motivate the participants to apply the learning in their jobs.

The program follows a structured five-step methodology developed by the authors, guiding participants through sequential learning stages for each competency. The process begins with the delivery of theoretical content, where leaders develop awareness of their competencies and how this manifests in teleworking contexts through e-learning materials and supplementary documents. This is followed by observational learning through video demonstrations showcasing exemplary behaviors in practical situations. Participants then practice applying their knowledge through multiple case scenarios involving a fictitious teleworker, with 5-6 exercises per competency unit. Using the mobile application, leaders subsequently identify 2-4 specific behaviors they intend to implement in their leadership practice after completing the web-based training. In the

final stage, participants report their implementation experiences in the mobile application, including facilitators and barriers encountered during practical application, and receive automated feedback based on their self-performance evaluation.

The program spans six weeks per competence and one week for registration and initial orientation. Each module requires approximately 60-90 minutes to complete, and participants can repeat activities until they achieve satisfactory outcomes. Participation requirements include leaders working remotely for at least a portion of their working hours and directly supervising employees who also engage in some degree of remote work.

The program underwent sequential pilot testing in two phases. The initial phase focused on core modules and involved two testers who evaluated fundamental functionality and user experience, resulting in improvements to navigation and contextual information. The second phase examined the complete program, including all modules and the mobile application, culminating in technical features and interface design refinements. Feedback from both phases highlighted the effectiveness of diverse learning formats and the practical applicability of content, contributing to developing a robust, user-friendly training platform for telework leadership development.

### 7.1.2 Training evaluation

To evaluate the effectiveness of the training program, we measured its impact on different variables. We depart from Kirkpatrick's model (1959, 2016), focusing on three stages of training evaluation: learning, transfer, and results.

*Web-based training impact on leaders' learning*

In Kirkpatrick's model, the *learning* stage focuses on measuring the knowledge acquired, skills developed, or attitudes changed due to training (Kirpatrick, 1959). In the updated version of the model (Kirkpatrick & Kirkpatrick, 2016), self-assessment is listed as one of several potential evaluation methods at this level, alongside knowledge tests, skill demonstrations, role-plays, simulations, and other assessment techniques. For competency-based training programs, improvements in self-reported trained competencies can provide evidence of effective learning, as has been utilized in other

competency training studies that compared participants' perceptions of their own competencies (i.e., Cheung et al., 2023; Taggart et al., 2024).

Therefore, for our training program, an improvement in leaders' perception of their competencies (for this study, remote goal management and remote relationships development) after training could provide evidence of effective learning in our web-based training platform. Consequently, the first hypothesis of our study is:

*H1: The leaders' perception of their competencies will improve after the training.*

*Training transfer*

In Kirkpatrick's model, the *transfer* stage evaluates the extent to which participants apply their training on the job and change their workplace behaviors (Kirpatrick, 1959). For competency-based training programs, improvements in competencies observed by external observers (in this case, leaders' subordinates) can provide evidence of effective transfer to the workplace, as demonstrated in other studies on competency training (i.e., Brown et al., 2013; Tafvelin et al., 2021).

Therefore, for our training program, an improvement in both remote goal management and remote relationships development, as reported by leaders' subordinates, could provide evidence of the effective transfer of leadership competencies to the workplace. Consequently, the second hypothesis of our study is:

*H2: The subordinates' perception of leaders' competencies will improve after the training.*

Research has demonstrated that effective training creates conditions for promoting the transfer of behaviors to the workplace (Blume et al., 2010). One way to accomplish this is by facilitating spaces for participants to share practices and experiences (Burke & Hutchins, 2007), which has been documented as a moderating mechanism that could enhance learning transfer (Lacerenza, 2017). Therefore, in our training program, we designed interactive sessions as an appropriate space for participants to exchange best practices and enhance their transfer to the work environment. Consequently, we expect that employees' perceptions of their leaders' competencies will be significantly improved by leaders' participation in the interactive sessions, as leaders who enroll will be encouraged to apply more behaviors in the workplace and gain ideas and inspiration from

other participants to implement new behaviors regarding the learned competencies, which their subordinates will notice. Therefore, the third hypothesis of our study is:

> *H3: Leaders' participation in interactive sessions will moderate the effect of the training on subordinates' perceptions of leaders' competencies. This effect will be stronger when the leaders participate in the interactive sessions.*

*Training results*

In Kirkpatrick's model, the *results* stage evaluates how training contributes to improving organizational outcomes (Kirkpatrick & Kirkpatrick, 2016). Results can manifest in various outcomes, depending on the training objectives and organizational context, including financial metrics, operational improvements, and customer-related outcomes, among others (Phillips & Phillips, 2016). For leadership development specifically, while various outcomes can be measured, subordinate outcomes are particularly appropriate, given that the primary function of leadership is to influence the individuals and teams under their supervision (Lacerenza et al., 2017).

In the context of teleworking, research has highlighted the relevance of leaders' operational competencies, such as remote goal management, to the satisfaction of teleworkers (Bravo-Duarte et al., 2025b; Challagalla et al., 2000; Giacomelli et al., 2023; Illozor et al., 2001) and their productivity (Bravo-Duarte et al., 2025a; Thomas & Bostrom, 2011). Additionally, competencies aimed at reducing affinity distance in telework, such as virtual relationships development, could also enhance teleworkers' satisfaction and productivity (Bravo-Duarte et al., 2025a; Bravo-Duarte et al., 2025b) through support (Soares et al., 2023), relationship building (Thomas & Bostrom, 2011), and participation via digital media (Hoegl & Muethel, 2016).

Moreover, it is essential to recognize that the role of leaders is especially relevant for enhancing team processes and outcomes (Kozlowski & Ilgen, 2006; Morgeson et al., 2010), making it more suitable to investigate how learned leadership competencies affect team-level outcomes. In support of this statement, research has found significant effects of leadership at the team level regarding job satisfaction (Braun et al., 2013) and performance (Chen et al., 2007; Liao & Chuang, 2007; Schaubroeck et al., 2007). Therefore, for our training program, the effect of developing both leadership

competencies (as perceived by the leaders) on their employees' team outcomes—specifically, team satisfaction and productivity—could provide meaningful evidence of the effectiveness of the training program.

Therefore, in this study, we assess the impact of training by focusing on the positive change in the competencies developed through the intervention. Moreover, we propose that potential improvements in leadership competencies will be reflected in subordinate outcomes at both individual and team levels, as leadership has been shown to influence both tiers (DeChurch et al., 2010; Liao, 2017; Miles & Mangold, 2002; Yammarino & Dansereau, 2008). Consequently, our fourth hypothesis is as follows:

> *H4: The positive changes in leaders' competencies after the intervention, as perceived by the subordinates, will generate positive changes in subordinates' job satisfaction and productivity at the individual and team levels.*

Additionally, it is important to examine whether the development of these competencies affects the leaders' own outcomes, which has been studied as a measure of leadership training results (i.e., Fernandez et al., 2020; Nuñez et al., 2023). Research suggests that leadership development programs often yield benefits not only for followers but also for the leaders themselves (Day & Dragoni, 2015).

As leaders develop more effective leadership competencies, they typically incorporate these same strategies into their personal workflow, resulting in better management skills that enhance their own productivity (Prada et al., 2019) and could also increase their job satisfaction (Tenschert et al., 2024). In our case, as we focus on remote goal management and remote relationships development, we expect that by better managing their team's work, leaders will also acquire tools to increase their own productivity and job satisfaction. Furthermore, we anticipate that by developing better relationships with their team, leaders will experience enhanced work productivity and higher levels of job satisfaction. Thus, our fifth and last hypothesis is:

> *H5: The positive changes in the self-perception of leaders' competencies after the intervention will have a positive effect on their job satisfaction and productivity.*

In summary, this research evaluates the effectiveness of a leadership training program by analyzing learning, transfer, and results for both leaders and subordinates. To

do so, we first examined changes in leaders' remote goal management and relationship development competencies through self-reports (H1) and subordinates' perceptions (H2). We then examined whether leaders' participation in interactive sessions moderates these improvements (H3). Next, we assessed training results on subordinates by analyzing the impact of the change in their perception of leadership competencies on their outcomes at both individual and team levels (H4). Finally, we investigated training results on leaders' own outcomes by examining how the changes in the self-perception of their competencies influenced the change in their personal outcomes (H5).

Through this research, we provide the results of an evidence-based intervention to develop leadership competencies for the digital era, which is a key factor for teleworking success (Bell et al., 2023; Kozlowski et al., 2021). By equipping them with the necessary competencies, we intend to impact leaders' and workers' well-being and performance in telework arrangements across diverse countries and industries. Therefore, our applied research aims to contribute to developing remote leaders and promoting healthy and positive organizations (Salanova et al., 2013) even in telework contexts.

## 7.2 METHODS

*Design*

The study employed a longitudinal design with measurements at two time points: Time 1 (T1), conducted one week before the intervention, and Time 2 (T2), conducted three months after the completion of the intervention. This design allowed sufficient time for participants to implement the skills acquired during the training program in their work settings and for potential changes in outcomes to manifest (Nielsen & Randall, 2013).

Leaders were included in the final sample only if they had completed the entire web-based training program and provided data at both measurement points. For both leaders and subordinates, those with missing data at either T1 or T2 were excluded from the analyses to ensure the integrity of the longitudinal comparisons.

*Sample*

The sample in this study was composed of teleworkers (leaders and their subordinates), members of 85 teams from Spanish (20), Colombian (3), and Chilean (1) companies in the information technologies, services, and consultancy sectors. All leaders and subordinates had to meet the following criteria: a) working remotely for at least 12 hours per week (equivalent to 30% or more of a standard 40-hour work week), and b) having a full-time or part-time employment contract with the organization.

*Leaders:* 187 leaders were requested to answer the surveys and participate in the training program. 85 participants finished the web-based training program, answered both T1 and T2 measures, and were included in the sample (response rate = 45%). Of those, 58.8% were women and 41.2% were men, with a mean age of 41 years (S.D = 9.46). Regarding the level of education, 8.5% attended a technical educational path, 41.5% graduated from university, and 50% completed a postgraduate path. Thirty-eight percent worked remotely less than 50% of the time (office first), 28.2% between 50% and 89% of the time (remote first), and 32.9% worked remotely above 90% of the time (full telework). Regarding organizational tenure, 3.5% of participants have worked less than one year in the organization, 37.6% between 1 and 5 years, and 58.8% more than five years.

*Subordinates:* 1177 teleworkers of teams under the supervision of each leader participating in the training were requested to answer the surveys. Of them, 326 completed both T1 and T2 measures (response rate = 27.7%) and were included in the sample. From them, 52.2% were men and 47.8% were women, with a mean age of 35.9 years (S.D. = 9.18). Regarding the level of education, 1% attended high school or lower, 36.4% attended a technical educational path, 40% graduated from university, and 22.6% completed a postgraduate path. Related to telework variables, 28.5% worked remotely less than 50% of the time (office first), 15.6% between 50% and 89% of the time (remote first), and 55.8% worked remotely above 90% of the time (full telework). Regarding organizational tenure, 8.9% of participants have worked less than one year in the organization, 58.9% between 1 and 5 years, and 32.2% more than five years.

*Teams:* To conduct a proper multilevel analysis, only teams with three or more participants (who completed both T1 and T2) were considered, resulting in a sample of

297 subordinates belonging to 48 teams whose leaders completed the training. Regarding team size, 31 teams (64.58%) had 3 to 5 members, nine teams (18.75%) had 6 to 10 members, and eight teams (16.67%) had more than 10 members.

*Procedure*

Participants were recruited from 24 companies between June 2023 and May 2024. After contacting a representative of each company, team leaders working at least 20% of their time remotely were offered free enrollment in the leadership training program in exchange for their participation in the research study. The program was implemented over six weeks. Leaders and team members working under their supervision were requested to answer an online survey before and after the intervention using the LimeSurvey platform. As stated before, pre-intervention (T1) measurements were taken one week before the training, and post-intervention (T2) two months after. All data were collected while preserving the confidentiality of participants, and strict data protection protocols were followed, according to the Declaration of Helsinki. Participants were informed about the study's purpose, data-handling procedures, and their right to withdraw without consequences. The research protocol was reviewed and approved by the Human Research Ethics Committee of the University (procedure number 1943262).

*Measures*

*Leaders' participation in the interactive sessions:* This variable represents the leaders' participation in at least one of the two interactive sessions conducted during the training program. It was coded as a dummy variable: 1 (participation) or 0 (non-participation).

All the rest of the measures were collected from both leaders and their subordinates.

*Leader competency on remote goal management:* This competence was measured using the Leadership Competencies for Telework Short-Version Scale (LCT-S) created in the Spanish language (see Study 4). Respondents were asked to respond to their level of agreement with five items about themselves (leaders) or their leaders (subordinates). The scale uses a 5-point Likert response scale, ranging from 1 (completely disagree) to 5 (completely agree). For subordinates, the items were kept from the original scale. An example of an item is "(Your leader) uses the appropriate digital tools to organize work

in the team". For leaders, the items from the original scale were reworded in the second person. An example of an item is: "(You) use the appropriate digital tools to organize work in the team." The scale shows good reliability for both leaders' (α = .89 at T1 and α = .88 at T2) and workers' (α = .94 at T1 and α = .95 at T2) versions.

*Leader competency on remote relationships development:* This competence was measured using the Leadership Competencies for Telework Short-Version Scale (LCT-S). Respondents were asked to respond to their level of agreement with five items about themselves (leaders) or their leaders (subordinates). The scale uses a 5-point Likert response scale, ranging from 1 (completely disagree) to 5 (completely agree). As with the previous competence, the items for leaders were reworded in the second person, while those for workers were retained in their original form. An example of an item is: "(The leader) reinforces the shared values of the team using virtual media". For the leaders, an example of item is "(You) reinforce the shared values of the team using virtual media". The scale shows good reliability for both leaders' (α = .93 at T1 and α = .93 at T2) and workers' (α = .95 at T1 and α = .95 at T2) versions.

*Job Satisfaction*: This variable was measured using the Spanish six-item scale developed by Bravo et al. (1993). It is a 5-point Likert response scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Additionally, a final item assessing general job satisfaction was, "Overall, how satisfied are you with your job?" The scale shows good reliability for both leaders' (α = .92 at T1 and α = .91 at T2) and workers' (α = .92 at T1 and α = .92 at T2) versions.

*Productivity:* This variable was measured using an adapted version of the E-Work Productivity factor from the E-Work Life (EWL) Scale (Grant et al., 2019), defined as the effectiveness at performing work using electronic technologies (Grant et al., 2019). The factor was composed of 4 items that the research team back-translated. It is a 6-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree). An example of an item is "(Telework) makes me more effective in delivering against my key objectives and deliverables." The scale shows good reliability for both leaders' (α = .93 at T1 and α = .93 at T2) and workers' (α = .88 at T1 and α = .91 at T2) versions.

*Data analysis*

To evaluate each of the study hypotheses, specific types of analyses were implemented. To test the first hypothesis (H1), changes in leaders' self-reported competencies (remote goal management and remote relationships development) from T1 to T2 were examined using paired-samples t-tests. Before analysis, confirmatory factor analysis (CFA) was conducted to validate the two-factor structure of leadership competencies. Due to violations of the normality assumption (Shapiro-Wilk, $p < .001$), Wilcoxon non-parametric tests were also used to validate the results. Effect sizes were calculated using Cohen's d for parametric tests and rank-biserial correlation for non-parametric tests. The same analysis was conducted to assess the training transfer hypothesis (H2), in which subordinates' perceptions of leaders' competencies were compared from T1 to T2.

A mixed repeated measures ANOVA was implemented to examine the moderating effect of leaders' participation in interactive sessions (H3). Leaders' participation (yes/no) was incorporated as a between-subjects factor, analysing the time × participation interaction effect on subordinates' perceptions of each leaders' competencies.

Multilevel modeling was performed to test whether the changes in the perception that subordinates have of leaders' competencies affected the changes in subordinates' outcomes at both individual and team levels (H4). Teams with at least three responding members were included in this analysis. Intraclass correlation coefficients (ICC) were calculated to determine the proportion of variance explained by team-level factors. Two-level models were constructed for each competency and outcome, controlling for T1 measures at both individual and team levels. Model fit was evaluated using various indices ($\chi^2$, RMSEA, CFI, TLI, and SRMR), following established recommendations (Hu & Bentler, 1999).

Finally, to examine whether changes in the leaders' self-perception of their competencies predicted changes in their own job satisfaction and productivity (H5), path analyses were conducted. Separate models were analyzed for each competency, controlling for pre-intervention measures (T1). Model fit was also evaluated using $\chi^2$, RMSEA, CFI, TLI, and SRMR.

Statistical analyses were performed using Jamovi (The Jamovi Project, 2022) and MPlus software (Muthén & Muthén, 2022), and unstandardized coefficients were reported for regression analyses to facilitate interpretation of effect magnitudes in the original measurement scales.

## 7.3 RESULTS

Descriptive statistics for the study variables (mean, standard deviation) and the correlations among the study variables are reported in Table 11 (for leaders) and Table 12 (for subordinates). In the case of leaders (Table 11), there were positive and significant correlations between the corresponding variables measured at different time points. Moreover, positive and significant correlations were observed for the relationship between both leaders' competencies at T2 with productivity at T2, which does not occur in the case of job satisfaction, which only shows a negative relationship with remote goal management at T1.

*Table 11: Descriptives and correlations between variables - Leaders*

| Variables | Mean | S.D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1. Remote Goal Management (T1)** | 4.75 | .91 | — | | | | | | | | |
| **2. Remote Goal Management (T2)** | 5.09 | .78 | .21*** | — | | | | | | | |
| **3. Remote Relationships Development (T1)** | 4.58 | .92 | .86*** | .09 | — | | | | | | |
| **4. Remote Relationships Development (T2)** | 4.95 | .95 | .13* | .78*** | .15** | — | | | | | |
| **5. Job Satisfaction (T1)** | 5.03 | .82 | .17** | .16** | .21*** | .12* | — | | | | |
| **6. Job Satisfaction (T2)** | 5.20 | .69 | -.11* | .10 | -.09 | .08 | .42*** | — | | | |
| **7. Productivity (T1)** | 5.08 | .93 | .38*** | .16** | .58*** | .24*** | .19*** | .15** | — | | |
| **8. Productivity (T2)** | 5.04 | 1.21 | .08 | .27*** | .23*** | .19*** | .33*** | .30*** | .67*** | — | |
| **9. Leaders' participation in interactive sessions** | .81 | .40 | -.14* | -.05 | -.14* | -.07 | .16** | .17** | -.29*** | -.17** | — |

*Note.* N = 85 * $p < .05$, ** $p < .01$, *** $p < .001$

In the case of subordinates (Table 12), there were also positive and significant correlations between the corresponding variables measured at the different time points. Moreover, significant relationships between subordinates' perceptions of both leadership competencies and their outcomes are observed, both at T1 and T2.

*Table 12: Descriptives and correlations between variables – Subordinates*

| Variables | Mean | S.D | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1. Remote Goal Management (T1)** | 5.12 | .99 | — | | | | | | | |
| **2. Remote Goal Management (T2)** | 5.16 | .96 | .45*** | — | | | | | | |
| **3. Remote Relationships Development (T1)** | 4.98 | 1.05 | .86*** | .38*** | — | | | | | |
| **4. Remote Relationships Development (T2)** | 5.04 | 1.01 | .44*** | .90*** | .41*** | — | | | | |
| **5. Job Satisfaction (T1)** | 5.02 | .85 | .59*** | .32*** | .50*** | .33*** | — | | | |
| **6. Job Satisfaction (T2)** | 4.98 | .82 | .37*** | .51*** | .29*** | .51*** | .58*** | — | | |
| **7. Productivity (T1)** | 5.31 | .81 | .25*** | .23*** | .23*** | .24*** | .17** | .18** | — | |
| **8. Productivity (T2)** | 5.26 | .81 | .26*** | .22*** | .22*** | .23*** | .18** | .24*** | .57*** | — |

*Note.* N = 326 * $p < .05$, ** $p < .01$, *** $p <$

Moving forward, the following sections present empirical findings related to our proposed hypotheses.

### 7.3.1 Effects of the training on leaders' learning

A paired-sample t-test was conducted to test for the changes in leaders' perceptions of their competencies, remote goal management, and remote relationships development leadership competencies after the intervention (H1). Shapiro-Wilk test indicated a violation of the normality assumption for both competency measures ($p < .001$), requiring the additional use of the Wilcoxon signed-rank test for non-parametric validation.

In remote goal management competency, leaders showed a significant increase between T1 and T2 ($t$ (84) = -2.83, $p$ = .003, one-tailed, $d$ = -.31). The results were confirmed by the Wilcoxon signed-rank test ($W$ = 764, $p$ <.001, one-tailed), with a biserial

rank correlation of -.46. In remote relationship development competency, there was also a significant improvement from pre-test to post-test ($t$ (84) = -2.85, $p$ = .003, one-tailed, $d$ = -.31). The Wilcoxon signed-rank test supported this finding ($W$ = 667, $p$ < .001, one-tailed), with a stronger effect size (biserial rank correlation = -.51). Therefore, the negative mean differences (-.34 for remote goal management and -.37 for remote relationship development) indicate improvements in both competency domains following the intervention. As a result, the H1 hypothesis is fully supported.

### 7.3.2 Effects of the training on transfer

A paired-sample t-test was conducted to test for the changes in subordinates' perceptions of leaders' competencies after the intervention (H2). Before starting, we provided statistical evidence that the two-factor model (each competence separated) fits the data significantly better than the one-dimensional model (one-dimensional model = $\chi^2$ = 446, df = 35, p < .001; CFI = .89; TLI = .86; RMSEA = .19; two-dimensional model = $\chi^2$ = 264, df = 34, p < .001; CFI = .94; TLI = .92; RMSEA = .14) The chi-square difference test resulted in $\Delta\chi^2$ = 182, $\Delta$df = 1, which exceeds the critical value for p < .001 with one df (10.83), supporting the separate analysis of competencies. As with leaders, the Shapiro-Wilk test indicated a violation of the normality assumption for both competency measures (p < .001), requiring the additional use of the Wilcoxon signed-rank test for non-parametric validation.

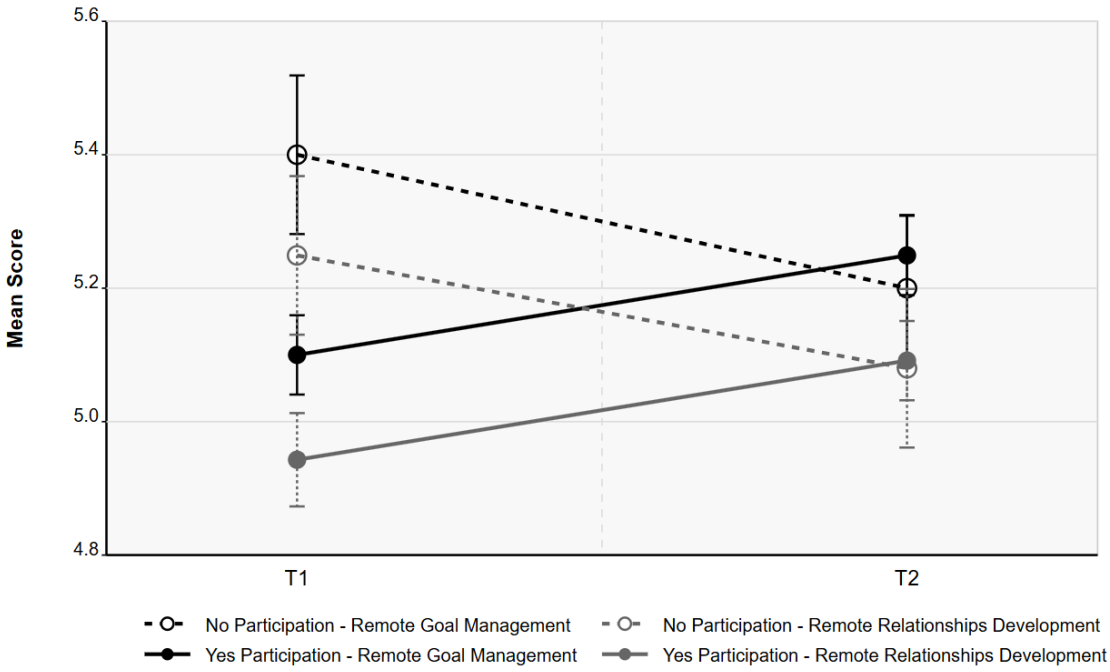
No significant difference was found in subordinates' perception of their leader competency for remote goal management, between T1 and T2 ($t$ (324) = -.615, $p$ = .270, one-tailed, $d$ = -.03). This finding was confirmed by the Wilcoxon signed-rank test ($W$ = 124, $p$ = .297), with a biserial rank correlation of -.04. Neither significant difference was found between T1 and T2 in subordinates' perception of their leader competency for remote relationships development ($t$ (324) = -1.10, $p$ = .135, one-tailed, $d$ = -.06). The Wilcoxon signed-rank test supported this finding ($W$ = 143, $p$ = .097), with an effect size of -.10 for the biserial rank correlation.

The negative mean differences (-.04 for goal management and -.07 for relationship development) suggest marginal improvements in both competency domains following the

intervention, although these did not reach statistical significance. Consequently, hypothesis 2 is not supported.

H3 hypothesized that leaders' participation in interactive sessions would moderate the effect of the training on subordinates' perceptions of leaders' competencies. This effect will be higher when the leaders participate in the interactive sessions, potentiating the positive changes in subordinates' perceptions. A mixed repeated measures ANOVA was used to test this hypothesis, incorporating leaders' participation in interactive sessions (yes/no) as a between-subjects factor among subordinates. For the interaction effect between time (T1-T2) and leader participation across both competency measures, leaders' participation in interactive sessions significantly moderated the subordinates' perceived changes in their leaders' competencies (see Figure 7).

*Figure 7: Subordinates' perceptions of leaders' competencies moderated by leaders' participation in interactive sessions*




For the remote goal management competency, the ANOVA revealed a significant time × participation interaction effect ($F$ (1, 318) = 5.71, $p$ = .001, one-tailed). The estimated marginal means showed that subordinates whose leaders did not participate in interactive sessions reported decreases in this competence when comparing T1 ($M$ = 5.34,

*SE* = .12) with T2 (*M* = 5.12, *SE* = .11). In contrast, subordinates whose leaders participated in interactive sessions, reported increases in this competence when comparing T1 (*M* = 5.05, *SE* = .06) with T2 (*M* = 5.16, *SE* = .06).

The interaction effect was also significant for the remote relationships development competence (*F* (1, 318) = 3.14, *p* = .039, one-tailed). Therefore, subordinates whose leaders did not participate in interactive sessions, reported decreases in this competence when comparing T1 (*M* = 5.17, *SE* = .12) with T2 (*M* = 5.03, *SE* = .12). Conversely, subordinates whose leaders participated reported increases in this competence when comparing T1 (*M* = 4.91, *SE* = .07) with T2 (*M* = 5.04, *SE* = .06).

In sum, the results show that leaders' participation in interactive sessions positively moderated the intervention effect on employees' perceptions of leaders' competencies. Specifically, subordinates whose leaders participated in interactive sessions reported improvements in their leaders' remote goal management and remote relationships development competencies from T1 to T2. In contrast, subordinates whose leaders did not participate in these sessions reported deterioration in their perceptions of these same leadership competencies, despite starting from a higher level of these perceptions. Therefore, hypothesis 3 is supported.

### 7.3.3 Effects of the training on results (outcomes)

*Effects on subordinates' outcomes*

We conducted a multilevel analysis to examine how the changes in the perception that subordinates have of leaders' competencies influenced the changes in workers' outcomes at both individual and team levels (H4). Only those teams from which we obtained responses from at least three members were included in the analysis. The intraclass correlation coefficients (ICC) showed that team-level factors accounted for 16% of the variance in job satisfaction and 13% in productivity, justifying the use of multilevel modeling.

Table 13 presents the unstandardized regression coefficients for the effects of both leadership competencies on T2 outcomes, controlling for the outcomes at T1. Both leadership competency models showed excellent fit: for remote goal management ( $\chi^2$ = 1.41, df = 4, p = .842; RMSEA = .00; CFI = 1.00; TLI = 1.04; SRMR within = .01, SRMR

between = .01) and for remote relationships development ( $\chi^2$ = 1.61, df = 4, p = .808; RMSEA = .00; CFI = 1.00; TLI = 1.04; SRMR within = .01, SRMR between = .03).

*Table 13: Effect of the changes in the perception of the subordinates of the leadership competencies on the changes in subordinates' outcomes at individual and team levels*

| | **Job Satisfaction (T2)** | | **Productivity (T2)** | |
|---|---|---|---|---|
| | Parameter | S.E | Parameter | S.E |
| **Model 1: Remote Goal Management** | | | | |
| **Individual Level** | | | | |
| Dependent variable at T1 | .49*** | .06 | .50*** | .09 |
| Remote Goal Management T1 | -.14** | .05 | .04 | .06 |
| Remote Goal Management T2 | .37*** | .09 | .05 | .04 |
| **Team Level** | | | | |
| Dependent variable at T1 | -.05 | .44 | .75** | .24 |
| Remote Goal Management T1 | -.03 | .28 | -.28 | .28 |
| Remote Goal Management T2 | .91* | .21 | .38* | .21 |
| **Model 2: Remote Relationships Development** | | | | |
| **Individual Level** | | | | |
| Dependent variable at T1 | .47*** | .07 | .50*** | .09 |
| Remote Relationships Development T1 | -.12* | .05 | .02 | .05 |
| Remote Relationships Development T2 | .33*** | .09 | .07 | .09 |
| **Team Level** | | | | |
| Dependent variable at T1 | -.03 | .45 | .76** | .28 |
| Remote Relationships Development T1 | -.31 | .33 | -.27 | .32 |
| Remote Relationships Development T2 | 1.17* | .61 | .36 | .32 |

*Note.* $p < .05$, ** $p < .01$, *** $p < .001$, one-tailed tests. All parameters are unstandardized beta coefficients (β).*

At the individual level, changes in both leadership competencies were positively related to changes in workers' job satisfaction (remote goal management: β = .37, p < .001, one-tailed; remote relationships development: β = .33, p < .001, one-tailed). Regarding productivity at the individual level, changes in any of the competencies showed significant relationships with the changes in subordinates' productivity. Both

outcomes were also positively related to their T1 measures, demonstrating a stability effect of the variables at the individual level.

At the team level, changes in both leadership competencies were positively related to changes in team job satisfaction (remote goal management: $\beta = .91$, $p = .014$, one-tailed; remote relationships development: $\beta = 1.17$, $p = .027$, one-tailed). For team productivity, only changes in remote goal management showed a significant positive effect ($\beta = .38$, $p = .035$, one-tailed), while changes in remote relationships development had no significant influence.

The models explained 40% of the variance in job satisfaction and 27% of the variance in productivity at the individual level, and 97% of the variance in job satisfaction and 99% in productivity at the team level (considering the contribution of team variances, which is 16% and 13% respectively). These findings indicate that while changes in leadership competency positively affected changes in subordinates' job satisfaction at both individual and team levels, they only influenced productivity at the team level and exclusively through remote goal management competencies. Therefore, hypothesis 4 is partially supported.

*Effects on leaders' outcomes*

To test hypothesis 5, we conducted a path analysis to determine whether the changes in the leaders' self-perception of their competencies following the intervention would be related to changes in their own levels of job satisfaction and productivity (see Table 14).

*Table 14: Effect of the changes in the self-perception of the leadership competencies on the changes in leaders' outcomes*

| | Job Satisfaction (T2) | | Productivity (T2) | |
|---|---|---|---|---|
| | Parameter | S.E | Parameter | S.E |
| **Model 1: Remote Goal Management** | | | | |
| Dependent variable at T1 | .35** | .11 | .72*** | .12 |
| Remote Goal Management T1 | -.11 | .08 | -.16 | .12 |
| Remote Goal Management T2 | .38* | .17 | .27* | .16 |
| **Model 2: Remote Relationships Development** | | | | |
| Dependent variable at T1 | .36** | .10 | .70*** | .14 |
| Remote Relationships Development T1 | -.14 | .07 | -.04 | .16 |
| Remote Relationships Development T2 | .28* | .14 | .10 | .12 |

*Note.* $p < .05$, ** $p < .01$, *** $p < .001$, one-tailed tests. All parameters are unstandardized beta coefficients (β).*

The changes in leaders' competencies also affected the change in their own outcomes. For remote goal management, changes in this competency positively affected changes in both leaders' job satisfaction (β = .38, p = .012, one-tailed) and productivity (β = .27, p = .044, one-tailed). The model explained 34% of the variance in job satisfaction and 32% in productivity, with excellent model fit ($\chi^2 = 1.96$, df = 4, p = .743, RMSEA = .00, CFI = 1.00, TLI = 1.12, SRMR = .04). For remote relationship development, changes in this competency positively affected changes in leaders' job satisfaction (β = .28, p = .042, one-tailed), but no significant effect was found on changes in productivity (β = .10, p = .215, one-tailed). The model explained 31% of the variance in job satisfaction and demonstrated excellent fit ($\chi^2 = 3.45$, df = 4, p = .485, RMSEA = .00, CFI = 1.00, TLI = 1.06, SRMR = .05).

In summary, the changes in both leaders' competencies for remote work were positively related to changes in leaders' job satisfaction. In the case of productivity, only changes in remote goal management competence were significantly related to changes in productivity. Therefore, hypothesis 5 is partially supported.

## 7.4 DISCUSSION

This research aimed to evaluate the effectiveness of a leadership training program in competencies for teleworking, specifically in leadership competencies for remote goal management and remote relationship development. The analysis considered the

Kirkpatrick model for evaluating training effectiveness, focusing on learning, transfer, and results. Our findings provide valuable insights into the training programs' effectiveness and the relationships between leadership competencies for teleworking and teleworkers' outcomes.

Regarding the impact of training on learning (H1), the findings revealed positive and significant changes in both types of self-reported competencies. Leaders reported significant improvements in their remote goal management and remote relationship development competencies. The perceived positive change in remote goal management suggests that leaders perceived an improvement in their ability to establish clear objectives, set appropriate deadlines, and leverage digital tools effectively. Moreover, the improvement in self-reported remote relationship development competencies indicates that leaders also perceived that the program successfully provided them with the knowledge and skills to enhance team relationships and a sense of belonging, addressing the challenges of virtual distance identified by Lojeski and Reilly (2020). These results indicate that leaders participating in the training perceived meaningful enhancements in their ability to reduce operational and affinity distance (Lojeski & Reilly, 2020), key elements for effective remote work environments (Bell, 2021; Cortellazzo et al., 2019).

Regarding the impact of training on transfer to the job, at a first stage, our results revealed that subordinates did not perceive changes in their leaders' competencies (H2 not supported). Several explanations may account for this unexpected result. First, developing leadership competencies in remote work environments may require an extended period to become observable to subordinates. Although the T2 measurement occurred three months after training completion, this timeframe may be insufficient for leaders to consistently demonstrate newly acquired skills in the limited interaction opportunities characteristic of remote work settings (Beauregard et al., 2019). Second, the execution of the training program may have elevated subordinates' expectations regarding their leaders' performance, creating a heightened standard against which T2 behaviors were evaluated (rising expectations effect), a phenomenon documented in previous leadership intervention studies (Spiers et al., 2010). Third, the relatively high baseline scores that subordinates have of the competencies of their leaders ($M = 5.12$ for remote goal management and $M = 4.98$ for remote relationships development, on a 6-

point scale) suggest a potential ceiling effect, limiting the observable magnitude of improvement from subordinates' perspectives.

Significant differences emerged when the moderating effect of leaders' participation in interactive sessions (H3) was examined. During these interactive sessions, leaders exchanged best practices, many of which involved practical behaviors that could be implemented with their teams. Therefore, implementing these behaviors facilitated subordinates' perception of changes in their leaders' competencies. Notably, among the subordinates of leaders who did not attend interactive sessions, their perceptions of their leaders, which started at a higher point compared to leaders who attended, worsened at T2. This suggests that these subordinates who initially rated their leaders more favorably may have developed higher expectations following their leaders' enrollment in the training program. When these leaders failed to participate in the interactive sessions, they were less encouraged to implement learned competencies in the workplace (as studies as Lacerenza et al., 2017 suggest), leading to deteriorating perceptions among their subordinates, whose expectations had been raised. In contrast, subordinates of leaders who initially received lower evaluations but committed to the interactive sessions reported improvements in their perceptions at T2, suggesting that they perceived that their leaders transferred and applied their learning to the workplace. These results support the importance of group learning and peer support for developing competencies (Burke & Hutchins, 2007). By sharing experiences with peers, leaders can more effectively transfer behaviors to the workplace, a process that can also occur in remote environments. This finding also suggests that transfer to the workplace can be enacted through auxiliary mechanisms that enhance the implementation of learned skills, as indicated by Blume et al. (2010) and Lacerenza et al. (2017).

Regarding the impact of training on outcomes, when examining the specific effects of changes in subordinates' perception of leaders' competencies on changes in subordinates' outcomes (H4), our findings showed that the change in both leadership competencies significantly impacted the change in job satisfaction at the individual and team levels. These results support previous research establishing remote goal management as a crucial determinant of employee satisfaction (Challagalla et al., 2000; Illozor et al., 2001; Giacomelli et al., 2023) while also confirming the importance of remote relationship management for enhancing satisfaction outcomes (Haines et al.,

2002; Soares et al., 2023). Notably, the results show that the effects of competency improvements were higher at the team level, compared to individual subordinates' results, supporting the idea that leadership also has a collective effect on team satisfaction (Miles & Mangold, 2002). Although the explained variance at the team level in our research is low, it still represents an interesting contribution to the theoretical development of how leadership is linked to team-level variables in telework.

Regarding productivity, changes in subordinates' perceptions of leaders' competencies did not show a significant effect at the individual level; however, at the team level, the enhancement of leaders' remote goal management positively affected the change in team productivity. This finding reinforces that leaders who effectively establish and communicate clear objectives contribute to a collective team-level work environment where employees experience enhanced productivity through greater clarity, autonomy, and control over their tasks (Bell, 2023; Thomas & Bostrom, 2011; Wakefield et al., 2008). Notably, while this effect manifests at the team level, it was not observed at the individual level, supporting the team-level influence of leadership on productivity (DeChurch et al., 2010; Miles & Mangold, 2002; Yammarino & Dansereau, 2008) which has also been found in digital leadership studies (Liao, 2017). The higher stability in productivity levels from T1 to T2 compared to job satisfaction stability could also explain the lower capacity to identify predictors. Nevertheless, when conceptualized at the team level, productivity benefits more substantially from operational leadership competencies such as remote goal management (Liao, 2017). In the case of remote relationships development, no effect was found either at the team level, offering no support for this leadership competence in terms of ensuring productivity in a virtual environment (Lojeski & Reilly, 2020)

Regarding the effects of changes in the self-perception of the leaders' competencies on the changes in their own outcomes (H5), changes in remote goal management competency were related to changes in leaders' own satisfaction and productivity. This finding suggests that the intervention program, by equipping leaders with tools to enhance their management capabilities, enabled them to perform more effectively while simultaneously increasing their job satisfaction (Tenschert et al., 2024). This aligns with previous research suggesting that leadership development interventions can enhance leaders' sense of competence, autonomy, and relatedness, leading to increased workplace

satisfaction (Deci & Ryan, 2017; Nielsen et al., 2017). In the case of remote relationships development, changes in these competencies were related to changes in leaders' job satisfaction. This result highlights the connection between the enhancement of relationships in remote environments and leaders' own satisfaction, as leaders remain team members and benefit from positive team dynamics, even in virtual contexts (Robert & You, 2017). However, there was no significant association between remote relationships development and productivity changes; in our case, this lack of association might be explained by the possibility that these effects on performance may manifest over a longer time period and were not yet reflected in the leaders' own perceptions, which could be enhanced in longer periods of time.

*Theoretical implications*

Our findings contribute to leadership theory in several important ways. First, they extend the understanding of leadership competencies in telework contexts by providing empirical evidence that training designed to develop leadership competencies for telework improves digitalized competencies, such as remote goal management and remote relationships development. This advances the theoretical framework proposed by Peiró and Martínez-Tur (2022) regarding the relevance of digitalizing traditional leadership competencies, adapting them to remote contexts, and considering the use of new digital tools and the challenges of virtual distance that this phenomenon may bring (Lojeski & Reilly, 2020). The effects of the training were reflected in the learning and transfer processes. Moreover, results also contribute to this area of theoretical development by showing that, to some extent, changes in these competencies are related to changes in the well-being and performance of teleworkers and their leaders.

Second, our results support previous research in leadership in remote contexts, regarding that task-oriented competencies (i.e., remote goal management) may have a stronger impact on job satisfaction than relationship-oriented competencies (i.e. remote relationships development), suggesting that the challenges and needs of teleworkers may differ from traditional work settings (Bell et al., 2023; Madlock, 2012). In our study, the effects of remote goal management on individual satisfaction (of both subordinates and leaders) were greater than those of remote relationships development. Additionally, remote goal management had an effect on team productivity, which remote relationships

development did not. These findings suggest that in telework environments, where operational distance occurs (Lojeski & Reilly, 2020), providing clear structure and goals may address more fundamental needs than relationship development, potentially because goal clarity reduces the uncertainty that characterizes remote work contexts (Lee et al., 2023; Mühl et a., 2024).

Third, this research contributes to a better understanding of when a training intervention better contributes to the transfer process in the workplace. The significant moderating effect of interactive sessions on training transfer highlights the importance of social learning mechanisms in developing leadership competencies for remote work and suggests that commitment to the training program could also enhance the training transfer. Moreover, this also extends existing transfer models by emphasizing the particular importance of collaborative learning in remote leadership development (Harris et al., 2013).

*Practical implications*

Our findings have several practical implications. First, we provide evidence that leadership training can positively impact leader competencies and individual and team outcomes, particularly regarding well-being and performance. This demonstrates that it is beneficial for organizations to invest in leadership training, particularly when implementing or transitioning to full remote or hybrid telework arrangements. Organizations should consider integrating digitalized competencies training and, specifically, ensure that their leaders develop structured goal management behaviors to optimize both leaders' and subordinates' well-being and performance.

Second, we show evidence of the usefulness and necessity of training in digitalized competencies. In remote environments, it may be more appropriate to train competencies that consider the challenges and contextual conditions that distance work entails, such as the generation of operational and affinity distance (Lojeski & Reilly, 2020). While training leaders in traditional competencies or models may also be useful, applying a model that addresses the digitalization of leadership competencies (Peiró & Martínez-Tur, 2022) can help organizations have leaders who are better equipped to face the challenges posed by telework.

Third, the results also suggest potential improvements to our training program and other telework leadership training programs. While the current intervention focused on individual leader competencies, a broader approach incorporating team-level interventions could enhance productivity outcomes. As research states, improving team dynamics and workflow processes might also yield stronger effects on performance-related outcomes (Ritcher et al., 2011).

*Limitations and further research*

This study has several limitations that should be acknowledged. First, its semi-longitudinal design with only two measurement points (T1 and T2) may limit our ability to detect the full effect of leadership competencies development over time. Future studies should include additional measurement points to better capture these variables' development and impact over time.

Second, although statistically significant, the effect sizes were modest. However, given the diversity of organizations and teams in the study, even these modest effects represent meaningful contributions to understanding leadership dynamics in telework settings.

Third, future research should incorporate additional contextual variables to better understand how leaders with enhanced competencies can improve both individual and team outcomes. The variability in intervention effectiveness across different leaders, subordinates, and teams suggests the presence of moderating factors that warrant further investigation. Exploring organizational culture, technological infrastructure, and job characteristics could provide more comprehensive insights into the complex relationships between leadership competencies and teleworker outcomes.

Finally, the generation of expectations during training interventions, consistent with Lewin's action research model (Dickens & Watkins, 1999), may create complex dynamics that affect intervention success. Future studies could benefit from mixed methods approaches that capture both quantitative outcomes and qualitative experiences of leaders and team members. These approaches would provide richer data on the mechanisms through which leadership development initiatives succeed or fail in remote work contexts

and on the impact of process variables on the intervention results (Nielsen & Randall, 2013).

*Conclusions*

This study provides empirical evidence for successfully transferring training outcomes to the remote workplace, demonstrated by improved leadership competencies and corresponding subordinate and leader outcomes. While this training program shows promise as an initial approach to telework leadership training, future enhancements could include team-based training components and blended learning, incorporating in-person workshops.

In summary, this research also reinforces the training and importance of digitalized competencies in maintaining a significant relationship with the well-being and performance of teleworkers and leaders. This also acknowledges the need for leadership intervention program evaluations to consider both the well-being and performance of leaders, which are often neglected in research (Kelloway & Barling, 2010). Our findings contribute to the growing knowledge on effective leadership in remote and hybrid work environments, providing practical evidence and guidance for organizations navigating the complexities of the evolving digital world.

# CHAPTER 8: GENERAL DISCUSSION

The present doctoral thesis aims to conceptualize, assess, and develop leadership competencies for telework that enhance teleworkers' performance and well-being. This objective has been pursued through five distinct but interconnected studies, each addressing a specific aspect of leadership for telework.

The first two studies focus on identifying leadership competencies that promote teleworkers' performance (Objective 1) and well-being (Objective 2) through systematic literature reviews. The third study develops and validates a comprehensive scale to measure Leadership Competencies for Telework (LCT) that positively impact the performance and well-being of teleworkers (Objective 3). The fourth study creates and validates a shorter version of the LCT scale across Spanish and Colombian samples to enhance its practical utility and cross-cultural applicability (Objective 4). Finally, the fifth study evaluates the effectiveness of the Digylid training program in enhancing the proposed leadership competencies for telework and assesses its impact on performance and well-being outcomes (Objective 5).

This final chapter presents an integrated discussion of the results across all five studies, examining their theoretical and practical implications. It also addresses the limitations of the research and suggests directions for future investigation.

## 8.1 SYNTHESIS OF MAIN RESULTS

This doctoral thesis explores the assessment and development of leadership competencies in teleworking environments, with the specific aim of enhancing teleworkers' performance and well-being. The research addresses leaders’ unique challenges in virtual contexts, where traditional leadership approaches may prove insufficient (Avolio et al., 2009; Bell et al., 2023; Cortellazzo et al., 2019). Therefore, digitalized competencies must be considered (Peiró & Martínez-Tur, 2022), especially for overcoming virtual distance created by remote work (Lojeski &Reilly, 2020).

The first two systematic reviews (Studies 1 and 2) identified leadership competencies most relevant for promoting performance and well-being in telework settings. These studies conceptualized digitalized leadership competencies (Peiró & Martínez-Tur, 2022) within the virtual distance framework (Lojeski & Reilly, 2020), categorizing behaviors aimed at reducing operational or affinity distance. For

performance outcomes (Study 1), several key competencies emerged. Task-focused communication (with appropriate frequency and ensuring the quality of virtual interactions) consistently appeared crucial for enhancing team and individual performance. Goal management behaviors, such as clarifying objectives and facilitating structural support, also demonstrated positive relationships with performance, particularly at the team level. Additional competencies, including trust-building and empowering behaviors that grant appropriate autonomy in remote settings, further contributed to performance enhancement. Similarly, for well-being outcomes (Study 2), the systematic review identified five essential competencies. Digital communication and goal management demonstrated associations with hedonic well-being measures, including job satisfaction. Social support, work-life facilitation, and participative leadership emerged as particularly important for reducing affinity distance and enhancing teleworkers' well-being.

Both reviews also identified mediating mechanisms through which these leadership competencies influence outcomes. Trust emerged as a consistent mediator between leadership behaviors and both performance and well-being. Other identified mechanisms included team collaboration, technology adaptation, autonomy, and work-life enrichment. The reviews further highlighted moderators serving as boundary conditions, including telework intensity, leaders' digital skills, emotional intelligence, and employee characteristics such as self-management orientation that can potentiate or mitigate the effects of leadership competencies on teleworker outcomes.

Building on this conceptual foundation, the third and fourth studies developed and validated measurement instruments to assess digitalized leadership competencies for telework contexts. Given the limitations of existing measures (Arias & Durán,2021; Batırlık et al., 2022; Miranda et al., 2024; Roman et al., 2018), particularly their failure to comprehensively address telework-specific challenges, there was a clear need for a more tailored instrument. Therefore, Study 3 documented the creation of the Leadership Competencies for Telework (LCT) scale, which operationalizes the five core competencies of the LCT model: digital communication, digital trust, remote goal management, remote relationships development, and telework-life balance (Rodríguez et al., 2023). The LCT scale demonstrated strong psychometric properties, highly reliable across all dimensions ($\alpha > .90$) and strong factorial validity through confirmatory factor

analysis. The scale showed appropriate convergent validity with other leadership constructs, such as Leader-Member Exchange measures, while maintaining discriminant validity. Criterion validity tests confirmed significant relationships with well-being indicators (job satisfaction, positive emotions), Organizational Citizenship Behavior (OCB), and negative associations with professional isolation and telework-life conflict.

Study 4 extended this work by developing and validating a shortened version (LCT-S scale) across Spanish and Colombian populations. This cross-national validation addressed a significant gap in the measurement of leadership competencies for telework, as highlighted by Zander (2020), who emphasized the need for comparable leadership measures across countries. In both samples, the LCT-S maintained excellent reliability and validity while providing a more efficient assessment tool. Importantly, measurement invariance analysis confirmed the scale's cross-cultural applicability, with configural, metric, scalar, and strict invariance established across both populations. The LCT-S demonstrated predictive validity, correlating significantly with job satisfaction, engagement, e-work productivity, and OCB in both samples, as well as with e-work self-efficacy in the Spanish sample. However, some differences in predictor strength and demographic influences were noted between the countries.

The fifth study evaluated the effectiveness of the Digylid training program (Rodríguez et al., 2023), focused on two critical leadership competencies of the LCT model: remote goal management and remote relationships development. This study addresses the notable gap in empirically validated training programs to develop digitalized leadership competencies (Bauwens & Cortelazzo, 2025). Using Kirkpatrick's training evaluation framework (Kirkpatrick & Kirkpatrick, 2016), the study assessed learning, transfer, and results across individual and team levels. The analysis revealed significant improvements in leaders' self-perceived competencies, supporting the effectiveness of the intervention for producing learning. Transfer to the workplace was moderated by leaders' participation in interactive sessions, with subordinates perceiving improvements only when leaders actively engaged in these collaborative learning spaces. Multilevel analyses showed that the changes in the two leadership competencies positively affected the changes in subordinates' job satisfaction at individual and team levels, with stronger effects observed at the team level. The positive changes in remote goal management were also significantly and positively related to productivity at the team

level. In contrast, the changes in remote relationships development showed no significant effect on this outcome. Additionally, the changes in leadership competencies positively influenced the changes in leaders' own outcomes, both competencies for the case job satisfaction, and remote goal management for leaders' productivity.

In conclusion, this series of studies provides a comprehensive investigation into leadership competencies for teleworking. It systematically identifies key competencies influencing both performance and well-being, develops and rigorously validates robust instruments (LCT and LCT-S) for measuring these specific competencies, demonstrates the cross-national applicability of the LCT-S in Spain and Colombia, and provides empirical evidence for the effectiveness of training interventions targeting these digitalized competencies. The findings highlight that specific, digitalized leadership behaviors are crucial in telework, can be measured reliably, and that targeted training can foster their development, ultimately impacting both leader and employee outcomes, with interactive learning components playing a key role in facilitating behavioral transfer.

## 8.2 THEORETICAL IMPLICATIONS

This doctoral dissertation offers several significant contributions to leadership theory in teleworking contexts. The following paragraphs list the main theoretical implications of this research.

First, this research demonstrates that traditional leadership models require substantial adaptation for teleworking contexts. While existing leadership theories provide valuable foundations, the studies in this dissertation reveal that the social influence process at the core of leadership (Bass, 1990) transforms significantly when mediated by technology and executed in remote settings (Bauwens & Cortelazzo, 2024). The systematic reviews (Studies 1 and 2) indicate that while general principles of effective leadership remain relevant, telework introduces unique challenges requiring specific adaptations to address virtual distance. For example, transformational leadership components manifest differently in digital environments—idealized influence becomes harder to project without physical presence (Ernst et al., 2022), while individualized consideration requires more structured and programmed approaches in technology-mediated interactions (Efimov et al., 2020). Similarly, traditional competency models like

Quinn's framework (Quinn et al., 2011) must be adapted likewise; for example, mentor and facilitator roles must address psychological safety without physical proximity, while coordinator and monitor roles require different approaches to structuring and evaluating work in teleworking settings which requires new behaviors, as seen in Study 1, in which goal setting require different structuring (Kashive et al., 2022; Al-Ani et al., 2011) and usage of digital tools for communication (Darics, 2020). Furthermore, Studies 3 and 4 provide empirical evidence of both convergent and discriminant validity between the Leadership Competencies for Telework (LCT) and the behaviors established in theories like Leader-Member Exchange (Graen & Uhl-Bien, 1995), indicating that while both approaches address the relationship between leader and employee, this relationship is transformed in telework contexts.

Second, the dissertation's central theoretical contribution is the development and validation of the Leadership Competencies for Telework (LCT) model. This model advances leadership theory by integrating insights from virtual distance theory (Lojeski & Reilly, 2020) with the concept of digitalized competencies (Peiró & Martínez-Tur, 2022) to create a comprehensive framework tailored explicitly to telework contexts. The LCT model addresses the limitations of existing approaches, such as e-leadership (Avolio et al., 2000; Roman et al., 2019) and virtual team leadership (Kozlowski et al., 2021), by providing a more detailed examination of the necessary behaviors to promote performance and well-being in telework. As Contreras et al. (2020) indicated, technology-mediated leadership represents a fundamental reconfiguration of work processes beyond mere tool adoption. Our findings in Studies 1 and 2 show that effective leadership in telework settings requires transformed approaches to these leadership behaviors. For example, communication in telework requires deliberate selection of appropriate media channels (Vătămănescu et al., 2022), while goal management demands more structured objective-setting and non-invasive monitoring approaches using new digital tools (Wakefield et al., 2008; Solís, 2017). Similarly, supportive behaviors in virtual contexts require structured "check-in" activities explicitly designed to assess teleworkers' emotional states and using new media to support the teleworkers (Efimov et al., 2020). Therefore, the developed LCT model frames these requirements as five core digitalized competencies that also advance the conceptualization and operationalization of leadership competencies in digitalized contexts by empirically validating a framework centered on

reducing virtual distance. The model incorporates behaviors that implement digital planning tools, facilitate synchronous collaboration among geographically dispersed team members, and enable novel forms of interactions between leaders and subordinates that would be difficult or impossible in traditional settings, specially taking advantages of digital tools and the possibility to collaborate in different physical and virtual spaces (Vartiainen, 2024)., These digitally enabled leadership practices extend beyond what would be possible in conventional face-to-face environments, suggesting that telework leadership represents not merely an adaptation but potentially an evolution of leadership practice. While Lojeski and Reilly (2020) advocate for "soul-based leadership" that recreates closeness in virtual environments, our research suggests the implications extend beyond merely recreating face-to-face dynamics in digital spaces. Rather than viewing virtual distance as inherently challenging, our LCT model treats it as a new working condition that can be transformed into an advantage through appropriate competency development. Additionally, as Peiró (2024) suggests, these digitalized competencies combat technological determinism by cultivating distinctly human leadership capabilities that continue to provide added value despite increasing technological support. By mastering these five digitalized competencies, leaders maintain their distinctive human contribution in technology-mediated environments, ensuring that leadership remains fundamentally human-centered despite the digital transformation of work processes.

Third, the research makes a substantial methodological contribution by developing and validating psychometric instruments for measuring telework leadership competencies. Studies 3 and 4 address a significant gap in the literature by providing reliable tools for assessing leadership in telework contexts—an area where existing measures are still novel and require more enhancements (Bauwens & Cortelazzo, 2025). This advances leadership theory by enabling more precise empirical testing of theoretical relationships between specific leadership behaviors and outcomes in telework settings. The full LCT scale (Study 3) and its short version (LCT-S) (Study 4) demonstrated excellent psychometric properties across multiple samples, confirming the robustness of the underlying theoretical model.

Fourth, particularly noteworthy is the cross-cultural validation achieved in Study 4, which demonstrated measurement invariance between Spanish and Colombian samples. This finding indicates that telework leadership competencies maintain their structural

integrity across different Spanish-speaking cultural contexts, aligning with research showing that leadership can be described consistently across nationalities (Boehnke et al., 2003; Idrovo Carlier et al., 2012; Rodríguez-Carvajal et al., 2014).

Fifth, the dissertation provides consistent empirical evidence that digitalized leadership competencies significantly impact teleworkers' outcomes. The systematic reviews (Studies 1 and 2) identified relationships between specific leadership behaviors and teleworker performance and well-being, while the validation studies (Studies 3 and 4) demonstrated significant correlations between LCT competencies and key well-being and performance outcomes. Study 5 offers particularly compelling evidence by showing that improvements in these competencies through training lead to measurable changes in job satisfaction and productivity. This supports the theoretical position that reducing virtual distance through appropriate leadership behaviors directly enhances teleworkers' outcomes. These findings also align with Vartiainen's hybrid work model (2024), which conceptualizes leadership in hybrid contexts as the combination of structuring behaviors (transition phase) and supporting behaviors (action phase). Therefore, the two leadership competencies tested in Study 5 (remote goals management and remote relationships development) could be important to develop in both hybrid and full remote environments.

Sixth, the evaluation of the Digylid training program (conducted in Study 5) contributes to theoretical understandings of leadership development in digital contexts. The findings highlight the importance of social learning mechanisms (Lacerenza et al., 2017) in digital spaces as demonstrated by the improved perception of leaders' competencies among subordinates when those leaders participated in interactive sessions designed for sharing best practices in a synchronous, participative environment. This extends existing transfer models by emphasizing the importance of collaborative learning in remote leadership development (Nielsen & Shepherd, 2022), even when learning occurs in digital environments. Moreover, the decreased perception of leaders' competencies among subordinates when those leaders did not participate in interactive sessions, despite their higher initial levels, suggests that developing leadership capabilities in telework contexts involves complex dynamics that extend beyond individual skill acquisition, including social perception processes and the effects of rising expectations (Dickens & Watkins, 1999).

Seventh, the dissertation highlights the theoretical importance of analyzing leadership effectiveness at both individual and team levels, confirming that leadership functions simultaneously across multiple levels of analysis (DeChurch et al., 2010; Yammarino & Dansereau, 2008). Study 5 demonstrates that leadership competencies can differentially affect individual and team-level outcomes, with stronger effects observed at the team level for some competencies. This supports the notion that effective telework leadership requires a nuanced understanding of how leadership behaviors influence outcomes across organizational levels. This could be particularly in contexts characterized by varying degrees of virtuality and geographic dispersion, in which the temporal, spatial, and mental spaces interact in a more complex way (Vartiainen, 2024).

Collectively, these theoretical contributions advance understanding of leadership in increasingly digital and remote work environments, providing a foundation for future research on how leadership can effectively address the challenges and opportunities of teleworking arrangements.

## 8.3 PRACTICAL IMPLICATIONS

This doctoral research offers several significant practical implications for organizations implementing teleworking arrangements. First, Studies 1 and 2 provide valuable insights into the specific leadership competencies necessary to enhance performance and well-being in teleworking environments. The identification of these competencies allows organizations to design and implement targeted interventions to develop the precise skills leaders need in this new working context due to the need for transformation in leadership, as stated by Peiró (2024), Vartiainen (2024), Bell et al. (2023), Lojeski and Reilly (2020), Kozlowski et al. (2021), and Bauwens and Cortelazzo (2024). Furthermore, the identification of mediating mechanisms (such as trust, autonomy, and psychological contract fulfillment) and boundary conditions (such as telework intensity or leaders' digital skills) offer organizations additional considerations when implementing these interventions (as stated by Nielsen and Taris, 2019), potentially amplifying their effectiveness on teleworkers' outcomes.

Second, the validated measurement instruments developed in this research—the LCT scale (Study 3) and its short version, the LCT-S (Study 4)—equip organizations with

specialized tools to assess leadership competencies specifically tailored for teleworking contexts. These instruments allow more precise identification of leadership development needs compared to generic leadership measures, enabling more targeted interventions (Nielsen & Christensen, 2021; Salanova et al., 2013). The established reliability and validity across Spanish and Colombian samples make these tools particularly valuable for multinational organizations operating in Spanish-speaking countries. These scales have practical applications in both research settings and human resource practices, including selection processes, performance evaluation, and leadership potential assessment.

Third, the research provides evidence-based guidance for leadership training in teleworking contexts. Identifying five core competencies offers a clear framework for designing comprehensive leadership training programs that address operational and affinity dimensions of virtual distance (Lojeski & Reilly, 2020). The findings from Study 5 highlight the particular importance of remote goal management for team-level outcomes, suggesting that organizations should prioritize this competency when seeking to enhance team productivity in teleworking settings.

Fourth, the evaluation of the Digylid training program offers practical insights into effective approaches for developing telework leadership competencies. The program's blended learning methodology, which incorporates web-based modules, a mobile application, and interactive sessions, provides a template for organizations seeking to implement similar initiatives (Rodríguez et al., 2023). The finding that subordinates of leaders who participated in interactive sessions significantly improved their perceptions of their leaders' competencies underscores the importance of incorporating peer learning and experience-sharing components regarding training transfer of leadership development programs, even in virtual contexts. This aligns with the best practices in transfer research (Lacerenza et al., 2017) and extends them specifically to telework leadership development. Furthermore, the Kirkpatrick evaluation model (Kirkpatrick & Kirkpatrick, 2016) was found to be a valuable framework for assessing the effectiveness of blended learning interventions that combine synchronous and asynchronous components in digital environments, as it provides a structured approach to measuring learning, transfer, and impact in telework leadership development.

Fifth, the results suggest that organizations should consider both individual and team-level processes when designing and evaluating leadership interventions (Nielsen & Taris, 2019; Salanova et al., 2019). The stronger effects observed at the team level in Study 5 indicate that organizations may benefit from complementing individual leader development with team-based interventions that enhance collective processes. This multi-level approach may yield stronger effects on performance outcomes than focusing solely on individual leader competencies (DeChurch et al., 2010; Yammarino & Dansereau, 2008).

Sixth, the work conducted in this thesis, along with the entire Digylid project, contributes to promoting positive organizations. As defined by Salanova et al. (2012), positive organizations implement systematic, planned, and proactive actions to improve processes and outcomes for both employees and the whole organization. These organizations demonstrate resilience by maintaining positive adjustment under challenging circumstances, strengthening during adverse situations, and sustaining their functioning and results under pressure. By addressing the leadership component of their IGLO model, this research contributes to the body of scientifically validated practical interventions that support organizational and individual development (Salanova et al., 2019) in which leadership plays an important role for both sustaining changes and promoting the resilience of the organizations (Salanova et al., 2025). Maintaining organizations that can cope with changes is essential, especially in dynamic contexts where they simultaneously operate across multiple geographic and virtual locations. In these situations, leaders play a vital role as an integral part of organizational management (Bartsch et al., 2020).

Finally, this research provides practical guidance for organizations implementing or transitioning to hybrid work arrangements (Vartiainen, 2024). The identified competencies address specific challenges in these contexts, such as maintaining team cohesion across physical and virtual environments, setting clear expectations for remote work, and supporting healthy work-life boundaries. By developing leaders' capabilities in these areas, organizations can enhance sustainability (Peiró et al., 2014) and the effectiveness of their hybrid work models (Vartiainen, 2024).

## 8.4 LIMITATIONS AND FURTHER RESEARCH

While this doctoral research provides significant contributions to understanding leadership in teleworking contexts, it is important to acknowledge certain limitations and identify directions for future research.

First, there is a need to continue exploring beyond the digitalized leadership competencies necessary for enhancing performance and well-being in telework environments, especially considering digital competencies related to the technical usage of media (Peiró & Martínez-Tur, 2022). Future research should explore how technical digital competencies interact with the digitalized leadership competencies identified in the LCT model. Additionally, as telework models continue to evolve (Vartiainen & Vanharanta, 2024), research should examine how these competencies might need adjustment for different configurations of hybrid work, considering variables such as telework intensity, geographic dispersion, and synchronicity.

Second, regarding the systematic reviews (Studies 1 and 2), while they identified several mediating mechanisms connecting leadership competencies to teleworkers' outcomes (trust, psychological contract fulfillment, work-family interference, among others), future research should explore additional mediators that qualitative research has pointed out ( for example, psychological safety, knowledge sharing, media savviness, among others), to develop a more comprehensive understanding of how telework leadership influences outcomes. Moreover, examining how these mechanisms operate across different levels of analysis (individual, dyadic, and team) would enhance theoretical understanding of multilevel leadership processes in teleworking contexts, essential for promoting healthy organizations (Salanova et al., 2020).

Third, the cross-sectional nature of data collection in Study 3 limits causal inferences about the relationships between leadership competencies and outcomes. Moreover, Studies 4 and 5 employed longitudinal designs with two measurements, including only two time points, which constrains our ability to fully capture the developmental trajectory of leadership competencies and their effects. Future research should employ longitudinal designs with multiple measurement points (three or more waves) to better understand how these competencies develop over time, their sustained

impact on teleworkers' outcomes, and the potential reciprocal relationships between variables.

Fourth, while our assessment of leadership competencies benefited from subordinate ratings (a methodological strength in leadership research), our measurement of outcome variables relied primarily on self-reported measures. Although self-reports are appropriate for assessing subjective experiences such as job satisfaction (Peiró et al., 2014), they may not fully capture objective aspects of performance outcomes. Future research should incorporate additional objective performance indicators where possible, such as productivity metrics, work quality assessments, or organizational performance data. This multi-method approach would provide a more comprehensive evaluation of the effects of telework leadership competencies and strengthen causal inferences about their impact on organizational outcomes (Nielsen & Christensen, 2021).

Fifth, while Study 4 demonstrated measurement invariance of the LCT-S scale between Spanish and Colombian samples, it should be noted that there are some differences in their composition. The Spanish sample represents greater diversity across sectors (technology, industry, services, consulting, and education), whereas the Colombian sample consisted primarily of individuals from the IT sector with high telework intensity and predominantly technical educational backgrounds. Future research should validate the LCT and LCT-S scales across more diverse samples, including different sectors, organizational types, and telework intensities. Additionally, extending validation to other languages (particularly English and Portuguese) and other Latin American countries would enhance the scales' international applicability and cross-cultural validity (Caycho-Rodríguez et al., 2021).

Sixth, the evaluation of the training program in Study 5 did not include a control group, which limits our ability to conclusively attribute observed changes to the intervention rather than to external factors or natural development. Future research should implement randomized controlled designs to strengthen causal inferences about training effectiveness, which is essential for testing interventions (Lacerenza et al., 2017; Nielsen & Randall, 2013).

Seventh, our studies provided limited exploration of boundary conditions that might moderate the effectiveness of telework leadership training. While Study 5 identified

interactive sessions as a significant moderator of training transfer, other potentially important moderators remain unexplored. Future research should investigate how factors such as telework intensity, leaders' digital skills, among others, influence the relationship between leadership competencies and outcomes. Understanding these boundary conditions would enable more contextualized and effective leadership approaches (Nielsen & Taris, 2019; Salanova et al., 2019).

Eighth, the evaluation of the Digylid training program in Study 5 focused primarily on outcomes related to job satisfaction and productivity. Future research should expand the range of outcomes examined to include additional well-being indicators (such as burnout, professional development, and other eudaimonic measures) and performance dimensions (including creativity, adaptive performance, and counterproductive workplace behaviors). This would provide a more comprehensive understanding of training effects across different outcomes and their value for promoting positive organizations (Salanova et al., 2020).

Ninth, while our theoretical framework conceptualized the leadership competencies as mechanisms to reduce virtual distance (Lojeski & Reilly, 2020), and we designed the LCT model specifically to address operational and affinity distance challenges, we did not directly measure virtual distance itself. Future research could incorporate explicit measures of virtual distance (following Lojeski & Reilly's framework) alongside the LCT competencies to empirically test the relationship between these constructs. This would allow researchers to examine whether the leadership competencies we identified do indeed correlate with reduced virtual distance, and whether changes in virtual distance mediate the relationship between leadership competencies and teleworkers' outcomes. Such research would provide additional validation for the theoretical foundations of the LCT model and deepen our understanding of how leadership influences telework dynamics through the reduction of virtual distance.

Finally, it is important to continue investigating telework leadership development in a broader multilevel context, considering teams, senior management, and the organization as a whole (Salanova et al., 2020). This approach would promote positive, healthy, and resilient remote organizations by considering all stakeholders, contexts, and intervening mechanisms (Salanova et al., 2019). Future research adopting this integrated

perspective could provide valuable insights into how telework leadership development can be aligned with broader organizational development initiatives to create sustainable remote work environments that balance performance and well-being objectives.

## 8.5 CONCLUSIONS

This doctoral thesis has generated significant insights into the nature and development of leadership in teleworking contexts. Through systematic reviews, scale development, cross-cultural validation, and intervention evaluation, several important conclusions have emerged that advance our understanding of how leadership functions and evolves in teleworking. Below are the main conclusions reached in this doctoral thesis:

- Telework leadership is not merely a digital adaptation of traditional leadership approaches but represents a fundamental reconceptualization of leadership processes. The findings in studies 1 and 2, validated in studies 3 and 4, and found in the intervention in study 5, consistently demonstrate that effective leadership in telework contexts requires addressing both operational and affinity dimensions of virtual distance. This dual focus helps overcome the unique challenges that arise when work is conducted remotely and mediated by technology. The conceptualization of leadership as a mechanism for reducing virtual distance offers a valuable theoretical lens to understand leadership effectiveness in telework environments.
- The systematic reviews of empirical research reveal that leadership in teleworking environments operates through complex pathways to influence both well-being and performance. Rather than functioning through simple, direct effects, telework leadership appears to activate various mediating mechanisms while operating under specific boundary conditions. For well-being outcomes, leadership functions by enhancing psychological resources such as autonomy, trust, and work-life enrichment. For performance outcomes, leadership operates by clarifying goals, enhancing team collaboration, and facilitating effective use of technology. These findings

challenge simplistic views of leadership effects and emphasize the need for theoretical frameworks that account for this complexity.

- The development and validation of the Leadership Competencies for Telework (LCT) scale confirms the multidimensional nature of telework leadership. The empirical evidence supports a model comprising five interconnected but distinct competencies: digital communication, digital trust-building, remote goal management, remote relationships development, and telework-life balance support. The confirmation of this factor structure across samples supports the conclusion that leadership in telework contexts requires a specific set of competencies that address both task and relationship aspects of leadership, but in forms adapted to the digital context (reducing operational and affinity distance).
- The cross-national validation of the LCT short scale indicates that while core leadership functions may transcend cultural boundaries, their expression and impact are shaped by cultural context. The fundamental dimensions of telework leadership remain consistent, though their relative importance and specific behavioral manifestations may vary. This conclusion highlights the need for culturally sensitive approaches while confirming that certain basic leadership functions remain essential across contexts.
- The LCT competencies significantly predict important organizational variables across multiple domains: well-being indicators (job satisfaction, positive emotions, reduced isolation, reduced work-life conflict) and performance outcomes (productivity, organizational citizenship behavior), which validates the practical significance of these competencies for effective telework.
- Telework leadership competencies can be effectively developed through structured interventions. The evidence for learning effects, transfer to the workplace, and improvements in job satisfaction and productivity emphasizes the importance of training leaders in digitalized competencies in a multi-modal way, combining asynchronous and synchronous actions.

- Social learning processes remain essential even in virtual contexts, though they require intentional facilitation. This conclusion aligns with established principles in training transfer research but extends them specifically to online telework leadership development.
- There are differential impacts at individual versus team levels, with particularly strong effects observed at the team level for both satisfaction and productivity outcomes. This indicates that telework leadership functions through complex multilevel processes that must be addressed in theoretical frameworks. The collective amplifying effect observed at the team level suggests that leadership in telework contexts has emergent properties beyond the sum of individual effects.
- Leadership development benefits leaders themselves, enhancing their job satisfaction and productivity. This conclusion enriches our understanding of leadership development processes by highlighting that the benefits extend beyond followers to include the leaders themselves, creating potential positive feedback loops in the development process.
- Effective teleworking leadership represents a form of positive organizational practice that can enhance well-being and performance regardless of physical location. The challenges of virtual distance can be overcome through the development of specific digitalized leadership competencies, suggesting that organizations can successfully implement telework arrangements without sacrificing employee outcomes.

In summary, as organizations worldwide navigate the continuing evolution of work arrangements, this research provides a theoretical foundation for understanding how leadership functions in teleworking contexts, as well as offering practical tools for measuring and developing essential leadership competencies. By conceptualizing leadership competencies as mechanisms for reducing both operational and affinity dimensions of virtual distance that telework produces, this thesis contributes to a more nuanced and comprehensive understanding of leadership in the digital era. The findings presented here serve the ultimate purpose of our discipline: to create healthier work environments and promote positive organizations, regardless of location, distance, or geographical situation. As the boundaries between physical and virtual workspaces

continue to blur, this research offers a roadmap for developing leaders who can bridge these spaces effectively, ensuring that the benefits of technological advancement translate into enhanced well-being and performance for individuals, teams, and organizations in an increasingly digitalized world.

# RESUMEN GLOBAL - LIDERAZGO EN TELETRABAJO: ANÁLISIS Y FORMACIÓN DE COMPETENCIAS PARA MEJORAR EL DESEMPEÑO Y BIENESTAR DE LOS TELETRABAJADORES

## INTRODUCCIÓN

Esta tesis doctoral aborda la evaluación y el desarrollo de competencias de liderazgo en entornos de teletrabajo, con el objetivo de mejorar el bienestar y el desempeño de los teletrabajadores. El teletrabajo ha experimentado un crecimiento sin precedentes en los últimos años, transformando significativamente la dinámica laboral a nivel global. Antes de la pandemia de COVID-19, la Organización Internacional del Trabajo (OIT) estimaba que aproximadamente 260 millones de personas trabajaban desde casa, lo que representaba el 7,9% de la fuerza laboral mundial (International Labour Organization, 2020). Sin embargo, esta tendencia se aceleró dramáticamente en 2020, alcanzando los 557 millones de personas, equivalente al 17,4% de la fuerza laboral global (Benavides & Silva-Peñaherrera, 2022).

España ha seguido un patrón similar, aunque con características propias. Los indicadores clave muestran una evolución del 4,8% de trabajadores que teletrabajaban regularmente antes de la pandemia (2019) al 16,2% durante el pico de la pandemia (segundo trimestre de 2020) (Observatorio Nacional de Tecnología y Sociedad, 2020). Los datos actuales de 2024 indican que el 15,1% de las personas empleadas de 16 a 74 años trabajaban desde casa al menos una vez por semana (Instituto Nacional de Estadística, 2024). Según el Observatorio Nacional de Telecomunicaciones y Sociedad de la Información (ONTSI), el teletrabajo total en España creció del 13,2% en el primer trimestre de 2023 (2.725.100 personas) al 14,4% en el mismo período de 2024 (3.057.400 personas) (ONTSI, 2024).

A pesar de este crecimiento, la implementación del teletrabajo todavía enfrenta importantes resistencias. Por ejemplo, varias grandes corporaciones, como Amazon y Google, han tenido recientemente dificultades para gestionar el trabajo remoto de manera efectiva y han requerido que los empleados cambien del teletrabajo a tiempo completo a otros arreglos laborales (Perman, 2023). Estos hechos plantean una cuestión crítica en la investigación laboral contemporánea sobre los factores que determinan el éxito o fracaso de la implementación del teletrabajo.

Cuando se considera esta cuestión, los hallazgos inconsistentes de la investigación sobre la eficacia del teletrabajo (Athanasiadou & Theriou, 2021; Gajendran et al., 2024)

y su impacto en el bienestar (Beauregard et al., 2019; Crawford, 2022) sugieren que actores clave pueden desempeñar un papel decisivo, especialmente en lo relativo al liderazgo (Athanasiadou & Theriou, 2021; Efimov et al., 2020; Gajendran et al., 2024; Gohoungodji et al., 2022). De hecho, investigaciones previas indican que la implementación exitosa del teletrabajo depende más del liderazgo efectivo que de la infraestructura tecnológica (Beauregard et al., 2019; Wang et al., 2020).

El reconocimiento del papel crucial del liderazgo pone de relieve un desafío significativo: los enfoques tradicionales de liderazgo desarrollados para contextos presenciales parecen insuficientes para entornos de teletrabajo (Avolio et al., 2009; Bell et al., 2023; Cortellazzo et al., 2019). Los líderes que gestionan teletrabajadores enfrentan obstáculos únicos para mantener el desempeño y el bienestar cuando las posibilidades de interacción cara a cara se reducen y la comunicación está principalmente mediada por la tecnología (Bell et al., 2023). En este contexto, investigaciones previas destacan que los líderes deben lidiar con la distancia virtual creada por el teletrabajo, que se refiere a la separación psicológica que surge cuando el trabajo se realiza a distancia y es mediado por la tecnología (Lojeski & Reilly, 2020). La distancia virtual abarca dimensiones físicas, operativas y de afinidad.

Para reducir esta distancia virtual se requiere digitalizar las competencias de liderazgo para estos nuevos entornos mediados por la tecnología. Peiró y Martínez-Tur (2022) identifican la relevancia de diferentes tipos de competencias para enfrentar los desafíos de la transformación digital: competencias digitales (habilidades técnicas para usar herramientas digitales) y competencias digitalizadas (comportamientos tradicionales de liderazgo adaptados a contextos mediados por tecnología). Si bien ambas son importantes, estas últimas son críticas para mantener una gestión efectiva de las personas en entornos remotos. Esto también se alinea con la estrategia digital de España para 2025, que señala la importancia de mejorar las habilidades digitales y enfatiza la necesidad de desarrollar competencias personales para la era digital como una prioridad nacional, (Ministerio de Ciencia e Innovación, 2020).

En respuesta a esta demanda, la presente tesis doctoral se desarrolla en el contexto del proyecto Digylid (Programa de formación en liderazgo para el teletrabajo a través de web y app "Digylid", ref. UV-MET-202327R, coordinado por Isabel Rodríguez y Núria

Tordera) que tiene por objetivo establecer las bases para desarrollar y formar competencias de liderazgo digitalizadas, impactando positivamente en el desempeño y bienestar de los teletrabajadores mediante la gestión adecuada de la distancia virtual que pueden enfrentar líderes y equipos. El proyecto incluyó el desarrollo de una intervención específica dirigida a formar a los líderes en competencias digitalizadas para entornos de teletrabajo, con el fin de mejorar el desempeño y el bienestar de los teletrabajadores. El programa de formación Digylid fue creado empleando una metodología innovadora que integra aprendizaje basado en web, uso de aplicaciones móviles y sesiones interactivas para intercambiar buenas prácticas entre pares (Rodríguez et al., 2023).

Como parte de este proyecto general, la presente tesis doctoral aborda distintas brechas de investigación interconectadas. Primero, aunque los estudios han comenzado a examinar qué enfoques de liderazgo afectan positivamente los resultados de los teletrabajadores (Brown et al., 2021; Cortellazzo et al., 2019; Lundqvist et al., 2023), la evidencia empírica sobre qué competencias digitalizadas acortan la distancia virtual y mejoran tanto el desempeño como el bienestar en contextos de teletrabajo sigue siendo insuficientemente identificada y comprendida. Además, los mecanismos y factores contextuales que influyen en estas relaciones requieren una investigación sistemática más profunda (Inceoglu et al., 2018).

Segundo, los instrumentos de medición validados diseñados específicamente para evaluar las competencias de liderazgo en teletrabajo son notablemente escasos. A pesar de que se han desarrollado algunas escalas para medir el e-liderazgo (Roman et al., 2018) o constructos similares (Batırlık et al., 2022; González & Durán, 2021; Miranda et al., 2024), existe la necesidad de escalas adaptadas al lenguaje y realidad Hispanoamericanos que aborden las competencias digitalizadas específicas que pueden impactar positivamente en el desempeño y bienestar de los teletrabajadores.

Finalmente, a pesar del creciente reconocimiento de la importancia de las competencias de liderazgo para el teletrabajo, los programas de formación empíricamente validados diseñados para desarrollar estas competencias siguen siendo excepcionales (Arora & Suri, 2020; Gohoungodji et al., 2022). Dado que la implementación inicial del programa de formación Digylid se realizó como una versión beta, es crucial evaluar su efectividad e impacto sustancial en el desempeño y bienestar de los teletrabajadores y los

líderes. Esto permitirá establecer evidencia empírica de su efecto y sentar las bases para futuras ediciones de la intervención.

## OBJETIVOS

A raíz de lo anterior, el objetivo principal de esta tesis doctoral es **conceptualizar, evaluar y desarrollar competencias de liderazgo para el teletrabajo que mejoren el desempeño y bienestar de los teletrabajadores.** Para lograrlo, la progresión de la investigación sigue una secuencia lógica: primero, identificar qué competencias de liderazgo digitalizadas influyen en el desempeño de los teletrabajadores (Estudio 1) y su bienestar (Estudio 2) a través de revisiones sistemáticas; segundo, contribuir al desarrollo del modelo de Competencias de Liderazgo para el Teletrabajo (LCT), desarrollando y validando una escala de medición (LCT) para estas competencias en una población española (Estudio 3); tercero, validar una versión abreviada de la escala LCT en muestras españolas y colombianas para garantizar la aplicabilidad transnacional (Estudio 4); y finalmente, evaluar la efectividad del programa de formación en el desarrollo de estas competencias y la mejora de los resultados tanto para los teletrabajadores como para los líderes (Estudio 5).

En síntesis, los cinco objetivos principales de esta tesis son:

Objetivo 1: Identificar competencias de liderazgo relevantes que promuevan el desempeño de los teletrabajadores (Estudio 1).

Objetivo 2: Identificar competencias de liderazgo relevantes que promuevan el bienestar de los teletrabajadores (Estudio 2).

Objetivo 3: Desarrollar y validar una escala para medir las Competencias de Liderazgo para el Teletrabajo (LCT) que impacte positivamente el bienestar y desempeño de los teletrabajadores (Estudio 3).

Objetivo 4: Desarrollar y validar la versión corta de la escala LCT en poblaciones española y colombiana (Estudio 4).

Objetivo 5: Evaluar la efectividad del programa de formación en liderazgo Digylid analizando el aprendizaje, la transferencia y los resultados tanto para líderes como para subordinados (Estudio 5).

## METODOLOGÍA

*Procedimiento Estudios teóricos (Estudios 1 y 2)*

En los dos primeros estudios se realizaron revisiones de literatura estructuradas (SLR) siguiendo las directrices PRISMA. La metodología SLR permite una recopilación exhaustiva de literatura que cumple con criterios específicos para descubrir temas, patrones, tendencias o brechas, especialmente en el desarrollo de recursos humanos (Rocco et al., 2023). Se incluyeron las siguientes bases de datos: Scopus, PsycARTICLES, PsycINFO, ABI/INFORM y Web of Science. Se incluyeron investigaciones cuantitativas y cualitativas publicadas en inglés, español y portugués.

*Procedimiento Estudios empíricos (Estudios 3, 4 y 5)*

Para el Estudio 3, se desarrolló la escala LCT utilizando los hallazgos de los Estudios 1 y 2 y un análisis cualitativo de entrevistas y grupos focales con teletrabajadores, líderes y gerentes de RR.HH. (Puentes et al., 2022). Basándose en estas fuentes y de acuerdo con las directrices de Prior (2014) para el análisis de contenido, se identificaron 88 comportamientos y se convirtieron en ítems, agrupados en cinco competencias digitalizadas fundamentales que los líderes necesitan para gestionar eficazmente equipos en contextos de teletrabajo:

A) *Comunicación Digital:* Capacidad de los líderes para elaborar y transmitir mensajes a través de medios digitales, generar espacios para la escucha activa y reducir la distancia virtual con el equipo de trabajo.

B) *Construcción de Confianza Digital:* Capacidad de los líderes para generar un entorno de seguridad psicológica a través de la tecnología, es decir, un contexto en el que los líderes saben que los teletrabajadores realizarán su trabajo y estos, a su vez, saben que recibirán apoyo de su líder.

C) *Gestión de objetivos en remoto:* Capacidad de los líderes para adaptar la planificación y el seguimiento de tareas para favorecer la autonomía de los teletrabajadores.

D) *Desarrollo de relaciones en entornos virtuales:* Capacidad de los líderes para fomentar el espíritu de equipo a través de medios virtuales, unificando los

esfuerzos de todos los individuos hacia un objetivo compartido y generando interacciones de alta calidad.

E) *Apoyo a la conciliación vida-teletrabajo:* Capacidad de los líderes para identificar necesidades de apoyo emocional y generar condiciones de equilibrio entre el teletrabajo y la vida personal, considerando las necesidades individuales y las demandas de estas áreas.

Estas competencias forman el modelo LCT (Competencias de Liderazgo para el Teletrabajo), que es la base para el resto de los estudios posteriores.

Para la validación de contenido de la escala LCT, se realizaron dos paneles de expertos con una muestra de académicos y profesionales para asegurar que los ítems creados para cada dimensión fueran teóricamente adecuados y relevantes para medir el constructo. Posteriormente, se examinó la fiabilidad y validez de la escala LCT, realizando un estudio piloto dentro de una muestra española de teletrabajadores. Los participantes fueron reclutados a través de una empresa de estudios de panel y la encuesta se administró en línea utilizando la plataforma de la empresa. La empresa aplicadora incorporó mecanismos de detección de atención (dos ítems para verificar la atención) e identificó aceleradores, eliminando a las personas que no cumplían con ambos criterios. El equipo Digylid supervisó el procedimiento de recolección durante todo el proceso.

Para el Estudio 4, se desarrolló la versión corta de la escala LCT seleccionando los cinco ítems con las cargas factoriales más altas en cada dimensión, basándose en los resultados de la encuesta piloto realizada en el Estudio 3. Esta versión abreviada se administró a la medición pre-intervención de los subordinados de los líderes que participaron en el programa de formación Digylid realizado en empresas españolas, colombianas y chilenas. Para la comparación transnacional, esta muestra se dividió en dos submuestras: España y Colombia. La muestra chilena, al ser demasiado pequeña, se excluyó de este estudio y solo se incluyó en el estudio posterior. Para la validez predictiva, se utilizó una medición posterior (T2) específica para testear el efecto de la escala LCT en las variables resultado.

Para el Estudio 5, se utilizó la muestra completa, incluyendo participantes de España, Colombia y Chile. Se utilizó la misma medición de línea base previa a la

formación del estudio anterior (T1). Sin embargo, se realizó una nueva medición de seguimiento dos meses después de la finalización del programa de formación para dar a los líderes tiempo suficiente para aplicar sus habilidades recién adquiridas en sus entornos de trabajo y permitir que sus subordinados evaluaran estos comportamientos. Esta medición corresponde a T2 en este estudio y se considera la medida postintervención. En este caso, también se consideraron las propias medidas de los líderes en ambos puntos temporales, además de las de sus subordinados.

A los líderes y sus respectivas organizaciones se les ofreció inscripción gratuita a cambio de su participación en el estudio de investigación. Tanto los líderes como los miembros de su equipo completaron cuestionarios electrónicos. Todas las mediciones se realizaron en línea utilizando la plataforma LimeSurvey. Para los tres estudios empíricos, se garantizó el anonimato de los datos recopilados y se siguieron estrictos protocolos de protección de datos, de acuerdo con la Declaración de Helsinki. Los participantes fueron informados sobre el propósito del estudio, los procedimientos de manejo de datos y su derecho a retirarse sin consecuencias. El Comité de Ética de Investigación Humana de la Universidad de Valencia revisó y aprobó los protocolos de investigación y dio permiso para llevar a cabo el estudio (número de procedimiento 1943262).

*Muestras*

En el Estudio 3 (Capítulo 5), sobre la validez de contenido y validación de la escala LCT, se utilizaron dos paneles de expertos para la fase de validez de contenido. El primer panel estuvo compuesto por 8 expertos en liderazgo y digitalización de universidades españolas, mientras que el segundo panel incluyó a 19 profesionales y académicos (profesionales de recursos humanos y profesores).

Para el estudio piloto se contó con 543 teletrabajadores españoles, de los cuales el 50,5% eran mujeres y el 49,5% hombres, con una edad media de 40,3 años (DE = 9,65). La mayoría trabajaba a tiempo completo (89,7%) y con una antigüedad organizacional de más de cinco años (47,9%), entre uno y cinco años (41,6%) o menos de un año (10,5%). Los participantes provenían de diversos sectores, principalmente de TI (19,9%), industrial (11,8%), finanzas (10,1%), administración pública (9,0%), consultoría (8,5%), marketing (8,1%), educación (7,0%), salud (4,4%), turismo (3,2%) y otros (18,0%). En cuanto al

nivel educativo, el 52,1% tenía título universitario, el 22,7% grado técnico o bachillerato, y el 21,7% estudios de posgrado.

Para los Estudios 4 y 5 (Capítulos 6 y 7), relacionados con el Programa de Formación Digylid, se invitó a participar a 187 líderes, de los cuales 183 completaron la medición pre-intervención (T1) y 85 la de seguimiento (T2). En T1, los líderes provenían de empresas españolas (91), colombianas (68) y chilenas (24). El 52,5% eran mujeres y el 47,5% hombres, con una edad media de 40,1 años (DE = 8,48). Respecto a su nivel educativo, el 8,1% tenía educación técnica, el 36,4% título universitario y el 55,5% estudios de posgrado. Los sectores representados incluían TI (50,8%), servicios (16,3%), industrial (12,6%), consultoría (10,9%) y educación (7,6%).

En cuanto a los subordinados (teletrabajadores), se solicitó la participación de 1.177 personas, de las cuales 911 completaron la medición preintervención (T1), 737 respondieron a la medición intermedia (T2 para el Estudio 4) y 326 completaron la medición de seguimiento (T2 para el Estudio 5). En T1, los participantes provenían de empresas colombianas (505), españolas (311) y chilenas (95). El 55,4% eran hombres y el 44,6% mujeres, con una edad media de 34,7 años (DE = 9,14). En relación con su nivel educativo, el 1,1% había completado la educación secundaria, el 34,1% tenía educación técnica, el 37,8% título universitario y el 27% estudios de posgrado. Los sectores representados incluían TI (65%), industrial (13,2%), servicios (12,5%), consultoría (6,1%) y educación (3,2%).

Para el análisis a nivel de equipo en el Estudio 5, se incluyeron 48 equipos con al menos 3 miembros que completaron tanto T1 como T2. La distribución del tamaño de los equipos fue: 31 equipos (64,6%) con 3-5 miembros, 9 equipos (18,8%) con 6-10 miembros y 8 equipos (16,7%) con más de 10 miembros. En total, 297 subordinados fueron incluidos en el análisis a nivel de equipo.

En los tres estudios, todos los teletrabajadores y sus líderes debían cumplir con los siguientes criterios: a) trabajar de forma remota durante al menos 12 horas por semana (equivalente al 30% o más de una semana laboral estándar de 40 horas), y b) tener un contrato laboral a tiempo completo o parcial con una organización. En el caso de los teletrabajadores en el Estudio 3 y los subordinados en los Estudios 4 y 5, también se aseguró que tuvieran un supervisor directo.

*Variables*

El Estudio 3 se centró en la validación de la escala completa de Competencias de Liderazgo para el Teletrabajo (LCT), compuesta por 67 ítems distribuidos en cinco dimensiones fundamentales: comunicación digital (14 ítems), construcción de confianza digital (13 ítems), gestión de objetivos en remoto (13 ítems), desarrollo de relaciones en entornos virtuales (13 ítems) y apoyo al equilibrio teletrabajo-vida (14 ítems). esta escala mostró excelentes propiedades psicométricas con una fiabilidad global de $\alpha = .94$. Para evaluar su validez convergente y divergente, se utilizó el Intercambio Líder-Miembro (LMX), medido con la escala de 7 ítems de Scandura y Graen (1984).

Para la validez concurrente, se utilizó una serie de variables de bienestar: emociones positivas y negativas en el trabajo, evaluadas con factores de la escala de Warr (1990); satisfacción laboral, mediante la escala de Bravo et al. (1993); aislamiento profesional, con la escala de Golden et al. (2008); conflicto teletrabajo-vida, utilizando la escala de Charalampous et al. (2022). Asimismo, se incluyó como variable de desempeño extra-rol el comportamiento de ciudadanía organizacional (OCB), medido con la escala de Henderson et al. (2020). Todas estas medidas demostraron adecuada consistencia interna con valores alfa de Cronbach entre .80 y .94.

El Estudio 4 abordó la validación de una versión abreviada de la escala (LCT-S), compuesta por 25 ítems (5 por cada dimensión), en muestras tanto españolas como colombianas. Además de las variables utilizadas en el estudio anterior, se incorporaron nuevas medidas para evaluar la validez de esta versión reducida: para validez convergente y divergente, se usó LMX y la de comportamiento de apoyo del supervisor a la familia (FSSB) mediante la escala de Hammer et al. (2013).

Para la validez predictiva, además de Satisfacción Laboral, se utilizó engagement laboral con la Utrecht Work Engagement Scale (Schaufeli et al., 2006), productividad digital utilizando ítems de la escala E-Work Life (Grant et al., 2019), y la autoeficacia digital con la escala de Tramontano et al. (2021). La consistencia interna de estas medidas fue adecuada en ambas muestras, con valores alfa entre .81 y .98, lo que permitió confirmar la validez transcultural del instrumento.

Finalmente, el Estudio 5 se centró en la evaluación del programa de formación Digylid, utilizando dos de las dimensiones clave de la escala LCT: la Gestión de objetivos en remoto y el Desarrollo de relaciones en entornos virtuales. Estas dimensiones fueron adaptadas tanto para los líderes (versión en primera persona) como para los subordinados (versión en tercera persona), manteniendo excelentes propiedades psicométricas (α entre .88 y .95). Las variables de resultado incluyeron la Satisfacción Laboral y la Productividad Digital, medidas en ambos grupos, con las escalas de Bravo et al. (1993) y Grant et al. (2019), respectivamente. También se consideró como variable de proceso la participación de los líderes en sesiones interactivas, codificada como variable *dummy.*

*Análisis*

Para los estudios teóricos (1 y 2), se empleó el método SLR (Rocco et al., 2023). El proceso de revisión involucró varios pasos: a) definir las preguntas de investigación y la estrategia de búsqueda; b) realizar una búsqueda exhaustiva en bases de datos; c) seleccionar artículos basados en criterios de inclusión y exclusión predefinidos; d) extraer y codificar datos de los artículos seleccionados; e) analizar temáticamente las competencias de liderazgo relacionadas con el desempeño o el bienestar; y f) sintetizar los hallazgos para identificar competencias clave y sus efectos.

Para el Estudio 3, se realizó una evaluación de expertos en dos paneles para la validez de contenido. Se evaluó el nivel de acuerdo siguiendo las directrices de Howard y Melloy (2015), en un índice que oscilaba entre 1 y 5. Una puntuación de acuerdo superior a 2,5 se consideró adecuada. En el segundo panel de expertos, los participantes evaluaron tanto la relevancia como la claridad de cada ítem en una escala de 1 a 4, considerándose adecuadas las puntuaciones superiores a tres.

Para el análisis de validación y fiabilidad de la escala LCT, se realizaron pruebas estadísticas, incluyendo análisis factorial confirmatorio (CFA), evaluación de consistencia interna, validez convergente, validez discriminante y pruebas de validez de criterio (concurrente).

Para el Estudio 4, se realizó un análisis factorial confirmatorio (CFA) comparando tres modelos: un primer modelo con un factor, un segundo modelo con los cinco factores teóricos, y un tercer modelo con el liderazgo como factor de segundo orden. Se evaluó la

invarianza de medida a través de cuatro modelos: invarianza configural (igualdad de estructuras factoriales), métrica (igualdad de cargas factoriales), escalar (igualdad de cargas e interceptos) y estricta (igualdad de cargas, interceptos y unicidades).

Para el Estudio 5, se utilizaron pruebas t de muestras pareadas para examinar los cambios en las competencias auto-informadas de los líderes de T1 a T2. Dado que se violó el supuesto de normalidad, también se utilizaron pruebas no paramétricas de Wilcoxon. Para examinar el efecto moderador de la participación de los líderes en sesiones interactivas, se implementó un ANOVA mixto de medidas repetidas. Para probar si los cambios en la percepción que los subordinados tienen de las competencias de los líderes afectaron los cambios en los resultados de los subordinados a nivel individual y de equipo, se utilizó modelado multinivel. Finalmente, para examinar si los cambios en la autopercepción de las competencias de los líderes predijeron cambios en su propia satisfacción laboral y productividad, se realizaron análisis de ruta.

## RESULTADOS

*Estudios 1 y 2: Revisiones sistemáticas de competencias de liderazgo para el desempeño y bienestar*

Las revisiones sistemáticas identificaron competencias clave de liderazgo orientadas a reducir tanto la distancia operativa como la afectiva en entornos de teletrabajo, siguiendo el marco de distancia virtual de Lojeski y Reilly (2020).

Para el desempeño (Estudio 1), se identificaron cinco competencias principales:

A) *Comunicación enfocada en tareas:* La comunicación frecuente, efectiva y de alta calidad entre líderes y miembros del equipo resultó crucial para mejorar el desempeño del equipo e individual.

B) *Gestión de objetivos:* La delimitación clara de objetivos y expectativas, junto con la provisión de apoyo estructural, contribuyó significativamente al rendimiento, especialmente a nivel de equipo.

C) *Apoyo social del líder:* La capacidad de proporcionar preocupación y asistencia individualizada a los teletrabajadores a través de medios virtuales mostró efectos positivos sobre el desempeño individual y contextual.

D) *Construcción de confianza:* Se encontraron relaciones significativas entre las competencias de construcción de confianza de los líderes y diversos indicadores de desempeño.

E) *Empoderamiento:* La capacidad de otorgar autonomía, facilitar la autogestión y promover la colaboración entre miembros del equipo remoto favoreció tanto el desempeño del equipo como el individual.

Para el bienestar (Estudio 2), se identificaron también cinco competencias esenciales:

A) *Comunicación digital:* Esta competencia mostró asociaciones con medidas de bienestar hedónico, incluida la satisfacción laboral.

B) *Gestión de objetivos:* También demostró relaciones con medidas de bienestar hedónico como la satisfacción laboral.

C) *Apoyo social:* El apoyo del supervisor surgió como una competencia fundamental para reducir la distancia afectiva y mejorar el bienestar de los teletrabajadores.

D) *Facilitación del equilibrio trabajo-vida*: Los comportamientos de apoyo a la conciliación laboral-familiar mostraron efectos positivos sobre el bienestar.

E) *Liderazgo participativo:* Esta competencia emergió como particularmente importante para reducir la distancia afectiva y mejorar el bienestar.

Ambas revisiones también identificaron mecanismos mediadores a través de los cuales estas competencias de liderazgo influyen en los resultados. La confianza emergió como un mediador consistente entre los comportamientos de liderazgo y tanto el desempeño como el bienestar. Otros mecanismos identificados incluyeron la colaboración en equipo, la adaptación tecnológica, la autonomía y el enriquecimiento trabajo-vida.

Las revisiones también destacaron moderadores que pueden potenciar o atenuar los efectos del liderazgo, como la intensidad del teletrabajo, las habilidades digitales de los líderes, la inteligencia emocional y características de los empleados (como la orientación a la autogestión), que pueden potenciar o mitigar los efectos de las competencias de liderazgo.

*Estudio 3: Validación de la escala LCT*

Tras el proceso de validación de contenido, la escala final quedó compuesta por 67 ítems. El análisis factorial confirmatorio mostró que el modelo de cinco factores con liderazgo como factor de segundo orden presentó el mejor ajuste ($\chi^2 = 3470$, CFI = .972, TLI = .971, RMSEA = .034). La escala mostró una excelente fiabilidad, con valores alfa de Cronbach superiores a .90 para todas las dimensiones (.94 para comunicación digital, .93 para construcción de confianza digital, .92 para gestión de objetivos en remoto, .93 para desarrollo de relaciones en entornos virtuales y .94 para apoyo a la conciliación vida-teletrabajo).

La validez convergente se confirmó mediante una correlación positiva moderada con la escala LMX ($r = .62$; $p < .01$), mientras que la validez discriminante se respaldó al demostrar que un modelo de dos factores (considerando LCT y LMX como constructos separados) mostraba mejor ajuste que un modelo de factor único.

La validez de criterio se confirmó mediante regresiones múltiples jerárquicas que mostraron relaciones significativas entre la escala LCT y diversos resultados, incluyendo emociones positivas ($\beta = .53$, $p < .001$), satisfacción laboral ($\beta = .61$, $p < .001$) y comportamiento de ciudadanía organizacional ($\beta = .31$, $p < .001$), así como correlaciones negativas con emociones negativas ($\beta = -.40$, $p < .001$), aislamiento profesional ($\beta = -.34$, $p < .001$) y conflicto teletrabajo-vida ($\beta = -.32$, $p < .001$).

*Estudio 4: Validación de la versión reducida de la escala LCT*

La versión reducida de la escala LCT (LCT-S) mantuvo excelentes propiedades psicométricas en ambas muestras. Para la muestra española, el alfa de Cronbach para la escala completa fue .98, con valores superiores a .90 para todas las dimensiones. Resultados similares se encontraron en la muestra colombiana.

El análisis de invarianza de medición confirmó la aplicabilidad transnacional de la escala LCT-S entre las muestras española y colombiana, estableciéndose invarianza configural, métrica, escalar y estricta. Las cargas factoriales mostraron variaciones mínimas entre países, con diferencias típicamente dentro de .05 puntos.

La escala LCT-S demostró validez predictiva, correlacionando significativamente con satisfacción laboral, compromiso, productividad digital y comportamiento de

ciudadanía organizacional en ambas muestras, y con autoeficacia digital en la muestra española. También se demostró validez predictiva con la muestra colombiana, que mostró puntuaciones más altas en liderazgo, bienestar y medidas de desempeño en comparación con la muestra española.

*Estudio 5: Efectividad del programa de formación Digylid*

La evaluación del programa de formación Digylid siguió el modelo de Kirkpatrick, analizando aprendizaje, transferencia y resultados:

A) *Aprendizaje:* Los líderes mostraron mejoras significativas en sus competencias autopercibidas tras la formación. La competencia de gestión de objetivos en remoto mejoró significativamente entre T1 y T2. Igualmente, la competencia de desarrollo de relaciones en entornos virtuales mostró un aumento significativo.

B) *Transferencia:* Inicialmente, no se encontraron diferencias significativas en la percepción de los subordinados sobre las competencias de sus líderes. Sin embargo, al analizar el efecto moderador de la participación de los líderes en sesiones interactivas, se encontró una interacción significativa entre tiempo y participación. Los subordinados cuyos líderes participaron en sesiones interactivas reportaron mejoras en la percepción de ambas competencias, mientras que aquellos cuyos líderes no participaron reportaron deterioro en sus percepciones.

C) *Resultados:* Los cambios en ambas competencias de liderazgo se relacionaron positivamente con cambios en la satisfacción laboral de los subordinados tanto a nivel individual como de equipo. Para la productividad, solo los cambios en la gestión de objetivos en remoto mostraron un efecto positivo significativo y sólo a nivel de equipo. Los cambios en las competencias de los líderes también afectaron positivamente sus propios resultados, con ambas competencias relacionadas con la satisfacción laboral de los líderes, mientras que sólo la gestión de objetivos en remoto se relacionó con su productividad.

## CONCLUSIONES

Esta tesis doctoral ha generado importantes hallazgos sobre la naturaleza y desarrollo del liderazgo en contextos de teletrabajo, llegando a las siguientes conclusiones:

- El liderazgo en teletrabajo requiere una reconceptualización. No es simplemente una adaptación digital de enfoques tradicionales, sino una reformulación fundamental que debe abordar tanto la distancia operativa como afectiva que surge en entornos virtuales.

- El modelo LCT, con sus cinco competencias interconectadas pero distintas (comunicación digital, construcción de confianza digital, gestión de objetivos en remoto, desarrollo de relaciones en entornos virtuales y apoyo a la conciliación vida-teletrabajo), proporciona una estructura válida y fiable para entender el liderazgo en entornos de teletrabajo.

- Las escalas LCT y LCT-S proporcionan instrumentos válidos y confiables. Tanto la versión completa como la reducida demostraron excelentes propiedades psicométricas, validez convergente y discriminante, y validez de criterio con múltiples resultados organizacionales.

- Las competencias de liderazgo trascienden fronteras nacionales. La invarianza de medición de la escala LCT-S entre España y Colombia sugiere que, aunque las manifestaciones específicas pueden variar, las dimensiones fundamentales del liderazgo en teletrabajo permanecen consistentes a través de diferentes contextos culturales.

- Las competencias de liderazgo para teletrabajo pueden desarrollarse mediante intervenciones estructuradas. El programa Digylid demostró efectividad para mejorar tanto las competencias autopercibidas de los líderes como, en ciertos casos, las percepciones de los subordinados, especialmente cuando los líderes participan en instancias interactivas de aprendizaje en conjunto con sus pares. Esto muestra que los procesos de aprendizaje social siguen siendo esenciales en contextos virtuales.

- El impacto del liderazgo difiere entre niveles individuales y de equipo: se observaron efectos significativos del desarrollo de las competencias de liderazgo a nivel de equipo tanto para la satisfacción como para la productividad, indicando que el liderazgo en contextos de teletrabajo también funciona a través de procesos multinivel.
- El desarrollo del liderazgo beneficia a los propios líderes. Las mejoras en las competencias de liderazgo para teletrabajo mejoraron la satisfacción laboral y la productividad de los propios líderes, creando potenciales circuitos de retroalimentación positiva en el proceso de desarrollo.
- El liderazgo efectivo en teletrabajo representa una forma de práctica organizacional positiva. Las competencias digitalizadas de liderazgo pueden mejorar el bienestar y el desempeño independientemente de la ubicación física, sugiriendo que los desafíos de la distancia virtual pueden superarse mediante el desarrollo de competencias digitalizadas específicas.

*Implicaciones teóricas*

La investigación demuestra que los modelos tradicionales de liderazgo requieren adaptaciones sustanciales para entornos de teletrabajo. Por tanto, la contribución teórica central de esta tesis es el desarrollo y validación del modelo de Competencias de Liderazgo para el Teletrabajo (LCT), que integra conocimientos de la teoría de la distancia virtual (Lojeski & Reilly, 2020) con el concepto de competencias digitalizadas (Peiró & Martínez-Tur, 2022). Mientras que el liderazgo virtual (Kozlowski et al., 2021) y el e-liderazgo (Avolio et al., 2000) ofrecían marcos parciales, el modelo LCT proporciona un enfoque más detallado para promover el desempeño y bienestar en el teletrabajo. Por ejemplo, la comunicación en teletrabajo requiere una selección deliberada de canales apropiados (Vătămănescu et al., 2022), mientras que la gestión de objetivos demanda enfoques más estructurados y monitoreo no invasivo utilizando nuevas herramientas digitales (Wakefield et al., 2008). Además, la investigación apoya la idea de que las competencias digitalizadas no son simplemente una extensión de competencias tradicionales a entornos digitales, sino que representan una evolución del liderazgo que aprovecha nuevas posibilidades tecnológicas.

*Implicaciones prácticas*

Los hallazgos tienen importantes implicaciones para organizaciones que implementan teletrabajo. La escala LCT y su versión reducida proporcionan herramientas útiles para evaluar y desarrollar competencias de liderazgo específicas para el teletrabajo, permitiendo intervenciones más precisas que las ofrecidas por medidas de liderazgo genéricas.

Por otro lado, el programa de formación Digylid ofrece un ejemplo de intervención efectiva para desarrollar competencias de liderazgo en entornos de teletrabajo. Su metodología AMENA (Aprender, Modelar, Ejercitar, Nombrar, Aplicar) y su enfoque de aprendizaje mixto que integra plataforma web, aplicación móvil y sesiones interactivas proporciona una herramienta para organizaciones que buscan mejorar las competencias digitalizadas de sus líderes.

Por último, se destaca la importancia de incorporar componentes de aprendizaje entre pares e intercambio de experiencias en los programas de desarrollo de liderazgo, incluso en contextos virtuales. La participación en sesiones interactivas resultó ser un factor clave para la transferencia efectiva del aprendizaje.

*Limitaciones y futuras investigaciones*

A pesar de sus contribuciones, esta investigación tiene algunas limitaciones. La naturaleza transversal de parte de los datos limita las inferencias causales. Los estudios 4 y 5 emplearon diseños longitudinales con dos mediciones, lo que restringe la capacidad para capturar completamente la trayectoria de desarrollo de las competencias de liderazgo.

La validación transnacional se limitó a muestras española y colombiana, y futuras investigaciones deberían extenderse a otras culturas y contextos lingüísticos. También sería valioso explorar la aplicabilidad de la escala LCT en diferentes sectores y tipos de organizaciones.

Por último, la evaluación del programa Digylid no incluyó un grupo control, lo que limita la capacidad para atribuir concluyentemente los cambios observados a la intervención. Investigaciones futuras deberían implementar diseños controlados aleatorizados para fortalecer las inferencias causales.

*Conclusión*

En resumen, a medida que las organizaciones navegan por la evolución continua del teletrabajo, esta investigación proporciona una base teórica para comprender cómo funciona el liderazgo en estos contextos, así como herramientas prácticas para medir y desarrollar competencias digitalizadas en los líderes. Al conceptualizar las competencias de liderazgo como mecanismos para reducir las dimensiones operativa y afectiva de la distancia virtual que produce el teletrabajo, esta tesis contribuye a una comprensión más matizada y completa del liderazgo en la era digital.

A medida que los límites entre los espacios de trabajo físicos y virtuales continúan difuminándose, esta investigación ofrece una hoja de ruta para desarrollar líderes que puedan acortar la distancia virtual de manera efectiva, asegurando que los beneficios del avance tecnológico se traduzcan en un mayor bienestar y desempeño para individuos, equipos y organizaciones en un mundo cada vez más digitalizado.

# REFERENCES

References

Acosta, S., Garza, T., Hsu, H. Y., & Goodson, P. (2020). Assessing quality in systematic literature reviews: A study of novice rater training. *Sage Open, 10*(3), 1-11. https://doi.org/10.1177/2158244020939530

Adel, A. (2022). Future of industry 5.0 in society: human-centric solutions, challenges and prospective research areas. *Journal of Cloud Computing, 11*(40), 1-15. https://doi.org/10.1186/s13677-022-00314-5

Aksoy, C. G., Barrero, J. M., Bloom, N., Davis, S. J., Dolls, M., & Zarate, P. (2023). *Working From Home Around the Globe: 2023 Report*. EconPol Policy Brief, (No.53). https://www.econpol.eu/publications/policy_brief_53

Al-Ani, B., Horspool, A., & Bligh, M. C. (2011). Collaborating with "virtual strangers": Towards developing a framework for leadership in distributed teams. *Leadership, 7*(3), 219–249. https://doi.org/10.1177/1742715011407382

Alfaleh, A., Alkattan, A., Alageel, A., Salah, M., Almutairi, M., Sagor, K., … & Alabdulkareem, K. (2021). Onsite versus remote working: the impact on satisfaction, productivity, and performance of medical call center workers. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 58*. https://doi.org/10.1177/00469580211056041

Alimo-Metcalfe, B. (2013). A critical review of leadership theory. In Leonard, S. Lewis, R. Freedman, A. Passmore, J. *The Wiley-Blackwell Handbook of the Psychology of Leadership, Change, and Organizational Development* (pp. 13-47). Wiley-Blackwell. https://doi.org/10.1002/9781118326404.ch2

Alkhayyal, S., & Bajaba, S. (2023). The impact of e-leadership competences on workplace well-being and job performance: the mediating role of e-work self-efficacy. *Sustainability, 15*(6), 4724. https://doi.org/10.3390/su15064724

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? assessing the status of our scientific findings. *Psychological Science in the Public Interest, 16*(2), 40-68. https://doi.org/10.1177/1529100615593273

References

Anakpo, G., Nqwayibana, Z., & Mishi, S. (2023). The Impact of Work-from-Home on Employee Performance and Productivity: A Systematic review. *Sustainability, 15*(5), 4529. https://doi.org/10.3390/su15054529

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: a review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-423. https://doi.org/10.1037/0033-2909.103.3.411

Anderson, J. C., & Gerbing, D. W. (1991). Predicting the performance of measures in a confirmatory factor analysis with a pretest assessment of their substantive validities. *Journal of Applied Psychology, 76*(5), 732-740. https://doi.org/10.1037/0021-9010.76.5.732

Aram, J. D., & Walochik, K. (1996). Improvisation and the Spanish manager. *International Studies of Management & Organization, 26*(4), 73-89. https://doi.org/10.1080/00208825.1996.11656695

Araya-Guzmán, S., Aldea-Asencio, C., & Salazar-Concha, C. (2023). Efectos del liderazgo auténtico en el teletrabajo y su incidencia en la satisfacción laboral y en el compromiso organizativo en administrativos universitarios [Effects of authentic leadership in teleworking and its impact on job satisfaction and organizational commitment in university administrators]. *Revista Ibérica De Sistemas e Tecnologias De Informação*, *56*(02), 553-566. https://www.proquest.com/scholarly-journals/efectos-del-liderazgo-auténtico-en-el-teletrabajo/docview/2828438654/se-2

Arias, J. L. A., & Durán, H. M. (2021). Elaboración y validación de una escala para medir la capacidad de liderazgo en un entorno de trabajo remoto (cletr). *Contabilidad y Negocios, 16*(32), 23-37. https://doi.org/10.18800/contabilidad.202102.002

Arora, P., & Suri, D. (2020). Redefining, relooking, redesigning, and reincorporating HRD in the post covid 19 context and thereafter. *Human Resource Development International, 23*(4), 438-451. https://doi.org/10.1080/13678868.2020.1780077

References

Ashmi, J. (2017). Getting things done, virtually! - The role of virtual team leadership in virtual team Effectiveness. *Ushus - Journal of Business Management, 16*(2), 13–20. https://doi.org/10.12725/ujbm.39.2

Athanasiadou, C., & Theriou, G. (2021). Telework: systematic literature review and future research agenda. *Heliyon, 7*(10), e08165. https://doi.org/10.1016/j.heliyon.2021.e08165

Avolio, B. J. (2007). Promoting more integrative strategies for leadership theory-building. *American Psychologist, 62*(1), 25-33. https://doi.org/10.1037/0003-066x.62.1.25

Avolio, B. J., Bass, B. M., & Jung, D. I. (1999). Re-examining the components of transformational and transactional leadership using the multifactor leadership. *Journal of Occupational and Organizational Psychology, 72*(4), 441-462. https://doi.org/10.1348/096317999166789

Avolio, B. J., & Gardner, W. L. (2005). Authentic leadership development: getting to the root of positive forms of leadership. *The Leadership Quarterly, 16*(3), 315-338. https://doi.org/10.1016/j.leaqua.2005.03.001

Avolio, B. J., Kahai, S. S., & Dodge, G. E. (2000). E-leadership. *The Leadership Quarterly, 11*(4), 615-668. https://doi.org/10.1016/s1048-9843(00)00062-x

Avolio, B. J., Reichard, R. J., Hannah, S. T., Walumbwa, F. O., & Chan, A. D. C. (2009). A meta-analytic review of leadership impact research: experimental and quasi-experimental studies. *The Leadership Quarterly,* 20(5), 764-784. https://doi.org/10.1016/j.leaqua.2009.06.006

Avolio, B. J., Sosik, J. J., Kahai, S. S., & Baker, B. (2014). E-leadership: re-examining transformations in leadership source and transmission. *The Leadership Quarterly, 25*(1), 105-131. https://doi.org/10.1016/j.leaqua.2013.11.003

References

Avolio, B. J., Walumbwa, F. O., & Weber, T. J. (2009). Leadership: current theories, research, and future directions. *Annual Review of Psychology, 60*, 421-449. https://doi.org/10.1146/annurev.psych.60.110707.163621

Bailenson, J. N. (2021). Nonverbal overload: A theoretical argument for the causes of Zoom fatigue. *Technology, Mind, and Behavior, 2*(1). https://doi.org/10.1037/tmb0000030

Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: findings, new directions, and lessons for the study of modern work. *Journal of Organizational Behavior, 23*(4), 383-400. https://doi.org/10.1002/job.144

Baker, E., Avery, G. C., & Crawford, J. (2008). Home-based telecommuting: technology's role. In M. Khosrow-Pour, D.B.A. (Ed.), *Innovative Technologies for Information Resources Management* (pp. 350-372). IGI Global Scientific Publishing. https://doi.org/10.4018/978-1-59904-570-2.ch020

Banks, G. C., Dionne, S. D., Mast, M. S., & Sayama, H. (2022). Leadership in the digital era: a review of who, what, when, where, and why. *The Leadership Quarterly, 33*(5), 101634. https://doi.org/10.1016/j.leaqua.2022.101634

Barhate, B., Hirudayaraj, M., & Nair, P. K. (2022). Leadership challenges and behaviours in the information technology sector during COVID-19: a comparative study of leaders from India and the U.S. *Human Resource Development International, 25*(3), 274–297. https://doi.org/10.1080/13678868.2022.2069429

Barrero, J. M., Bloom, N., & Davis, S. J. (2023). The evolution of work from home. *Journal of Economic Perspectives, 37*(4), 23-49. https://doi.org/10.1257/jep.37.4.23

Bartel, C. A., Wrzesniewski, A., & Wiesenfeld, B. M. (2012). Knowing where you stand: physical isolation, perceived respect, and organizational identification among virtual employees. *Organization Science, 23*(3), 743-757. https://doi.org/10.1287/orsc.1110.0661

Bartsch, S., Weber, E., Büttgen, M., & Huber, A. (2020). Leadership matters in crisis-induced digital transformation: how to lead service employees effectively during the COVID-19 pandemic. *Journal of Service Management, 32*(1), 71-85. https://doi.org/10.1108/JOSM-05-2020-0160

Bass, B. M. (1985). Leadership: good, better, best. *Organizational Dynamics, 13*(3), 26-40. https://doi.org/10.1016/0090-2616(85)90028-2

Bass, B. M. (1990). *Bass and Stogdill's handbook of leadership: Theory, research, and managerial applications* (3rd ed.). Free Press.

Bass, B. M., & Avolio, B. J. (1994). Transformational leadership and organizational culture. *International Journal of Public Administration, 17*(3-4), 541-554. https://doi.org/10.1080/01900699408524907

Batırlık, S. N., Gençer, Y. G., & Akküçük, U. (2022). Global virtual team leadership scale (gvtls) development in multinational companies. *Sustainability, 14*(2), 1038. https://doi.org/10.3390/su14021038

Bauer, T. N., & Erdogan, B. (Eds.). (2015). *The Oxford handbook of leader-member exchange*. Oxford University Press.

Bauer, T. N., & Erdogan, B. (2015). Leader-member exchange (LMX) theory: An introduction and overview. In T. N. Bauer & B. Erdogan (Eds.), *The Oxford handbook of leader-member exchange* (pp. 3-9). Oxford University Press.

Bauwens, R., & Cortellazzo, L. (2024). The different faces of e-leadership: six perspectives on leading in the era of digital technologies. *Human Resource Management Review, 35*(1), 101058. https://doi.org/10.1016/j.hrmr.2024.101058

Beauregard, T. A., Basile, K. A., & Canonico, E. (2019). Telework: Outcomes and facilitators for employees. In R. N. Landers (Ed.), *The Cambridge handbook of technology and employee behavior* (pp. 511–543). Cambridge University Press. https://doi.org/10.1017/9781108649636.020

References

Beckel, J. L. O., & Fisher, G. G. (2022). Telework and worker health and well-being: a review and recommendations for research and practice. *International Journal of Environmental Research and Public Health, 19*(7), 3879. https://doi.org/10.3390/ijerph19073879

Bell, B. S., & Kozlowski, S. W. J. (2002). A typology of virtual teams. *Group & Organization Management, 27*(1), 14-49. https://doi.org/10.1177/1059601102027001003

Bell, B. S., McAlpine, K. L., & Hill, N. S. (2023). Leading virtually. *Annual Review of Organizational Psychology and Organizational Behavior, 10*, 339-362. https://doi.org/10.1146/annurev-orgpsych-120920-050115

Belzunegui-Eraso, A., & Erro-Garcés, A. (2020). Teleworking in the context of the Covid-19 crisis. *Sustainability, 12*(9), 3662. https://doi.org/10.3390/su12093662

Benavides, F. G., & Silva-Peñaherrera, M. (2022). Datos y evidencias del teletrabajo, antes y durante la pandemia por covid-19. *Archivos De Prevención De Riesgos Laborales, 25*(2), 133-146. https://doi.org/10.12961/aprl.2022.25.02.06

Ben Sedrine, S., Bouderbala, A., & Nasraoui, H. (2020). Leadership style effect on virtual team efficiency: trust, operational cohesion and media richness roles. *Journal of Management Development, 40*(5), 365-388. https://doi.org/10.1108/jmd-10-2018-0289

Bentley, T. A., Teo, S. T., McLeod, L., Tan, F., Bosua, R., & Gloet, M. (2016). The role of organizational support in teleworker wellbeing: A socio-technical systems approach. *Applied Ergonomics, 52*, 207-215. https://doi.org/10.1016/j.apergo.2015.07.019

Bhumika. (2020). Challenges for work–life balance during COVID-19 induced nationwide lockdown: exploring gender difference in emotional exhaustion in the Indian setting. *Gender in Management, 35*(7/8), 705–718. https://doi.org/10.1108/gm-06-2020-0163

Biron, C., Karanika-Murray, M., & Cooper, C. L. (Eds.). (2012). *Improving Organizational Interventions for Stress and Well-Being: Addressing process and context* (1st ed.). Routledge. https://doi.org/10.4324/9780203723494

Bjärntoft, S., Hallman, D., Zetterberg, C., Larsson, J., Edvinsson, J., & Jahncke, H. (2021). A participatory approach to identify key areas for sustainable work environment and health in employees with flexible work arrangements. *Sustainability, 13*(24), 13593. https://doi.org/10.3390/su132413593

Blahopoulou, J., Ortiz-Bonnín, S., Montañez-Juan, M., Espinosa, G. T., & García-Sastre, M. A. (2022). Telework satisfaction, wellbeing and performance in the digital era. lessons learned during covid-19 lockdown in spain. *Current Psychology, 41*(5), 2507-2520. https://doi.org/10.1007/s12144-022-02873-x

Blake, R. R., & Mouton, J. S. (1975). An overview of the grid. *Training and Development Journal, 29*(5), 29-37. https://assets.td.org/m/7483aa803f5f39f3/original/An-Overview-of-the-Grid.pdf

Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 349-381). Jossey-Bass.

Bloom, N., Liang, J., Roberts, J., & Ying, Z. J. (2014). Does working from home work? evidence from a chinese experiment. *The Quarterly Journal of Economics, 130*(1), 165-218. https://doi.org/10.1093/qje/qju032

Blume, B. D., Ford, J. K., Baldwin, T. T., & Huang, J. L. (2010). Transfer of training: a meta-analytic review. *Journal of Management, 36*(4), 1065-1105. https://doi.org/10.1177/0149206309352880

Boccoli, G., Gastaldi, L., & Corso, M. (2024). Transformational leadership and work engagement in remote work settings: the moderating role of the supervisor's digital communication skills. *Leadership & Organization Development Journal, 45*(7), 1240-1257. https://doi.org/10.1108/lodj-09-2023-0490

Boehnke, K., Bontis, N., DiStefano, J. J., & DiStefano, A. C. (2003). Transformational leadership: an examination of cross-national differences and similarities. *Leadership & Organization Development Journal, 24*(1), 5-15. https://doi.org/10.1108/01437730310457285

Bonet Fernandez, D., & Jawadi, N. (2015). Virtual R&D project teams: From e-leadership to performance. *Journal of Applied Business Research, 31*(5), 1693–1708. https://doi.org/10.19030/jabr.v31i5.9384

Bondarouk, T., & Brewster, C. (2016). Conceptualising the future of HRM and technology research. *International Journal of Human Resource Management, 27*(21), 2652–2671. https://doi.org/10.1080/09585192.2016.1232296

Boyatzis, R. E. (1991). *The competent manager: A model for effective performance*. John Wiley & Sons.

Braun, S., Peus, C., Weisweiler, S., & Frey, D. (2013). Transformational leadership, job satisfaction, and team performance: a multilevel mediation model of trust. *The Leadership Quarterly, 24*(1), 270-283. https://doi.org/10.1016/j.leaqua.2012.11.006

Bravo, M. J., García, J. A., Peiró, J. M., & Prieto, F. (1993). Satisfacción con el trabajo [Job satisfaction]. In J. M. Peiró, F. Prieto, M. J. Bravo, P. Ripoll, I. Rodríguez, P. Hontangas, & M. Salanova (Eds.), *Los jóvenes ante el primer empleo: el significado del trabajo y su medida*. Nau Llibres.

Bravo-Duarte, F., Rodriguez, I., & Tordera, N. (2024). *Managing Well-Being and Performance at Distance: Development of a Leadership Competences for Telework (LCT) Scale*. [Manuscript submitted for publication].

Bravo-Duarte, F., Tordera, N., & Rodríguez, I. (2025a). Overcoming virtual distance: A systematic review of leadership competences for managing performance in telework. *Frontiers in Organizational Psychology, 2*, 1499248. https://doi.org/10.3389/forgp.2024.1499248

Bravo-Duarte, F., Tordera, N., & Rodríguez, I. (2025b). Wellbeing in Telework: A Systematic Review of Leadership Competences. *Frontiers in Organizational Psychology, 3*, 1576926. https://doi.org/10.3389/forgp.2025.1576926

Bregenzer, A., & Jiménez, P. (2021). Risk factors and leadership in a digitalized working world and their effects on employees' stress and resources: web-based questionnaire study. *Journal of Medical Internet Research, 23*(3), e24906. https://doi.org/10.2196/24906

Breque, M., De Nul, L., & Petridis, A. (2021). *Industry 5.0: Towards a Sustainable, Human-centric and Resilient European Industry*. European Commission, Directorate-General for Research and Innovation. Publications Office of the European Union. https://doi.org/10.2777/308407

Brinkerhoff, R. O., & Dressler, D. (2002). Using evaluation to build organizational performance and learning capability: a strategy and a method. *Performance Improvement, 41*(6), 14-21. https://doi.org/10.1002/pfi.4140410605

Brown, M. A. (Ed.). (2021). *Analyzing Telework, Trustworthiness, and Performance Using Leader-Member Exchange: COVID-19 Perspective*. IGI Global.

Brown, S. G., Hill, N. S., & Lorinkova, N. M. (2021). Leadership and virtual team performance: a meta-analytic investigation. *European Journal of Work and Organizational Psychology, 30*(5), 672-685. https://doi.org/10.1080/1359432x.2021.1914719

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Brown, T. C., McCracken, M., & Hillier, T. (2013). Using evidence-based practices to enhance transfer of training: assessing the effectiveness of goal setting and behavioural observation scales. *Human Resource Development International, 16*(4), 374-389. https://doi.org/10.1080/13678868.2013.812291

Brynjolfsson, E., Horton, J. J., Ozimek, A., Rock, D., Sharma, G., & TuYe, H. Y. (2020). *COVID-19 and remote work: An early look at US data*. National Bureau of Economic Research. https://doi.org/10.3386/w27344

Budur, T., & Demir, A. (2019). Leadership perceptions based on gender, experience, and education. *International Journal of Social Sciences & Educational Studies, 6*(1). https://doi.org/10.23918/ijsses.v6i1p142

Burke, L. A., & Hutchins, H. M. (2007). Training transfer: an integrative literature review. *Human Resource Development Review, 6*(3), 263-296. https://doi.org/10.1177/1534484307303035

Busse, R., & Weidner, G. (2020). A qualitative investigation on combined effects of distant leadership, organisational agility and digital collaboration on perceived employee engagement. *Leadership and Organization Development Journal, 41*(4), 535–550. https://doi.org/10.1108/lodj-05-2019-0224

Cano, S. O., González, E. Y. Q., Villavicencio-Ayub, E., & Rodríguez, G. A. (2023). Autoeficacia y engagement desde la perspectiva de género [Self-efficacy and engagement from a gender perspective]. *Equidad y Desarrollo, 1*(41), e1488. https://doi.org/10.19052/eq.vol1.iss41.7

Caputo, A., Toscano, F., Dolce, V., & Angelis, M. D. (2024). Leadership in face-to-face and virtual teams: a systematic literature review on hybrid teams management. *Informing Science: The International Journal of an Emerging Transdiscipline*, 27, 008. https://doi.org/10.28945/5342

Carless, S. A. (1998). Assessing the discriminant validity of transformational leader behaviour as measured by the mlq1. *Journal of Occupational and Organizational Psychology, 71*(4), 353-358. https://doi.org/10.1111/j.2044-8325.1998.tb00681.x

Carpini, J. A., Parker, S. K., & Griffin, M. (2017). A look back and a leap forward: a review and synthesis of the individual work performance literature. *Academy of Management Annals, 11*(2), 825-885. https://doi.org/10.5465/annals.2015.0151

References

Caycho-Rodríguez, T., Valencia, P. D., Vilca, L. W., Cervigni, M., Gallegos, M., Martino, P., … & Videla, C. B. (2021). Cross-cultural measurement invariance of the fear of covid-19 scale in seven latin american countries. *Death Studies, 46*(8), 2003-2017. https://doi.org/10.1080/07481187.2021.1879318

Chafi, M. B., Hultberg, A., & Yams, N. B. (2021). Post-pandemic office work: perceived challenges and opportunities for a sustainable work environment. *Sustainability, 14*(1), 294. https://doi.org/10.3390/su14010294

Challagalla, G., Shervani, T., & Huber, G. (2000). Supervisory orientations and salesperson work outcomes: The moderating effect of salesperson location. *The Journal of Personal Selling & Sales Management, 20*(3), 161–171. https://doi.org/10.1080/08853134.2000.10754236

Chambel, M. J., Castanheira, F., & Santos, A. (2022). Teleworking in times of COVID-19: the role of family-supportive supervisor behaviors in workers' work-family management, exhaustion, and work engagement. *The International Journal of Human Resource Management, 34*(15), 2924–2959. https://doi.org/10.1080/09585192.2022.2063064

Chan, X. W., Shang, S., Brough, P., Wilkinson, A., & Lu, C. (2022). Work, life and covid-19: a rapid review and practical recommendations for the post-pandemic workplace. *Asia Pacific Journal of Human Resources, 61*(2), 257-276. https://doi.org/10.1111/1744-7941.12355

Charalampous, M., Grant, C. A., Tramontano, C., & Michailidis, E. (2019). Systematically reviewing remote e-workers' well-being at work: A multidimensional approach. *European Journal of Work and Organizational Psychology, 28*(1), 51-73. https://doi.org/10.1080/1359432X.2018.1541886

Charalampous, M., Grant, C., & Tramontano, C. (2022). Getting the measure of remote e-working: a revision and further validation of the e-work life scale. *Employee Relations: The International Journal, 45*(1), 45-68. https://doi.org/10.1108/er-11-2021-0483

Chaudhary, P., Rohtagi, M., Singh, R. K., & Arora, S. (2022). Impact of leaders' e-competences on employees' wellbeing in global virtual teams during COVID-19: the moderating role of emotional intelligence. *Employee Relations: The International Journal, 44*(5), 1042–1057. https://doi.org/10.1108/er-06-2021-0236

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(3), 464-504. https://doi.org/10.1080/10705510701301834

Chen, F. F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology, 95*(5), 1005–1018. https://doi.org/10.1037/a0013193

Chen, G., Kirkman, B. L., Kanfer, R., Allen, D., & Rosen, B. (2007). A multilevel study of leadership, empowerment, and performance in teams. *Journal of Applied Psychology, 92*(2), 331-346. https://doi.org/10.1037/0021-9010.92.2.331

Chen, Y., & Fulmer, I. S. (2017). Fine-tuning what we know about employees' experience with flexible work arrangements and their job attitudes. *Human Resource Management, 57*(1), 381-395. https://doi.org/10.1002/hrm.21849

Cheung, V. K., Chia, N., So, S., Ng, G. W., & So, E. H. (2023). Expanding scope of kirkpatrick model from training effectiveness review to evidence-informed prioritization management for cricothyroidotomy simulation. *Heliyon, 9*(8), e18268. https://doi.org/10.1016/j.heliyon.2023.e18268

Chu, A. M. Y., Chan, T. W. C., & So, M. K. P. (2022). Learning from work-from-home issues during the covid-19 pandemic: balance speaks louder than words. *Plos One, 17*(1), e0261969. https://doi.org/10.1371/journal.pone.0261969

Cioffi, G., Balducci, C., & Toderi, S. (2025). Digital stress-preventive management competences: definition, identification and tool development for research and practice. *International Journal of Environmental Research and Public Health, 22*(2), 267. https://doi.org/10.3390/ijerph22020267

Cioffi, G. (2025, May). *Developing traditional and digital stress-preventive management competences in hybrid team managers*. [Paper presentation]. 23rd European Congress of Work and Organisational Psychology, Prague, Czech republic.

Cleary, M., Kornhaber, R., Thapa, D. K., West, S., & Visentin, D. (2020). A systematic review of behavioral outcomes for leadership interventions among health professionals. *Journal of Nursing Research, 28*(5), e118. https://doi.org/10.1097/jnr.0000000000000397

Collins, A., Hislop, D., & Cartwright, S. (2016). Social support in the workplace between teleworkers, office-based colleagues and supervisors. *New Technology, Work and Employment, 31*(2), 161-175. https://doi.org/10.1111/ntwe.12065

Conger, J. A., & Ready, D. A. (2004). Rethinking leadership competences. *Leader to Leader, 2004*(32), 41-47. https://doi.org/10.1002/ltl.75

Contreras, F., Baykal, E., & Abid, G. (2020). E-leadership and teleworking in times of COVID-19 and beyond: What we know and where do we go. *Frontiers in Psychology, 11*, 590271. https://doi.org/10.3389/fpsyg.2020.590271

Cortellazzo, L., Bruni, E., & Zampieri, R. (2019). The role of leadership in a digitalized world: A review. *Frontiers in Psychology, 10*, 1938. https://doi.org/10.3389/fpsyg.2019.01938

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*(1), 98–104. https://doi.org/10.1037/0021-9010.78.1.98

Crawford, J. (2022). Working from home, telework, and psychological well-being? a systematic review. *Sustainability, 14*(19), 11874. https://doi.org/10.3390/su141911874

Cripe, K. M., & Burleigh, C. (2022). Examining leadership skills, behaviors, and effective communication for virtual IT project managers. *Team Performance Management, 28*(3/4), 223–237. https://doi.org/10.1108/tpm-11-2021-0085

Cropanzano, R., & Wright, T. A. (2001). When a "happy" worker is really a "productive" worker: A review and further refinement of the happy-productive worker thesis. *Consulting Psychology Journal: Practice and Research, 53*(3), 182-199. https://doi.org/10.1037/1061-4087.53.3.182

Cullen-Lester, K. L., Maupin, C. K., & Carter, D. R. (2017). Incorporating social networks into leadership development: A conceptual model and evaluation of research and practice. *The Leadership Quarterly, 28*(1), 130–152. https://doi.org/10.1016/j.leaqua.2016.10.005

Dahlstrom, T. R. (2013). Telecommuting and leadership style. *Public Personnel Management, 42*(3), 438–451. https://doi.org/10.1177/0091026013495731

Darics, E. (2020). E-Leadership or "how to be boss in instant messaging?" The role of nonverbal communication. *International Journal of Business Communication, 57*(1), 3–29. https://doi.org/10.1177/2329488416685068

Davidov, E., Meuleman, B., Cieciuch, J., Schmidt, P., & Billiet, J. (2014). Measurement equivalence in cross-national research. *Annual Review of Sociology, 40*(1), 55–75. https://doi.org/10.1146/annurev-soc-071913-043137

Day, D., Fleenor, J., Atwater, L., Sturm, R., & Mckee, R. (2014). Advances in Leader and Leadership Development: A Review of 25 Years of Research and Theory. *The Leadership Quarterly*, 25, 63-82. https://doi.org/10.1016/j.leaqua.2013.11.004

Day, D. V., & Dragoni, L. (2015). Leadership development: an outcome-oriented review based on time and levels of analyses. *Annual Review of Organizational Psychology and Organizational Behavior, 2*(1), 133-156. https://doi.org/10.1146/annurev-orgpsych-032414-111328

DeChurch, L. A., Hiller, N. J., Murase, T., Doty, D., & Salas, E. (2010). Leadership across levels: levels of leaders and their levels of impact. *The Leadership Quarterly, 21*(6), 1069-1085. https://doi.org/10.1016/j.leaqua.2010.10.009

Decuypere, A. (2023). Aandachtige leidercommunicatie in hybride tijden: pilottest van een nieuwe training. *Gedrag & Organisatie, 36*(4), 335-380. https://doi.org/10.5117/go2023.4.003.decu

Delanoeije, J., & Verbruggen, M. (2020). Between-person and within-person effects of telework: a quasi-field experiment. *European Journal of Work and Organizational Psychology, 29*(6), 795-808. https://doi.org/10.1080/1359432x.2020.1774557

Delanoeije, J., Verbruggen, M., & Germeys, L. (2019). Boundary role transitions: a day-to-day approach to explain the effects of home-based telework on work-to-home conflict and home-to-work conflict. *Human Relations, 72*(12), 1843-1868. https://doi.org/10.1177/0018726718823071https://www.google.com/url?sa=E&q=https%3A%2F%2Fdoi.org%2F10.1177%2F0018726718823071

Den Hartog, D. N., & Den Hoogh, A. H. B. (2024). Cross-cultural leadership: what we know, what we need to know, and where we need to go. *Annual Review of Organizational Psychology and Organizational Behavior, 11*(1), 535-566. https://doi.org/10.1146/annurev-orgpsych-110721-033711

DeRue, D. S., Nahrgang, J. D., Wellman, N. E., & Humphrey, S. E. (2011). Trait and behavioral theories of leadership: An integration and meta-analytic test of their relative validity. *Personnel Psychology, 64*(1), 7-52. https://doi.org/10.1111/j.1744-6570.2010.01201.x

Di Fabio, A., & Peiró, J. M. (2018). Human capital sustainability leadership to promote sustainable development and healthy organizations: A new scale. *Sustainability, 10*(7), 2413. https://doi.org/10.3390/su10072413

Dickens, L., & Watkins, K. E. (1999). Action research: rethinking lewin. *Management Learning, 30*(2), 127-140. https://doi.org/10.1177/1350507699302002

Dickson, M. W., Den Hartog, D. N., & Mitchelson, J. K. (2003). Research on leadership in a cross-cultural context: making progress,and raising new questions. *The Leadership Quarterly, 14*(6), 729-768. https://doi.org/10.1016/j.leaqua.2003.09.002

Dissanayake, J. (2024). *Exploring the impact of remote work on the psychological well-being of software professionals in New Zealand*. [Unpublished master's thesis]. Otago Polytechnic. https://doi.org/10.34074/thes.6382

Donaldson-Feilder, E., Yarker, J., & Lewis, R. (2009). *Preventing stress: Promoting positive manager behavior* (p. 59). CIPD. Available online: https://www.cipd.org/globalassets/media/knowledge/knowledge-hub/reports/preventing-stress_2009-promoting-positive-manager-behaviour_tcm18-16794.pdf (accessed on April 27, 2025).

EADA Business School. (2024). *Teletrabajo: Una realidad tras la pandemia 2024*. https://www.eada.edu/es/actualidad/prensa/informes/teletrabajo-una-realidad-tras-la-pandemia-2024

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review, 109*(3), 573-598. https://doi.org/10.1037/0033-295X.109.3.573

Earley, P. C. (2012). Observation methods: learning about leadership practice through shadowing. *ECPS - Educational, Cultural and Psychological Studies, 6*, 15-31. https://doi.org/10.7358/ecps-2012-006-earl

Efimov, I., Harth, V., & Mache, S. (2020). Health-oriented self and employee leadership in virtual teams: A qualitative study with virtual leaders. *International Journal of Environmental Research and Public Health, 17*(18), 6519. https://doi.org/10.3390/ijerph17186519

Efimov, I., Rohwer, E., Harth, V., & Mache, S. (2022). Virtual leadership in relation to employees' mental health, job satisfaction and perceptions of isolation: A scoping review. *Frontiers in Psychology, 13*, 960955. https://doi.org/10.3389/fpsyg.2022.960955

Elyousfi, F., Anand, A., & Dalmasso, A. (2021). Impact of e-leadership and team dynamics on virtual team performance in a public organization. *International*

*Journal of Public Sector Management, 35*(8), 917-937. https://doi.org/10.1108/ijpsm-08-2020-0218

Ernst, B. A., Banks, G. C., Loignon, A. C., Frear, K. A., Williams, C. E., Arciniega, L. M., Gupta, R. K., Kodydek, G., & Subramanian, D. (2022). Virtual charismatic leadership and signaling theory: A prospective meta-analysis in five countries. *The Leadership Quarterly, 33*(5), 101541. https://doi.org/10.1016/j.leaqua.2021.101541

Eurofound. (2017). *Working anytime, anywhere: The effects on the world of work*. Publications Office of the European Union; International Labour Office. http://eurofound.link/ef1658

Eurofound. (2020). *Living, working and COVID-19*. COVID-19 series. Publications Office of the European Union. https://www.eurofound.europa.eu/publications/report/2020/living-working-and-covid-19

Eurofound (2020). *Telework and ICT-based mobile work: Flexible working in the digital age*. New forms of employment series, Publications Office of the European Union.

Eurofound (2021). Telework. In *European Industrial Relations Dictionary*. https://www.eurofound.europa.eu/en/european-industrial-relations-dictionary/telework

European Commission: Directorate-General for Research and Innovation. (2024). *ERA industrial technologies roadmap on human-centric research and innovation for the* manufacturing sector. Publications Office of the European Union. https://data.europa.eu/doi/10.2777/0266.

Eurostat. (2024). *Employed persons working from home as a percentage of the total employment, by sex, age and professional status (%)* [Data set]. European Commission. https://ec.europa.eu/eurostat/databrowser/view/lfsa_ehomp__custom_12158505/default/table?lang=en

Fauville, G., Luo, M., Queiroz, A. C. M., Bailenson, J. N., & Hancock, J. T. (2021). Zoom exhaustion & fatigue scale. *Computers in Human Behavior Reports, 4*, 100119. https://doi.org/10.1016/j.chbr.2021.100119

Feitosa, J., & Salas, E. (2021). Today's virtual teams: Adapting lessons learned to the pandemic context. *Organizational Dynamics, 50*(1), 100777. https://doi.org/10.1016/j.orgdyn.2020.100777

Félix, A. (2022). Gestão de talentos, home office e comunicaçao digital. Passado, presente… que futuro pós COVID-19? *International Humanities Review / Revista Internacional de Humanidades, 11*(Special Issue), 1–17. https://doi.org/10.37467/revhuman.v11.4136

Felstead, A., Jewson, N., & Walters, S. (2003). Managerial control of employees working at home. *British Journal of Industrial Relations, 41*(2), 241-264. https://doi.org/10.1111/1467-8543.00271

Flavián, C., Guinalíu, M., & Jordán, P. (2019). Antecedents and consequences of trust on a virtual team leader. *European Journal of Management and Business Economics, 28*(1), 2-24. https://doi.org/10.1108/ejmbe-11-2017-0043

Fonner, K. L., & Roloff, M. E. (2010). Why teleworkers are more satisfied with their jobs than are office-based workers: When less contact is beneficial. *Journal of Applied Communication Research, 38*(4), 336-361. https://doi.org/10.1080/00909882.2010.513998

Foxon, M. (1993). A process approach to the transfer of training. *Australasian Journal of Educational Technology, 9*(2). https://doi.org/10.14742/ajet.2104

Fröhlich, L. S., Krick, A., Münstermann, F., Reiner, A., Schübbe, K., Renner, K.-H., & Felfe, J. (2025). *Hybride Führung meistern: Einblicke in die Onlineplattform für Führungskräfte DigiLAP*. In D. Schulz (Ed.), dtec.bw-Beiträge der Helmut-Schmidt-Universität / Universität der Bundeswehr Hamburg – Forschungsaktivitäten im Zentrum für Digitalisierungs- und Technologieforschung der Bundeswehr dtec.bw (pp. 280–285). Helmut-Schmidt-Universität/ Universität

der Bundeswehr. https://openhsu.ub.hsu-hh.de/server/api/core/bitstreams/d5ff5166-fcc1-4359-8268-826044fc136d/content

Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92*(6), 1524-1541. https://doi.org/10.1037/0021-9010.92.6.1524

Gajendran, R. S., Harrison, D. A., & Delaney-Klinger, K. (2014). Are telecommuters remotely good citizens? unpacking telecommuting's effects on performance via i-deals and job resources. *Personnel Psychology, 68*(2), 353-393. https://doi.org/10.1111/peps.12082

Gajendran, R. S., & Joshi, A. (2012). Innovation in globally distributed teams: the role of lmx, communication frequency, and member influence on team decisions. *Journal of Applied Psychology, 97*(6), 1252-1261. https://doi.org/10.1037/a0028958

Gajendran, R. S., Ponnapalli, A. R., Wang, C., & Javalagi, A. A. (2024). A dual pathway model of remote work intensity: a meta-analysis of its simultaneous positive and negative effects. *Personnel Psychology, 77*(4), 1351-1386. https://doi.org/10.1111/peps.12641

Gardner, W. L., Cogliser, C. C., Davis, K. M., & Dickens, M. (2011). Authentic leadership: a review of the literature and research agenda. *The Leadership Quarterly, 22*(6), 1120-1145. https://doi.org/10.1016/j.leaqua.2011.09.007

Gardner, W. L., Lowe, K. B., Meuser, J. D., Noghani, F., Gullifor, D. P., & Cogliser, C. C. (2020). The leadership trilogy: a review of the third decade of the leadership quarterly. *The Leadership Quarterly, 31*(1), 101379. https://doi.org/10.1016/j.leaqua.2019.101379

Gerstner, C. R., & Day, D. V. (1997). Meta-analytic review of leader–member exchange theory: correlates and construct issues. *Journal of Applied Psychology, 82*(6), 827-844. https://doi.org/10.1037/0021-9010.82.6.827

Giacomelli, G., Annesi, N., & Barbieri, M. (2023). Telework and job satisfaction in knowledge-intensive public organizations: a quali-quantitative analysis from an environmental protection agency in italy. *Journal of Public Budgeting, Accounting & Financial Management, 36*(5), 617-635. https://doi.org/10.1108/jpbafm-07-2023-0134

Gilson, L. L., Maynard, M. T., Jones Young, N. C., Vartiainen, M., & Hakonen, M. (2014). Virtual Teams Research: 10 Years, 10 Themes, and 10 Opportunities. *Journal of Management, 41*(5), 1313-1337. https://doi.org/10.1177/0149206314559946

Gobierno de España. (2021, July 9). *Ley 10/2021, de 9 de julio, de trabajo a distancia*. Boletín Oficial del Estado, 164, 83129-83150. https://www.boe.es/eli/es/l/2021/07/09/10

Gohoungodji, P., N'Dri, A. B., & Matos, A. L. B. (2022). What makes telework work? Evidence of success factors across two decades of empirical research: a systematic and critical review. *International Journal of Human Resource Management, 34*(3), 605–649. https://doi.org/10.1080/09585192.2022.2112259

Golden, T. D. (2006). The role of relationships in understanding telecommuter satisfaction. *Journal of Organizational Behavior, 27*(3), 319–340. https://doi.org/10.1002/job.369

Golden, T. D., & Fromen, A. (2011). Does it matter where your manager works? Comparing managerial work mode (traditional, telework, virtual) across subordinate work experiences and outcomes. *Human Relations, 64*(11), 1451-1475. https://doi.org/10.1177/0018726711415581

Golden, T. D., & Gajendran, R. S. (2019). Unpacking the role of a telecommuter's job in their performance: examining job complexity, problem solving, interdependence, and social support. *Journal of Business and Psychology, 34*(1), 55-69. https://doi.org/10.1007/s10869-018-9530-4

Golden, T. D., & Veiga, J. F. (2005). The impact of extent of telecommuting on job satisfaction: resolving inconsistent findings. *Journal of Management, 31*(2), 301-318. https://doi.org/10.1177/0149206304271768

Golden, T. D., & Veiga, J. F. (2008). The impact of superior–subordinate relationships on the commitment, job satisfaction, and performance of virtual workers. *The Leadership Quarterly, 19*(1), 77-88. https://doi.org/10.1016/j.leaqua.2007.12.009

Golden, T. D., Veiga, J. F., & Dino, R. N. (2008). The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *Journal of Applied Psychology, 93*(6), 1412-1421. https://doi.org/10.1037/a0012722

González-Anta, B. (2024). Digitalization. In V. Ratten (Ed.). *International Encyclopedia of Business Management*. Elsevier. https://doi.org/10.1016/B978-0-443-13701-3.00069-4

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: development of leader-member exchange (lmx) theory of leadership over 25 years: applying a multi-level multi-domain perspective. *The Leadership Quarterly, 6*(2), 219-247. https://doi.org/10.1016/1048-9843(95)90036-5

Grant, C. A., Wallace, L. M., Spurgeon, P. C., Tramontano, C., & Charalampous, M. (2019). Construction and initial validation of the E-Work Life Scale to measure remote e-working. *Employee Relations, 41*(1), 16-33. https://doi.org/10.1108/ER-09-2017-0229

Haines, V. Y., St-Onge, S., & Archambault, M. (2002). Environmental and person antecedents of telecommuting outcomes. *Journal of End User Computing, 14*(3), 32–50. https://doi.org/10.4018/joeuc.2002070103

Halmen, E., Lamsali, H., & Iteng, R. (2024). The impact of virtual work on employee adaptive performance in its industry. *PaperASIA, 40*(6b), 245-256. https://doi.org/10.59953/paperasia.v40i6b.193

Hambley, L. A., O'Neill, T. A., & Kline, T. J. B. (2007). Virtual team leadership: The effects of leadership style and communication medium on team interaction styles and outcomes. *Organizational Behavior and Human Decision Processes, 103*(1), 1–20. https://doi.org/10.1016/j.obhdp.2006.09.004

Hambley, L., O'Neill, T., & Kline, T. J. B. (2007). Virtual team leadership. *International Journal of E-Collaboration, 3*(1), 40-64. https://doi.org/10.4018/jec.2007010103

Hammer, L. B., Kossek, E. E., Bodner, T., & Crain, T. L. (2013). Measurement development and validation of the Family Supportive Supervisor Behavior Short-Form (FSSB-SF). *Journal of Occupational Health Psychology, 18*(3), 285–296. https://doi.org/10.1037/a0032612

Han, S. J., Chae, C., Macko, P., Park, W., & Beyerlein, M. (2017). How virtual team leaders cope with creativity challenges. *European Journal of Training and Development, 41*(3), 261–276. https://doi.org/10.1108/ejtd-10-2016-0073

Han, S. J., & Hazard, N. (2022). Shared Leadership in Virtual Teams at Work: Practical Strategies and Research Suggestions for Human Resource Development. *Human Resource Development Review, 21*(3), 300-323. https://doi.org/10.1177/15344843221093376

Han, S. J., Kim, M., Beyerlein, M., & DeRosa, D. (2020). Leadership role effectiveness as a mediator of team performance in new product development virtual teams. *Journal of Leadership Studies, 13*(4), 20–36. https://doi.org/10.1002/jls.21677

Harker Martin, B., & Mesler, R. M. (2012). Is telework effective for organizations? *Management Research Review, 35*(7), 602-616. https://doi.org/10.1108/01409171211238820

Harris, A., Jones, M., & Baba, S. (2013). Distributed Leadership and Digital Collaborative Learning: A Synergistic Relationship? *British Journal of Educational Technology, 44*(6), 926-939. https://doi.org/10.1111/bjet.12107

Henderson, A. A., Foster, G. C., Matthews, R. A., & Zickar, M. J. (2020). A psychometric assessment of ocb: clarifying the distinction between ocb and cwb and developing a revised ocb measure. *Journal of Business and Psychology, 35*(6), 697-712. https://doi.org/10.1007/s10869-019-09653-8

Henke, R. M., Benevent, R., Schulte, P. M., Rinehart, C., Crighton, K. A., & Corcoran, M. K. (2015). The effects of telecommuting intensity on employee health. *American Journal of Health Promotion, 30*(8), 604-612. https://doi.org/10.4278/ajhp.141027-quan-544

Hersey, P., & Blanchard, K. H. (1974). So you want to know your leadership style? *Training & Development Journal, 28*(2), 22–37.

Hill, N. S., & Bartol, K. M. (2016). Empowering leadership and effective collaboration in geographically dispersed teams. *Personnel Psychology, 69*(1), 159–198. https://doi.org/10.1111/peps.12108

Hoch, J. E., & Kozlowski, S. W. J. (2014). Leading virtual teams: Hierarchical leadership, structural supports, and shared team leadership. *Journal of Applied Psychology, 99*(3), 390-403. https://doi.org/10.1037/a0030264

Hodžić, S., Prem, R., Nielson, C., & Kubicek, B. (2023). When telework is a burden rather than a perk: the roles of knowledge sharing and supervisor social support in mitigating adverse effects of telework during the covid-19 pandemic. *Applied Psychology, 73*(2), 599-621. https://doi.org/10.1111/apps.12491

Hoegl, M., & Muethel, M. (2016). Enabling shared leadership in virtual project teams: A practitioners' guide. *Project Management Journal, 47*(1), 7–12. https://doi.org/10.1002/pmj.21564

Hollenbeck, G. P., McCall, M. W., & Silzer, R. F. (2006). Leadership competency models. *The Leadership Quarterly, 17*(4), 398-413. https://doi.org/10.1016/j.leaqua.2006.04.003

Howard, M. C., & Melloy, R. C. (2016). Evaluating item-sort task methods: the presentation of a new statistical significance formula and methodological best practices. *Journal of Business and Psychology, 31*(1), 173-186. https://doi.org/10.1007/s10869-015-9404-y

Howe, L. C., & Menges, J. I. (2022). Remote work mindsets predict emotions and productivity in home office: a longitudinal study of knowledge workers during the covid-19 pandemic. *Human–Computer Interaction, 37*(6), 481-507. https://doi.org/10.1080/07370024.2021.1987238

Hu, J., Xiong, L., Zhang, M., & Chen, C. (2022). The mobilization of employees' psychological resources: how servant leadership motivates pro-customer deviance. *International Journal of Contemporary Hospitality Management, 35*(1), 115-136. https://doi.org/10.1108/ijchm-02-2022-0198

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Idrovo Carlier, S., Leon Llorente, C., & Grau Grau, M. (2012). Comparing work-life balance in Spanish and Latin-American countries. *European Journal of Training and Development, 36*(2/3), 286-307. https://doi.org/10.1108/03090591211204751

Ilozor, D. B., Ilozor, B. D., & Carr, J. (2001). Management communication strategies determine job satisfaction in telecommuting. *Journal of Management Development, 20*(6), 495–507. https://doi.org/10.1108/02621710110399783

Inceoglu, I., Thomas, G., Chu, C. W. L., Plans, D., & Gerbasi, A. (2018). Leadership behavior and employee well-being: an integrated review and a future research agenda. *The Leadership Quarterly, 29*(1), 179-202. https://doi.org/10.1016/j.leaqua.2017.12.006

Instituto Nacional de Estadística (INE). (2024). *Encuesta sobre equipamiento y uso de tecnologías de información y comunicación (tic) en los hogares - año 2024*. https://www.ine.es/dyngs/Prensa/es/TICH2024.htm

International Labour Organization. (2020). *Working from home*. https://www.ilo.org/resource/other/working-home

Jawadi, N., Daassi, M., Favier, M., & Kalika, M. (2013). Relationship building in virtual teams: a leadership behavioral complexity perspective. *Human Systems Management, 32*(3), 199-211. https://doi.org/10.3233/hsm-130791

Jooss, S., McDonnell, A., & Conroy, K. (2021). Flexible global working arrangements: An integrative review and future research agenda. *Human Resource Management Review, 31*(4), 100780. https://doi.org/10.1016/j.hrmr.2020.100780

Joshi, A., Lazarova, M., & Liao, H. (2009). Getting everyone on board: the role of inspirational leadership in geographically dispersed teams. *Organization Science, 20*(1), 240-252. https://doi.org/10.1287/orsc.1080.0383

Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: a meta-analytic test of their relative validity. *Journal of Applied Psychology, 89*(5), 755-768. https://doi.org/10.1037/0021-9010.89.5.755

Kane, L. M. (2014). *Telework and organizational citizenship behaviors: The underexplored roles of social identity and professional isolation* (Publication No. 3641843) [Doctoral dissertation, University of New York]. Available from ProQuest One Academic. (1626388419). https://www.proquest.com/dissertations-theses/telework-organizational-citizenship-behaviors/docview/1626388419/se-2

Karácsony, P. (2021). Impact of teleworking on job satisfaction among slovakian employees in the era of covid-19. *Problems and Perspectives in Management, 19*(3), 1-9. https://doi.org/10.21511/ppm.19(3).2021.01

Karani, A., & Mehta, S. A. (2022). "I am OK when you are with me"–Understanding the well-being and innovative behavior in the digitized workspace. *International*

*Journal of Sociology and Social Policy, 42*(5/6), 583-602. https://doi.org/10.1108/ijssp-05-2021-0127

Kashive, N., Khanna, V. T., & Powale, L. (2022). Virtual team performance: E-leadership roles in the era of COVID-19. *Journal of Management Development, 41*(5), 277–300. https://doi.org/10.1108/jmd-05-2021-0151

Kazekami, S. (2020). Mechanisms to improve labor productivity by performing telework. *Telecommunications Policy, 44*(2), 101868. https://doi.org/10.1016/j.telpol.2019.101868

Kelley, E., & Kelloway, E. K. (2012). Context matters: Testing a model of remote leadership. *Journal of Leadership & Organizational Studies, 19*(4), 437–449. https://doi.org/10.1177/1548051812454173

Kelloway, E. K., & Barling, J. (2010). Leadership development as an intervention in occupational health psychology. *Work & Stress, 24*(3), 260-279. https://doi.org/10.1080/02678373.2010.518441

Kelliher, C., & Anderson, D. (2009). Doing more with less? flexible working practices and the intensification of work. *Human Relations, 63*(1), 83-106. https://doi.org/10.1177/0018726709349199

Kirkpatrick, D. L. (1979). Techniques for evaluating training programs. *Training and Development Journal, 33*(6), 78-92.

Kirkpatrick, J. D., & Kirkpatrick, W. K. (2016). *Kirkpatrick's four levels of training evaluation*. Association for Talent Development.

Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., et al. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist, 76*(1), 63–77. https://doi.org/10.1037/amp0000716

Konradt, U., Hertel, G., & Schmook, R. (2003). Quality of management by objectives, task-related stressors, and non-task-related stressors as predictors of stress and job satisfaction among teleworkers. *European Journal of Work and Organizational Psychology, 12*(1), 61–79. https://doi.org/10.1080/13594320344000020

Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., Schaufeli, W. B., de Vet, H. C., & van der Beek, A. J. (2011). Conceptual frameworks of individual work performance: A systematic review. *Journal of Occupational and Environmental Medicine, 53*(8), 856-866. https://doi.org/10.1097/JOM.0b013e318226a763

Koopmans, L., Coffeng, J., Bernaards, C., Boot, C. R. L., Hildebrandt, V., de Vet, H. C., … & van der Beek, A. J. (2014). Responsiveness of the individual work performance questionnaire. *BMC Public Health, 14*(1), 513. https://doi.org/10.1186/1471-2458-14-513

Kozlowski, S. W. J., Chao, G. T., & Van Fossen, J. A. (2021). Leading virtual teams. *Organizational Dynamics, 51*(1), 100842. https://doi.org/10.1016/j.orgdyn.2021.100842

Kozlowski, S. W. J., & Ilgen, D. R. (2006). Enhancing the effectiveness of work groups and teams. *Psychological Science in the Public Interest, 7*(3), 77-124. https://doi.org/10.1111/j.1529-1006.2006.00030.x

Kożusznik, M. W., Rodríguez, I., & Silla, J. M. P. (2015). Eustress and distress climates in teams: patterns and outcomes. *International Journal of Stress Management, 22*(1), 1-23. https://doi.org/10.1037/a0038581

Kreamer, L., Stock, G., & Rogelberg, S. (2021). Optimizing virtual team meetings: Attendee and leader perspectives. *American Journal of Health Promotion, 35*(5), 744-747. https://doi.org/10.1177/08901171211007955

Krick, A., Fröhlich, L. S., Münstermann, L. F., & Felfe, J. (2025). Mit der digital leadership assistance platform (digilap) digitale führungskompetenz entwickeln. *Gruppe. Interaktion. Organisation. Zeitschrift Für Angewandte*

*Organisationspsychologie (GIO), 56*(1), 69-81. https://doi.org/10.1007/s11612-024-00788-8

Krueger, R. A. (1994). *Focus groups: A practical guide for applied research* (2nd ed.). Sage Publications.

Krug, H., Haslam, S. A., Otto, K., & Steffens, N. K. (2021). Identity leadership, social identity continuity, and well-being at work during covid-19. *Frontiers in Psychology, 12*, 684475. https://doi.org/10.3389/fpsyg.2021.684475

Kurland, N. B., & Cooper, C. D. (2002). Manager control and employee isolation in telecommuting environments. *Journal of High Technology Management Research, 13*(1), 107–126. https://doi.org/10.1016/s1047-8310(01)00051-7

Kuruzovich, J., Paczkowski, W., Golden, T. D., Goodarzi, S., & Venkatesh, V. (2021). Telecommuting and job outcomes: A moderated mediation model of system use, software quality, and social Exchange. *Information & Management, 58*(3), 103431. https://doi.org/10.1016/j.im.2021.103431

Lacerenza, C. N., Reyes, D. L., Marlow, S. L., Joseph, D. L., & Salas, E. (2017). Leadership training design, delivery, and implementation: a meta-analysis. *Journal of Applied Psychology, 102*(12), 1686-1718. https://doi.org/10.1037/apl0000241

Lamprinou, V. D. I., Tasoulis, K., & Kravariti, F. (2021). The impact of servant leadership and perceived organisational and supervisor support on job burnout and work–life balance in the era of teleworking and covid-19. *Leadership & Organization Development Journal, 42*(7), 1071-1088. https://doi.org/10.1108/lodj-12-2020-0526

Lapointe, C., Langlois, L., Valois, P., & Arar, K. (2016). An international cross-cultural validation of the ethical leadership questionnaire. *International Studies in Educational Administration, 44*(2), 129-150. https://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-128812

Larson, L. L., & DeChurch, L. A. (2020). Leading teams in the digital age: Four perspectives on technology and what they mean for leading teams. *The Leadership Quarterly, 31*(1), 101377. https://doi.org/10.1016/j.leaqua.2019.101377

Lauring, J., & Jonasson, C. (2018). Can leadership compensate for deficient inclusiveness in global virtual teams?. *Human Resource Management Journal, 28*(3), 392-409. https://doi.org/10.1111/1748-8583.12184

Lautsch, B. A., & Kossek, E. E. (2011). Managing a blended workforce. *Organizational Dynamics, 40*(1), 10-17. https://doi.org/10.1016/j.orgdyn.2010.10.005

Lautsch, B. A., Kossek, E. E., & Eaton, S. C. (2009). Supervisory approaches and paradoxes in managing telecommuting implementation. *Human Relations, 62*(6), 795–827. https://doi.org/10.1177/0018726709104543

Lee, Y., & Kim, J. (2022). How family-supportive leadership communication enhances the creativity of work-from-home employees during the covid-19 pandemic. *Management Communication Quarterly, 37*(3), 599-628. https://doi.org/10.1177/08933189221144997

Lee, D., Lee, J., & Kim, S. Y. (2023). Paving the way for interpersonal collaboration in telework: the moderating role of organizational goal clarity in the public workplace. *Review of Public Personnel Administration, 44*(4), 768-789. https://doi.org/10.1177/0734371x231190324

Leonardelli, G. J. (2022). Lessons from a Crisis. *Organizational Dynamics, 51*(2), 100886. https://doi.org/10.1016/j.orgdyn.2021.100886

LePine, J. A., Erez, A., & Johnson, D. E. (2002). The nature and dimensionality of organizational citizenship behavior: a critical review and meta-analysis. *Journal of Applied Psychology, 87*(1), 52-65. https://doi.org/10.1037/0021-9010.87.1.52

Liao, C. (2017). Leadership in virtual teams: a multilevel perspective. *Human Resource Management Review, 27*(4), 648-659. https://doi.org/10.1016/j.hrmr.2016.12.010

Liao, H., & Chuang, A. (2007). Transforming service employees and climate: a multilevel, multisource examination of transformational leadership in building long-term service relationships. *Journal of Applied Psychology, 92*(4), 1006-1019. https://doi.org/10.1037/0021-9010.92.4.1006

Liao, M., Li, S., & Liu, H. (2024). The impact mechanism of telework on job performance: a cross-level moderation model of digital leadership. *Scientific Reports, 14*(1), 13392. https://doi.org/10.1038/s41598-024-63518-6

Lojeski, K. S., & Reilly, R. R. (2020). *The Power of Virtual Distance: A Guide to Productivity and Happiness in the Age of Remote Work*. John Wiley & Sons.

Lundqvist, D., & Wallo, A. (2023). Leadership and employee well-being and work performance when working from home: a systematic literature review. *Scandinavian Journal of Work and Organizational Psychology, 8*(1), 9. https://doi.org/10.16993/sjwop.199

Madlock, P. E. (2012). The influence of supervisors' leadership style on telecommuters. *Journal of Business Strategies, 29*(1), 1-24. https://doi.org/10.54155/jbs.29.1.1-24

Madlock, P. E. (2018). The influence of leadership style on telecommuters in the insurance industry: A contingency theory approach. *Journal of Leadership, Accountability and Ethics, 15*(2), 73–85. https://doi.org/10.33423/jlae.v15i2.645

Maduka, N. S., Edwards, H., Greenwood, D., Osborne, A., & Babatunde, S. O. (2018). Analysis of competences for effective virtual team leadership in building successful organisations. *Benchmarking, 25*(2), 696–712. https://doi.org/10.1108/bij-08-2016-0124

Magnavita, N., Tripepi, G., & Chiorri, C. (2021). Telecommuting, off-time work, and intrusive leadership in workers' well-being. *International Journal of Environmental Research and Public Health, 18*(7), 3330. https://doi.org/10.3390/ijerph18073330

Makarius, E. E., & Larson, B. Z. (2017). Changing the perspective of virtual work: building virtual intelligence at the individual level. *Academy of Management Perspectives, 31*(2), 159-178. https://doi.org/10.5465/amp.2014.0120

Malhotra, A., Majchrzak, A., & Rosen, B. (2007). Leading virtual teams. *Academy of Management Perspectives, 21*(1), 60–70. https://doi.org/10.5465/amp.2007.24286164

Mann, S., & Holdsworth, L. (2003). The psychological impact of teleworking: stress, emotions and health. *New Technology, Work and Employment, 18*(3), 196-211. https://doi.org/10.1111/1468-005x.00121

Martin, R., Guillaume, Y., Thomas, G., Lee, A., & Epitropaki, O. (2015). Leader–member exchange (lmx) and performance: a meta-analytic review. *Personnel Psychology, 69*(1), 67-121. https://doi.org/10.1111/peps.12100

Martinolli, G. (2024). *Assessment and Analysis of the Psychological and Unit Climate for Well-Being. Exploring Its Mediator Role in the Relationship between Teleworking Components, Well-Being, and Scientific Productivity as an Exemplar* [Doctoral dissertation, University of Valencia]. RODERIC. https://hdl.handle.net/10550/102101

Martinolli, G., Posada, A. S., Belli, S., Tomas, I., & Tordera, N. (2023). Teleworking Components and Scientific Productivity in Spanish ERC-Granted Teams: The Mediating Role of Climate and Well-Being. *Journal of Work and Organizational Psychology, 39*(3), 131 - 143. https://doi.org/10.5093/jwop2023a14

Martinolli, G., Posada, A. S., Belli, S., Tomás, I., & Tordera, N. (2024). The joint role of focused and molar climates and eudaemonic well-being as mediators of the relationship between flexible telework and scientific productivity in spanish erc-granted teams. *The Spanish Journal of Psychology, 27*, e5. https://doi.org/10.1017/sjp.2024.5

McClelland, D. C. (1973). Testing for competence rather than for "intelligence." *American Psychologist, 28*(1), 1–14. https://doi.org/10.1037/h0034092

McDonald, K. S., Hite, L. M., & O'Connor, K. W. (2022). Developing sustainable careers for remote workers. *Human Resource Development International, 25*(2), 182–198. https://doi.org/10.1080/13678868.2022.2047148

Means, B., Toyama, Y., Murphy, R. F., & Baki, M. (2013). The effectiveness of online and blended learning: a meta-analysis of the empirical literature. *Teachers College Record: The Voice of Scholarship in Education, 115*(3), 1-47. https://doi.org/10.1177/016146811311500307

Meiryani, N., Nelviana, N., Koh, Y., Soepriyanto, G., Aljuaid, M., & Hasan, F. (2022). The effect of transformational leadership and remote working on employee performance during COVID-19 pandemic. *Frontiers in Psychology, 13*, 919631. https://doi.org/10.3389/fpsyg.2022.919631

Messenger, J. C., & Gschwind, L. (2016). Three generations of telework: new icts and the (r)evolution from home office to virtual office. *New Technology, Work and Employment, 31*(3), 195-208. https://doi.org/10.1111/ntwe.12073

Michinov, E., Ruiller, C., Chédotel, F., Dodeler, V., & Michinov, N. (2022). Work-from-home during covid-19 lockdown: when employees' well-being and creativity depend on their psychological profiles. *Frontiers in Psychology, 13*, 862987. https://doi.org/10.3389/fpsyg.2022.862987

Ministerio de Ciencia e Innovación. (2020). *Estrategia Española de Ciencia, Tecnología e Innovación*. https://www.ciencia.gob.es/stfls/MICINN/Ministerio/FICHEROS/EECTI-2021-2027.pdf

Mishra, J., & Dholakia, K. (2023). The future of hybrid learning models and sustainable education in the post-pandemic era. In: Walker, T., Tarabieh, K., Goubran, S., Machnik-Kekesi, G. (eds) *Sustainable Practices in Higher Education*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-27807-5_4

Moens, E., Lippens, L., Sterkens, P., Weytjens, J., & Baert, S. (2021). The covid-19 crisis and telework: a research survey on experiences, expectations and hopes. *The*

*European Journal of Health Economics, 23*(4), 729-753. https://doi.org/10.1007/s10198-021-01392-z

Mokhtarian, P. (1991). Telecommuting and travel: state of the practice, state of the art. *Transportation, 18*(4), 319-342. https://doi.org/10.1007/bf00186563

Morgan, L., Paucar-Caceres, A., & Wright, G. (2014). Leading effective global virtual teams: The consequences of methods of communication. *Systemic Practice and Action Research, 27*(6), 607–624. https://doi.org/10.1007/s11213-014-9315-2

Morganson, V. J., Major, D. A., Oborn, K. L., Verive, J. M., & Heelan, M. P. (2010). Comparing telework locations and traditional work arrangements. *Journal of Managerial Psychology, 25*(6), 578-595. https://doi.org/10.1108/02683941011056941

Morgeson, F. P., DeRue, D. S., & Karam, E. P. (2010). Leadership in teams: a functional approach to understanding leadership structures and processes. *Journal of Management, 36*(1), 5-39. https://doi.org/10.1177/0149206309347376

Morrison, G. R., Ross, S. J., Morrison, J. R., & Kalman, H. K. (2019). *Designing effective instruction*. John Wiley & Sons.

Mourão, L., da Silva Abbad, G., & Legentil, J. (2021). E-Leadership: Lessons Learned from Teleworking in the COVID-19 Pandemic. In R. B. C. Silva (Ed.), *Leadership*. IntechOpen. https://doi.org/10.5772/intechopen.100634

Mühl, A., Schöllbauer, J., Straus, E., & Korunka, C. (2024). Threatening relatedness while boosting social interactions: the inconsistent effect of daily task ambiguity on daily relatedness satisfaction among remote workers. *The International Journal of Human Resource Management, 36*(1), 56-79. https://doi.org/10.1080/09585192.2024.2439264

Mumford, M. D., Zaccaro, S. J., Connelly, M. S., & Marks, M. A. (2000). Leadership skills. *The Leadership Quarterly, 11*(1), 155-170. https://doi.org/10.1016/s1048-9843(99)00047-8

Muriel Ramírez, S. (2020). *El papel diferenciador de algunas condiciones sociodemográficas en la autoeficacia y el optimismo en trabajadores del sector de las telecomunicaciones en Colombia* [Undergraduate thesis, Universidad Católica de Pereira]. Institutional Repository. http://hdl.handle.net/10785/6242

Mutha, P., & Srivastava, M. (2023). Decoding leadership to leverage employee engagement in virtual teams. *International Journal of Organizational Analysis, 31*(3), 737-758. https://doi.org/10.1108/ijoa-07-2021-2856

Muthén, L. K., & Muthén, B. O. (2022). *Mplus user's guid*e (8th ed.). Muthén & Muthén.

Mutiganda, J. C., Wiitavaara, B., Heiden, M., Svensson, S., Fagerström, A., Bergström, G., … & Aboagye, E. (2022). A systematic review of the research on telework and organizational economic performance indicators. *Frontiers in Psychology, 13*, 1035310. https://doi.org/10.3389/fpsyg.2022.1035310

Nakrošienė, A., Bučiūnienė, I., & Goštautaitė, B. (2019). Working from home: characteristics and outcomes of telework. *International Journal of Manpower, 40*(1), 87-101. https://doi.org/10.1108/ijm-07-2017-0172

Narayanan, L., Menon, S., & Plaisent, M. (2017). Telecommuting: The work anywhere, anyplace, anytime organization in the 21st century. *Journal of Marketing & Management, 8*(2), 47-54.

Nemțeanu, M., Dabija, D., & Stanca, L. (2021). The influence of teleworking on performance and employees' counterproductive behaviour. *Amfiteatru Economic, 23*(58), 601-616. https://doi.org/10.24818/ea/2021/58/601

Neufeld, D. J., Wan, Z., & Fang, Y. (2008). Remote leadership, communication effectiveness and leader performance. *Group Decision and Negotiation, 19*(3), 227-246. https://doi.org/10.1007/s10726-008-9142-x

Newman, S. A., Ford, R. C., & Marshall, G. W. (2020). Virtual team leader communication: Employee perception and organizational reality. *International*

*Journal of Business Communication, 57*(4), 452–473. https://doi.org/10.1177/2329488419829895

Ng, T. W. H., & Feldman, D. C. (2009). How broadly does education contribute to job performance? *Personnel Psychology, 62*(1), 89-134. https://doi.org/10.1111/j.1744-6570.2008.01130.x

Ng, T. W. H., & Feldman, D. C. (2010). Organizational tenure and job performance. *Journal of Management, 36*(5), 1220-1250. https://doi.org/10.1177/0149206309359809

Ng, T. W. H., & Feldman, D. C. (2012). Age and innovation-related behavior: the joint moderating effects of supervisor undermining and proactive personality. *Journal of Organizational Behavior, 34*(5), 583-606. https://doi.org/10.1002/job.1802

Ngayo Fotso, G. M. (2021). Leadership competences for the 21st century: a review from the Western world literature. *European Journal of Training and Development, 45*(6/7), 566-587. https://doi.org/10.1108/ejtd-04-2020-0078

Nielsen, K., & Abildgaard, J. S. (2013). Organizational interventions: a research-based framework for the evaluation of both process and effects. *Work & Stress, 27*(3), 278-297. https://doi.org/10.1080/02678373.2013.812358

Nielsen, K., & Christensen, M. (2021). Positive participatory organizational interventions: a multilevel approach for creating healthy workplaces. *Frontiers in Psychology, 12*, 696245. https://doi.org/10.3389/fpsyg.2021.696245

Nielsen, K., & Randall, R. (2013). Opening the black box: presenting a model for evaluating organizational-level interventions. *European Journal of Work and Organizational Psychology, 22*(5), 601-617. https://doi.org/10.1080/1359432x.2012.690556

Nielsen, K., & Shepherd, R. (2022). Understanding the outcomes of training to improve employee mental health: a novel framework for training transfer and effectiveness

evaluation. *Work & Stress, 36*(4), 377-391. https://doi.org/10.1080/02678373.2022.2028318

Nielsen, K., & Taris, T. W. (2019). Leading well: Challenges to researching leadership in occupational health psychology – and some ways forward. *Work & Stress, 33*(2), 107-118. https://doi.org/10.1080/02678373.2019.1592263

Nilles, J. M., Carlson, F., Gray, P., & Hanneman, G. J. (1976). Telecommuting - an alternative to urban transportation congestion. *IEEE Transactions on Systems, Man, and Cybernetics, SMC-6*(2), 77-84. https://doi.org/10.1109/tsmc.1976.5409177

Norman, S. M., Avey, J., Larson, M., & Hughes, L. (2019). The development of trust in virtual leader–follower relationships. *Qualitative Research in Organizations and Management: An International Journal, 15*(3), 279–295. https://doi.org/10.1108/qrom-12-2018-1701

Northouse, P. G. (2025). *Leadership: Theory and practice (8th edition)*. Sage publications.

Núñez, M. T. S., Patti, J., & Latorre, J. M. (2023). Developing emotional and social intelligence in an education leadership postgraduate program: perceptions of aspiring school leader. *Escritos De Psicología - Psychological Writings, 16*(1). https://doi.org/10.24310/espsiescpsi.v16i1.14754

Observatorio Nacional de Tecnología y Sociedad (ONTSI). (2021). *El teletrabajo en España* [Telework in Spain]. https://www.ontsi.es/sites/ontsi/files/2022-06/teletrabajoenespana.pdf

Observatorio Nacional de Tecnología y Sociedad (ONTSI). (2021). *Flash Datos Teletrabajo: Segundo Trimestre de 2021*. https://www.ontsi.es/sites/ontsi/files/2021-09/indicadoresteletrabajo2T2021_1.pdf

Offstein, E. H., Morwick, J. M., & Koskinen, L. (2010). Making telework work: leading people and leveraging technology for competitive advantage. *Strategic HR Review, 9*(2), 32-37. https://doi.org/10.1108/14754391011022244

Olafsen, A. H., Stenling, A., Tafvelin, S., & Bentzen, M. (2024). The paradox of remote work: when employee wishes and well-being collide. *Human Resource Development International*, 1-9. https://doi.org/10.1080/13678868.2024.2351335

Observatorio Nacional de Tecnología y Sociedad (ONTSI). (2024). *Flash Teletrabajo 2024*. https://www.ontsi.es/es/publicaciones/Teletrabajo-2024

Organ, D. W., & Ryan, K. C. (1995). A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology, 48*(4), 775-802. https://doi.org/10.1111/j.1744-6570.1995.tb01781.x

Orhan, M. A., Rijsman, J. B., & van Dijk, G. M. (2016). Invisible, therefore isolated: comparative effects of team virtuality with task virtuality on workplace isolation and work outcomes. *Revista De Psicología Del Trabajo Y De Las Organizaciones, 32*(2), 109-122. https://doi.org/10.1016/j.rpto.2016.02.002

Parker, S. K., Knight, C., & Keller, A. (2020, ). *R*emote managers are having trust issues. *Harvard Business Review, July 30* https://hbr.org/2020/07/remote-managers-are-having-trust-issues

Pauleen, D. J. (2003). An inductively derived model of leader-initiated relationship building with virtual team members. *Journal of Management Information Systems, 20*(3), 227–256. https://doi.org/10.1080/07421222.2003.11045771

Peiró, J. M. (Ed.). (2024). *Las competencias digitales y digitalizadas. Sus implicaciones en el ámbito laboral y de los recursos humanos*. Fundación BBVA.

Peiró, J. M., Ayala, Y., Tordera, N., Lorente, L., & Rodríguez, I. (2014). Bienestar sostenible en el trabajo: Revisión y reformulación [Sustainable well-being at work: A review and reformulation]. *Papeles del Psicólogo, 35*(1), 5–14. https://doaj.org/article/9fc55af821734dfca457e2ccf5b6f750

Peiró, J. M., Bravo-Duarte, F., González-Anta, B., & Todolí-Signes, A. (2024). Supervisory performance in telework: the role of job demands, resources, and

satisfaction with telework. *Frontiers in Organizational Psychology, 2*, 1430812. https://doi.org/10.3389/forgp.2024.1430812

Peiró, J. M., & Martínez-Tur, V. (2022). 'Digitalized' competences. a crucial challenge beyond digital competences. *Revista de Psicología del Trabajo y de las Organizaciones, 38*(3), 189-199. https://doi.org/10.5093/jwop2022a22

Peláez Zuberbühler, J. P., Pietrantoni, L., Mazzetti, G., Angelis, M. D., Giusino, D., Román-Niaves, M. S., … & Salanova, M. (2025). A systematic realist synthesis of digital interventions for enhancing mental health at work: contexts, mechanisms, and outcomes. *International Journal of Mental Health Systems, 19*(3), 28. https://doi.org/10.1186/s13033-024-00655-5

Perman, C. (2023, March 2). Amazon's RTO backlash, Google desk-sharing: Latest on hybrid work, WFH. *CNBC*. https://www.cnbc.com/2023/03/02/amazons-rto-backlash-google-desk-sharing-latest-on-hybrid-work-wfh.html

Peters, P., Ligthart, P., Bardoel, A., & Poutsma, E. (2016). 'fit' for telework'? cross-cultural variance and task-control explanations in organizations' formal telework practices. *The International Journal of Human Resource Management, 27*(21), 2582-2603. https://doi.org/10.1080/09585192.2016.1232294

Platts, K., Breckon, J., & Marshall, E. (2022). Enforced home-working under lockdown and its impact on employee wellbeing: a cross-sectional study. *BMC Public Health, 22*(1), 265. https://doi.org/10.1186/s12889-022-12630-1

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: a critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management, 26*(3), 513-563. https://doi.org/10.1177/014920630002600307

Poulsen, S., & Ipsen, C. (2017). In times of change: How distance managers can ensure employees' wellbeing and organizational performance. *Safety Science, 100*, 37–45. https://doi.org/10.1016/j.ssci.2017.05.002

Pourbarkhordari, A., Zhou, E. H., & Pourkarimi, J. (2016). Multilevel approach in organizational research: a review of dual-level transformational leadership. *European Scientific Journal, ESJ, 12*(4), 445. https://doi.org/10.19044/esj.2016.v12n4p445

Prada, M. F., Rucci, G., & Urzúa, S. (2019). *Training, soft skills and productivity: evidence from a field experiment in retail*. Inter-American Development Bank. https://doi.org/10.18235/0001714

Prior, L. (2014). Content analysis. In Leavy. P. (Ed.), *The Oxford handbook of qualitative research* (pp. 359-379). Oxford University Press.

Puentes, A., Lorente, L., & Peiró, J. M. (2022, June 29 - July 2). *Challenges and opportunities for well-being and performance in telework (Desafíos y oportunidades para el bienestar y desempeño en teletrabajo)* [Paper presentation]. 5th International Congress of the Spanish Scientific Society of Social Psychology, Burgos, Spain.

Puentes, A., Tordera, N., & Peiró, J. M. (2023, May 24-27). *Distant learning for leadership training: A systematic review of theoretical foundations, design, and evaluations of web-based leadership training*. [Poster presentation]. 21st EAWOP Congress, Katowice, Poland.

Pyöriä, P. (2011). Managing telework: risks, fears and rules. *Management Research Review, 34*(4), 386-399. https://doi.org/10.1108/01409171111117843

Raghuram, S., & Dong, F. (2013). Telecommuting and the role of supervisory power in china. *Asia Pacific Journal of Management, 31*(2), 523-547. https://doi.org/10.1007/s10490-013-9360-x

Raghuram, S., Hill, N. S., Gibbs, J. L., & Maruping, L. M. (2019). Virtual work: bridging research clusters. *Academy of Management Annals, 13*(1), 308-341. https://doi.org/10.5465/annals.2017.0020

Ramos-Villagrasa, P. J., Barrada, J. R., Fernández-del-Río, E., & Koopmans, L. (2019). Assessing job performance using brief self-report scales: the case of the individual work performance questionnaire. *Revista De Psicología Del Trabajo Y De Las Organizaciones, 35*(3), 195-205. https://doi.org/10.5093/jwop2019a21

Reilly, R. R., & Lojeski, K. S. (2009). Leading the dispersed workforce: when it comes to the distances that can separate virtual teams, geography is only the beginning. *Mechanical Engineering-CIME, 131*(11), 39. https://link.gale.com/apps/doc/A211365613/AONE?u=univ&sid=bookmark-AONE&xid=ddacbd0d

Richter, A. W., Dawson, J. F., & West, M. A. (2011). The effectiveness of teams in organizations: a meta-analysis. *The International Journal of Human Resource Management, 22*(13), 2749-2769. https://doi.org/10.1080/09585192.2011.573971

Rinker, C. M., Bessi, V. G., & Schreiber, D. (2024). Engagement in the teleworking context: challenges and leadership performance. *Leadership & Organization Development Journal, 46*(2), 254-268. https://doi.org/10.1108/lodj-04-2024-0247

Robert, L. P., Jr., & You, S. (2018). Are you satisfied yet? shared leadership, individual trust, autonomy, and satisfaction in virtual teams. *Journal of the Association for Information Science and Technology, 69*(4), 503-513. https://doi.org/10.1002/asi.23983

Rocco, T. S., Plakhotnik, M. S., McGill, C. M., Huyler, D., & Collins, J. C. (2023). Conducting and writing a structured literature review in human resource development. *Human Resource Development Review, 22*(1), 104-125. https://doi.org/10.1177/15344843221141515

Rodríguez, I., Tordera, N., Villajos, E., Puentes, A., Pérez-Aixendri, M., Peiró, J. M., Bravo-Duarte, F., Lorente, L., Moro, M., & Picazo, C. (2023). *Programa de*

*formación en liderazgo para el teletrabajo a través de web y app (Digylid)*. Universidad de Valencia, Ref. UV-MET-202327R.

Rodríguez-Carvajal, R., Rivas, S. d., Herrero, M., Moreno-Jiménez, B., & Van Dierendonck, D. (2014). Leading people positively: cross-cultural validation of the servant leadership survey (sls). *The Spanish Journal of Psychology, 17*, E73. https://doi.org/10.1017/sjp.2014.73

Roman, A. V., Van Wart, M., Wang, X., Liu, C., Kim, S., & McCarthy, A. (2019). Defining e-leadership as competence in ict-mediated communications: an exploratory assessment. *Public Administration Review, 79*(6), 853-866. https://doi.org/10.1111/puar.12980

Roodbari, H., Nielsen, K., & Axtell, C. (2023). What works for whom in which circumstances? an integrated realist evaluation model for organisational interventions. *Scandinavian Journal of Work and Organizational Psychology, 8*(1), 8. https://doi.org/10.16993/sjwop.171

Rotundo, M., & Sackett, P. R. (2002). The relative importance of task, citizenship, and counterproductive performance to global ratings of job performance: a policy-capturing approach. *Journal of Applied Psychology, 87*(1), 66-80. https://doi.org/10.1037/0021-9010.87.1.66

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: a review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*(1), 141-166. https://doi.org/10.1146/annurev.psych.52.1.141

Salanova, M. (2020). How to survive covid-19? notes from organisational resilience (¿cómo sobrevivir al covid-19? apuntes desde la resiliencia organizacional). *International Journal of Social Psychology: Revista De Psicología Social, 35*(3), 670-676. https://doi.org/10.1080/02134748.2020.1795397

Salanova, M., Llorens, S., Acosta, H., & Torrente, P. (2013). Positive interventions in positive organizations. *Terapia Psicológica, 31*(1), 101-113. https://doi.org/10.4067/s0718-48082013000100010

Salanova, M., Llorens, S., Cifré, E., & Martínez, I. M. (2012). We need a hero! toward a validation of the healthy and resilient organization (hero) model. *Group & Organization Management, 37*(6), 785-822. https://doi.org/10.1177/1059601112470405

Salanova, M., Llorens, S., & Martínez, I. M. (2016). Aportaciones desde la psicología organizacional positiva para desarrollar organizaciones saludables y resilientes. *Papeles del Psicólogo, 37*(3), 177-184. ISSN: 0214-7823

Salanova, M., & Ortega-Maldonado, A. (2019). Psychological capital development in organizations: an integrative review of evidence-based intervention programs. In Van Zyl, L & Rothmann Sr., S. (Eds.), *Positive psychological intervention design and protocols for multi-cultural contexts* (pp. 81-102). Springer. https://doi.org/10.1007/978-3-030-20020-6_4

Salvoni, S., Biron, C., Gilbert, M., Dextras-Gauthier, J., & Ivers, H. (2024). Managing virtual presenteeism during the COVID-19 pandemic: a multilevel study on managers' stress management competences to foster functional presenteeism. *International Journal of Environmental Research and Public Health, 21*(9), 1115. https://doi.org/10.3390/ijerph21091115

Sardeshmukh, S., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: a job demands and job resources model. *New Technology, Work and Employment, 27*(3), 193-207. https://doi.org/10.1111/j.1468-005x.2012.00284.x

Scandura, T. A., & Graen, G. B. (1984). Moderating effects of initial leader–member exchange status on the effects of a leadership intervention. *Journal of Applied Psychology, 69*(3), 428-436. https://doi.org/10.1037/0021-9010.69.3.428

Schaubroeck, J. M., Lam, S. S. K., & Cha, S. E. (2007). Embracing transformational leadership: team values and the impact of leader behavior on team performance. *Journal of Applied Psychology, 92*(4), 1020-1030. https://doi.org/10.1037/0021-9010.92.4.1020

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire. *Educational and Psychological Measurement, 66*(4), 701-716. https://doi.org/10.1177/0013164405282471

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. In *Methods of Psychological Research* (Vols. 8, Issues 2, pp. 23-74). Department of Psychology - University of Koblenz-Landau. https://doi.org/10.23668/psycharchives.12784

Schmidt, S. M., & Yeh, R. S. (1992). The structure of leader influence. *Journal of Cross-Cultural Psychology, 23*(2), 251-264. https://doi.org/10.1177/0022022192232009

Schulze, J., & Krumm, S. (2016). The "virtual team player". *Organizational Psychology Review, 7*(1), 66-95. https://doi.org/10.1177/2041386616675522

Schwarzmüller, T., Brosi, P., Duman, D., & Welpe, I. M. (2018). How Does the Digital Transformation Affect Organizations? Key Themes of Change in Work Design and Leadership. *Management Revue, 29*(2), 114–138. https://www.jstor.org/stable/26491473

Segura, S., & González-Romá, V. (2003). How do respondents construe ambiguous response formats of affect items? *Journal of Personality and Social Psychology, 85*(5), 956–968. https://doi.org/10.1037/0022-3514.85.5.956

Shann, C., Martin, A., Chester, A., & Ruddock, S. (2019). Effectiveness and application of an online leadership intervention to promote mental health and reduce depression-related stigma in organizations. *Journal of Occupational Health Psychology, 24*(1), 20–35. https://doi.org/10.1037/ocp0000110

Shirmohammadi, M., Chan Au, W., & Beigi, M. (2022). Antecedents and outcomes of work-life balance while working from home: A review of the research conducted during the COVID-19 pandemic. *Human Resource Development Review, 21*(4), 473-516. https://doi.org/10.1177/15344843221125834

Shockley, K. M., Allen, T. D., Dodd, H., & Waiwood, M. M. (2021). Remote Worker Communication During COVID-19: The Role of Quantity, Quality, and Supervisor Expectation-Setting. *Journal of Applied Psychology, 106*(10), 1423–1444. https://doi.org/10.1037/apl0000970

Silva, A. J., Almeida, A., & Rebelo, C. (2022). The effect of telework on emotional exhaustion and task performance via work overload: the moderating role of self-leadership. *International Journal of Manpower, 45*(2), 398-421. https://doi.org/10.1108/ijm-08-2022-0352

Soares, M. E., Barroso, B., & Tavares, P. (2023). Motivação e satisfação em contexto de teletrabalho: A relevância do apoio das chefias [Motivation and satisfaction in a telework context: The role of managers' support]. *Revista Ibérica De Sistemas e Tecnologias De Informação*, *7*(60), 496-510. https://www.proquest.com/scholarly-journals/motivação-e-satisfação-em-contexto-de/docview/2865401815/se-2

Solís, M. (2017). Moderators of telework effects on the work-family conflict and on worker performance. *European Journal of Management and Business Economics, 26*(1), 21–34. https://doi.org/10.1108/ejmbe-07-2017-002

Soon, C. C., & Salamzadeh, Y. (2021). The impact of digital leadership competences on virtual team effectiveness in mnc companies in Penang, Malaysia. *Journal of Entrepreneurship, Business and Economics, 8*(2), 219-253. https://scientificia.com/index.php/JEBE/article/view/147

Spiers, J. A., Cummings, G. G., Langenhoff, P., Sharlow, J., & Bhatti, A. (2010). “But we can't go back”. *Journal of Leadership Studies, 4*(1), 6-19. https://doi.org/10.1002/jls.20151

Stanton, J. M., Sinar, E. F., Balzer, W. K., & Smith, P. C. (2002). Issues and strategies for reducing the length of self-report scales. *Personnel Psychology, 55*(1), 167-194. https://doi.org/10.1111/j.1744-6570.2002.tb00108.x

Staples, D. S. (1997). An investigation of information technology-enabled remote management and remote work issues. *Australasian Journal of Information Systems, 4*(2). https://doi.org/10.3127/ajis.v4i2.362

Staples, D. S. (2001). A study of remote workers and their differences from non-remote workers. *Journal of End User Computing, 13*(2), 3–14. https://doi.org/10.4018/joeuc.2001040101

Stoian, C., Caraiani, C., Anica-Popa, I., Dascălu, C., & Lungu, C. I. (2022). Telework systematic model design for the future of work. *Sustainability, 14*(12), 7146. https://doi.org/10.3390/su14127146

Suh, A., & Lee, J. (2017). Understanding teleworkers' technostress and its influence on job satisfaction. *Internet Research, 27*(1), 140-159. https://doi.org/10.1108/intr-06-2015-0181

Sullivan, C., & Lewis, S. (2001). Home-based telework, gender, and the synchronization of work and family: perspectives of teleworkers and their co-residents. *Gender, Work & Organization, 8*(2), 123-145. https://doi.org/10.1111/1468-0432.00125

Swain, J. E. (2018). Effects of Leader Humility on the Performance of Virtual Groups. *Journal of Leadership Studies, 12*(1), 21–37. https://doi.org/10.1002/jls.21552

Symeonidou, E., & Mihail, D. (2024). The Effect of Telework on Employee Engagement: An Empirical Approach. In: Mavri, M., Ikouta Mazza, P., Karasavvoglou, A., Polychronidou, P. (Eds.), Economic Growth, Prosperity and Sustainability in the Economies of the Balkans and Eastern European Countries. EBEEC 2023. *Springer Proceedings in Business and Economics*, pp. 387-407. Springer. https://doi.org/10.1007/978-3-031-58437-4_20

Tafvelin, S., Hasson, H., Nielsen, K., & von Thiele Schwarz, U. (2021). Integrating a transfer perspective into evaluations of leadership training. *Leadership & Organization Development Journal, 42*(6), 856-868. https://doi.org/10.1108/lodj-11-2019-0492

Taggart, K., Kennedy, M. M., O'Connor, S. K., & Gilder, D. V. (2024). Using the kirkpatrick model to evaluate a sepsis escape room for advanced pharmacy learners. *Currents in Pharmacy Teaching and Learning, 16*(5), 352-362. https://doi.org/10.1016/j.cptl.2024.02.004

Tangen, S. (2005). Demystifying productivity and performance. *International Journal of Productivity and Performance Management, 54*(1), 34-46. https://doi.org/10.1108/17410400510571437

Tarafdar, M., Cooper, C. L., & Stich, J. F. (2019). The technostress trifecta - techno eustress, techno distress and design: theoretical directions and an agenda for research. *Information Systems Journal, 29*(1), 6-42. https://doi.org/10.1111/isj.12169

Taşkan, B., Silva, A. J., & Caetano, A. (2024). Perceived effects of teleworking on adaptive performance: a moderated mediation model of leadership effectiveness and negative affect. *International Journal of Organizational Analysis, 32*(10), 2321-2338. https://doi.org/10.1108/ijoa-06-2023-3787

Tautz, D., Felfe, J., Klebe, L., & Krick, A. (2024). Transformational leadership and well-being when working from home – the role of ict demands. *Journal of Managerial Psychology, 39*(7), 915-929. https://doi.org/10.1108/jmp-04-2023-0235

Tavares, A. I. (2017). Telework and health effects review. *International Journal of Healthcare, 3*(2), 30-36. https://doi.org/10.5430/ijh.v3n2p30

Tejero, L. M. S., Seva, R. R., & Fadrilan-Camacho, V. F. F. (2021). Factors associated with Work-Life Balance and Productivity before and during work from home. *Journal of Occupational and Environmental Medicine, 63*(12), 1065–1072. https://doi.org/10.1097/jom.0000000000002377

Tenschert, J., Furtner, M., & Peters, M. (2024). The effects of self-leadership and mindfulness training on leadership development: a systematic review. *Management Review Quarterly*. Advance online publication. https://doi.org/10.1007/s11301-024-00448-7

The Jamovi Project. (2022). *Jamovi* (Version 2.3) [Computer software]. https://www.jamovi.org

Thomas, D., & Bostrom, R. P. (2011). Building trust and cooperation through technology adaptation in virtual teams: Empirical field evidence. *Information Systems Management, 25*(1), 45–56. https://doi.org/10.1080/10580530701777149

Toderi, S., Cioffi, G., Houdmont, J., Yarker, J., Lewis, R., & Balducci, C. (2025). Developing stress-preventive management competences: an evaluation of the mechanism and the process in a training experience. *International Journal of Workplace Health Management*. Advance online publication. https://doi.org/10.1108/IJWHM-05-2024-0101

Toffler, A. (1980), *Third Wave*. Bantam.

Tordera, N., & Martinolli, G. (2023, May 24-27). *Teleworking components and scientific productivity in Spanish ERC-granted teams: The mediating role of climate and well-being*. [Poster presentation]. 21st EAWOP Congress: The Future is Now: The Changing World of Work, Katowice, Poland.

Torraco, R. J., & Lundgren, H. (2019). What HRD Is Doing—What HRD Should be Doing: The Case for Transforming HRD. *Human Resource Development Review, 19*(1), 39–65. https://doi.org/10.1177/1534484319877058

Tramontano, C., Grant, C. A., & Clarke, C. (2021). Development and validation of the e-Work Self-Efficacy Scale to assess digital competences in remote working. *Computers in Human Behavior Reports, 4*, 100129. https://doi.org/10.1016/j.chbr.2021.100129

Uríen, B., & Erro-Garcés, A. (2024). Do you prefer logging in? the relevance of the experience of telework for well-being. *Employee Relations: The International Journal, 46*(3), 641-656. https://doi.org/10.1108/er-10-2022-0487

Van Der Lippe, T., & Lippényi, Z. (2019). Co-workers working from home and individual and team performance. *New Technology, Work and Employment, 35*(1), 60-79. https://doi.org/10.1111/ntwe.12153

Van Dierendonck, D. (2010). Servant Leadership: A Review and Synthesis. *Journal of Management, 37*(4), 1228-1261. https://doi.org/10.1177/0149206310380462

Van Wart, M., Roman, A. V., Wang, X., & Liu, C. (2017). Operationalizing the definition of e-leadership: identifying the elements of e-leadership. *International Review of Administrative Sciences, 85*(1), 80-97. https://doi.org/10.1177/0020852316681446

Varma, A., Jaiswal, A., Pereira, V., & Kumar, Y. L. N. (2022). Leader-member exchange in the age of remote work. *Human Resource Development International, 25*(2), 219–230. https://doi.org/10.1080/13678868.2022.2047873

Varotsis, N. (2022). Exploring the influence of telework on work performance in public services: experiences during the covid-19 pandemic. *Digital Policy, Regulation and Governance, 24*(5), 401-417. https://doi.org/10.1108/dprg-11-2021-0152

Vartiainen, M. (2021). Telework and Remote Work. In D. S. Dunn (Ed.), *Oxford Research Encyclopedia of Psychology*. Oxford University Press. https://doi.org/10.1093/acrefore/9780190236557.013.850

Vartiainen, M. (2024). Towards flexible hybrid work. In M. Vartiainen (Ed.), *Flexible Hybrid Work* (pp. 46-56). Edward Elgar Publishing.

Vartiainen, M., & Vanharanta, O. (2024). True nature of hybrid work. *Frontiers in Organizational Psychology, 2*, 1448894. https://doi.org/10.3389/forgp.2024.1448894

Vătămănescu, E. M., Dinu, E., Stratone, M. E., Stăneiu, R. M., & Vintilă, F. (2022). Adding knowledge to virtual teams in the new normal: From leader-team communication to the satisfaction with teamwork. *Sustainability (Switzerland), 14*(11), 6424. https://doi.org/10.3390/su14116424

Vega, R. P., Anderson, A. J., & Kaplan, S. A. (2014). A within-person examination of the effects of telework. *Journal of Business and Psychology, 30*(2), 313–323. https://doi.org/10.1007/s10869-014-9359-4

Virick, M., DaSilva, N. A., & Arrington, K. (2009). Moderators of the curvilinear relation between extent of telecommuting and job and life satisfaction: the role of performance outcome orientation and worker type. *Human Relations, 63*(1), 137-154. https://doi.org/10.1177/0018726709349198

Waight, C. L., Nery-Kjerfve, T., Kite, A., & Smith, B. C. (2022). Connecting and relating in Brazil: implications of remote work. *Human Resource Development International, 25*(2), 231–253. https://doi.org/10.1080/13678868.2022.2048435

Wakefield, R. L., Leidner, D. E., & Garrison, G. (2008). A model of conflict, leadership, and performance in virtual teams. *Information Systems Research, 19*(4), 434–455. https://doi.org/10.1287/isre.1070.0149

Walumbwa, F. O., Avolio, B. J., Gardner, W. L., Wernsing, T. S., & Peterson, S. J. (2007). Authentic leadership: development and validation of a theory-based measure. *Journal of Management, 34*(1), 89-126. https://doi.org/10.1177/0149206307308913

Wang, B., Liu, Y., Qian, J., & Parker, S. K. (2020). Achieving effective remote working during the COVID-19 pandemic: A work design perspective. *Applied Psychology, 70*(1), 16-59. https://doi.org/10.1111/apps.12290

Wang, H., Xiao, Y., Wang, H., Zhang, H., & Chen, X. (2023). "Who knows me understands my needs": The effect of home-based telework on work engagement. *Psychology Research and Behavior Management, 16*, 619–635. https://doi.org/10.2147/PRBM.S402159

Warr, P., & Nielsen, K. (2018). Wellbeing and Work Performance. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being* (pp. 647–668). DEF Publishers.

Watson, K. D. (2007). *Remote management: traditional leadership behaviors in a contemporary work environment* [Doctoral dissertation, Kansas State University]. K-State Research Exchange. https://krex.k-state.edu/dspace/handle/2097/432

Whitman, D. S., Van Rooy, D. L., & Viswesvaran, C. (2010). Satisfaction, citizenship behaviors, and performance in work units: a meta-analysis of collective construct relations. *Personnel Psychology, 63*(1), 41-81. https://doi.org/10.1111/j.1744-6570.2009.01162.x

World Economic Forum. (2023). *The future of jobs report 2023*. World Economic Forum.

Yammarino, F. J., & Dansereau, F. (2008). Multi-level nature of and multi-level approaches to leadership. *The Leadership Quarterly, 19*(2), 135-141. https://doi.org/10.1016/j.leaqua.2008.01.001

Yarberry, S., & Sims, C. (2021). The impact of COVID-19-prompted virtual/remote work environments on employees' career development: Social learning theory, belongingness, and self-empowerment. *Advances in Developing Human Resources, 23*(3), 237–252. https://doi.org/10.1177/15234223211017850

Yarker, J., Lewis, R., & Donaldson-Feilder, E. (2008). *Management Competences for Preventing and Reducing Stress at Work: Identifying the Management Behaviours Necessary to Implement the Management Standards: Phase Two*. Project Report. Health and Safety Executive, Bootle. https://eprints.bbk.ac.uk/id/eprint/28227/

Yukl, G. (2012). Effective leadership behavior: what we know and what questions need more attention. *Academy of Management Perspectives, 26*(4), 66-85. https://doi.org/10.5465/amp.2012.0088

Yukl, G. (2006). *Leadership in Organizations.* Pearson Education.

Yun, S., Cox, J., Sims Jr., H. P., & Salam, S. (2007). Leadership and teamwork: The effects of leadership and job satisfaction on team citizenship. *International Journal of Leadership Studies, 2*(3), 171–193.

Zander, L. (2020). Interpersonal leadership across cultures: a historical exposé and a research agenda. *International Studies of Management & Organization, 50*(4), 357-380. https://doi.org/10.1080/00208825.2020.1850980

Zander, L. (2024). Interpersonal leadership across cultures: a historical exposé and a research agenda. In M. Banai, A. Stefanidis, & J. J. Boddewyn (Eds.), *International Business Research: Culture, Work, Employment, and Leadership* (1st ed., pp. 38-61). Routledge. https://doi.org/10.4324/9781003459903

Zeike, S., Bradbury, K., Lindert, L., & Pfaff, H. (2019). Digital leadership skills and associations with psychological well-being. *International Journal of Environmental Research and Public Health, 16*(14), 2628. https://doi.org/10.3390/ijerph16142628

Zhu, W., Zheng, X., He, H., Wang, G., & Zhang, X. (2017). Ethical leadership with both "moral person" and "moral manager" aspects: scale development and cross-cultural validation. *Journal of Business Ethics, 158*(2), 547-565. https://doi.org/10.1007/s10551-017-3740-y

# APPENDIXES

## Appendix 1: Quantitative papers analyzing the relationship between leadership for telework and performance indicators

| Study | Sample | Independent Variable(s) | Mechanisms and/or boundary conditions | Performance outcomes |
|---|---|---|---|---|
| Challagalla et al. (2000) | **Type:** Remote and co-located Workers.<br>**N:** 239 sales workers<br>**Country:** USA | Supervisory Orientations (output, activity, capability) | **Moderator:** Salesperson location (on-site vs. remote) | **Individual Task performance:** Salespeople accomplishment (*self-rated*) |
| Staples (2001) | **Type:** Remote and co-located Workers.<br>**N:** 376 remote and 255 local.<br>**Country:** USA | Frequency of communication from the leader | **Mediator:** Employee/ manager trust | **Individual Task Performance:**<br>a. Perception of overall productivity *(self-rated)*<br>b. Perception of remote work effectiveness *(self-rated)* |
| Haines et al. (2002) | **Type:** Telecommuters<br>**N:** 193 workers<br>**Country:** USA | Supervisor support for telecommuting | **Moderators:**<br>a.Affiliation motivation<br>b.Self-management orientations | **Individual Overall Performance:** creativity, the quantity of work, and meeting deadlines, compared to when not telecommuting *(self-rated)* |
| Wakefield et al. (2008) | **Type:** Virtual team members<br>**N:** 159 members<br>**Countries:** USA and Korea. | Leadership roles (*Behavioral Complexity Theory*) | **Mediators:**<br>a. Team conflict<br>b.Leader effectiveness (*rated by workers)* | **Team Overall Performance:** Efficiency, quality, technical innovation, adherence to schedule, and work excellence (*self-rated*) |
| Lautsch et al. (2009) | **Type:** Telecommuters (79%) and not-telecommuters (21%)<br>**N:** 90 dyads supervisor-worker<br>**Country:** USA | Telecommuting | **Moderators:**<br>a. Frequency of contact with supervisor<br>b. Same monitoring<br>c. Standardized hours<br>d. Requirement of separation between work and family | **Individual Task Performance:** Quality, avoiding mistakes and standards (*rated by supervisor*)<br>**Individual Contextual Performance:** Helping behaviors (*self-rated*) |
| Thomas and Bostrom (2011) | **Type:** Virtual team leaders.<br>**N:** 13 veteran leaders<br>**Country:** USA | Theory X (command and control) and Theory Y (facilitate and support) behaviors. | **Mediators:**<br>a. Technology adaptation<br>b. Trust and cooperation | **Team Overall Performance:** Team outcomes (*Self-rated by the leader*) |
| Hill and Bartol (2016) | **Type:** Virtual teams<br>**N:** 193 workers in 29 virtual teams<br>**Country:** USA. | Virtual teamwork situation judgement.<br>Empowering leadership | **Moderators:**<br>a. Team geographic dispersion<br>**Mediator:** | **Individual Task Performance:** Contribution to team performance (*self-rated*)<br>**Team Overall Performance:** Key team performance indicators (*rated by supervisor*) |

| | | | | |
|---|---|---|---|---|
| | | | a. Team virtual collaboration (rated by peers) | |
| Solís (2017) | **Type:** Teleworkers and non-teleworkers<br>**N:** 92 teleworkers, 72 non-teleworkers and 33 supervisors<br>**Country:** Costa Rica | Telework v/s non-telework. | **Moderators:**<br>a. Supervisor control of subordinates' work (high control/low control).<br>b. Level of responsibility outside work. | **Individual Task Performance:**<br>Individual task proficiency (*self-rated*)<br>**Individual Contextual Performance:**<br>a. Initiative<br>b. Adaptability to tasks (*Self-rated*) |
| Swain (2018) | **Type:** Virtual workers.<br>**N:** 320 1st study, 317 2nd study and 147 3rd study.<br>**Country**: USA | Leader expressed humility (*measured with a scale for manipulation check)* | **Mediators:**<br>a. Psychological safety<br>b. Liking for the leader<br>c. Information flow | **Team Task Performance:**<br>Problem-solving activity. |
| Flavian et al. (2019) | **Type:** Virtual workers.<br>**N:** 241 workers<br>**Country**: Spain | *Competences:*<br>a. Empathy of leaders.<br>b. Justice of leaders. | **Mediators:**<br>a. Trust in leader (first order)<br>b. Commitment to the team (second order) | **Individual Contextual Performance:**<br>Organizational citizenship behavior (OCB) (*Self-rated*) |
| Bartsch et al. (2020) | **Type:** Virtual workers due to COVID-19<br>**N:** 206 service workers<br>**Country**: Germany | a. Task-oriented leadership behavior (manager)<br>b. Relation-oriented leadership behavior (enabler) | **Mediators:**<br>a. Individual Job autonomy<br>b. Individual work tension<br>c. Team cohesiveness<br>d.Perceived Teamwork tension<br>**Moderator:**<br>Digital maturity | **Individual Task Performance:**<br>Work intensity (*Self-rated*) |
| Han et al. (2020) | **Type:** Virtual team members<br>**N:** 294 at 44 teams<br>**Countries:** 24 different countries, mainly the USA. | a. Global dispersion<br>b. Team training (*number of training sessions attended*) | **Mediator:**<br>Leadership role effectiveness (*Behavioral Complexity Theory*) | **Team Task Performance:**<br>Goal accomplishment, quality, innovation, and budget usage. (*Self-rated*) |
| Newman et al. (2020) | **Type:** Virtual team members.<br>N: 399 members from 68 teams **Countries:** USA, India and Canada. | Leader communication effectiveness (usage of tools and techniques) | **Moderator:**<br>Trust in leader | **Team task performance:**<br>a. Team effectiveness (*self-reported*)<br>b. Team Balanced Scorecard results. |
| Soon and Salamzadeh (2020) | **Type:** Virtual workers<br>**N:** 150 team members<br>**Country:** Malaysia | E-leadership competences | None | **Team Overall Performance:**<br>Virtual team effectiveness (*Self-rated*) |

| | | | | |
|---|---|---|---|---|
| Elyousfi et al. (2021) | **Type:** Virtual team workers.<br>**N:** 184 workers<br>**Country:** Canada | a. E-leadership<br>b. Team behaviors<br>c. Team collaboration<br>d. Team support | None | **Team task performance:**<br>Team member performance (reported by managers and members) |
| Ernst et al. (2022) | **Type:** Virtual and face-to-face workers.<br>**N:** 60 in control and 63 in experimental (1st study)<br>128 in 2nd study)<br>523 in 3rd study<br>64 in control and 65 in experimental (4th study)<br>**Countries:** USA Austria, France, India, and Mexico | Charismatic leadership tactics (verbal and non-verbal) | **Mediator:**<br>Evaluations of leader (not tested) | **Individual Task Performance:**<br>Number of complete flashcards sets created in the allotted time.<br><br>**Individual Contextual Performance:**<br>Choice of completing an extra flashcard. |
| Karani and Mehta (2022) | **Type:** Tele-workers due to COVID-19<br>**N:** 239 workers<br>**Country:** India | Supervisor support | **Mediators:**<br>a. Psychological contract fulfillment<br>b. Work engagement | **Individual Contextual Performance:**<br>Innovative behavior |
| Kashive et al. (2022) | **Type:** Virtual team workers in the COVID-19 period<br>**N:** 175 workers<br>**Country:** India | a. Internal leadership roles (monitor, coordinator, mentor, and facilitator)<br>b. External leadership roles (innovator, broker, producer, and director) | **Mediators:**<br>**1st order**<br>a. Communication quality<br>b. Role clarity<br>**2nd order**<br>a. Task and relations conflict<br>b. Interpersonal trust<br>c. Leadership effectiveness | **Overall Team Performance:**<br>Efficiency, quality, technical innovation, adherence to schedule, and work excellence (*self-rated*) |
| Lee and Kim (2022) | **Type:** Teleworkers due to COVID-19<br>**N:** 449 workers<br>**Country:** USA | Family-supportive leadership communication | **Moderator:**<br>Segmentation preference<br>**Mediators**<br>Positive affect<br>Employee-organization relationship<br>Work-life enrichment | **Individual Contextual Performance:**<br>Employee creativity |
| Vătămănescu et al. (2022) | **Type:** Virtual team members<br>**N:** 175 workers<br>**Country:** Romania | Effectiveness of communication between leaders and team members | **Mediator:**<br>Strength of team culture | **Team task performance:**<br>Efficiency, objectives, and meeting the schedule (*Self-rated*). |

| | | | | |
|---|---|---|---|---|
| Hodzic et al. (2023) | **Type:** Home-based workers<br>**N:** 242 employees<br>**Country:** Germany and Austria | Telework (days per week) | **Moderator:** Supervisor social support<br>**Mediator:** Knowledge sharing | **Team Task Performance:** Perceived overall perfomance |
| Salvoni et al. (2024) | **Type:** Teleworkers due to COVID-19<br>**N:** 880 employees and 190 managers<br>**Country:** Canada | Managers' stress management competences | **Moderator:** Manager-employee agreement | **Individual Overall Performance:** Task, contextual and counterproductive work behavior |

## Appendix 2: Qualitative papers analyzing the relationship between leadership for telework and performance indicators

| Study | Sample | Approach to leadership |
|---|---|---|
| Pauleen (2003) | **Type:** Virtual team leaders<br>**N:** 7 leaders<br>**Country:** New Zealand | *Competences:*<br>Relationship building |
| Hambley et al. (2007) | **Type:** Virtual team leaders and members<br>**N:** 9 leaders<br>**Country:** Canada | *Competences:*<br>Monitoring<br>Control strategies<br>Communication |
| Malhotra et al. (2007) | **Type:** Virtual team leaders and members<br>**N:** 54 leaders and 269 members<br>**Country:** USA | Leadership practices |
| Al-Ani et al. (2011) | **Type:** Virtual team members<br>**N:** 16 workers<br>**Country:** USA | Task and Relationship Orientations |
| Morgan et al. (2014) | **Type:** Virtual team leader<br>**N:** 1 Pharmaceutical team leader<br>**Country:** USA | *Competences:*<br>Role clarification<br>Communication |
| Bonet Fernandez and Jawadi (2015) | **Type:** Virtual R&D Team<br>**N:** 7 workers<br>**Country:** France | Full-range leadership theory |
| Hoegl and Muethel (2016) | **Type:** Virtual team leaders and members<br>**N:** 96 leaders and 337 workers<br>**Countries:** Germany, other European countries | *Competences:*<br>Decision making<br>Autonomy promotion |
| Han et al (2017) | **Type:** Virtual team leaders<br>**N:** 8 leaders<br>**Country:** USA | *Competences:*<br>Communication<br>Trust-based open communication |
| Jude (2017) | **Type:** Virtual team members<br>**N:** 7 workers<br>**Country:** India | Full-range leadership theory |
| Poulsen and Ipsen (2017) | **Type:** Virtual team leaders and members<br>**N:** 17 workers<br>**Country:** Denmark | *Competences:*<br>Planning<br>Communication<br>Feedback |
| Maduka et al. (2018) | **Type:** Virtual team members<br>**N:** 14 workers<br>**Country:** Nigeria | *Competences:*<br>Communication<br>Goal setting<br>Media savviness<br>Decision making |

| | | |
|---|---|---|
| Norman et al. (2019) | **Type:** Virtual team workers.<br>**N:** 137 Production and Service workers<br>**Country:** USA | *Competences:*<br>Media savviness |
| Darics (2020) | **Type:** Virtual team members<br>**N:** Consultancy team<br>**Country:** United Kingdom | *Competences:*<br>Communication |
| Kreamer et al. (2021) | **Type:** Virtual team members<br>**N:** 271 Workers<br>**Country:** Norway | *Competences:*<br>Communication<br>Planning |
| Cripe and Burleigh (2022) | **Type:** Virtual team leaders<br>**N:** 10 project leaders<br>**Country:** USA | *Competences:*<br>Communication<br>Relationship building |

## Appendix 3: Quantitative papers analyzing the relationship between leadership for telework and well-being indicators

| Study | Sample | Independent Variable(s) | Mechanisms and/or boundary conditions | Well-being outcomes |
|---|---|---|---|---|
| Challagalla et al. (2000) | **Type:** Remote and co-located Workers. **N:** 239 Sales workers in 2 Fortune 500 companies (168 remote vs 71 co-located) **Country:** USA | Supervisory Orientations (output, activity, capability) | **Moderator:** Salesperson location (on-site vs. remote) | Satisfaction with supervisor |
| Ilozor et al. (2001) | **Type:** Telecommuters **N:** 43 IT workers **Country:** Australia | Management communication strategies (Clarity and regularity, telecommuting support, reviewing, provision of equipment, assistance in career development, training, and others) | None | Job Satisfaction (*intention to leave, output perception, job stress-reducing, among others*) |
| Staples (2001) | **Type:** Remote and co-located Workers. **N:** 376 remotely managed and 255 locally managed employees in 18 organizations (tech, financial, and public sector) **Country:** USA | Frequency of communications from the leader | **Mediator:** Employee/ manager trust *(mediation not tested)* | a. Job Satisfaction<br>b. Job stress |
| Haines et al. (2002) | **Type:** Telecommuters **N:** 193 workers of federal government agency, high-tech and financial institutions **Country:** USA | Supervisor support for telecommuting | **Moderators:**<br>a. Affiliation motivation<br>b. Self-management orientations | a. Satisfaction with Telecommuting<br>b. Work/life quality |
| Konradt et al (2003) | **Type:** Teleworkers and non-teleworkers. **N:** 30 home-centered teleworkers, 24 office-centered teleworkers, and 18 non-teleworkers from data processing, telecommunications, and financial services small companies. **Country:** Germany | a. Quality of Management by objectives (goal clarity, supervisory support, tangible rewards, goal efficacy, goal rationale, goal stress, goal conflict, among others)<br>b. Task-related stressors<br>c. Task-related resources<br>d. Non-job related stressors | None | a. Psychological strain<br>b. Job Satisfaction |

| | | | | |
|---|---|---|---|---|
| Kelley and Kelloway (2012) | **Type:** Teleworkers and non-teleworkers.<br>**N:** 151 remotely managed workers, 241 proximal-managed workers from production and service companies.<br>**Country:** Canada | a. Regularly scheduled communication<br>b. Unplanned communication<br>c. (Perceived) Control<br>d. Prior knowledge of leader and team | **Mediator:**<br>Transformational leadership style | Job satisfaction |
| Madlock (2012) | **Type:** Full-time telecommuters<br>**N:** 157 workers from insurance, healthcare, high-tech, and banking/finance companies.<br>**Country:** USA | a. Task and Relationship Orientations<br>b. Communication competence | None | a. Job Satisfaction<br>b. Telecommuters communication satisfaction |
| Madlock (2018) | **Type:** Tele-commuters<br>**N:** 222 workers from Insurance companies<br>**Country:** USA | a. Task and Relationship Orientations<br>b. Communication competence | None | a. Job Satisfaction<br>b. Telecommuters communication satisfaction |
| Bartsch et al. (2020) | **Type:** Virtual workers due to COVID-19<br>**N:** 206 service workers<br>**Country**: Germany | a. Task-oriented leadership behavior (manager)<br>b. Relation-oriented leadership behavior (enabler) | **Mediators:**<br>a. Individual Job autonomy<br>b. Individual work tension<br>c. Team cohesiveness<br>d. Teamwork tension<br>**Moderator:**<br>Digital maturity | a. Individual work tension<br>b. Teamwork tension |
| Bhumika (2020) | **Type:** Virtual workers due to COVID-19<br>**N:** 180 service workers<br>**Country**: India | a.Participative leadership<br>b.Work interference with personal life (WIPL)<br>c.Personal life interference with work (PLIW) | None | Emotional exhaustion |
| Mutha and Srivastava (2021) | **Type:** Virtual team members<br>**N:** 300 workers from IT, manufacturing, pharmaceutical and other industries<br>**Countries:** India (72.5%), USA (7%) and UK (8.5%) | a. Effective leadership communication | **Mediator:**<br>Trust between team members | Employee engagement |
| Magnavita et al. (2021) | **Type:** Telecommuters<br>**N:** 905 workers from 17 trade and service companies<br>**Country:** Italy | a. Intrusive Leadership<br>b. Off-time work | **Moderators:**<br>Workaholism | a. Effort/reward imbalance<br>b. Anxiety<br>c. Overall happiness<br>d. Depression |

| | | | | |
|---|---|---|---|---|
| Chambel et al. (2022) | **Type:** Teleworkers due to COVID-19<br>**N:** 318 workers (Study 1). 290 workers (Study 2)<br>**Country:** Portugal | Family-supportive supervisor behavior | **Mediators:**<br>a. Work-family conflict<br>b. Work-family enrichment<br><br>**Moderator:**<br>Intensity of telework. | a. Exhaustion<br>b. Work engagement |
| Chaudhary et al. (2022) | **Type:** Global virtual team members<br>**N:** 810 workers from IT companies<br>**Countries:** USA, UK, Denmark, Australia, and India | E-leadership competences | **Moderator:**<br>Emotional intelligence | Emotional Well-being |
| Karani and Mehta (2022) | **Type:** Tele-workers due to COVID-19<br>**N:** 239 workers from sales departments<br>**Country:** India | Supervisor support | **Mediators:**<br>a. Psychological contract fulfillment<br>b. Work engagement | a. Emotional well-being<br>b. Psychological well-being<br>c. Workspace well-being<br>d. Life well-being |
| Vătămănescu et al. (2022) | **Type:** Virtual team members<br>**N:** 175 workers from private and public organizations<br>**Country:** Romania | Effectiveness of communication between leaders and team members | **Mediator:**<br>Team performance | Satisfaction with teamwork |
| Giacomelli et al. (2023) | **Type:** Teleworkers<br>**N:** 700 employees of a regional environmental protection agency. **Country:** Italy. | a. Conditions for telework.<br>b.Supervisor support. | **Mediator:**<br>Job autonomy | Job satisfaction |
| Wang et al. (2023) | **Type:** Home based workers<br>**N:** 276 employees. **Country:** China | Home-based telework | **Moderator:**<br>Family supportive leadership<br>**Mediators**<br>a. Workplace isolation<br>b. Telepressure | a. Negative emotion<br>b. Work engagement |
| Hodzic et al. (2023) | **Type:** Home-based workers<br>**N:** 242 employees from different industries .<br>**Country:** Germany and Austria | Telework | **Moderator:**<br>Supervisor social support<br>**Mediators**<br>Knowledge sharing | Work engagement |

| | | | | |
|---|---|---|---|---|
| Lee and Kim (2023) | **Type:** Tele-workers due to COVID-19<br>**N:** 449 workers from different industries .<br>**Country:** USA | Family-supportive leadership communication | **Moderator:**<br>Segmentation preference<br>**Mediators**<br>Employee-organization relationship<br>Work-life enrichment | Positive affect |
| Soares et al. (2023) | **Type:** Teleworkers<br>**N:** 242 employees from different industries .<br>**Country:** Portugal | Supervisor support | **Mediators:**<br>Satisfaction of basic psychological needs | Job satisfaction |
| Boccoli et al. (2024) | **Type:** Tele-workers due to COVID-19<br>**N:** 239 workers from the public sector<br>**Country:** Italy | Perceived supervisor support | **Moderator:**<br>Perceived supervisor digital communication skills | Work engagement |
| Salvoni et al. (2024) | **Type:** Teleworkers due to COVID-19<br>**N:** 880 employees and 190 managers from public service<br>**Country:** Canada | Managers' stress management competences | **Moderator:**<br>Manager-employee agreement | Psychologycal distress |

## Appendix 4: Qualitative papers analyzing the relationship between leadership for telework and well-being indicators

| Study | Design | Sample | Sex/Age Variables | Approach to leadership |
|---|---|---|---|---|
| Kurland and Cooper (2002) | Individual semi-structured interviews | **Type:** Supervisors, telecommuters, and non-telecommuters<br>**N:** 17 leaders and 36 workers from IT Teams<br>**Country:** USA | **Sex:** 31 males and 21 females<br>**Age:** 31-62 (mean not reported) | *Competences:*<br>Control<br>Mentoring |
| Hoegl and Muethel (2016) | Individual Questionnaires | **Type:** Virtual team leaders and members<br>**N:** 96 leaders and 337 workers from 96 IT teams<br>**Countries:** Germany, and members from other European countries | *No information on sex or age of respondents*. | *Competences:*<br>Decision making<br>Autonomy promotion |
| Poulsen and Ipsen (2017) | Individual Semi-structured interviews | **Type:** Virtual team leaders and members<br>**N:** 17 Production and Service workers<br>**Country:** Denmark | *No information on sex or age of respondents*. | *Competences:*<br>Planning<br>Communication<br>Feedback |
| Busse and Weidner (2020) | Individual Semi-structured interviews | **Type:** Distant leaders (partially)<br>**N:** 10 Production and Service leaders<br>**Country:** Germany | **Sex:** 8 males and 2 females<br>**Age:** 46.5 (mean) | Agile leadership |
| Efimov et al. (2020) | Individual Semi-structured interviews | **Type:** Virtual team leaders<br>**N:** 13 leaders from IT, manufacturing, aerospace, and logistics industries.<br>**Country:** Germany | **Sex:** 13 males and 0 females<br>**Age:** 38,46% between 30 and 40. | Health-oriented leadership |
| Yarberry and Sims (2021) | Individual Semi-structured interviews | **Type:** Employees from various professions working virtually due to COVID-19<br>**N:** 8 workers<br>**Country:** USA | **Sex:** 4 males and 4 females<br>**Age:** Between 32 and 63. | Virtual mentoring<br>Empowerment |
| Barhate et al. (2022) | Individual Semi-structured interviews | **Type:** IT sector leaders<br>**N:** 12 total (6 per country)<br>**Countries:** India and United States | *No information on sex or age of respondents*. | Distributed leadership<br>Empathy<br>Flexibility |

## Appendix 5: Final selection of items of the LCT scale (in Spanish)

| Factor (in Spanish) | Item ID (english) | Item (in Spanish |
|---|---|---|
| **Comunicación Digital** | DComm1 | Sabe escoger el medio de comunicación adecuado para el tipo de mensaje a transmitir |
| | DComm2 | Se asegura de que la cantidad de información que recibe el equipo no sea ni excesiva ni insuficiente |
| | DComm3 | Acuerda cómo debe comunicarse el equipo en situaciones excepcionales |
| | DComm4 | Se asegura de que los nuevos miembros conozcan los medios digitales utilizados |
| | DComm5 | Planifica encuentros individuales para facilitar la comunicación personalizada con cada miembro del equipo |
| | DComm6 | Planifica encuentros grupales para facilitar la comunicación en el equipo |
| | DComm7 | Muestra un buen uso del lenguaje no verbal en el contexto digital (p.ej., uso de emoticonos, gesticulación por cámara, tono de voz) |
| | DComm8 | Fomenta que, en las reuniones virtuales, las personas se escuchen y respeten los turnos de palabra |
| | DComm9 | Asegura que, en las reuniones virtuales, las personas participen activamente |
| | DComm10 | Se asegura de documentar y compartir lo acordado en reuniones y conversaciones importantes |
| | DComm11 | Planifica oportunidades de feedback, utilizando el medio más adecuado |
| | DComm12 | Genera oportunidades para recibir feedback del equipo |
| | DComm13 | Acuerda con el equipo principios para dar y recibir feedback constructivo |
| | DComm14 | Se asegura de que todos los miembros del equipo puedan proporcionar feedback |
| **(Construir) Confianza Digital** | DTrust1 | Promueve que las personas cumplan con los compromisos que adquieren con el equipo |
| | DTrust2 | Muestra al equipo que cumple con sus compromisos |
| | DTrust3 | Si no puede cumplir un compromiso, informa con suficiente antelación |
| | DTrust4 | Trata a las personas de manera equitativa, sin importar la distancia geográfica o modalidad de trabajo |

| | | |
|---|---|---|
| | DTrust5 | Utiliza medios que permitan mantener la confidencialidad para tratar temas delicados o información sensible |
| | DTrust6 | Muestra honestidad frente al equipo (p.ej., reconociendo cuando desconoce algo o comete algún error) |
| | DTrust7 | Fomenta un clima en el que la gente se sienta libre para expresar sus puntos de vista |
| | DTrust8 | Genera la confianza suficiente para que se expresen desacuerdos o conflictos |
| | DTrust9 | Establece mecanismos digitales para que las personas puedan solicitar ayuda si la necesitan |
| | DTrust10 | Su nivel de competencia en el trabajo genera confianza en el equipo |
| | DTrust11 | Destaca las capacidades de cada uno de los miembros del equipo |
| | DTrust12 | Se muestra competente en el uso de herramientas digitales |
| | DTrust13 | Se asegura de que las personas sean competentes en el uso de herramientas digitales |
| **Gestión de Objetivos en Remoto** | RGoals1 | Usa las herramientas digitales adecuadas para organizar el trabajo en el equipo |
| | RGoals2 | Planifica el trabajo para reducir las interrupciones y la multitarea |
| | RGoals3 | Asegura un sistema de gestión del trabajo virtual sencillo y claro |
| | RGoals4 | Comprueba, a través de medios digitales, que los objetivos y roles de cada miembro del equipo estén claros para todos |
| | RGoals5 | Usa las herramientas digitales para hacer un seguimiento del cumplimiento de los objetivos y tareas |
| | RGoals6 | Hace seguimiento periódico del trabajo del equipo, utilizando medios digitales |
| | RGoals7 | Se asegura de que las personas cuenten con el equipamiento necesario para trabajar en remoto |
| | RGoals8 | Se asegura de que las personas cuenten con el software y la documentación que necesitan |
| | RGoals9 | Detecta con antelación dificultades que puedan afectar al trabajo en remoto |
| | RGoals10 | Facilita que el trabajo que requiere alta concentración se lleve a cabo sin interrupciones |
| | RGoals11 | Acuerda objetivos de trabajo claros y medibles, que faciliten la autonomía en el teletrabajo |

| | | |
|---|---|---|
| | RGoals12 | Facilita que las personas organicen y gestionen sus tiempos cuando trabajan en remoto |
| | RGoals13 | Facilita la autonomía de las personas para tomar decisiones en su trabajo |
| **Desarrollo de Relaciones en Remoto** | RRelations1 | En los encuentros virtuales refuerza la importancia de la cooperación en el equipo |
| | RRelations2 | Organiza actividades virtuales para desarrollar la cooperación y el apoyo entre compañeros |
| | RRelations3 | Está pendiente de que nadie se quede aislado dentro del equipo en remoto |
| | RRelations4 | Facilita la integración de los nuevos miembros mediante actividades virtuales de acogida |
| | RRelations5 | Facilita oportunidades de interacción que recreen situaciones presenciales (p.ej. cafés virtuales, juegos en línea) |
| | RRelations6 | Planifica eventos sociales virtuales para que los miembros del equipo conozcan su parte más humana y personal |
| | RRelations7 | Ayuda a las personas a identificar los aspectos que tienen en común con sus compañeros de equipo |
| | RRelations8 | Realiza acciones, a través de medios digitales, para reforzar la pertenencia al equipo |
| | RRelations9 | Realiza acciones, a través de medios digitales, para reforzar la pertenencia a la organización |
| | RRelations10 | Celebra los logros grupales utilizando los medios disponibles |
| | RRelations11 | Refuerza a través de los medios virtuales los valores compartidos del equipo |
| | RRelations12 | Se asegura de que las personas sean conscientes de cómo el trabajo de cada uno afecta al de los demás |
| | RRelations13 | Facilita la interacción virtual con otros equipos para fomentar el sentimiento de pertenencia organizacional |
| **(Apoyo a) Conciliación Vida-Teletrabajo** | TWLBalance1 | Genera confianza para poder tratar cuestiones personales de forma virtual |
| | TWLBalance2 | Demuestra interés por las necesidades de las personas en el contexto de teletrabajo |
| | TWLBalance3 | Estimula la empatía entre los miembros de su equipo en el contexto virtual |
| | TWLBalance4 | Demuestra preocupación por el estado emocional de las personas en las interacciones digitales |

| | |
|---|---|
| TWLBalance5 | Se asegura de que el equipo conozca los recursos disponibles para afrontar problemas emocionales |
| TWLBalance6 | Muestra a las personas de su equipo que es capaz de entender sus situaciones personales |
| TWLBalance7 | Busca alternativas junto con las personas para resolver los conflictos vida personal-teletrabajo |
| TWLBalance8 | Muestra conductas de conciliación entre su vida personal y el teletrabajo |
| TWLBalance9 | Considera las necesidades de conciliación vida personal-teletrabajo en la planificación del trabajo |
| TWLBalance10 | Se asegura de que las personas del equipo puedan acceder a las prácticas de conciliación de la organización |
| TWLBalance11 | Estructura el trabajo del equipo en remoto de forma que facilita la conciliación |
| TWLBalance12 | Acuerda con el equipo normas de desconexión laboral |
| TWLBalance13 | Ejemplifica con sus acciones cotidianas el respeto a la desconexión laboral |
| TWLBalance14 | Respeta los tiempos de desconexión del equipo |