

Development and psychometric validation of the intrinsic motivation in telework scale: evidence from Peru

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Abstract

The present study aimed to develop and validate the first psychometric scale designed to assess intrinsic motivation in teleworking environments in Latin America, thereby addressing a critical gap in global occupational psychology research. A sequential mixed-method design was employed, combining qualitative interviews grounded in Self-Determination Theory with a quantitative survey administered to 207 Peruvian teleworkers from the banking and education sectors. The methodological process included the initial design of the instrument, expert judgment validation, a pilot test, and successive refinement stages. Exploratory and confirmatory factor analyses, complemented by structural equation modeling, were conducted using JASP, SPSS, and R software, applying the principal axis factoring method to address data non-normality. The final scale, consisting of five factors and 28 items, demonstrated high internal consistency ($\alpha = 0.93$) and explained 68.85% of the total variance. The factors identified included dimensions associated with intrinsic motivation in teleworking contexts, such as achievement motivation, physical and mental well-being, organizational communication and human resource support, adequacy of the physical workspace for teleworking, and personal and family well-being. The findings confirmed that this scale is a valid and reliable instrument for assessing intrinsic motivation in teleworking environments, particularly in a post-pandemic context characterized by widespread digital adoption. Its application will enable organizations across Latin America and beyond to monitor and strengthen the motivation of remote workers, supporting evidence-based human resource policies that foster performance, resilience, and well-being in the future of work.

Keywords: Intrinsic motivation, measurement invariance, psychometrics, structural equation, telework.

INTRODUCTION

At the international level, teleworking had already been implemented prior to the pandemic in several countries, serving as an inclusive mechanism particularly designed for individuals with disabilities, family caregivers, and residents of regions characterized by high unemployment rates (World Health Organization [WHO] & International Labour Organization [ILO], 2022a; Murray et al., 2016). Following the health crisis, this modality underwent a rapid expansion, yielding both benefits and strains (World Health Organization [WHO], 2022b). Among the most pressing challenges, the increasingly blurred boundaries between professional and personal life stand out, as they negatively affect workers and their family environments, thus requiring continuous efforts to sustain balance and psychological well-being (Gadecki et al., 2016; Organisation for Economic Co-operation and Development [OECD], 2023).

In the Latin American context, the pandemic precipitated a swift adoption of teleworking across both productive and service sectors (Inter-American Development Bank [IDB], 2023). Although digital technologies broadened employment opportunities and ensured the continuity of essential operations (Economic Commission for Latin America and the Caribbean [ECLAC] & International Labour Organization [ILO], 2023), challenges concerning emotional, motivational, and social well-being intensified (De Aguiar et al., 2022). Against this backdrop, motivation became a cornerstone for sustaining both performance and team resilience (Rodríguez-Sánchez, 2020). Furthermore, the region—characterized by volatile and fluid labor conditions—was compelled to navigate persistent organizational transformations (Medrano et al., 2013).

In Peru, the pandemic profoundly reconfigured the labor landscape, culminating in the enactment of Law No. 31572 in September 2022, which institutionalized telework as the prevailing legal framework (National Civil Service Authority [SERVIR], 2023a). What had once been a marginal practice evolved into a consolidated modality across strategic sectors particularly education, banking, and selected branches of corporate services whereby accelerated digitalization enabled operational continuity and organizational adaptability (National Civil Service Authority [SERVIR], 2023b). Nonetheless, challenges related to intrinsic motivation remain pressing, as teleworkers require heightened autonomy,

meaningful social connections, and a sustained sense of competence to uphold their performance within virtual environments (Ryan & Deci, 2020).

The relevance of this research is substantiated by the fact that, even though telework offers advantages in terms of flexibility and efficiency, it simultaneously poses specific challenges to both well-being and productivity (Ministry of Labor and Employment Promotion of Peru [MTPE], 2025). In this regard, the design and validation of a scale to assess intrinsic motivation within the Peruvian context will enable organizations to discern how to foster sustainable work environments. As Gagné and Deci (2005) assert, motivation depends on contexts that nurture autonomy, competence, and social connectedness. Accordingly, an instrument of this nature will contribute to the formulation of inclusive and effective policies, while reinforcing employee commitment and job satisfaction (Robbins & Judge, 2013), hence generating positive repercussions for both organizational management and academic inquiry.

The study was conducted in Metropolitan Lima between 2019 and 2025, focusing on companies within the educational and banking sectors both recognized as pioneers in consolidating telework as an established practice in the country. This sectoral relevance ensures that the findings yield critical insights for key organizational contexts. Nevertheless, the research encountered limitations associated with technical difficulties during virtual interviews and delays in the administration of the scale, which necessitated additional monitoring and coordination efforts (Maslach & Leiter, 2016). Within this framework, the overarching objective is to design and validate a scale capable of measuring intrinsic motivation in teleworking environments in Peru.

Despite the progress achieved in the development of motivational instruments, there remains no psychometric measure specifically designed to capture intrinsic motivation within teleworking contexts in Latin America, where distinct labor, technological, and sociocultural realities converge. This gap constrains both international comparability and the formulation of evidence-based interventions. In response, this study develops and validates the Intrinsic Motivation in Telework Scale, owing to providing robust psychometric evidence derived from the Peruvian population.

Specifically, this study aims to: (a) to design a psychometric scale that accurately measures intrinsic motivation in teleworking environments within the Peruvian context; (b) to evaluate its factorial structure, reliability, and validity through exploratory and confirmatory factor analyses; and (c) to provide empirical evidence for the development of evidence-based human resource policies that foster motivation and well-being among remote workers.

Accordingly, the study tested the following hypotheses:

H1: Intrinsic motivation in telework is influenced by multiple psychological, organizational, and environmental dimensions

H2: The proposed scale will demonstrate adequate reliability ($\alpha \geq 0.80$) and convergent–discriminant validity.

H3: The factorial structure of intrinsic motivation will be consistent with the theoretical components proposed by Self-Determination Theory.

Previous studies

The analysis of the reviewed studies indicates that intrinsic motivation within work environments and particularly within teleworking contexts manifests heterogeneously and is contingent upon cultural, organizational, and personal factors. Gutiérrez and Solano (2020) revealed that telework implemented during the pandemic resulted in increased motivation among a substantial portion of employees, whilst simultaneously producing declines in others, thereby underscoring the need for instruments capable of capturing the nuanced individual dimensions of motivational experience. This finding resonates with the conclusions of Ojeda et al. (2023), who determined that teleworking exerts differentiated effects depending on gender and work modality preferences, highlighting that men reported higher motivation in remote environments, whereas women exhibited greater motivation in on-site settings.

On a complementary level, the evidence demonstrates that intrinsic motivation occupies a central role in professional sectors where vocation and commitment are fundamental. Breed et al. (2020) concluded that nursing leaders in South Africa are characterized by high levels of internal motivation, rooted in personal fulfillment and professional commitment, hence reinforcing the significance of deep psychological factors. Similarly, Yildiz and Durmus (2021) observed that primary school teachers exhibit higher intrinsic than extrinsic motivation, albeit with variations across age, gender, and place of residence implying that any psychometric scale must remain sensitive to such sociodemographic differences.

Moreover, efforts aimed at validating and adapting psychometric instruments yield valuable methodological insights. Duman et al. (2020) ascertained that the cultural and linguistic adaptation of the German inventory into Turkish proved both valid and reliable, as a result affirming that translation alone is insufficient unless the specificities of the sociocultural context are duly considered. Along similar

lines, Ramírez (2022) evidenced that, despite certain reliability limitations in specific constructs, a questionnaire developed in Mexico based on the Self-Motivational System achieved satisfactory levels of overall reliability, owing to establishing itself as a benchmark for Spanish-speaking populations.

In university contexts, research highlights the significance of motivational self-regulation. Rojas and Valencia (2021) established that a learning-value orientation enhances both self-regulation and academic engagement, thus confirming that understanding the dynamics of intrinsic motivation facilitates the creation of more autonomous and productive environments. Likewise, Santiago-Torner (2023) substantiated that intrinsic motivation plays a moderating role in the relationship between telework and creative behavior, as the advantages of remote work foster creativity when motivational levels are moderate or high.

From an organizational standpoint, Forero et al. (2021) determined that teleworking not only enhances individual and family productivity but also constitutes a government-oriented strategy with the potential to yield substantial social and economic benefits, provided that supportive policies are effectively structured. Such a scenario implies that the validation of specialized instruments must encompass dimensions linked to holistic well-being, extending beyond mere short-term productivity. Taken together, the literature demonstrates that intrinsic motivation operates as a transversal axis across multiple domains healthcare, education, academia, and business and that psychometric design processes require not only reliability and validity but also cultural relevance and organizational sensitivity. The identified gap, therefore, lies in the absence of an instrument specifically designed for teleworkers, capable of capturing the distinct features of the Latin American context, due to substantiating the need for psychometric development and validation attuned to realities such as the Peruvian case.

THEORETICAL FRAMEWORK

This section examines motivational theories and their connection to concepts such as intrinsic motivation and teleworking, alongside the theoretical foundation for a scale designed to measure it within this context. Ryan and Deci (2000) and Gaibor (2023) contended that intrinsic motivation is associated with the inherent satisfaction derived from autonomous action, whereas Adams et al. (2017) underscored the role of cultural influence. In this vein, motivation is understood as the outcome of an ongoing interplay between personal capacities, contextual demands, and sociocultural challenges.

The historical evolution of these theories unfolded through distinct phases. Campbell et al. (1993) and Herrera et al. (2004) identified an initial stage grounded in instincts and rewards, a subsequent cognitive phase centered on performance and achievement, and a third focused on self-concept and self-efficacy. Mahmud et al. (2023) further asserted that these approaches originate from pressures and needs, whilst Burak (1975) conceived motivation as the interaction between internal requirements and goals. Subsequently, Chiavenato (2022) systematized these perspectives into content theories and process theories, this leads to distinguishing between the driving factors and the operational mechanisms underlying motivation.

Among the content theories, Maslow (1943) structured human needs from the physiological level to self-actualization. Simão et al. (2023) highlighted its emphasis on autonomy, whereupon Simons et al. (1987) underscored its sequential nature. Alderfer (1969) reformulated this hierarchy into the dimensions of existence, relatedness, and growth, at the same time as Naranjo (2009) and Kovach (2018) stressed the potential to regress toward previously satisfied needs. In a similar vein, McClelland (1961) centered his model on the social motives of power, achievement, and affiliation, which correspond to Maslow's categories according to Daft (2004). Herzberg et al. (2011) differentiated between intrinsic and extrinsic factors—an idea initially anticipated by Bonillo and Nieto (2002) and subsequently elaborated by Sachau (2007), who clarified the nuanced connection between the presence or absence of these factors and job satisfaction. Labor motivation may thus be conceived through two complementary perspectives: content theories and process theories. The former focus on what motivates individuals, whereas the latter elucidate how motivation takes place. Due to this, Herzberg et al. (2011) distinguished intrinsic from extrinsic factors, a proposition further refined by Bonillo and Nieto (2002) and extended by Sachau (2007), who emphasized that motivational factors are intrinsically linked to satisfaction and personal growth.

Process theories, as outlined by Menon and Bhagat (2023), examine how individuals interpret and evaluate their work experiences. Adams (1965) conceptualized equity as a perception of fairness; Vroom (1964) argued that expectancy conditions motivation; Deci and Ryan (2000) developed self-determination theory, emphasizing that the needs for competence, relatedness, and autonomy are fundamental, contrast Robbins (2004) underscored the necessity of maintaining equilibrium between intrinsic and extrinsic incentives. Motivation is hence defined as an essential trait that drives action and orients individuals toward achievement. Caballero (2002) associated it with goal orientation, while Chiavenato (2022) linked it to personal growth. Complementarily, Al-Abdallat and Alqdah (2023) and

Adams et al. (2017) viewed it as a strategy for overcoming obstacles, and Bisquerra (2008) depicted it as a regulator of both the intensity and direction of behavior.

Regarding its typology, Deci and Ryan (2000) conceptualized intrinsic motivation as that which is sustained by the personal satisfaction derived from the activity itself. This standpoint has been reinforced by several scholars (Camacho & Del Campo, 2014; Chóliz, 2004; Hoornweg et al., 2016; Hunton, 2005; Ruth, 2024; Slater & Narver, 1995; Timón, 2013; Wenger & Snyder, 2000), who concur that intrinsic motivation drives creativity, commitment, and self-actualization. For its measurement, Botella and Ramos (2020) employed the Intrinsic Motivation Inventory (IMI) originally developed by Deci and Ryan—an instrument validated by Cardozo et al. (2021), who identified positive effects from the dimensions of interest and competence, and negative effects associated with perceived pressure or tension.

Although intrinsic motivation has traditionally been conceptualized as the enjoyment and satisfaction derived from the activity itself, contemporary approaches grounded in Self-Determination Theory argue that intrinsic motivation is strongly conditioned by contextual factors that facilitate or inhibit the satisfaction of basic psychological needs, namely autonomy, competence, and relatedness (Ryan & Deci, 2020). In teleworking environments, recent evidence suggests that organizational communication, human resource support, work–life balance, physical workspace conditions, and psychosocial well-being significantly influence autonomous motivation and motivational internalization processes (Gagné & Deci (2005); Van den Broeck et al., 2021). Likewise, Wang et al. (2021) demonstrated that social isolation, virtual communication dynamics, and environmental working conditions directly affect employee well-being and motivation during remote work, whereas Kniffin et al. (2021) argued that telework reshapes the psychosocial conditions that sustain work motivation in digital contexts. From this perspective, the dimensions identified in the present study do not represent constructs external to intrinsic motivation, but rather contextual conditions that mediate the experience and sustainability of intrinsic motivation among teleworkers. Consequently, the proposed scale adopts a contextualized and multidimensional understanding of intrinsic motivation in teleworking environments.

Telework, initially theorized by Nilles at NASA as suggested by Chiru (2017) and defined as a flexible form of employment by Schiff (1979), was subsequently expanded upon by Saco (2007) and examined by Beckel and Fisher (2022). Barrios and Paravic (2006) integrated both individual and family dimensions into its analysis. In the United States, Chiru (2017) outlined the regulatory evolution culminating in the 2010 Act, conversely Lister and Harnish (2011) estimated a 61% increase in teleworking between 2005 and 2009. Across Europe, the European Foundation (2010) underscored the significance of the 2002 Framework Agreement, subsequently analyzed by Visser and Ramos (2008).

In 2020, the Ministry of Labor and Employment Promotion (MINTRA) launched a labor pact aimed at modernizing employment relations. With the onset of the pandemic, several specific decrees introduced remote work as an exceptional modality, hence triggering substantial transformations in human talent management and motivational mechanisms, as elucidated by Abanto (2020).

Within this framework, the proposed five-factor, twenty-eight-item scale is grounded in the necessity of assessing workers' intrinsic motivation under teleworking conditions, with particular emphasis on achievement motivation (Atkinson, 1964; Mario et al., 2024; Santiago, 2023; Senarathne, 2020). Its analytical foundation is further enriched by the contributions of several scholars (Campanario, 2023; Canseco & Ojeda, 2016; Castillo & Prieto, 1990; Castro-Martínez & Díaz-Morilla, 2020; Chiavenato, 2011; De la Mora & Gutiérrez, 2020; Fernández, 2008; Freyssinet, 2023; Guayacán et al., 2022; Lago, n.d.; Ortega et al., 2016; Sánchez et al., 2011), who collectively demonstrated that intrinsic motivation in teleworking is contingent not only upon internal dispositions but also upon a supportive social and organizational environment.

METHODOLOGY

The research adopted an applied, non-experimental, and cross-sectional design, employing a sequential exploratory mixed-methods approach that integrated an initial qualitative phase—aimed at generating items and understanding the telework context—followed by a quantitative phase devoted to designing and validating an intrinsic motivation scale. The methodological rationale combined induction (the identification of patterns from semi-structured interviews and the literature) with deduction (the statistical testing of the proposed model). Epistemologically, the study articulated positivism emphasizing objectivity, measurement, and statistical analysis with constructivism, which sought to capture the subjective meanings underlying participants' experiences. The target population consisted of approximately 500 teleworkers from three companies in Metropolitan Lima. In the qualitative stage, purposive sampling was applied until data saturation was achieved (confirmed between interviews 12 and 14), whereas in the quantitative stage, non-probabilistic convenience sampling was employed. The

final valid sample for quantitative analysis comprised 207 participants. Regarding the sampling procedure, a non-probabilistic convenience sampling method was adopted due to accessibility constraints during the post-pandemic period. The inclusion criteria required participants to be full-time or part-time teleworkers with at least 20 hours of remote work per week and a minimum of six consecutive months of teleworking experience in the same organization. Exclusion criteria included temporary or hybrid workers who performed less than 50% of their tasks remotely, as well as respondents who submitted incomplete questionnaires. These parameters ensured that the selected participants possessed sufficient exposure to teleworking conditions to provide reliable responses concerning intrinsic motivation. The instrument was developed based on classical motivation theories and preliminary qualitative findings, initially structured into seven factors and thirty-five items, with responses rated on a five-point Likert scale.

In addition, the inclusion of contextual dimensions was theoretically supported by contemporary approaches to Self-Determination Theory, which posit that intrinsic motivation in remote work settings is shaped by organizational, environmental, and psychosocial conditions that influence the satisfaction of basic psychological needs. Subsequently, the instrument was subjected to expert judgment, yielding an Aiken's V coefficient of 0.91, a value that attested to a high level of content validity. Following expert feedback, adjustments were implemented in the phrasing of several items, the restructuring of certain dimensions, and the incorporation of new indicators associated with autonomy and commitment.

A pilot test was subsequently administered (n = 70 valid cases), the results of which enabled the consolidation of the final instrument into eight factors and forty items. Data collection was conducted virtually through Zoom interviews and a self-administered Google Forms questionnaire, ensuring informed consent, data confidentiality, and personalized telephone follow-ups to enhance the response rate. The qualitative processing involved verbatim transcription, open coding, and tabular organization of categories and subcategories, this leads to identifying emerging themes such as physical and mental health, physical workspace, and family-economy balance. The quantitative analysis encompassed descriptive statistics, reliability testing (overall Cronbach's alpha = 0.93), and exploratory factor analysis (EFA), which aimed to identify the underlying structure of the Intrinsic Motivation Scale. It was followed by confirmatory factor analysis (CFA) and structural equation modeling (SEM) using the weighted least squares mean and variance adjusted estimator (WLSMV) for ordinal scales, assessing convergent and discriminant validity, composite reliability, and overall model fit (SRMR, RMSEA, CFI, TLI). Analyses were performed with JASP, SPSS, and R (lavaan).

RESULTS

This chapter presents the analysis of the research findings, encompassing the descriptive analysis, reliability assessment, exploratory factor analysis, and confirmatory factor analysis with SEM.

Table 1 summarizes the sociodemographic profile of the study participants. Broadly speaking, a higher concentration of teleworkers is observed within the 31–50 age range (50.24%), indicating a professionally active population in a stage of consolidated career development. The younger group aged 18–30 (17.39%) and the older cohort aged 51–65 (26.09%) complement the sample, whereas the proportion of individuals aged 66 and above (6.28%) reflects the relatively limited participation of older adults in teleworking arrangements.

Regarding gender, the composition appears relatively balanced, with a slight predominance of women (51.21%) over men (48.79%), which aligns with the growing integration of women into flexible work modalities. In relation to job positions, the most prominent roles correspond to coordination (30.92%), secretarial/assistant (23.19%), and managerial/sub-directorial positions (21.74%), which collectively illustrate a sample strongly represented by administrative and supervisory functions. Executive-level roles (12.56%) and teaching positions (11.59%) further enrich the profile, therefore highlighting the occupational diversity of the participants.

Table 2 presents the descriptive statistical summary of the questionnaire items, information that is crucial for assessing the initial quality of the data and verifying its suitability for subsequent factorial analyses. This overview enables the observation of response trends and the behavior of individual distributions in terms of frequency, variance, skewness, and kurtosis. Overall, responses tended to cluster around the upper categories of the scale (values 4 and 5), indicating a negative skewness associated with favorable perceptions of intrinsic motivation. With regard to kurtosis, certain items exhibited positive values, reflecting low dispersion and high consensus among participants, whereas others displayed negative kurtosis, suggesting greater variability in perceptions depending on the type of indicator assessed.

To evaluate the distribution of the data, the Kolmogorov–Smirnov and Shapiro–Wilk tests were applied, both yielding statistically significant results ($p < .05$), as a consequence indicating that the data did not follow a normal distribution. Consequently, the exploratory factor analysis employed the Principal Axis Factoring (PAF) extraction method, which does not assume multivariate normality and enables the identification of underlying latent factors rather than merely reducing data dimensionality. Moreover, this method enhances the estimation of communalities in samples exhibiting non-normal behavior, as is often the case in applied social research. This methodological decision is grounded in the recommendations of Costello and Osborne (2005), who advocate for the use of PAF in studies examining non-observable psychological constructs when data display significant skewness or kurtosis. Accordingly, the approach adopted was deemed the most appropriate both from a statistical standpoint and in alignment with the objectives of the study.

Table 1. Descriptive Summary of Respondents' Profile

Variables	Categories	Frequency	Percentage
Age group	18 - 30 años	36	17.39
	31 - 50 años	104	50.24
	51 - 65 años	54	26.09
	> 66 años	13	6.28
	Total	207	100
Gender	Male	101	48.79
	Female	106	51.21
	Total	207	100
Position Held	Coordination	64	30.92
	Teacher	24	11.59
	Manager / director	26	12.56
	Head / Deputy director	45	21.74
	Secretary / assistant	48	23.19
	Total	207	100

Table 2. Descriptive Summary of Items

Dimensions / Items	Absolute Frequencies					σ^2	Skewness	Kurtosis	K-S (p value)
	1	2	3	4	5				
A1	0	1	6	68	132	0.33	-1.25	1.44	0.01
A2	0	3	12	79	113	0.45	-1.15	1.26	0.01
A3	0	4	14	85	104	0.49	-1.07	1.09	0.01
A4	5	25	27	71	79	1.21	-0.86	-0.18	0.01
A5	1	18	58	68	62	0.95	-0.36	-0.76	0.01
B1	0	1	9	66	131	0.36	-1.26	1.24	0.01
B2	0	0	9	69	129	0.33	-1.01	0.03	0.01
B3	1	0	12	74	120	0.43	-1.40	3.16	0.01
B4	0	3	12	95	97	0.44	-0.91	0.98	0.01
B5	0	1	20	81	105	0.46	-0.80	-0.13	0.01
C1	0	6	29	80	92	0.64	-0.82	0.01	0.01
C2	22	55	60	44	26	1.41	0.10	-0.87	0.01
C3	0	1	5	63	138	0.31	-1.39	1.92	0.01
C4	20	75	35	64	13	1.30	0.10	-1.10	0.01
C5	6	17	36	82	66	1.08	-0.87	0.24	0.01
D1	4	24	26	92	61	1.05	-0.85	0.07	0.01
D2	8	36	33	82	48	1.29	-0.55	-0.64	0.01
D3	6	24	54	64	59	1.19	-0.48	-0.56	0.01
D4	4	6	21	74	102	0.81	-1.46	2.30	0.01
D5	2	23	27	89	66	0.98	-0.81	-0.05	0.01
E1	16	55	44	48	44	1.61	-0.05	-1.17	0.01
E2	5	25	25	96	56	1.07	-0.86	0.11	0.01
E3	3	12	24	106	62	0.78	-1.07	1.34	0.01
E4	2	7	23	89	86	0.71	-1.15	1.54	0.01
E5	11	32	50	64	50	1.37	-0.42	-0.72	0.01
F1	5	19	20	83	80	1.07	-1.10	0.62	0.01

	A	A	A	A	B	B	B	B	B	C	C	C	C	C	D	D	D	D	E	E	E	E	E	F	F	F	F	F	G	G	G	G	H	H	H	H	H														
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5											
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
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	5	5	1	2	5	6	5	4	4	4	1	4	5	4	1	1	2	2	2	2	2	2	3	2	3	3	3	2	3	3	2	3	1	8	2	1	8	7	2	.	.	.	.	.							
	4	8	6	9	4	2	1	7	6	3	6	6				5	0	7	5	1	0	3	9	9	3	1	2	3	9	3	8	5	9	1		4	1							5	.						
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
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	6	2	3	3	4	4	4	4	4	5	2	3	3	6	2	1	3	3	2	3	3	4	4	4	3	3	2	2	2	4	3	3	1	4	2	2	0	9	3	.	.	.	.	.	.						
	1	4	6	6	5	0	6	3	3	0	5					8	9	1	3	3	5	8	0	9	0	9	0	3	5	4	1	0	7	5		0	0								6	.					
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	2	4	.	
	2	4	4	5	4	5	5	4	1	3	5	9	2	1	3	2	2	2	2	3	4	3	3	3	3	3	2	3	3	3	1	5	2	1	7	1	4	.	.	.	.	.	.	.	.	.					
	3	0	7	9	8	8	0	9	9	9						0	7	4	9	0	3	8	1	8	6	6	4	4	0	8	9	5	8	3		1	9									2	.				
A	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0					
4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	.	.	1	1	.
	4	1	1	1	1	1	1	3	3	1	0	0	1	1	4	2	3	4	3	3	2	4	2	2	1	2	2	2	3	2	3	0	2	2	8	1	1	.	.	.	.	.	.	.	.	.					
	5	4	7	1	6	1	4	3	4	1	2	7	2	0	3	6	3	0	1	2	4	4	6	4	7	3	1	0	4	7	2	2	3														7	.			

D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	2	3.		
	4	4	5	5	5	4	3	3	3	2	1	4	3	4	2	3	1	2	3	
	9	6	6	3	4	7	9	2	8	0	7	5	8	0	4		7	7	0	
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	2.		
	5	5	5	4	5	5	4	3	3	3	4	5	4	4	2	3	3	0	9	3
	6	1	6	8	1	4	3	2	8	5	6	1	3	1		3	8		3	
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	3.		
	5	5	4	7	4	3	3	3	2	4	4	3	4	0	3	4	1	2	3	
	6	4	2	2	4	4	3	9	6	4	1	9	7		3	2		5		
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	2	3.		
	6	4	6	4	4	4	3	3	4	4	4	3	1	2	3	6	2	3		
	5	8	0	0	0	1	6	0	7	9	5	0		5	3		1			
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	2	3.		
	5	6	4	3	3	3	4	4	4	4	4	7	2	3	9	4	3			
	7	1	9	8	7	6	4	8	7	1	4		4	1		2				
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	2	3.		
	4	4	4	3	2	3	5	4	5	2	1	2	2	3	9	3				
	6	2	0	0	3	2	9	9	0	4		2	6		3					
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	3.		
	5	4	3	4	3	5	5	4	3	5	3	3	2	7	3					
	1	0	9	6	8	3	3	7	4		7	8		5						
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	3.		
	7	6	4	4	4	5	5	3	5	3	4	7	6	3						
	9	9	9	8	3	1	2	4		4	3		0							
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	3	3.		
	7	4	5	3	4	5	2	4	3	3	9	9	3							
	6	6	5	7	6	4	4		6	9		0								
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	3	3.		
	4	4	4	4	4	1	8	3	3	0	5	2								
	1	6	0	2	7															

Factor Extraction and Evaluation of Initial Model Fit

Figure 1 illustrates the distribution of eigenvalues for each dimension. Applying the parallel analysis method, it becomes evident that the items of the Intrinsic Motivation Inventory can be grouped into six factors, as the eigenvalues derived from the empirical data exceeded the average eigenvalues from the simulated data within this factor set. These six factors accounted for a total variance of 64.49%, with Factor 1 explaining the largest proportion of variance (see Table 5). In addition, the estimated reliability coefficients ranged from 0.63 to 0.91 across factors and reached 0.94 for the overall instrument.

Figure 1. Scree Plot Depicting the Number of Factors to Be Extracted in the Initial Step

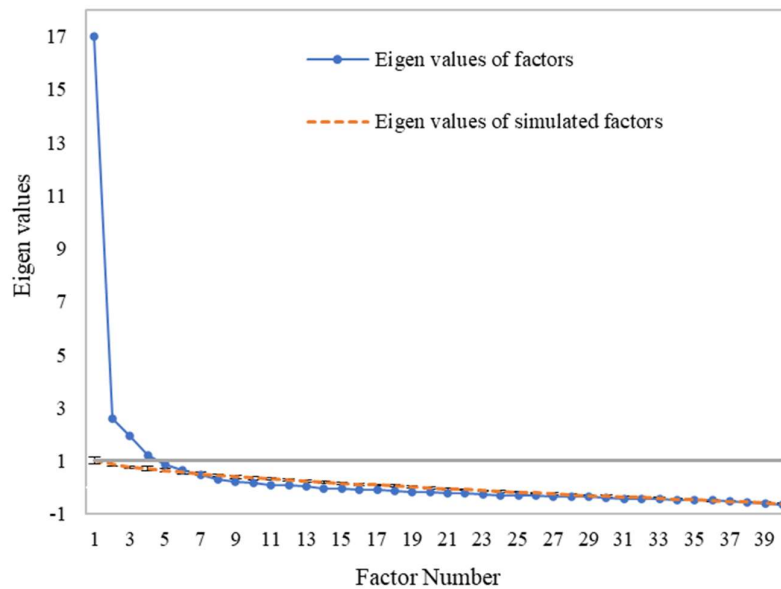


Table 5. Explained Variance and Cronbach's Alpha Coefficient of the Factors Extracted in the Initial Step

Factors	N° of Items	Eigenvalues	% of variance	Cronbach's Alpha
1	10	7.17	17.93	0.91
2	11	6.11	15.29	0.89
3	06	3.78	9.46	0.79
4	05	3.75	9.37	0.86
5	05	3.52	8.80	0.82
6	03	1.46	3.64	0.63
Total	40	25.79	64.49	0.94

Note. Extraction method: Minimum Residuals.

Interpretation and Assessment of Factor Significance

The Promax rotation was applied to the factor loading matrix, the results of which revealed that certain items displayed either factor loadings or reproduced communalities below 0.5, and in some cases, correlations exceeding 1 an outcome that may occur when employing a polychoric correlation matrix. Specifically, items C2, A5, E4, D3, D4, G1, F4, and G2 showed factor loadings below 0.5, while items B2 and F3 exhibited loadings greater than 1. Additionally, items A4, G4, C2, C5, F5, and C4 presented reproduced communalities below 0.5 (see Table 6). As a result, these items were removed during the iterative refinement process: in the first five runs, items C4, C2, G4, A4, and C5 were excluded due to low communalities; subsequently, between the sixth and tenth runs, items G3, G2, F4, E4, and D3 were eliminated owing to low factor loadings; in the eleventh run, item F5 was excluded for exhibiting low communality; and finally, in the twelfth run, item D4 was omitted for displaying a factor loading below 0.5.

Table 6. Factor Loadings of the Rotated Matrix and Communalities Obtained in the Initial Step

Factor 1	λ	h^2
B2: I feel deeply satisfied when optimizing my digital technology skills to benefit my teleworking tasks.	1.00	0.90
A1: I believe that learning new technological skills is helping me improve my telework performance.	0.98	0.74
B1: I experience great personal satisfaction when accomplishing the goals I have set in telework.	0.92	0.66

A3: Strengthening my communication skills allows me to interact more fluently with colleagues while teleworking.	0.87	0.70
B4: I am motivated by the idea of collaborating with members from other departments to achieve a telework-related project.	0.78	0.76
B3: I am very responsible in using the technological and informational resources provided by my organization for telework.	0.77	0.72
A2: Adapting to new teleworking strategies enables me to manage my time effectively.	0.72	0.60
B5: I feel satisfied having autonomy in making important decisions related to telework.	0.71	0.73
C3: I feel pleased when my supervisors acknowledge my good performance.	0.62	0.57
C1: I enjoy teleworking overall.	0.55	0.64
Factor 2		
E1: Stress levels are lower when teleworking.	0.93	0.74
E5: The quality of my mental health has improved since I began teleworking.	0.79	0.74
A4: Telework allows me the freedom to decide when and where to work.	0.77	0.44
E3: After a telework meeting, I can relax and perform body stretches.	0.60	0.71
G4: I can disconnect digitally on weekends.	0.60	0.38
D5: I set clear boundaries between household activities and telework responsibilities.	0.57	0.64
E2: During telework breaks, I can engage in physical activity.	0.51	0.67
C2: I remain in telework even if the pay is lower.	0.49	0.32
A5: Since teleworking, my productivity has increased.	0.48	0.56
E4: Teleworking allows me to contribute to environmental protection.	0.39	0.65
D3: I have opportunities for promotion while continuing to telework.	0.36	0.66
Factor 3		
D2: During telework hours, I can engage in personal activities.	0.93	0.65
D1: I have time to enjoy family moments while teleworking.	0.83	0.72
C5: I accept failure as part of the drive to achieve telework objectives.	0.76	0.49
G5: My company has provided me with at least one technological device to perform telework duties.	0.54	0.56
D4: Teleworking enables me to save money.	0.47	0.60
G1: In my opinion, teleworking is better than on-site work.	0.32	0.60
Factor 4		
F3: I believe I have sufficient technological equipment to fulfill telework responsibilities.	1.04	0.88
F2: I have suitable furniture for teleworking.	0.93	0.87
F1: I have a private physical workspace for telework.	0.74	0.79
F5: Internet connectivity allows me to carry out my telework normally.	0.56	0.49
F4: The noise level in my telework environment allows me to concentrate.	0.42	0.56
Factor 5		
H3: My supervisors hold virtual meetings at the beginning or end of the workday to optimize telework.	0.95	0.75
H2: During telework, communication schedules with supervisors are clearly defined.	0.85	0.74
H1: In telework, we have established deadlines for responding to emails and/or internal or external messages.	0.7	0.57
H4: In my company, we have virtual spaces or activities that allow us to socialize outside of work hours.	0.60	0.60
H5: We have a virtual communication channel through which we are informed about company updates, policy changes, and internal processes.	0.59	0.56
Factor 6		
C4: Distractions at home reduce my concentration during telework.	0.68	0.29
G3: While teleworking, I feel satisfied with my job performance.	0.52	0.81
G2: Teleworking allows me to develop professionally.	0.45	0.74

Note. λ : Factor loading of the rotated matrix using the Promax rotation method; h^2 : Reproduced communality.

Factor Extraction and Evaluation of Model Fit in the Final Step

Accordingly of the preceding process, it was determined that the Intrinsic Motivation Inventory is composed of 28 items, clustered into five factors, as illustrated in Figure 2. Likewise, it can be observed that these five extracted factors account for 68.85% of the total common variance, with Intrinsic Motivation for Achievement explaining the highest proportion of shared variance (see Table 7). Furthermore, the estimated reliability coefficients, measured through Cronbach's Alpha, ranged from 0.68 to 0.90 across the factors and reached 0.93 for the overall instrument.

Figure 2. Scree Plot Depicting the Number of Factors to Be Extracted in the Final Step

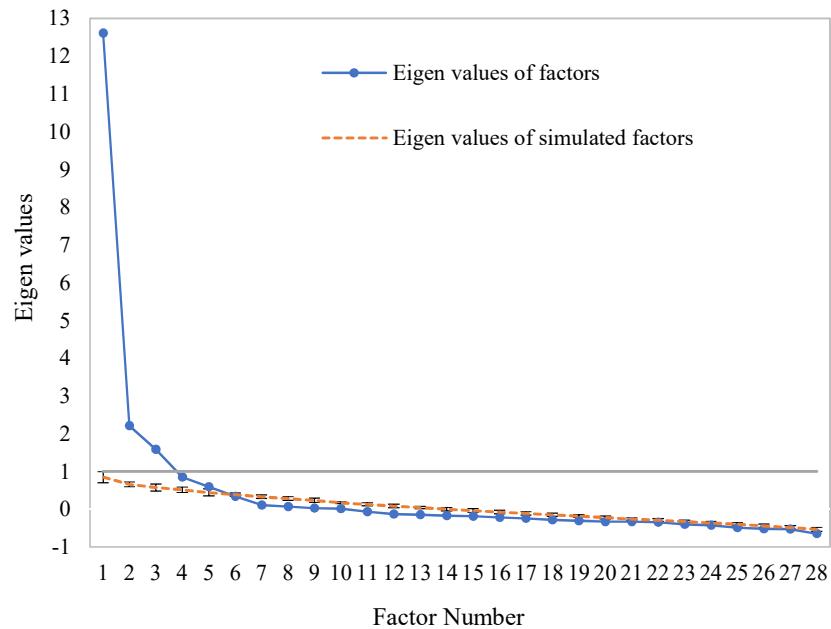


Table 7. Explained Variance and Cronbach's Alpha Coefficient of the Factors Extracted in the Final Step

Factors	N° of Items	Eigenvalues	% of variance	Cronbach's Alpha
MIL	09	6.66	23.80	0.90
EFM	08	4.86	17.36	0.89
CRH	05	3.21	11.45	0.82
EFT	03	2.44	8.71	0.90
BPF	03	2.11	7.54	0.68
Total	28	20.92	68.85	0.93

Interpretation and Assessment of Factor Significance in the Final Step

Table 8 presents the factor loadings derived from the rotated matrix using the Promax method, along with the corresponding communalities, as the outcome of the final stage of analysis. Overall, it can be observed that all items exhibit factor loadings and communalities greater than 0.5. At this stage, the factors were interpreted and labeled as stated by the conceptual meaning of their respective items.

- Intrinsic Motivation for Achievement: This factor encompasses items that reflect personal satisfaction, skill development, responsibility, and autonomy within the teleworking context (Deci & Ryan, 2000).
- Physical/Mental Health Balance: This factor groups items illustrating how telework positively influences individuals' personal and family quality of life (Greenhaus & Powell, 2006).
- Communication/Human Resources: This dimension integrates items that represent the structure and effectiveness of internal communication and human resource practices within the teleworking environment (Chiavenato, 2011).
- Physical Workspace for Teleworking: This factor comprises elements emphasizing the material and physical conditions required to perform telework effectively (Duffy, 1997).
- Personal/Family Well-being: This factor includes items that address how telework contributes to individual and family well-being, fostering a balance between professional responsibilities and personal life (Kossek et al., 2012).

Table 8. Factor Loadings of the Rotated Matrix and Communalities Obtained in the Final Step

MIL: Intrinsic Motivation for Achievement	λ	h^2
B2: I feel deeply satisfied when optimizing my digital technology skills to benefit my teleworking duties.	0.95	0.74
A1: I believe that learning new technological skills is helping me improve in my telework.	0.95	0.88
B1: I experience great personal satisfaction when accomplishing the goals I have set in telework.	0.91	0.66
A3: Strengthening my communication skills enables me to interact fluently with colleagues during telework.	0.83	0.69
B4: I am motivated by the idea of collaborating with members from other departments to complete a telework project.	0.81	0.74
B5: I feel fulfilled when I have autonomy in making important decisions related to telework.	0.76	0.72
B3: I am highly responsible in using the technological and informational resources provided by my organization for telework.	0.75	0.72
C3: I feel pleased when my supervisors acknowledge my good performance.	0.69	0.53
A2: Adapting to new telework strategies allows me to manage my time effectively.	0.64	0.60
EFM: Physical/Mental Health Balance		
E5: The quality of my mental health has improved since I began teleworking.	0.91	0.79
E1: Stress levels are lower in telework.	0.90	0.70
E3: After a telework meeting, I can relax and perform physical stretches.	0.64	0.67
D5: I set clear boundaries between household activities and telework.	0.64	0.61
E2: During telework breaks, I can engage in physical activity.	0.60	0.68
C1: I enjoy teleworking in general.	0.57	0.66
G1: In my opinion, teleworking is better than on-site work.	0.52	0.54
A5: Since teleworking, my productivity has increased.	0.51	0.54
CRH: Communication/Human Resources		
H3: My supervisors schedule virtual meetings at the beginning or end of the workday to optimize telework.	0.91	0.73
H2: In telework, communication schedules with supervisors are clearly established.	0.84	0.72
H1: In telework, deadlines are set for responding to emails and/or internal or external messages.	0.69	0.56
H5: We have a virtual communication channel that keeps us informed about company updates, policy changes, and internal processes.	0.58	0.57
H4: My company offers virtual spaces or activities that allow us to socialize outside working hours.	0.56	0.58
EFT: Physical Workspace for Teleworking		
F2: I have appropriate furniture for teleworking.	0.83	0.90
F3: I believe I have sufficient technological equipment to fulfill my teleworking responsibilities.	0.82	0.83
F1: I have a private physical space to work remotely.	0.69	0.82
BPF: Personal/Family Well-being		
D2: During telework hours, I can engage in personal activities.	0.94	0.81
D1: I have time to enjoy with my family during telework.	0.70	0.74
G5: My company has provided me with at least one technological device to perform my teleworking tasks.	0.51	0.56

Note. λ : Factor loading of the rotated matrix using the Promax rotation method; h^2 : Reproduced communality.

Furthermore, the factor correlation matrix, displayed in Table 9, was estimated. The results reveal moderate relationships among the evaluated factors, implying that the constructs are not entirely independent. The highest correlation (0.56) was observed between Intrinsic Motivation for Achievement and Communication/Human Resources, whereas the lowest correlation (0.26) occurred between Physical Workspace for Teleworking and Personal/Family Well-being. Such predominance of moderate correlations lends support to conducting a confirmatory factor analysis based on correlated factors, thereby deepening the understanding of how these constructs interact within the teleworking context.

Table 9. Factor Correlation Matrix Obtained in the Final Step

	MIL	EFM	CRH	EFT	BPF
MIL: Intrinsic Motivation for Achievement	1	0.56	0.56	0.50	0.46
EFM: Physical/Mental Health Balance		1	0.50	0.53	0.47
CRH: Communication/Human Resources			1	0.54	0.37
EFT: Physical Workspace for Teleworking				1	0.26
BPF: Personal/Family Well-being					1

Confirmatory Factor Analysis Using Structural Equation Modeling Specification

In the initial stage, a multidimensional reflective measurement model with correlated factors was specified. A total of five factors emerged from the exploratory factor analysis (EFA), encompassing 28 items that exhibited factor loadings and communalities above 0.5. Additionally, factorial invariance was examined across gender and occupational sector (banking and education) to verify whether the structure of the Intrinsic Motivation in Telework Scale remained stable across subgroups. The multigroup confirmatory factor analysis (MGCFA) demonstrated configural, metric, and scalar invariance, indicating that the scale measures intrinsic motivation equivalently for men and women, as well as for teleworkers from both sectors. This finding reinforces the robustness and cross-contextual applicability of the instrument, confirming that the latent constructs are not significantly biased by gender or professional domain differences. These factors and their corresponding items are detailed in Table 10.

Tabla 10. Especificación de la estructura factorial derivado del AFE

Factors	Items
Intrinsic Motivation for Achievement	B1, B2, B3, B4, B5, A1, A2, A3, C3
Physical/Mental Health Balance	E1, E2, E3, E5, A5, C1, D5, G1
Communication/Human Resources	H1, H2, H3, H4, H5
Physical Workspace for Teleworking	F1, F2, F3
Personal/Family Well-being	D2, D1, G5

Identification

For the identification process, both the number of parameters to be estimated and the amount of available data (variances and covariances) were considered. The total number of parameters to estimate amounted to 477, which exceeded the 406 available variances and covariances, hence preventing the complete estimation of all parameters. Consequently, it was decided to restrict the estimation of factor variances, error regression coefficients, and error covariances. This adjustment reduced the total number of parameters to 66—fewer than the sample size therefore allowing these parameters to be successfully estimated (see Table 11).

Table 11. Number of Parameters to Be Estimated

Parameters to Estimate	N° of parameters
Correlation among factors	10
Variance of factors	5
Factor loadings	28
Regression coefficients of errors	28
Error variances	28
Error covariances	378
Total	477

Evaluation of Assumptions

The sample size consisted of 207 participants and included 28 items for the confirmatory factor analysis. Additionally, the results confirmed that the data did not follow a multivariate normal distribution ($p = 0.00$), as indicated in Table 12. Given these characteristics, a covariance-based confirmatory factor analysis was employed, utilizing the polychoric correlation matrix and the WLSMV estimator.

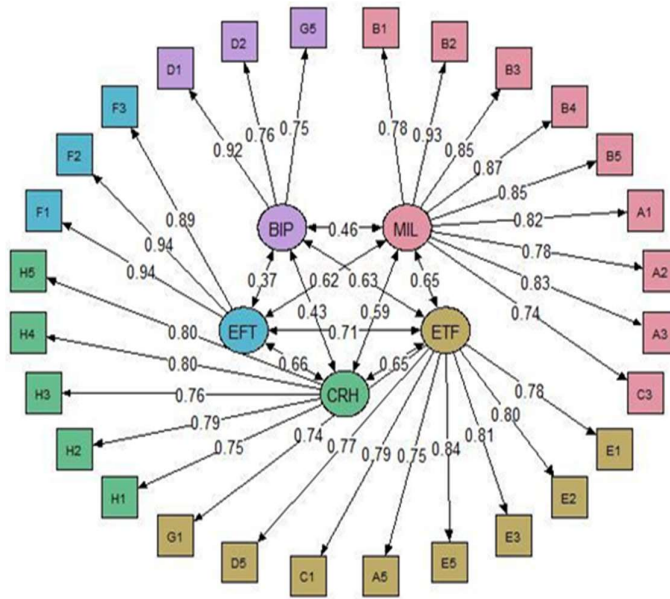
Table 12. Test of Normality, Multivariate Skewness, and Kurtosis

Tests	Assessment	Statistic	P-Value
Royston	Multivariate normality	1798.36	0.00
Mardia	Multivariate skewness	9414.68	0.00
Mardia	Multivariate kurtosis	43.70	0.00

Estimation, Fit, and Interpretation of the Factor Structure

Parameter Estimation and Global Fit. Given the violation of assumptions, the characteristics of the dataset, and the study's objectives, the parameters were estimated using the WLSMV estimator. The resulting global fit indices demonstrated an acceptable level of model adequacy, with the following values: CFI = 0.95, TLI = 0.94, SRMR = 0.08, and RMSEA = 0.08, as illustrated in Figure 3.

Figure 3. Specification and Fit of the Factor Structure



RMSEA: 0.08 | SRMR: 0.08 | CFI: 0.95 | TLI: 0.94

Measurement Reliability. The reliability of the factor measurements was assessed using the internal consistency method, yielding satisfactory results when analyzed through the ordinal alpha coefficient and McDonald's Omega. These reliability indices ranged from 0.85 to 0.91 and from 0.76 to 0.95, respectively (see Table 13).

Table 13. Reliability in the Measurement of Factors

Factors	N° of Items	Ordinal Alpha	McDonald's Omega
Intrinsic Motivation for Achievement	09	0.91	0.95
Physical/Mental Health Balance	08	0.91	0.92
Communication/Human Resources	05	0.85	0.88
Physical Workspace for Teleworking	03	0.90	0.94
Personal/Family Well-being	03	0.80	0.76

Convergent and Discriminant Validity

To assess convergent validity, standardized factor loadings, their statistical significance, the explained variance of each item, and the average variance extracted (AVE) per factor were analyzed. The factor loadings were statistically significant (Z -values $> |2|$) and ranged from 0.74 to 0.94, consequently demonstrating a strong relationship between the items and their corresponding latent constructs. The variance explained by the items of each factor ranged between 0.53 and 0.89, while the AVE values fell between 0.61 and 0.85, all of which exceeded the recommended threshold of 0.50, owing to confirming adequate convergence. Likewise, the composite reliability (CR) values were consistently above 0.70 across all factors, ensuring internal consistency (see Table 14). Regarding discriminant validity, both the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT) were applied. The square root of the AVE for each factor was found to be greater than the inter-factor correlations, and the HTMT values remained below 0.85, thus meeting the accepted standards. This demonstrates the presence of discriminant validity, indicating that the items of one dimension do not significantly contribute to the measurement of other dimensions within the factorial structure (see Table 15). Taken together, these results confirm that each construct of the scale is conceptually distinct and that the items accurately capture intrinsic motivation within teleworking environments (see Table 16).

Table 14. Convergent Validity in the Measurement of Factors

Factors	Items	Convergent Validity					
		Estimate	Std.Err	z-value	P(> z)	λ^2	AVE
	B1	0.78	0.03	24.27	0.00	0.60	0.69

Intrinsic Motivation for Achievement	B2	0.93	0.02	51.93	0.00	0.86	
	B3	0.85	0.03	28.71	0.00	0.72	
	B4	0.87	0.02	36.30	0.00	0.75	
	B5	0.85	0.02	37.32	0.00	0.72	
	A1	0.82	0.03	24.81	0.00	0.67	
	A2	0.78	0.04	20.21	0.00	0.61	
	A3	0.83	0.03	28.02	0.00	0.68	
	C3	0.74	0.04	19.47	0.00	0.55	
Physical/Mental Health Balance	E1	0.78	0.03	28.23	0.00	0.60	0.62
	E2	0.81	0.03	27.08	0.00	0.65	
	E3	0.81	0.03	27.82	0.00	0.66	
	E5	0.84	0.03	33.31	0.00	0.71	
	A5	0.75	0.03	22.49	0.00	0.56	
	C1	0.79	0.03	23.05	0.00	0.63	
	D5	0.77	0.03	24.10	0.00	0.59	
	G1	0.74	0.03	22.11	0.00	0.55	
Communication/Human Resources	H1	0.75	0.03	21.77	0.00	0.56	0.61
	H2	0.79	0.04	22.11	0.00	0.62	
	H3	0.76	0.03	23.06	0.00	0.58	
	H4	0.80	0.04	20.55	0.00	0.64	
	H5	0.80	0.04	22.46	0.00	0.64	
Physical Workspace for Teleworking	F1	0.94	0.02	54.63	0.00	0.88	0.85
	F2	0.94	0.01	67.09	0.00	0.88	
	F3	0.89	0.02	50.62	0.00	0.78	
Personal/Family Well-being	D1	0.93	0.03	27.99	0.00	0.86	0.67
	D2	0.76	0.04	20.23	0.00	0.58	
	G5	0.75	0.06	12.48	0.00	0.56	

Note. λ^2 : Explained variance; AVE: Average Variance Extracted.

Table 15. Discriminant Validity Using the Fornell and Larcker (1981) Criterion

	MIL	EFM	CRH	EFT	BIP
MIL: Intrinsic Motivation for Achievement	(0.83)				
EFM: Physical/Mental Health Balance	0.65	(0.79)			
CRH: Communication/Human Resources	0.59	0.65	(0.78)		
EFT: Physical Workspace for Teleworking	0.62	0.71	0.66	(0.92)	
BPF: Personal/Family Well-being	0.46	0.63	0.43	0.37	(0.82)

Table 16. Final Scale for Measuring Intrinsic Motivation in the Telework Context

Intrinsic Motivation for Achievement	
A1	I believe that learning new technological skills is helping me improve my telework performance.
A2	Adapting to new teleworking strategies allows me to manage my time effectively.
A3	Strengthening my communication skills enables me to interact fluently with colleagues during telework.
B1	I feel great personal satisfaction when I accomplish my telework goals.
B2	I feel highly satisfied when optimizing my digital technology skills to enhance my telework performance.
B3	I am very responsible in using the technological and informational resources provided by my organization for telework.
B4	I am motivated by the idea of collaborating with colleagues from other departments to complete telework projects.
B5	I feel fulfilled by having autonomy in making important decisions related to telework.
C3	I feel pleased when my supervisors acknowledge my good performance.
Physical/Mental Health Balance	
A5	Since teleworking, my productivity has increased.
E1	Stress levels are lower during telework.
E2	During telework breaks, I can engage in physical activity.

E3	After a telework meeting, I can relax and perform stretching exercises.
E5	The quality of my mental health has improved since I began teleworking.
C1	I enjoy teleworking in general.
D5	I clearly set boundaries between household activities and telework.
G1	In my opinion, teleworking is better than on-site work.
Communication/Human Resources	
H1	In telework, we have established deadlines for responding to emails and/or internal or external messages.
H2	In telework, communication schedules with supervisors are clearly defined.
H3	My supervisors schedule virtual meetings at the beginning or end of the workday to optimize telework.
H4	My company offers virtual spaces or activities that allow us to socialize outside of working hours.
H5	We have a virtual communication channel that keeps us informed about company updates, policy changes, and internal processes.
Physical Workspace for Teleworking	
F1	I have a private physical space for telework.
F2	I have suitable furniture for teleworking.
F3	I believe I have sufficient technological equipment to fulfill my telework responsibilities.
Personal/Family Well-being	
D1	I have time to enjoy with my family during telework.
D2	During telework hours, I can engage in personal activities.
G5	My company has provided me with at least one technological device to perform my telework tasks.

DISCUSSION

The overarching aim of this research was to design and validate an instrument to assess intrinsic motivation among teleworkers. To achieve this, a sequence of rigorously structured procedures was undertaken, drawing upon the methodological principles and recommendations advanced by Churchill (1979) and DeVellis (2017). The initial phase of the study entailed employing a qualitative approach, which comprised the development of a semi-structured interview grounded in Self-Determination Theory and the major motivational frameworks articulated by leading theorists (Alderfer, 1969; Herzberg et al., 2011; Maslow, 1943; McClelland, 1961; Ryan & Deci, 2000). Equally, my professional expertise and trajectory within organizational contexts were acknowledged as pivotal elements in shaping the interview design. Subsequently, the instrument was validated by organizational psychologists and practitioners who, at the time, held key positions in human resources departments within the local corporate sector.

The specific objectives were addressed in the subsequent stage, during which a questionnaire comprising seven factors and thirty-five items was meticulously devised based on the analysis of qualitative findings and theoretical foundations. In addition, the instrument underwent expert evaluation by international specialists, who recommended the inclusion of an additional dimension with five new items. Subsequently, the scale was subjected to a pilot test, through which it was refined and ultimately consolidated into eight factors encompassing forty items. At a later stage, the final version of the scale was administered to the target sample, and the results were used to assess reliability through internal consistency, exploratory factor analysis, and confirmatory factor analysis. Concurrently, during the analytical process and the renaming of factors in the scale designed to measure intrinsic motivation among teleworkers, several adjustments were made based on relevant literature, therefore enhancing the conceptual depth of each evaluated dimension.

The finalized instrument consisted of five factors and twenty-eight items. In this regard, several authors, including DeVellis (2017), Churchill (1979), and Hair et al. (2019), contend that the merging or adjustment of factors within a scale is valid when grounded in a robust theoretical framework and implemented through rigorous methodological procedures. By integrating theory with empirical evidence in the design process, it becomes possible to ensure that each factor precisely captures distinct aspects of the construct while maintaining theoretical coherence with prior studies. In alignment with this, Hancock et al. (2018) assert that conceptual consistency arises when merged items share a common theoretical foundation and represent analogous or complementary facets of a given phenomenon—such as intrinsic motivation—where theory substantiates their integration. For instance, the notions of intrinsic motivation for achievement and work performance may be conceptually coherent insofar as both

encapsulate internal drivers of motivation and personal growth, as elucidated in the seminal works of Ryan and Deci (2000) on Self-Determination Theory.

The multidimensional structure obtained in this study supports recent evidence indicating that intrinsic motivation in teleworking contexts cannot be understood exclusively as task enjoyment or internal satisfaction detached from environmental conditions. Instead, factors such as organizational communication, work-life balance, psychosocial well-being, and adequacy of the physical workspace operate as contextual conditions that facilitate the satisfaction of autonomy, competence, and relatedness among teleworkers (Gagné et al., 2022; Wang et al., 2021). From this perspective, these dimensions do not constitute external constructs unrelated to intrinsic motivation, but rather contextual mechanisms that influence the development and sustainability of autonomous motivation in digitally mediated work environments. This interpretation reinforces contemporary perspectives of Self-Determination Theory within teleworking contexts.

The structure exhibited both sampling adequacy and factorability ($KMO = 0.9069$; Bartlett's $\chi^2 = 5055.66$, $df = 780$, $p < .001$). Following the exploratory factor analysis (EFA), a five-factor model was retained, explaining 68.85 % of the total variance, with Cronbach's alpha coefficients ranging from 0.68 to 0.90 per factor and an overall reliability of 0.93. Subsequently, the confirmatory factor analysis (CFA) using the WLSMV estimator revealed a satisfactory global fit ($CFI = 0.95$, $TLI = 0.94$, $SRMR = 0.08$, $RMSEA = 0.08$). In terms of convergent validity, the results were supported by standardized loadings equal to or greater than .50 and statistically significant values, complemented by the assessment of Average Variance Extracted (AVE) at the factor level. In contrast, discriminant validity was verified through the Fornell-Larcker criterion ($\sqrt{AVE}$ compared with interfactor correlations) and by examining the inter-factor correlation matrix. Finally, internal consistency reliability proved satisfactory, with ordinal alpha values between 0.85 and 0.91, and McDonald's ω coefficients ranging from 0.76 to 0.95 across factors.

At present, only a limited number of studies focus on the design and validation of scales aimed at measuring intrinsic motivation among teleworkers. Such instruments are essential for understanding how remote work influences motivation and performance, due to enabling organizations to identify and respond to the evolving needs of their employees. For instance, the study conducted by Gutiérrez and Solano (2020) in Costa Rica examined motivation and job performance within the context of teleworking during the pandemic. Nevertheless, their approach was more general in scope, whereas the present research specifically seeks to develop a tailored scale designed for this purpose. In essence, these instruments are considered indispensable for the effective management of teleworkers and for fostering both their intrinsic motivation and overall well-being.

While it may seem that, the studies conducted by Duman et al. (2020) are particularly noteworthy, as they were grounded in the adaptation of Deci and Ryan's (2007) Intrinsic Motivation Inventory to diverse linguistic and cultural contexts including German, Portuguese, Greek, and Turkish and to various applied domains such as primary and secondary education, sports settings, and discipline-specific courses like mathematics. Conversely, the present research focuses on the design and validation of a novel scale intended to measure intrinsic motivation among teleworkers in Metropolitan Lima, thereby addressing a distinct professional and sociocultural context that had previously remained underexplored.

The rationale behind designing and validating the present scale to measure intrinsic motivation among teleworkers lies in the premise that intrinsically motivated employees tend to achieve their professional goals with greater ease an assertion supported by Breed et al. (2020) and Ulloa (2024). Likewise, Chóliz (2014) emphasizes that intrinsic motivation reflects the dedication, time, and effort individuals invest in their activities for the sheer satisfaction of performing them, rather than for any form of external reward; the essence of such engagement rests solely in deriving personal fulfillment from action itself. Undeniably, it is also necessary to recall the global crisis that began in early 2020 with the COVID-19 pandemic, during which numerous enterprises experienced a significant decline in economic performance, with the degree of impact varying according to country, industry, and organizational size. As suggested by the World Bank's 2021 report, only a limited number of firms initially adopted digitalization, which enabled them to survive although to micro and small enterprises that delayed its implementation. In consequence, telework emerged as a crucial mechanism for ensuring operational continuity and the sustained achievement of corporate objectives amid unprecedented disruptions.

Building upon the preceding discussion, it is equally crucial to underscore that one of the emerging priorities for human resource managers is the cultivation of a virtual organizational culture, given that many departments now operate in predominantly digital environments. In this regard, Dessler (2015) asserts that achieving such a transformation entails discovering how to align employees' individual objectives with those of the organization, hence consolidating the new labor paradigm represented by telework. Accordingly, several scholars concur that the most effective way for companies to integrate personal and institutional goals lies in fostering synergy through intrinsic motivation, as this exertion

profoundly and positively influences employees' performance (Giurge & Woolley, 2022; Ghosh et al., 2020; Husnatarina & Elia, 2022; Nurfaizi & Muafi, 2022; Zeng et al., 2023).

Furthermore, the findings derived from the fit indices, along with the evidence of convergent and discriminant validity, exceeded the recommended thresholds and remained consistent with prior research. Within the present model, confirmatory fit indices reached optimal levels (CFI = 0.95, TLI = 0.94, SRMR = 0.08, RMSEA = 0.08), results comparable to those reported by Duman et al. (2020), who obtained CFI = 0.93, TLI = 0.91, and RMSEA = 0.07 for a similar structural model. Regarding convergent validity, standardized factor loadings ranged from 0.74 to 0.94, with AVE values between 0.61 and 0.85 and composite reliability (CR) above 0.70, this leads to confirming a robust association between the items and their latent constructs. In relation to discriminant validity, the square roots of the AVE exceeded the inter-factor correlations, and HTMT values remained below 0.85, confirming the conceptual distinctiveness of the factors and the instrument's overall discriminant precision.

Ultimately, based on the final results, this scale constitutes a significant contribution for organizations, as it enables the measurement of teleworkers' intrinsic motivation. Such an instrument will be particularly valuable for companies whose human resource departments incorporate teleworking into their organizational frameworks and prioritize a humanistic approach one that emphasizes workforce flexibility and the balance between achieving corporate objectives and safeguarding employee well-being.

In summary, this research not only succeeded in designing and validating a robust scale to assess intrinsic motivation among teleworkers but also produced an instrument that is contextually attuned to the Peruvian labor reality. Through the integration of qualitative and quantitative approaches, a tool was developed that is sensitive to the lived experiences of teleworkers while grounded in well-established theoretical foundations.

This scale, therefore, represents a substantial advancement in the field of human resource management, offering organizations a practical mechanism to diagnose and enhance intrinsic motivation among employees operating in virtual environments settings that are increasingly prevalent and indispensable. In the post-pandemic context, where labor flexibility has evolved from an option to a necessity, possessing tools such as this one becomes essential for fostering well-being, self-fulfillment, and genuine professional commitment. Consequently, this study not only bridges a critical gap in the scientific literature but also presents a concrete and highly applicable proposal, reaffirming that research conducted from a local perspective with methodological rigor can yield impactful and transformative contributions to the contemporary world of work.

In line with international evidence, the findings of this study are consistent with those reported by Breed et al. (2020) and Yildiz and Durmus (2021), who confirmed that intrinsic motivation is a decisive factor for sustaining engagement and professional commitment in flexible work settings. Nonetheless, compared to European and North American studies (e.g., Duman et al., 2020; Ramírez, 2022), the Peruvian context reveals distinctive cultural and organizational characteristics that condition the experience of autonomy and social connectedness in telework. Therefore, this research contributes novel psychometric evidence from Latin America, highlighting that intrinsic motivation operates as a multidimensional construct influenced by contextual, technological, and socio-emotional variables. Consequently, the Intrinsic Motivation in Telework Scale offers a validated instrument for comparative studies across countries, promoting future cross-cultural analyses on digital labor motivation.

CONCLUSION

The research successfully designed and validated a scale to measure intrinsic motivation among teleworkers, providing a robust and contextually grounded tool tailored to the Peruvian socio-labor environment. Unlike previous studies that merely adapted instruments from other cultural contexts, this scale was developed through a quantitatively driven approach, preceded by an initial qualitative phase consisting of semi-structured interviews based on motivational theories, and followed by a rigorous quantitative phase that encompassed both exploratory and confirmatory factor analyses. This methodological design enabled the identification of context-specific factors within Peru's teleworking reality namely, physical and mental health balance, workplace environment, achievement motivation, and family well-being.

Anchored in the Self-Determination Theory proposed by Ryan and Deci (2000), which served as the theoretical foundation of this study, the analysis addressed the distinctive features of teleworking from a perspective that clearly differentiates intrinsic motivation associated with enjoyment, autonomy, and competence—from extrinsic motivation—linked to external rewards. In the realm of telework, where external control is significantly diminished, understanding this distinction proves essential for effectively managing both performance and professional engagement.

The confirmatory factor analysis revealed a five-factor structure comprising 28 items, explaining 68.85% of the total variance. The fit indices (CFI, TLI, RMSEA, SRMR) and reliability coefficients (Cronbach's alpha and McDonald's omega) confirmed the psychometric robustness of the instrument. Additionally, both convergent and discriminant validity exceeded the recommended thresholds. The removal of items with loadings below 0.5 further enhanced the precision and internal coherence of the final scale. The selection of the Principal Axis Factoring (PAF) extraction method was justified by the non-normal distribution of the data, as identified through the Kolmogorov–Smirnov test. This technique was preferred over principal component analysis due to its superior ability to uncover latent constructs and to estimate communalities under non-ideal empirical conditions, as recommended by Costello and Osborne (2005).

In essence, this research not only bridges a critical gap in the scientific literature but also produces a practical instrument for organizational use. The proposed scale represents a strategic tool for understanding and fostering intrinsic motivation among teleworkers—particularly in a post-pandemic context, where labor flexibility has evolved into a structural prerequisite of modern employment.

The practical value of this scale also lies in its potential to inform human resource management policies within organizations seeking to sustain high levels of employee engagement. By pinpointing specific dimensions of intrinsic motivation, companies can design training programs, recognition systems, and support strategies that strengthen workers' overall well-being and, as a consequence, enhance productivity without relying solely on financial incentives.

Furthermore, the instrument paves the way for cross-cultural comparisons that could unveil differences in intrinsic motivation among teleworkers from diverse socio-labor contexts. Such contrasts may enrich the global understanding of telework and provide empirical foundations for the formulation of more equitable and context-sensitive labor policies, thus consolidating a robust framework for future research in organizational psychology and work behavior.

As for limitations, the focus on two sectors constrains the generalizability of the findings. The cross-sectional design and self-reported measures may introduce common method bias; nevertheless, diagnostic tests indicate that its effect is minimal. Looking ahead, future studies should examine measurement invariance across multinational samples, implement longitudinal designs, and assess the predictive validity of the scale concerning performance and well-being outcomes.

Ultimately, the validated Intrinsic Motivation in Telework Scale represents a methodological contribution that strengthens the empirical study of motivation in the context of digital work, particularly in emerging economies.

Limitations and Future Research Lines

Although the present study provides robust psychometric evidence, certain methodological and contextual limitations must be acknowledged. First, the non-probabilistic sampling design and the concentration of participants in Metropolitan Lima restrict the generalizability of the results to other regions of Peru and Latin America. Second, the cross-sectional nature of the data prevents establishing causal relationships between intrinsic motivation and other psychosocial variables. Third, potential self-selection bias may have influenced participation, as individuals with higher levels of motivation were more inclined to respond voluntarily.

Future studies

Should seek to replicate this validation process with larger and more heterogeneous samples, incorporating diverse occupational sectors and cultural contexts. Longitudinal and multigroup invariance analyses are also recommended to verify the temporal stability and cross-cultural consistency of the scale. Likewise, integrating qualitative methods such as in-depth interviews or focus groups could enrich the understanding of the socio-emotional mechanisms underlying intrinsic motivation in telework. Ultimately, this line of research will allow the refinement of the instrument and contribute to the development of evidence-based strategies for promoting well-being and productivity in digital work environments.

ETHICS STATEMENT

This study was conducted in strict adherence to the principles of scientific integrity, respect for participants, and data confidentiality. All participants were previously informed about the objectives of the research, its academic nature, and their voluntary involvement, providing informed consent prior to participating in interviews and surveys. In addition, anonymity was ensured through the use of alphanumeric coding, and all collected data were securely stored. The study did not involve any physical, psychological, or social risks for the participants and was carried out exclusively for academic and scientific purposes.

ACKNOWLEDGEMENTS

The authors express their sincere gratitude to the teleworkers who voluntarily participated in this study, as well as to the organizations from the educational and banking sectors in Metropolitan Lima for

facilitating access to the data. The authors also acknowledge the valuable contribution of the experts who participated in the validation of the instrument through expert judgment.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to this research. Catherine Elizabeth Joseph Rubio (CEJR) and Niria Marleny Goñi Avila (NMGA) confirm that they have no financial, professional, or personal relationships that could have influenced the results of this study.

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