Leadership as an Axiological Expression of Behavioral Traits: Empirical Insights

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ABSTRACT:
Leadership is a key transversal skill for the employability of university graduates. Even so, clear evidence is still lacking on how basic behavioral traits translate into observable leadership. In practice, this transformation usually occurs through intermediate skills, such as initiative, the ability to influence, and self-control. To analyze the relationship between three behavioral traits of the natural profile Extroversion/Influence, Risk/Dominance and Self-Control— and leadership competence, examining the mediating role of Initiative, Impact and Influence and Self-Control (competence). A sample of 4,294 Spanish university students was studied, evaluated using PDA Assessment (Personal Development) . Assessment) (2023–2024). A PLS-SEM model (SmartPLS 4) was estimated to simultaneously assess (a) the strength of the relationships between traits, competencies, and leadership, and (b) whether traits influence leadership indirectly by "passing through" intermediate competencies. Robustness was tested using bootstrapping (5,000 resamples), and collinearity (VIF), explained variance (R^2), and out-of-sample predictive capacity were checked using PLSpredict. The traits were significantly associated with the "bridging" competencies: Risk/Dominance → Initiative ($\beta = 0.693$), Extraversion/Influence → Impact and Influence ($\beta = 0.582$), and Self-Control → Self-Control (competence) ($\beta = 0.271$) ($p < .001$). In practical terms, this indicates that the tendency to take on challenges translates into greater proactivity; sociability and expressiveness translate into a greater capacity for influence; and self-regulation is expressed as more consistent behaviors. In turn, the competencies predicted leadership, with Impact and Influence standing out as the most decisive factor ($\beta = 0.918$), followed by Initiative ($\beta = 0.295$) and Self-Control (competence) ($\beta = 0.144$) ($p < .001$). Specific mediations were confirmed, especially Extraversion/Influence → Impact and Influence → Leadership ($\beta\_ind = 0.535$) and Risk/Dominance → Initiative → Leadership ($\beta\_ind = 0.204$). The model explained a very high proportion of leadership ($R^2 = 0.968$) with controlled collinearity (VIF = 1.586–2.749) and out-of-sample predictive relevance ($Q^2\_predict > 0$). The results show that leadership in university students is primarily developed when behavioral traits are transformed into trainable competencies, especially impact, influence, and initiative. Applied to employability, programs should prioritize these two levers to strengthen the leadership of future graduates.

KEYWORDS: Leadership competence; behavioral assessment; talent development; graduate employability; human resource management; PLS-SEM.

INTRODUCTION

Leadership is a highly valued transversal skill in the professional sphere, which is why educational institutions are looking for ways to foster it in their students. Previous studies have highlighted the importance of developing soft skills. Leadership skills during university education have been studied to improve graduate employability (Bartolomé Muñoz de Luna et al., 2024; Martín Gómez et al., 2022; Neria-Piña & Reyes Guerrero, 2021; Santa Fajardo et al., 2021). However, there remains a need to identify individual factors that predispose a student to exercise leadership. In this context, behavioral profiles were evaluated using the PDA Assessment (*Personal Development Analysis*) tool at a Spanish university during 2023 and 2024. The data from 4294 university students from different degree programs provides a valuable and representative database for investigating how certain personality traits are associated with leadership ability.

In the field of work and organizational psychology, the assessment of behavioral profiles relies on different types of instruments. On the one hand, broad-spectrum trait inventories, such as the 16PF (Russell, 2002), or measures of the Big Five model, including the NEO PI-R (Costa & McCrae, 1992), allow for the description of relatively stable dispositions and have meta-analytic evidence of a relationship with job performance (Barrick & Mount, 1991).

On the other hand, there are occupational questionnaires focused on work behaviors, such as the Occupational Personality OPQ32 Questionnaire (Smith & Banerji, 2007), as well as instruments specifically designed for organizational contexts, such as the Hogan Personality Inventory (Hogan & Hogan, 2007).

Finally, tools based on behavioral style models derived from Marston's proposal and popularized in the DiSC family are used (Marston, 1928; Wiley, 2013). According to international standards for the use of tests, the choice of instrument must be justified by the construct and the purpose of application, supported by evidence of validity and reliability for the intended use (American Educational Research Council). Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014).

In this context, the PDA Assessment is a psychometric tool designed to describe the behavioral profile in the workplace. It does not measure intelligence or technical skills. Based on Marston's model, it operationalizes five dimensions (Extroversion, Risk-taking, Patience, Conformity to Norms, and Emotional Self-Control) evaluated in Natural Profile (spontaneous or "preferred" behavioral tendencies) and Adapted Profile (behaviors adjusted to the demands of the context). It also provides technical documentation on its design and psychometric evidence for its use in HR (PDA International, 2021).

Using this database as a starting point, the present research proposes a Structural Equation Model (SEM), estimated using PLS-SEM, to analyze the relationship between certain behavioral traits measured by the PDA and leadership competence in university students. This approach is particularly suitable when the objective is to explain simultaneous relationships (including mediations) and complement the explanation with out-of-sample predictive evaluation, in addition to offering robustness to non-normal distributions (Hair et al., 2022; Shmueli et al., 2019).

The proposal is supported by meta-analytic evidence that has shown that two personality traits, extraversion and conscientiousness , are among the most consistent predictors of leadership, both in its emergence and in its effectiveness: extraversion usually appears as the strongest predictor, while conscientiousness, linked to self-discipline and reliability, also shows a robust association with leadership effectiveness (Judge et al., 2002).

Additionally, several studies suggest that subdimensions related to Risk/Dominance (associated with assertiveness and risk-taking) are linked to the emergence of leadership and

interpersonal influence within groups (Ensari et al., 2011; Lord et al., 1986). In fact, it has been observed that individuals with higher Risk/Dominance tend to gain social influence and are perceived as more competent by their peers, partly due to their ability to signal competence through visible behaviors (Anderson & Kilduff, 2009).

On the other hand, emotional stability (the inverse of neuroticism) is also a key attribute: leaders who are able to remain calm under pressure and regulate their emotions are often valued as more effective, while profiles with low emotional stability are negatively associated with leadership performance criteria (Judge et al., 2002).

In summary, the evidence suggests that a behavioral profile conducive to leadership would include high levels of sociability and interpersonal influence (extroversion), a marked tendency to take initiative and assume challenges with controlled risks (dominance), and good emotional control (Anderson & Kilduff, 2009; Ensari et al., 2011; Judge et al., 2002).

The aim of this study is to examine these relationships in the university population using PDA indicators, modeling leadership as a competency, and evaluating both the explanatory structure and the predictive performance of the model (Hair et al., 2022; Shmueli et al., 2019).

The research questions guiding the study are presented below, followed by the hypotheses and the proposed conceptual model:

Q1: What is the relationship between students' Extroversion/Influence and their leadership competence and to what extent is this relationship explained by the Impact and Influence competence?

P2: Does a greater Risk/Domain orientation contribute to greater leadership competence through the development of Initiative competence as an intermediate mechanism?

P3: To what extent is Self-Control associated with leadership competence through Self-Control competence and emotional self-regulation?

These questions address how behavioral traits measured by PDA are positively associated with leadership ability, laying the foundation for the model's hypotheses.

THEORETICAL FRAMEWORK

Based on the literature and the research questions posed, we propose a conceptual model in which three behavioral traits measured by the PDA Assessment, operationalized through the instrument's Natural Profile, predict leadership competence in university students. This research exclusively uses the Natural Profile because it more accurately represents relatively stable behavioral tendencies (dispositions) that serve as antecedents to competence development. From the classical trait perspective applied to leadership, accumulated evidence shows that certain personality dispositions are consistently associated with the emergence and effectiveness of leadership, especially extraversion and conscientiousness (Judge et al., 2002; Bono & Judge, 2004). In this sense, the Natural Profile is conceptually suitable for modeling the central question of the study: how an initial behavioral predisposition transforms into intermediate competencies (e.g., initiative and influence) and, ultimately, into leadership.

Specifically, Influence (NaturalIValor) is used as a proxy for Extraversion/interpersonal style, Risk/Dominance (NaturalDValor) as a proxy for Risk/Dominance/results-oriented action, and Self-Control (Natural Valor) as the capacity for emotional and behavioral self-regulation (PDA International, 2021).

Leadership and Leadership Competence In Higher Education

In the realm of natural abilities, leadership is often defined as a process of social influence oriented toward shared goals. Yukl (2006) describes it as the process of influencing others to understand and agree on what needs to be done and how to do it, facilitating individual

and collective efforts to achieve common objectives. From this perspective, leadership is not simply a hierarchical position; it also involves behaviors of coordination, communication, motivation, and influence that can emerge at multiple organizational levels and are therefore relevant for understanding leadership potential in university populations. In the last two decades, higher education has increased its emphasis on generic or " soft" skills " Skills " are valued for their link to employability and early professional performance. Among university students, the relevance of leadership competencies and their relationship to teaching and learning processes, teamwork, and preparation for complex organizational environments has been documented (Méndez et al., 2019; Neria-Piña & Reyes Guerrero, 2021; Santa Fajardo et al., 2021). In parallel, organizational studies report that leadership is linked to outcomes such as culture and productivity, reinforcing its cross-cutting nature and its relevance for labor market integration (Yaulilahua -Huacho & Almenaba-Guerrero, 2022; Sauñe -Villalobos & Ramos, 2024).

From a competency-based approach, a competency is conceived as an integrated set of underlying characteristics and behavioral repertoires that enable effective or superior performance in a role. In the tradition of " competency" In " modeling ," Boyatzis (1982) proposes identifying behaviors and attributes that distinguish effective performance; subsequently, this vision expands to encompass competencies for changing environments and the demands of the 21st century (Boyatzis, 2008). Complementarily, Spencer and Spencer (1993) maintain that competencies are expressed in observable behaviors that can be identified and developed. In leadership, this translates into skills such as influence, communication, team management, conflict management, and motivation, which in university contexts can be trained through active methodologies, experiential learning, and feedback (Páez Gabriunas, 2008; Santa Fajardo et al., 2021).

Traits, Personality and Leadership: From Trait Theory to Meta-Analytic Evidence

Leadership research has alternated between context-centered and person-centered approaches. Historically, the "trait approach" sought to explain the emergence and effectiveness of leadership based on relatively stable individual differences; although criticized for its reductionism, subsequent research revived the approach with improved taxonomic frameworks and cumulative methods (Zaccaro, 2012). In particular, the Big Five model became established as a common language for organizing personality traits (John & Srivastava, 1999; Costa & McCrae, 1992), allowing for comparisons of findings across studies and the accumulation of evidence.

In a qualitative and meta-analytic review, Judge et al. (2002) reported consistent associations between personality traits and leadership, highlighting positive correlations with Extraversion and Conscientiousness , and negative correlations with Neuroticism (i.e., greater emotional stability). These findings support the premise that certain dispositions—for example, social energy and assertiveness (Extroversion), discipline and impulse control (Conscientiousness), and emotional stability—favor behavioral patterns associated with leadership. In line with this, recent research in student populations shows that personality traits are related to the development of

academic and professional competencies (Hernández-Romero, 2021; Moreno Núñez et al., 2025) and to specific competencies such as digital skills, where conscientiousness is often relevant (Cortés et al., 2024). Taken together, this strengthens the theoretical plausibility of modeling behavioral traits as antecedents of leadership competence.

Marston's Disc Model and Its Operationalization in the PDA Assessment

The PDA Assessment belongs to the family of instruments inspired by the DISC model, whose

theoretical origin is attributed to William Moulton Marston. In Emotions In his study of normal people, Marston (1928) proposed that observable behavior can be understood as an expression of emotional responses to the environment, articulated within a two-axis space: the perception of the environment as favorable vs. unfavorable, and the tendency to respond actively vs. passively. From the combination of these axes, Marston derived four general response patterns, later known as Dominance, Inducement (or Influence), Submission, and Compliance (Marston, 1928).

Operationally, Marston (1928) described four patterns of behavioral response to the environment: (1) Dominance (translated here as Risk/Dominance), associated with intense action aimed at modifying or controlling an environment perceived as unfavorable; (2) Inducement (or Influence), linked to action aimed at persuading and influencing when the environment is perceived as favorable; (3) Submission, related to a more passive and cooperative adaptation in favorable contexts; and (4) Compliance , associated with a more cautious and rule-bound adaptation to contexts perceived as unfavorable. This four-response structure has been widely adopted in instruments applied under the acronym DISC to describe behavioral styles in work environments.

One reason for the continued relevance of Marston's approach in organizational contexts is that it focuses on patterns of behavioral response to situational demands, rather than rigid "types." This aligns with the contemporary understanding of leadership as a situated influence phenomenon: leadership effectiveness depends, among other factors, on how individuals interpret the context (opportunity/threat) and regulate their behavior to mobilize collective efforts (Yukl, 2006; Zaccaro, 2012). Thus, Marston's framework is useful as a behavioral language for describing interaction and coping tendencies in the face of the environment, especially in scenarios requiring initiative, interpersonal influence, and adaptation.

In the specific case of the PDA Assessment, its Technical Manual operationalizes the DISC framework through four main responses and a fifth complementary dimension. Specifically, it defines Extraversion as proactive behavior in a perceived favorable environment; Risk/Dominance as the tendency to act proactively in a perceived unfavorable environment; Patience as a more passive response in favorable environments; and Conformity as a more passive response in unfavorable environments.

In terms of conceptual correspondence, these four responses approximate Dominance (Risk/Dominance), Influence, Submission, and Compliance, respectively. Additionally, the instrument incorporates Emotional Self-Control, understood as impulse control, self-discipline, and social responsibility, integrating elements of emotional regulation and intelligence into performance (PDA International, 2021).

Definition And Evolution Of The Model Variables

Extroversion. The construct of extroversion has a long history in personality psychology. Its origins can often be traced back to Jung's psychological typology (1921), where extroversion is associated with the orientation of psychic energy toward the external world (people, objects, and activities). Later, Eysenck (1967) integrated it into dimensional models and related it to sociability, arousal, and stimulation-seeking. With the consolidation of the Big Five model, extroversion is conceived as a broad trait that includes facets such as sociability, assertiveness, and positive emotionality (Costa & McCrae, 1992; John & Srivastava, 1999). Introversion and socio-emotional competencies has also been studied; for example, Montalvo-García et al. (2023) discuss the role of introversion in the development of emotional competencies, which is relevant because influence and leadership rely on socio-emotional skills. In the context of the PDA, extroversion is defined as proactive behavior in environments perceived as favorable (PDA International, 2021), capturing a tendency to interact, persuade, and lead when the context is interpreted as an opportunity.

Risk/Domain. Risk propensity has evolved from conceptions centered on probability and expected utility to psychosocial approaches that distinguish between risk perception and propensity (risk propensity). Sitkin and Pablo (1992) argue that risk-taking behavior depends on both individual propensity and situational perception; similarly, March and Shapira (1987) show that, in managerial practice, risk is interpreted and managed using heuristics and frames of reference that include aspirations and prior experiences. Subsequently, the "domain-specific risk" approach suggests that the tendency to take risks varies according to the context (e.g., financial, social, recreational) and according to personality traits (Nicholson et al., 2005).

In terms of leadership, recent evidence suggests that demonstrating a willingness to take risks can increase recognition or support for an individual as a leader, although the social mechanisms are complex. Georgeac and Van Kleef (2021) found that risk-taking can increase perceptions of dominance and prestige, influencing the likelihood of being supported as a leader.

Furthermore, in areas such as negotiation, it has been noted that personality traits and socio-interpersonal skills (including assertiveness and initiative) influence performance, which is conceptually convergent with leadership (Ruiz et al., 2021).

In the PDA, the Risk dimension is defined as proactivity in the face of unfavorable environments (PDA International, 2021), which captures an orientation towards challenge and action that is usually associated with leadership in situations of uncertainty or conflict.

Self-Control. In the field of leadership, emotional stability consistently appears to be related to leadership in meta-analyses (Judge et al., 2002). Furthermore, emotional regulation, a central component of self-control, has been linked to leadership behaviors, particularly when considering measures of emotional intelligence; for example, Harms and Crede (2010) report associations between emotional intelligence and leadership behaviors (especially transformational), although with variation depending on the type of measure and the source of the assessment.

In accordance with this, the PDA defines Emotional Self-Control as self-discipline and emotional control, explicitly associating it with components of emotional intelligence in work contexts (PDA International, 2021).

Leadership Competence. In the literature, leadership can be approached as a role/process and also as a competence. From a competency-based approach, leadership abilities are expressed in behaviors such as influencing, coordinating, motivating, communicating, and directing teams, and are developed through experiential learning and feedback (Boyatzis, 1982; Spencer & Spencer, 1993).

In university settings, research reports the importance of these leadership competencies in students and their relationship to professional development (Neria-Piña & Reyes Guerrero, 2021; Santa Fajardo et al., 2021). Furthermore, it has been noted that the perception of leadership can be modulated by contextual and gender factors, suggesting the value of studying leadership as a competency and not solely as a formal position (Sinner & Tumino, 2022).

In higher education, these capabilities are considered part of the core of so-called soft skills . Skills), as they integrate interpersonal and self-regulation skills, such as communication, teamwork, influence, initiative, and emotional management, which are closely linked to employability and performance in complex professional contexts (Deming, 2017; Heckman & Kautz, 2012; Robles, 2012; Succi & Canovi , 2020). Consequently, it is pertinent to operationalize leadership competence through behavioral indicators associated with the management and development of people, cooperation, and strategic thinking, as reported in the competency module (GENERIC) of the PDA Assessment (PDA International, 2021).

Following the logic that traits predispose behavioral tendencies while competencies represent closer manifestations of performance, the proposed model assumes that D/I/A (Natural Profile) translates into intermediate competencies of the PDA (e.g., initiative, communication, impact and influence, and self-control), which, in turn, configure the leadership competency evaluated in the same competency framework (Boyatzis, 1982; Spencer & Spencer, 1993).

In Figure 1 of the SEM Model (PLS-SEM) it is observed how the behavioral traits of the PDA's Natural Profile, Extraversion/Influence (NaturalIValor), Risk/Dominance (NaturalDValor), and Self-Control (NaturalAValor), predict intermediate competencies of the PDA (Impact and Influence, Initiative, and Self-Control as a competency), which in turn explain the Leadership Competency (Natural_GENERIC_Liderazgo).

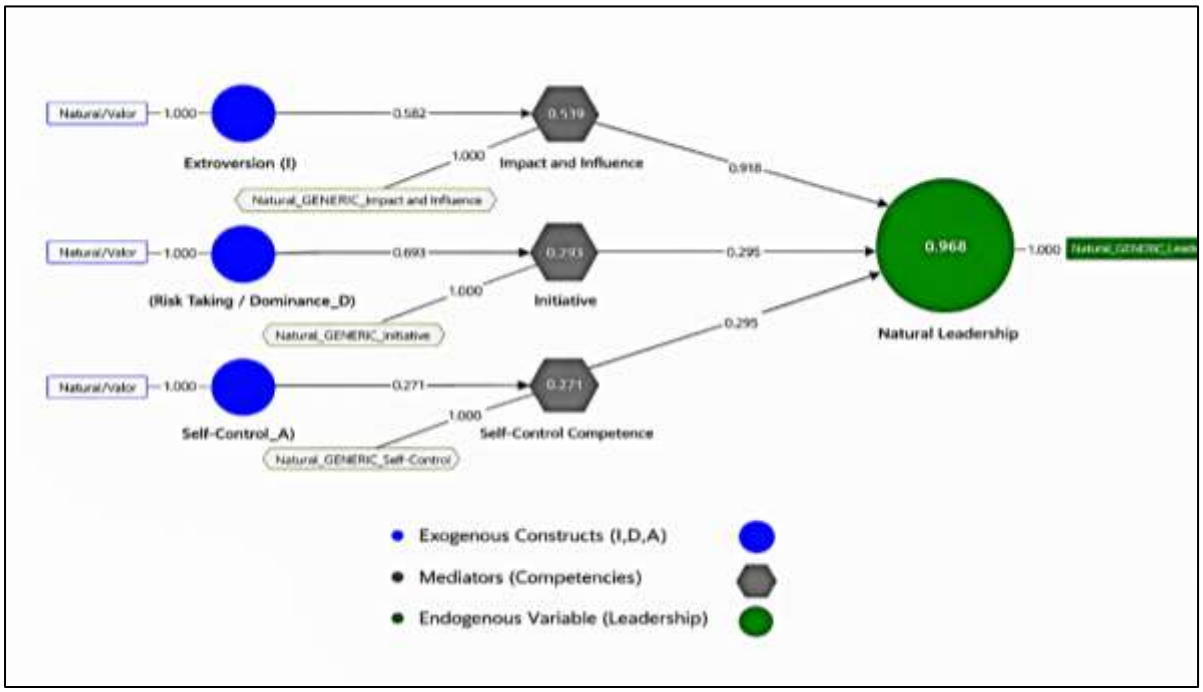

Figure 1. PLS-SEM analysis of natural leadership

Hypothesis Development

H1 (Extroversion/Influence → Impact and Influence → Leadership). Higher Extroversion/Influence (NaturalIValor) is expected to be positively associated with Leadership Competence (Natural_GENERIC_Leadership), primarily through greater Impact and Influence (Natural_GENERIC_Impact and Influence), understood as the ability to persuade, influence, and mobilize others. A relationship between leadership and personality traits has also been observed in university samples, where the social/expressive dimension is often relevant (Garzón-Lasso et al., 2022; Ballesta et al., 2024). Therefore, a student's level of extroversion is expected to have a positive effect on their leadership competence.

H2 (Risk/Dominance → Initiative → Leadership). A greater Risk/Dominance orientation (NaturalDValor) is expected to be positively related to Leadership Competence (Natural) indirectly, by promoting Initiative as an intermediate behavioral competency (Georgeac & Van Kleef, 2021; Marston, 1928; PDA International, 2021).

H3 (Self-control → Self-control (competence) → Leadership). Greater trait self-control (NaturalAValor) is expected to be positively associated with leadership competence (Natural) indirectly, by facilitating self-control competence (GENERIC), emotional regulation, and behavioral self-regulation, which are necessary for influencing and coordinating under pressure (Gross, 1998; PDA International, 2021; Tangney et al., 2004). Given that emotional stability is positively related to leadership (Judge et al., 2002), and that emotional regulation has been linked to leadership behaviors (Harms & Crede, 2010), students with greater emotional self-control are expected to exhibit greater leadership competence.

Overall, the model proposes a trait-competency chain: the behavioral traits of the Natural Profile (I/D/A) influence intermediate competencies of the PDA (Impact and Influence, Initiative, and Self-Control), and how these competencies relate to the Leadership

Competency (Natural_GENERIC_Leadership). This approach attempts to more closely explain the behavioral mechanisms that connect the DISC profile with leadership in university students.

APPLIED METHODOLOGY

Design and Sample: The study adopts a correlational design, analyzing existing data from the PDA Assessment with a sample size of N = 4294 university students. Participants span various majors and academic years, constituting a broad and heterogeneous population of young adults. The PDA database provides numerical scores for each individual on the five behavioral dimensions described (Extroversion, Risk-Taking, Patience, Conformity, and Self-Control).

Instrument and Variables: The PDA Assessment provides behavioral style scores (Natural and Adapted profiles) and competencies. This research focuses on the Natural Profile as an approximation of an individual's stable behavioral pattern, preventing the measurement from being influenced by specific situational demands. The model constructs were operationalized using observed PDA variables (unique indicators): NaturalIValor (Extroversion/Influence), NaturalDValor (Risk/Dominance) and NaturalAValor (Self-Control), which are summarized in (I/D/A), Natural_GENERIC_Impact and Influence (Impact and Influence), Natural_GENERIC_Initiative (Initiative), Natural_GENERIC_Self -Control (Self-Control as a Competence) and Natural_GENERIC_Leadership (Leadership).

Model Specification: as shown in Table 1, a mediational model was estimated in which: (I) NaturalIValor predicts Impact and Influence; (D) NaturalDValor predicts Initiative; (A) NaturalAValor predicts Self-control as a competency; and where the three intermediate competencies predict Leadership.

In addition, the following specific indirect effects were evaluated: I→Impact and Influence→Leadership, D→Initiative→Leadership; and A→Self-control competence→Leadership.

Analysis Procedure: PLS-SEM (SmartPLS 4 software) was used due to its predictive orientation and robustness to non-normal distributions. The significance of the coefficients was assessed using bootstrapping (completing the number of resamples and the configuration used). The following were reported: (a) collinearity (VIF) in the internal model; (b) path coefficients with their standard values; (c) explained variance (R^2) of the endogenous constructs; (d) effect sizes f^2; (e) specific indirect effects; and (f) out-of-sample predictive capacity using PLSpredict (Q^2_predict, RMSE, and MAE) comparing PLS-SEM with a linear model (LM), following recent methodological recommendations (Hair et al., 2022; Shmueli et al., 2019).

Note on Collinearity and Re-Specification: In a previous model specification where leadership was modeled with several highly related indicators (People Management, People Development, Strategic Thinking, and Teamwork and Cooperation), excessively high external and internal VIFs were observed, indicating multicollinearity. Therefore, and to maintain the model's interpretability, a single leadership indicator (Natural_GENERIC_Leadership) was chosen, and mediators were retained as single indicators, consistent with the predictive objective and the operational nature of the instrument's variables.

Table 1. Operationalization of constructs (PDA)

Constructo	Rol en el modelo	Tipo	Variable PDA (indicador)
Riesgo/Dominancia (D)	Exógeno	Indicador único	NaturalDValor
Extroversión/Influencia (I)	Exógeno	Indicador único	NaturalIValor
Autocontrol (A)	Exógeno	Indicador único	NaturalAValor
Iniciativa	Mediador	Indicador único	Natural_GENERIC_Iniciativa
Impacto e Influencia	Mediador	Indicador único	Natural_GENERIC_Impacto e Influencia
Autocontrol (competencia)	Mediador	Indicador único	Natural_GENERIC_Autocontrol
Liderazgo (competencia)	Endógeno	Indicador único	Natural_GENERIC_Liderazgo

RESULTS OBTAINED FROM THE RESEARCH CONDUCTED

• Descriptive statistics and distribution. Table 2 presents descriptive statistics for the key variables. Normality tests (Cramér-von Mises) were significant ($p < .001$) for the reported variables, which is consistent with the use of PLS-SEM, as it does not require multivariate normality. The effective sample size for the analysis was N = 4,294.

Table 2. Descriptive Statistics (competency variables in Natural Profile).

Variables	Media	Mediana	Mín	Máx	Desviación típica
Natural_GENERIC_Autocontrol	58.331	57.242	45.498	82.51	6.558
Natural_GENERIC_Impacto e Influencia	49.585	48.93	28.417	98.242	11.822
Natural_GENERIC_Iniciativa	53.963	50.681	33.048	107.87	12.782
Natural_GENERIC_Liderazgo	47.874	46.037	20.794	111.22	13.798

• Structural Model: collinearity. After re-specification, multicollinearity among the leadership predictors was assessed using the variance inflation factor (VIF). The VIF quantifies the degree to which a predictor shares variance with others; when it is high, it increases standard errors and makes the estimates unstable (β), making it difficult to interpret which variable actually contributes to the criterion construct.

In this study, the VIFs of the Natural Leadership predictors were 1.586 (Impact and Influence → Natural Leadership), 2.160 (Initiative → Natural Leadership), and 2.749 (Self-Control Competence → Natural Leadership), placing them in a low range and below commonly used thresholds (e.g., 3.3 or 5) (Table 3). Interpretively, this indicates that the three explanatory competencies are not excessively redundant (they are not "measuring the same thing"), so each provides distinct information, and the estimated coefficients can be considered stable and sufficiently independent to interpret their effects on leadership.

Table 3. Collinearity (VIF) of the internal model.

Relación	**VIF**
Autocontrol Competencia → Liderazgo Natural	2.749
Impacto e Influencia → Liderazgo Natural	1.586
Iniciativa → Liderazgo Natural	2.16

• Variance explained (R^2). The explanatory quality of the model was assessed using the

coefficient of determination (R^2), which indicates the proportion of variability of the dependent construct that can be attributed to its predictors within the model (i.e., the "degree of explanation" achieved).

In this case, the model explained a very high proportion of the variance of Natural Leadership ($R^2 = 0.968$), which suggests that, in the analyzed sample, the included competencies very substantially capture the individual differences observed in leadership.

Similarly, behavioral traits explained a relevant fraction of the variance in the intermediate competencies: Initiative ($R^2 = 0.480$) and Impact and Influence ($R^2 = 0.339$), indicating that traits provide a moderate to high explanatory capacity on these competencies; in contrast, the variance explained in Self-control (competency) was lower ($R^2 = 0.074$), suggesting that its development and expression could depend to a greater extent on other non-modeled factors.

Table 4. Explained variance (R^2) of the endogenous constructs

Constructo endógeno	**R^2**
Iniciativa	0.48
Impacto e Influencia	0.339
Autocontrol (competencia)	0.074
Liderazgo Natural	0.968

• Path coefficients. The contribution of each predictor to leadership was examined using the standardized path coefficients (β) of the structural model. These coefficients represent the intensity and direction of the effect: the higher the β, the greater the expected change in leadership (in standard deviations) for a one standard deviation increase in the predictor, holding the others constant.

The results showed that all direct effects were positive and statistically significant ($p < .001$), indicating that the observed association is highly improbable under the no-effect hypothesis. In substantive terms, Impact and Influence was the strongest antecedent of Leadership ($\beta = 0.918$), suggesting that the ability to influence, persuade, and generate impact is the most decisive driver of leadership in the sample.

Secondly, Initiative ($\beta = 0.295$) showed a moderate effect, indicating that proactivity and action orientation contribute significantly to leadership, although to a lesser extent than influence. Finally, Self-Control as a competency ($\beta = 0.144$) showed a smaller positive effect, suggesting that self-regulation adds incremental value to leadership, but with a comparatively smaller impact.

Table 5 presents the coefficients, their standard errors, and the bootstrapping t-values, which provide information on the accuracy of the estimates and the statistical evidence for each trajectory.

Table 5. Bootstrapping coefficients.

Relación	β (O)	STDEV	t	p
(Autocontrol)_A → Autocontrol Competencia	0.271	0.014	19.406	< .001
(Extroversión)_I → Impacto e Influencia	0.582	0.011	55.195	< .001
(Riesgo/Dominio)_D → Iniciativa	0.693	0.009	80.961	< .001
Autocontrol Competencia → Liderazgo Natural	0.144	0.004	33.006	< .001
Impacto e Influencia → Liderazgo Natural	0.918	0.004	251.65	< .001
Iniciativa → Liderazgo Natural	0.295	0.005	59.97	< .001

Table 6. f^2 effect sizes.

Relación	f^2
(Autocontrol)_A → Autocontrol Competencia	0.08
(Extroversión)_I → Impacto e Influencia	0.513
(Riesgo/Dominio)_D → Iniciativa	0.922
Autocontrol Competencia → Liderazgo Natural	0.238
Impacto e Influencia → Liderazgo Natural	16.681
Iniciativa → Liderazgo Natural	1.264

• Specific indirect effects (mediation). To examine the mechanism by which behavioral traits translate into leadership, specific indirect effects were estimated, representing the part of a trait's effect on leadership that operates through a mediating competence.
In other words, they allow us to verify if a trait "impacts" leadership because it first favors the manifestation of an intermediate competence, and that competence is the one that is directly associated with leadership.
The results confirmed positive and statistically significant mediations ($p < .001$) for all three traits (Table 7):
(i) Self-control → Self-control (competence) → Leadership (β_ ind = 0.039), which suggests that the predisposition to self-control translates into leadership mainly to the extent that it is expressed as self-regulatory competence behaviors;
(ii) Extroversion/Influence → Impact and Influence → Leadership (β_ ind = 0.535), indicating that the extroverted and influential style contributes to leadership primarily because it increases the ability to generate impact, persuade and mobilize others, which is the main driver of leadership in the model; and
(iii) Risk/Dominance → Initiative → Leadership (β_ ind = 0.204), which implies that the tendency to take on challenges and lead becomes leadership mainly through an increase in proactivity and action orientation.
Thus, mediating competencies act as explanatory mechanisms that translate behavioral dispositions into measurable leadership behavior, supporting a general pattern of the type "trait → bridging competency → leadership"**.**

Table 7. Specific indirect effects (bootstrapping)

Efecto indirecto	β (O)	STDEV	t	p
(Autocontrol)_A → Autocontrol Competencia → Liderazgo Natural	0.039	0.003	15.328	< .001
(Extroversión)_I → Impacto e Influencia → Liderazgo Natural	0.535	0.01	51.314	< .001
(Riesgo/Dominio)_D → Iniciativa → Liderazgo Natural	0.204	0.004	48.874	< .001

• Predictive capacity (PLSpredict). In order to assess whether the model can anticipate outcomes in new cases (beyond describing relationships within the sample), PLSpredict was applied, which estimates out-of-sample predictive performance through partition validation.
In this context, Q^2_predict indicates whether the model predicts better than a "naive" reference point (usually the mean); Q^2_predict values > 0 suggest predictive relevance, meaning that the model provides useful information for forecasting observed values. In parallel, the RMSE and MAE indicators quantify the prediction error (lower values are better), expressing the average difference between predicted and actual values.
The results (Table 8) show Q^2_predict > 0 for all variables, indicating that the PLS-SEM model has predictive capacity. However, in all four cases, the linear model (LM) showed lower errors (lower RMSE and MAE) than the PLS-SEM.

In interpretative terms, this suggests that, for these data and this specification, the relationship between predictors and criteria behaves mainly linearly and that PLS-SEM does not provide an improvement in predictive accuracy compared to a standard linear regression.
Therefore, the main value of PLS-SEM in this study should be understood as explanatory/structural: it allows for the simultaneous modeling of several relationships and the contrasting of mediation mechanisms (how traits are channeled into competencies and these into leadership), rather than as an approach aimed at maximizing predictive accuracy.
Consequently, it is recommended to report and discuss the predictive implications of the model with caution, emphasizing its usefulness for understanding the phenomenon and designing interventions, rather than for high-precision individual prediction.

Table 8. PLSpredict (MVsummary)

Variable	Q^2_predict	PLS-RMSE	PLS-MAE	LM-RMSE	LM-MAE	IA-RMSE	IA-MAE
Natural_GENERIC_Autocontrol	0.073	23.255	20.185	16.619	13.767	24.158	20.935
Natural_GENERIC_Impacto e Influencia	0.339	16.514	13.336	14.926	11.733	20.305	17.179
Natural_GENERIC_Iniciativa	0.479	13.315	10.69	10.457	8.513	18.455	15.439
Natural_GENERIC_Liderazgo	0.323	16.952	13.239	15.894	12.46	20.608	17.297

DISCUSSION

The results support the proposed trait-competency logic: the behavioral traits of the Natural Profile (I/D/A) are linked to leadership competence mainly through intermediate competencies of the PDA itself.
In particular, the relationship of Extroversion/Influence with leadership is substantially channeled through Impact and Influence (β_indirect = 0.535), suggesting that sociability, expressiveness, and interpersonal orientation translate into leadership when expressed as the ability to influence and mobilize others.
Furthermore, Risk/Dominance showed a significant indirect effect via Initiative (β_indirect = 0.204). This finding is consistent with the idea that assertiveness and challenge orientation become leadership when they are articulated in proactive and initiative-taking behaviors, especially relevant in university contexts where self-management and participation in projects enhance the visibility of leadership.
Self-control, for its part, showed a small but significant indirect effect through the Self-Control competency (β_indirect = 0.039). This suggests that self-regulation contributes to leadership, although its relative weight is less compared to interpersonal and action competencies (impact/influence and initiative).
From an applied perspective, the model provides evidence for designing employability interventions based on soft skills Skills : If universities seek to develop leadership, the results suggest prioritizing training experiences that enhance (a) social influence and persuasive ability (impact and influence) and (b) proactivity (initiative), in addition to (c) self-regulation (self-control).

The use of behavioral profiling tools such as PDA can facilitate an initial diagnosis and monitoring of skills development in large cohorts.

The results of this study provide solid evidence in favor of a mechanistic reading of leadership in university population: the behavioral traits of the Natural Profile do not translate directly into leadership, but do so mainly through intermediate competencies.

This conclusion is relevant because it shifts the focus from a "dispositional" understanding (leadership as a trait) to a competency-based understanding (leadership as an observable result of trainable abilities).

In other words, the study supports that leadership, at least in this context, is best understood as a phenomenon that emerges when certain behavioral styles find their functional expression in bridging competencies (e.g., initiative and influence), which is consistent with contemporary approaches to leadership development (Day et al., 2014) and with models of activation/expression of dispositions in situated behaviors (Tett & Burnett, 2003).

A key initial interpretive contribution is the functional hierarchy that the model suggests among the competencies. Impact and Influence emerge as the central axis of leadership. This pattern makes sense from a psychosocial perspective: in the university setting, where leadership is often exercised with little formal authority, the ability to lead manifests itself primarily as the capacity to influence without hierarchy, build support, mobilize, and coordinate wills.

Therefore, leadership as measured here appears to be closely linked to processes of social influence, persuasive communication, and building interpersonal legitimacy (e.g., credibility, clarity, presence, ability to align others).

That this construct is the main driver of leadership is not only consistent with the literature that links extraversion and influence with the emergence of leadership (Judge et al., 2002; Bono & Judge, 2004), but also reinforces an applied interpretation: in early career stages, leadership is recognized more by the ability to generate interpersonal impact than by the mere possession of traits.

Secondly, the Initiative acts as a complementary driving force with a very clear meaning: leadership is not only about "influencing" but also about activating action. In the university ecosystem, much of observable leadership emerges when a person identifies opportunities, proposes, organizes, initiates tasks, and sustains their execution.

This connects with behavioral approaches to leadership in which proactivity and goal orientation are visible signs of emerging leadership. Interpretively, the study suggests a form of "early" leadership that combines two components: (a) social influence (mobilizing others) and (b) behavioral activation (initiating and driving progress).

This combination helps explain why leadership becomes especially visible in contexts of projects, collaborative work, and dynamics where initiative organizes collective effort.

Third, self-control as a competency contributes positively but with less relative weight, suggesting that its role is more stabilizing than activating. From a competency-based perspective, self-control can operate as the component that sustains leadership behavior under pressure: persistence, impulse control, emotional regulation, consistency, and reliability. In university contexts, these qualities can be critical for the continuity of performance, but they are not always the ones that most quickly trigger social recognition of leadership. Therefore, their smaller relative contribution should not be interpreted as irrelevance, but rather as evidence that the observed leadership is based first on interaction and influence competencies, then on proactive action competencies, and finally on a layer of self-regulation that reinforces the quality and sustainability of performance.

The second major contribution of the study is the confirmation of specific mediating factors that explain how behavioral styles translate into leadership.

• The mediation of Extroversion/Influence → Impact and Influence → Leadership (β_ ind ≈ 0.535) indicates that extroversion and interpersonal orientation do not generate leadership simply by being sociable or expressive, but rather when that orientation translates into an effective capacity to influence. This distinction is substantial: it separates a "basic" interpersonal style (a willingness to interact) from a "functional" competence (making the interaction produce commitment, coordination, and progress). In terms of employability, this suggests that simply "being communicative" is not enough; leadership emerges when one masters how to communicate to influence: arguing, persuading, negotiating, inspiring, and adapting the message to the audience.
• The Risk/Dominance → Initiative → Leadership mediation (β_ind ≈ 0.204) shows that challenge orientation, decision-making tendency, and control drive translate into leadership primarily when expressed as sustained proactive behavior. In other words, the dominant/risk style contributes to leadership if it is transformed into concrete, proactive behaviors (taking the lead, organizing, initiating tasks, sustaining progress). This mediation is consistent with the logic that traits become relevant when activated in situationally pertinent behaviors (Tett & Burnett, 2003). In the university setting, where leadership typically emerges through active participation and taking responsibility, initiative operates as a fundamental translation mechanism.
• The mediation of Self-Control → Self-Control (Competence) → Leadership (β_ind ≈ 0.039) confirms that self-regulation contributes to leadership in a more subtle way: it adds value when expressed in observable competency behaviors (discipline, emotional control, consistency). The smaller effect is consistent with the "infrastructure" role of self-control: it may not be the primary trigger for leadership recognition, but it acts as a foundation that prevents discontinuity, impulsiveness, or instability in execution—qualities that often erode leadership performance.
Taken together, these mediations support a clear thesis: leadership is not an automatic extension of traits, but rather the consequence of a transformation in competencies. This idea is scientifically valuable because it integrates two traditions: (1) evidence that certain traits predict leadership (Judge et al., 2002; Bono & Judge, 2004) and (2) the developmental approach, which emphasizes that leadership is built through practical and observable capabilities (Day et al., 2014). In the present study, both perspectives converge: traits predispose, but leadership materializes through bridging competencies.
From an applied perspective, this model architecture allows for the derivation of well-founded recommendations: if the objective is to enhance leadership as a *soft skill In terms of skills,* interventions should not focus on "changing traits," but on developing the competencies that the model identifies as translation mechanisms.
In particular, the weight of Impact and Influence suggests that the most powerful lever for enhancing leadership is training in interpersonal influence (persuasive communication, handling difficult conversations, negotiation, coordination, and building credibility). The relevance of Initiative further suggests that leadership increases when proactivity is trained (decision-making, execution, proactive habits, and accountability). Self-control is incorporated as a supporting competency: strengthening self-regulation contributes to leadership consistency and can be especially important in situations of evaluative pressure, academic workload, or group conflict.
Finally, predictive assessment adds an important interpretive nuance: the fact that the observed predictive pattern is essentially linear and that a linear model achieves minor errors suggests that the distinctive contribution of the approach used is not "better predicting" but better explaining.
The model adds value by clarifying mechanisms and relative contributions (which competencies are most decisive and how each trait is channeled), which is especially useful

when the goal is to design training interventions and understand the phenomenon, rather than constructing an individual prediction system. In this sense, the study should be read as an explanatory/structural model with high internal consistency.

CONCLUSIONS

Based on the estimated model and the results obtained, the following main findings are derived:

1) Leadership competence is predominantly explained by the capacity for interpersonal influence. The strongest predictor of leadership is Impact and Influence ($\beta = 0.918$; $p < .001$), and its incremental contribution is extraordinary ($f^2 = 16.681$). This result suggests that, within the PDA competency framework, leadership is especially evident when the individual has the resources to persuade, mobilize, and generate commitment in others.

2) Initiative acts as a second explanatory driver of leadership. Initiative is positively and significantly associated with leadership ($\beta = 0.295$; $p < .001$) and has a large effect size ($f^2 = 1.264$). Therefore, leadership depends not only on influencing, but also on activating proactive behaviors: identifying opportunities, initiating actions, and sustaining progress toward objectives.

3) Self-regulation provides an additional and consistent contribution. Self-control as a competency positively influences leadership ($\beta = 0.144$; $p < .001$) with a small-to-medium effect size ($f^2 = 0.238$). In interpretive terms, self-control acts as a support that facilitates consistency in leadership behavior, especially in demanding contexts where managing impulses and emotions conditions performance.

4) The behavioral traits of the natural profile are linked to leadership through 'bridging' competencies (specific mediation). It is confirmed that: (a) Extraversion/Influence increases leadership primarily through Impact and Influence ($\beta\_ind = 0.535$; $p < .001$); (b) Risk-taking/Dominance does so through Initiative ($\beta\_ind = 0.204$; $p < .001$); and (c) Self-control contributes through Self-control as a competency ($\beta\_ind = 0.039$; $p < .001$). This pattern supports a competency-based interpretation: behavioral style does not explain leadership on its own, but rather to the extent that it translates into observable behaviors and competencies.

5) The model is statistically consistent and offers predictive evidence, although it does not outperform the linear benchmark . Internal collinearity remains within acceptable ranges (VIF = 1.586–2.749), and the explained variance of leadership is high ($R^2 = 0.968$). In the predictive assessment, PLSpredict shows out-of-sample relevance ($Q^2\_predict = 0.323$ for leadership); however, the reference linear model (LM) yields lower errors (RMSE/MAE) than PLS-SEM. Consequently, the model's main value lies in clarifying mechanisms (mediations) and effect sizes, rather than in improving the predictive error compared to LM.

The practical implications of this research could be seen in university programs focused on employability; the results indicate that leadership as a soft skill Skill can be enhanced by prioritizing (i) impact and influence training (persuasion, mobilization and value communication), (ii) developing initiative (proactivity, decision-making and execution) and (iii), although to a lesser extent, working on self-control, thus being able to complement an initial behavioral diagnosis (natural profile) with competency development itineraries that allow focusing interventions and evaluating progress in large cohorts of students.

Based on the estimated model, the results suggest that leadership, within the PDA competency framework and in the university population, is predominantly expressed as the capacity for interpersonal influence.

Specifically, Impact and Influence is the most decisive antecedent of leadership ($\beta = 0.918$;

$p < .001$), with an extraordinary incremental contribution ($f^2 = 16.681$). Beyond the numerical value, this finding indicates that early leadership—in contexts with little formal authority, as occurs among students and junior profiles—is recognized above all when the person manages to mobilize others without hierarchy: persuading, aligning, generating credibility, and building commitment.

For an HR director, this evidence has a direct translation: if leadership potential is sought in the initial stages, it is advisable to evaluate and develop as a priority influence skills (persuasive communication, negotiation, objection management, ability to align interests), since these are the ones that most likely turn interpersonal "style" into observable leadership.

In selection and assessment, this suggests giving weight to behavioral evidence of effective influence (how he gains commitment, how he mobilizes in group dynamics), and not only to traits such as sociability or expressiveness.

Secondly, leadership is not simply about social influence: it also depends on activating action, and this is where Initiative emerges as the second driver of the model ($\beta = 0.295$; $p < .001$; $f^2 = 1.264$). Interpretively, leadership emerges when a person not only convinces but also takes action: identifying opportunities, initiating tasks, organizing efforts, and sustaining progress toward objectives.

This conclusion is particularly useful for HR because it highlights a practical difference between individuals with "good communication skills" and those who, in addition, translate that communication into action. In employability or talent development programs, this means designing experiences that encourage genuine initiative (ownership of deliverables, mini-projects with responsibilities, challenges with deadlines, rotating coordination roles), since initiative is a key way for leadership to become visible and solidify.

Third, self-control as a competency makes an additional, consistent but comparatively smaller contribution ($\beta = 0.144$; $p < .001$; $f^2 = 0.238$). In practical terms, self-control functions more as a component of leadership sustainability than as a trigger for visible leadership: it reinforces consistency, emotional management, discipline, and impulse control.

For talent decisions, this suggests that a candidate may demonstrate impact and initiative, but if they lack self-regulation, their leadership can become unstable under pressure. Therefore, while influence and initiative are key drivers, self-control should be incorporated as a supporting competency in development pathways (execution habits, emotional self-regulation, conflict management, time management), especially if the goal is sustainable leadership and not just "emergent" leadership.

A particularly relevant contribution of the study is that the behavioral traits of the natural profile are linked to leadership primarily through bridging competencies, confirming specific mediations: Extroversion/Influence increases leadership mainly through Impact and Influence ($\beta\_ ind = 0.535$; $p < .001$); Risk/Dominance does so through Initiative ($\beta\_ ind = 0.204$; $p < .001$); and Self-Control contributes through Self-Control as a competency ($\beta\_ ind = 0.039$; $p < .001$).

This supports a clearly competency-based interpretation: behavioral style does not "produce" leadership on its own; it does so to the extent that it is transformed into observable behaviors. For HR, this conclusion is highly actionable because it allows for the design of personalized development: for example, a naturally extroverted profile does not necessarily lead if it does not translate its sociability into effective influence; a profile with a tendency toward dominance may not lead if it does not translate into disciplined initiative and execution; and a self-regulated profile may need tools to transform its stability into recognized leadership behavior. In short, the model does not encourage "labeling" people, but rather identifying development paths: how to transform predispositions into trainable

competencies.
Finally, the model shows statistical consistency and usefulness for understanding the phenomenon: collinearity remains within acceptable ranges (VIF = 1.586–2.749) and the explained variance of leadership is high ($R^2 = 0.968$), reflecting strong internal consistency within the evaluated framework. In the predictive assessment, PLSpredict indicates out-of-sample relevance ($Q^2\_predict = 0.323$ for leadership), although the linear benchmark yields lower errors (RMSE/MAE).
Interpretively, this suggests that the main value of the PLS-SEM approach in this study is explanatory/structural: it clarifies mechanisms and relative contributions (which competencies drive leadership the most and how traits are channeled), rather than improving predictive accuracy against a linear model.
In practical terms, this guides its use in HR as a tool to prioritize training investments and design programs based on levers (influence and initiative, with self-control as support), rather than as a system intended to "predict" with maximum accuracy individual leadership in any case.

LIMITATIONS AND FUTURE LINES OF RESEARCH

First, the cross-sectional design prevents establishing causality: although the model is consistent with a theoretical sequence (traits → bridging competencies → leadership), the data capture a snapshot at a single point in time. Therefore, future research should employ longitudinal designs to observe how leadership competencies are consolidated (or changed) throughout a student's academic career and after specific experiences (projects, internships, coordination roles). This approach is particularly valuable for HR because it would allow a shift from a static diagnosis to a developmental tracking approach (before-after), aligned with the literature on leadership development as a progressive and experience-dependent process.
Secondly, the variables come from the same instrument and the same measurement source, which can increase common method variance and contribute to high levels of explained variance. In practical terms, this means that some of the observed relationship could be "favored" by the data collection method itself (same test, same time, same format), rather than by actual links between constructs. Therefore, future studies should triangulate with external and multi-method measures, such as 360° evaluations, project performance evidence, teaching rubrics, practicum supervisors, or observable behavioral indicators, following standard recommendations for reducing methodological bias.
Third, the model was estimated using unique indicators per construct. While this is practical when working with standardized scores, it limits the evaluation of the measurement model (e.g., reliability and convergent validity) and can impoverish the representation of leadership as a multidimensional phenomenon. A reasonable approach is to reintroduce multidimensional measures (e.g., leadership as a higher-order construct or with clearly defined subdimensions), provided that collinearity is controlled and discriminant validity is ensured, following current methodological guidelines for PLS-SEM. Along these lines, it is also advisable to base the interpretation of magnitudes (e.g., effect sizes) on established criteria from the methodological literature.
Fourth, the predictive analysis showed that the reference linear model had a lower prediction error than PLS-SEM, suggesting that the underlying pattern, in this sample and specification, is predominantly linear and that the value of the current model is primarily explanatory (mechanisms and mediations) rather than providing incremental predictive gain. Going forward, it is advisable to test alternative models (hierarchical regressions, covariance-based SEM where appropriate, or nonlinear models only if there is a theoretical basis for them), as well as to strengthen generalization with validation samples and out-of-sample procedures recommended in the literature on predictive evaluation in PLS.

Finally, several future lines of inquiry have direct implications for HR and employability. First, comparing Natural Profile vs. Adapted Profile is particularly relevant for estimating the role of context in the expression of leadership: in terms of talent management, this would help distinguish between potential (predispositions) and contextualized performance (what the person demonstrates when adapting to the demands and expectations of the environment).

This line of thought connects with interactionist/trait activation approaches, which emphasize that trait, are expressed in valuable behaviors when the context "activates" them. Second, it would be advisable to conduct multigroup analyses (e.g., gender, course, degree, university) and check for invariance to ensure that comparisons are interpretable and fair. Methodologically, this involves assessing invariance (e.g., MICOM) before comparing differences between groups using MGA in PLS-SEM. Third, additional mediators (e.g., communication, teamwork) can be explored, but with theoretical selection and strategies that maintain interpretability and avoid redundancies between variables, as recommended by contemporary PLS-SEM modeling guidelines.

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