



**Linking emotional intelligence and transformational leadership: an application to technology sector firms' leaders**

**Ligação entre inteligência emocional e liderança transformacional: uma aplicação aos líderes do sector tecnológico das empresas**

Joana Filipa Amorim Moreira<sup>1</sup>

Orlando Manuel Martins Marques de Lima Rua<sup>2</sup>

**Abstract**

This study aims to analyze the relationship between emotional intelligence and transformational leadership. This exploratory and transversal study takes a quantitative methodological approach based on survey data from 180 Portuguese small and medium-sized enterprises (SMEs) technology sector leaders. Data analysis was performed using the structural equation model (SEM). The results demonstrated a positive and significant relationship between three emotional intelligence dimensions (SEA - self-emotion appraisal, OEA - others emotion appraisal and UE - use of emotions) and transformational leadership (TL). However, the relationship between intelligence dimension regulation of emotions (RE) and transformational leadership was not supported. This study differs from the others as it seeks to establish relationships between emotional intelligence dimensions' and transformational leadership rather than treating the emotional intelligence's construct as a whole. Therefore, considering the scarce literature relating to the mentioned constructs fills the literature's lack. Its applicability in the Portuguese technology sector SMEs is also an innovative factor. We recommend that future studies explore the relevance of digital services

---

<sup>1</sup> Doutoranda em Análise Económica e Estratégia Empresarial na Universidade de Vigo (Espanha), Instituto Superior de Contabilidade e Administração do Porto (ISCAP), Rua Jaime Lopes Amorim, s/n, 4465-004 S. Mamede de Infesta, Portugal. E-mail: [joanamoreira.5@hotmail.com](mailto:joanamoreira.5@hotmail.com)

<sup>2</sup> Agregado em Gestão pela Universidade da Beira Interior (Portugal), CEOS.PP - Centro de Estudos Organizacionais e Sociais do Politécnico do Porto, Rua Jaime Lopes Amorim, s/n, 4465-004 S. Mamede de Infesta, Portugal. E-mail: [orua@iscap.ipp.pt](mailto:orua@iscap.ipp.pt) Orcid: <https://orcid.org/0000-0002-1593-7440>

for the enhancement of the linkage between emotional intelligence and transformational leadership.

**Keywords:** Emotional Intelligence. Transformational Leadership. Leaders. Technology Sector. Structural Equations Modeling (SEM).

### **Resumo**

Este estudo visa analisar a relação entre a inteligência emocional e a liderança transformacional. Este estudo exploratório e transversal adota uma abordagem metodológica quantitativa baseada em dados de inquérito de 180 líderes portugueses do sector tecnológico das pequenas e médias empresas (PME). A análise de dados foi realizada utilizando o modelo da equação estrutural (SEM). Os resultados demonstraram uma relação positiva e significativa entre três dimensões de inteligência emocional (SEA - auto-avaliação de auto-estima, OEA - outras avaliações emocionais e UE - utilização de emoções) e liderança transformacional (TL). Contudo, a relação entre a regulação da dimensão de inteligência das emoções (RE) e a liderança transformacional não foi apoiada. Este estudo difere dos outros na medida em que procura estabelecer relações entre as dimensões da inteligência emocional e a liderança transformacional em vez de tratar a construção da inteligência emocional como um todo. Portanto, considerando a escassa literatura relacionada com as construções mencionadas, preenche a falta de literatura. A sua aplicabilidade nas PME portuguesas do sector tecnológico é também um factor inovador. Recomendamos que futuros estudos explorem a relevância dos serviços digitais para a melhoria da ligação entre a inteligência emocional e a liderança transformacional.

**Palavras-chave:** Inteligência Emocional. Liderança Transformacional. Líderes. Sector Tecnológico. Modelação de Equações Estruturais (SEM).

### **Introduction**

Nowadays, the business world is more competitive than ever, leading to the increasing importance of organizations being aware and constantly improving organizational culture to keep their workers motivated and their productivity high (Goleman, 2020b). In this order, organizational leaders play a crucial role in influencing the emotional and organizational experience of the employees, as emotions affect critical cognitive tasks, including information processing and decision-making (Gilar-Corbi et al., 2019). Formerly, organizations believed

that an unavoidable absence of emotions, how to feel about something, what is done or how tasks are shared, is unusual and unwanted. However, according to this author, in the past decade, the “emotion-free” environment has been replaced by the idea that emotions are part of both individuals and organizations, affecting overall performance.

According to Christensen (2012), formulating an organizational culture aligned with the organization's strategy is essential to the success of an organization. Rahim et al. (2019) state that a leader's social skills are critical to creating a comfortable work environment. Hunter (2020) and Goleman (2020a) also argue that emotional competencies differentiate a good leader from a top leader, not neglecting the importance of the intelligence coefficient (IQ) in the process.

Bass (1990) identified good leaders as individuals who can better understand and interact with their followers, evaluate their feelings and those of others, and adapt their behavior appropriately to a specific situation. Good leaders show empathy to understand their followers' needs, spend time assessing group attitudes and motivations and meet their degree of satisfaction (Özdemir, 2020).

This new paradigm assumes that if the individuals have enough academic qualifications and technical knowledge to get a job, personal skills such as initiative, empathy, adaptability, and persuasiveness are the key to professional excellence, especially leadership (Goleman, 2020b). These skills are a strong indicator of satisfaction and high performance in the business context (O'Boyle, 2011).

Transformational leaders are in charge of sharing personal and organizational moral values with the employees, increasing their inherent motivation (Tran & Vu, 2021). According to Sehgal et al. (2021), motivated employees move beyond self-interest and commit themselves to the organization's goals, performing beyond expectations.

The emotional intelligence of leaders is a key determinant in ensuring the effective functioning of the organizational environment, depending on their abilities and inputs (Zhu et al., 2021). According to this author, these leaders with a higher level of emotional intelligence can clarify the value of work and the relationships between individuals and organizations, so they are more inclined to share resources and communicate to achieve common goals.

Therefore, prior empirical research has shown that emotional intelligence is responsible for identifying situations that need more attention and managing them using social skills to get the best out of relationships with peers, colleagues, leaders, and followers (Gonzaga & Rodrigues, 2018). Human behavior is highly interested in scientific studies on emotion and how it enhances leadership (Goleman, 2020b). However, no empirical studies

were done regarding the relationship between these constructs in the Portuguese technological sector. Moreover, the objective of this study is to analyze the relationship between the different dimensions of emotional intelligence.

This study is a response to some researchers who encouraged the analysis of how emotional intelligence dimensions influence leadership behaviors in the technological organizational environment (Alavi & Leidner, 2001; Sunindijo et al., 2007; Taouab & Issor, 2019; Zhu et al., 2021).

Thus, considering the intention of this study to explore the relationship between the emotional intelligence dimensions and transformational leadership, the following research questions are formulated:

*RQ1. How does self-emotion appraisal influence transformational leadership?*

*RQ2. How do others emotional appraisals influence transformational leadership?*

*RQ3. How does the use of emotions influence transformational leadership?*

*RQ4. How does the regulation of emotions influence transformational leadership?*

This paper is organized as follows: First, the theoretical framework for this study is presented, leading to the hypothesis's development. Emotional intelligence and transformational leadership literature were reviewed. The following section presents the method, including sample and data collection and measures. Then, the results are analyzed. Finally, we discuss these results and present our conclusions.

## **Theoretical Background and Research Hypotheses**

### **2.1 Emotional Intelligence**

Although the origin of the concept of emotional intelligence (EI) remounts to Thorndike (1920), that identifies three dimensions of intelligence: mechanical intelligence, abstract intelligence, and social intelligence. It was Salovey and Mayer (1990) firstly defined emotional intelligence as a subcategory of social intelligence that implies the capability to (1) supervise one's own and others' emotions, (2) distinguish among them, and (3) to use this information to guide one's thinking and actions. Later, Mayer and Salovey (1997) defined emotional intelligence as the mental process associated with emotions and problem-solving capabilities, including observing emotions, accessing, and generating emotions to support thoughts, comprehending emotions, and successfully regulating emotions to encourage emotional and rational development.

The conceptualization of emotional intelligence includes three main areas of investigation (Dhoopar et al., 2022). The first one considers emotional intelligence as a collection of interrelated mental capacities for using emotional knowledge (Mayer et al., 1997). The second domain is considered a collection of traits for adjusting and enduring, comparable to the models of dispositional traits and personality (Bar-On & Parker, 2000). The third domain is behavioural capabilities, which combine emotional and cognitive skills (Boyatzis, 2009; Mahon et al., 2014).

Emotional intelligence was defined as the capability to recognize and regulate emotions in ourselves and others (Cherniss & Goleman, 2005), attributing a large part of personal and professional success to four main EI competencies identified in Figure 1: self-awareness, self-management, internal motivation, and empathy. Self-awareness involves (a) knowing your inner emotional state, (b) having confidence in yourself and yourself, and (c) realistically analyzing your skills; self-management means being able to manage your (i) emotions and (ii) impulses; internal motivation regulates the goals inherent to the entrepreneur and his ability to achieve them; social awareness or empathy is the understanding of emotions and reactions, both one's own and others, reacting in the most assertive way possible (Goleman, 2020a). Later, this scholar added relationship management ability to the dimensions highlighting the importance of communication used with others to obtain positive responses from the addressee.

Still, it is essential to emphasize that translation can be made differently, and all competencies are identical (Gonzaga & Rodrigues, 2018). Self-awareness is also referred to as self-perception from an intrapersonal perspective and self-management can be referred to as self-regulation or internal motivation (Gonzaga & Rodrigues, 2018). From an interpersonal perspective, empathy is sometimes referred to as social perception or social awareness, and relationship management can be referred to as social skills, relationship management, or social aptitudes (Gonzaga & Rodrigues, 2018). Emotional and social skills are part of Goleman's emotional intelligence model (2001). This model is based on the perspective that all interpersonal behaviour is initiated from an emotional perspective. In other words, not every emotion can be a behaviour, but all behaviour in society (in interaction with others) is part of an emotional perspective (Gonzaga & Rodrigues, 2018).

Learning and practising emotional skills prepare the human being to direct impulsive behaviour, becoming progressively directed and conscious; in this way, proficiency in our behaviour is something to be understood and learned (Gonzaga & Rodrigues, 2018). Individuals with a higher EI can handle emotions and adjust behaviours in reaction to

emotional situations more easily than individuals with a low EI because of their ability to be team players (Dhoopar et al., 2022).

However, emotional intelligence only is not sufficient for the creation of successful relations with others, it was further claimed that the concept of social intelligence is necessary for analyzing interactions with others (Boyatzis, 2009). Several authors defend that the emotional intelligence's concept has evolved to be an emotional and social intelligence that implicates the ability to monitor feelings and emotions, both own and others, discriminate against them, and use this information to guide one's own or others' thinking and behaviour to enhance intellectual growth (Salovey & Mayer, 1990; Goleman, 2020b; Zhu et al., 2021).

## **2.2 Transformational Leadership**

The transformational leadership style has been demonstrated to play a vital role in encouraging performance improvements in followers, and that emotion plays a crucial part in the leadership process (Waglay & Becker, 2020).

Transformational leaders make their followers aware of how their work is meaningful for the organization, recognize employees' personal growth, and dedicate time to coaching, teaching, and developing employee strengths to reach their full potential (Sehgal et al., 2021). They are the ones that consistently question old assumptions and ways of doing things, encourage creativity, emphasize the use of knowledge, and inspire new viewpoints and ways of working with others (Yucel, 2021).

Transformational leaders also need to influence their followers; they seek to be empathetic toward them, offering a future vision that meets their needs and desires, communicating this vision, and motivating them (Khan Waglay & Becker, 2020). The knowledge that every person has different abilities and needs requires personal attention to feel valued (Yucel, 2021).

A transformational leadership style contributes to individual development, creative thinking, and a sense of belonging, leading to better individual performance and, consequently, the organization (Leite, 2021). The leader should use an innovative leadership style that encourages employees to think independently and improve their performance (Yucel, 2021). By communicating elevated expectations, transformational leaders help their followers to develop competencies such as responsibility and enthusiasm for the organization's vision, mission, and long-term goals (Sehgal et al., 2021).

Ehrnrooth et al. (2021) conceptualized transformational leadership as a set of particular leadership manners by which leaders can encourage and influence followers, that is, by acting, encouraging, communicating, and providing. Thompson et al. (2021) defend that the transformational leadership construct is based on four dimensions, usually labelled as the four I's: (1) Idealized influence is the ability to be seen as a role model by your followers, (2) Inspirational motivation describes the ability to inspire your followers, (3) Intellectual stimulation represents when followers feel that their leader recognizes and encourages their efforts to be innovative and creative in approaching different situations, and, finally, (4) Individualized consideration is when leaders are observant to their followers' individual needs, elevating them to the mentor title (Yucel, 2021).

From a theoretical point of view, it is possible to identify the correlation between the four competencies leading to a more challenging task of defining each concept. However, we can observe that the difference between inspirational motivation and idealized influence is less evident because charismatic leaders often tend to encourage people with their ideas; the difference between individualization and intellectual stimulation can be difficult once both refer to the growth of employees (Yucel, 2021).

Transformational leaders use less authority than traditional leadership models, representing a mentoring role to their followers instead of leading to an intimate relationship (Jyoti & Bhau, 2015). This has a positive impact on organizational performance. It is essential for organizations that are willing to anticipate essential changes before. They can encourage the willingness of the workers and departments to recognize and implement those changes effectively (Antonakis, 2012; Yucel, 2021).

Researchers have pointed out transformational leadership as the most influential leadership concept in organizational behaviour research (Gottfredson & Aguinis, 2017; Thompson et al., 2021). According to Tran and Vu (2021), leadership has been addressed as a significant factor in diverse dimensions of business performance as team effectiveness and team performance. Wanasida et al. (2021) propose that leaders influence organizational results and identify idealized influence as a crucial factor in increasing business results, including performance outcomes such as innovative behaviour, creativity, product development, and organizational performance.

### 2.3 Research Hypotheses

Organizational leaders play a crucial role in influencing the emotional and organizational experience of the employees, as emotions affect critical cognitive tasks, including information processing and decision-making (Gilar-Corbi et al., 2019). Leadership styles are diverse and can differ in different situations. However, the most influential leaders are similar in one critical aspect: their degree of emotional intelligence (Goleman, 2020b). Based on this theory, several authors defend that emotional intelligence affects different leadership styles and behaviours and is specially related to transformational leadership (Songer et al., 2006; Sunindijo et al., 2007).

Leaders with more emotional intelligence can promote team members' collaboration and balance project resource allocation (Su-fang, 2014) through a good understanding and regulation of their emotions and those around them (Zhu et al., 2021). Leaders' capacity to manage positive and negative emotions benefits motivation, optimism, innovation, and problem resolution in the organizational environment (Gilar-Corbi et al., 2019).

The emotional intelligence of leaders has been a key determinant in ensuring the effective functioning of the organizational environment, depending on their abilities and inputs (Zhu et al., 2021). These leaders with a higher level of emotional intelligence can clarify the value of work and the relationships between individuals and organizations, so they are more inclined to share resources and communicate to achieve common goals (Zhu et al., 2021).

According to Gilar-Corbi et al. (2019), emotional intelligence competencies are actively involved in defining organizational objectives, planning, organizing work activities, maintaining cooperative interpersonal relationships, and receiving the support needed to achieve organizational goals. Hierarchically, emotional intelligence helps leaders understand emotions, facilitate thoughts, and regulate the emotions of oneself or others (Zhu et al., 2021). According to Pawlak (2019), the most effective decisions can be made by sharing implicit knowledge within a group. It positively impacts organizational intelligence and requires self-management and relationship management skills (Mura et al., 2021).

Therefore, leaders with high emotional intelligence will encounter fewer cognitive barriers when dealing with problems and are more likely to understand and maintain relationships (Zhu et al., 2021). On the other hand, emotional competencies are crucial characteristics that individuals who occupy leadership positions must have (Gilar-Corbi et al., 2019). Thus, we intend to test the following hypotheses.



*H1. Self-emotion appraisal has a positive impact on transformational leadership.*

*H2. Others emotional appraisal has a positive impact on transformational leadership.*

*H3. The use of emotions has a positive impact on transformational leadership.*

*H4. The regulation of emotions has a positive impact on transformational leadership.*

## **Methodology**

### **3.1 Sample and Data Collection**

The sample for this empirical study was drawn from leaders of the Portuguese technology sector firms. A questionnaire was used as the primary data source. The data collection was carried out between May 5, 2022, and June 17, 2022. The firms were identified using the SABI database (SABI, 2018). The database includes 2,664 firms.

The research survey was sent to the leaders' email, and the addresses in the SABI database were verified and validated. The participants were informed about the survey content to enhance the efficiency of the responses, and they responded in a consenting way. Whenever one of the following situations occurred, the responses were discarded to avoid possible bias: (1) surveys that did not include all the responses, and (2) surveys passed on to another type of manager.

A total of 180 fully completed and validated questionnaires were returned. The sample used is, therefore, a non-probabilistic and convenience sampling. Hair et al. (2016) argued that this sample size is suitable for data analysis using partial least squares structural equation modelling (PLS-SEM).

### **3.2 Measures**

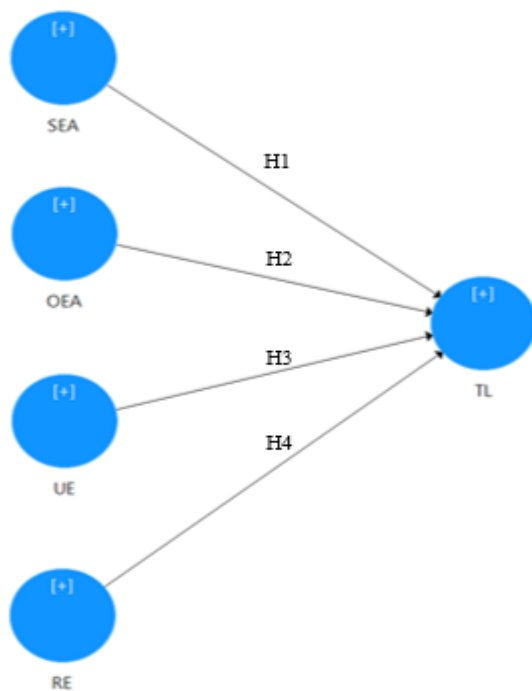
The constructs under study were measured using scales adopted from previous research.

The four dimensions of emotional intelligence were assessed using the Emotional Intelligence scale (WLEIS) from Wong and Law (2002), which was subsequently translated into the research of Zhu et al. (2021): (1) self-emotion appraisal (EI1 to EI4) - four items, (2) others emotion appraisal (EI5 to EI7) – three items, (3) use of emotions (EI8 to EI11) - four items and (4) regulation of emotions (EI12 to EI15) - four items. According to Zhu et al. (2021, p. 475), “a true measure of emotional intelligence must place respondents in a context

where they can experience the emotions that they are asked to respond to". The WLEIS was originally designed to evaluate the following four dimensions of emotional intelligence identified in the literature: self-emotion appraisal, others emotion appraisal, use of emotion, and regulation of emotion (Zhu et al., 2021). All items of emotional intelligence construct were presented on five-point Likert-type scales (1 – strongly disagree to 5 - strongly agree).

Transformational leadership was analysed through 23 items (TL1 to TL 23) recommended by Podsakoff et al. (1990), and subsequently translated into the studies of Rezende (2010) and Rua and Araújo (2016). Podsakoff et al. (1990) identified these behaviours as an essential element in the transformational leadership process. Several of these behaviours gather the consensus of researchers (e.g., “identifies and articulates vision”), while others were only defended by Bass and Avolio (e.g., “intellectual stimulation”).

Despite this construct comprise six dimensions - (1) identifies and articulates vision - five items, (2) provides a suitable model - three items, (3) promotes acceptance of group objectives - four items, (4) high-performance expectations - three items, (5) promotes individualized support - four items and (6) intellectual stimulation – it was studied holistically. It should be noted that items 16 and 19 of the questionnaire have an inverted quotation. All items of emotional intelligence construct were presented on five-point Likert-type scales (1 – strongly disagree to 5 - strongly agree).



**Figure 1 presents the proposed research model and hypotheses.**

Source: Own elaboration.

Key: SEA - Self-Emotion Appraisal; OEA - Others emotional appraisal; UE - Use of emotions; RE - Regulation of emotions; TL – Transformational leadership.

## Results

### 4.1 Descriptive Analysis

The reliability analysis was performed using Cronbach's alpha; the analysis guaranteed the consistency and stability of the answers while considering the heterogeneity of the respondents and their opinions (Pestana & Gageiro, 2008). The sample reliability was excellent for all variables (0.958).

Item	%
<b>Gender:</b>	
<b>Male</b>	<b>71.1</b>
<b>Female</b>	<b>28.9</b>
<b>Age (years old):</b>	
<20	5.0
20-30	12.2
31-40	45.6
41-50	30.6
51-60	6.7
> 60	0.0
<b>Academic qualifications:</b>	
<b>Basic studies</b>	1.1
<b>Secondary studies</b>	10.6
vocational qualification	1.1
Bachelor's degree	61.1
Master's degree	22.2
PhD	2.2
Post-PhD	0.6
Other	1.1
<b>Professional experience (years):</b>	
0-1	6.1
2-3	6.1
4-5	10.0
6-10	17.8
>10	60.0
<b>Location:</b>	
Porto	16.7
Lisboa	38.3
Vila Nova de Gaia	2.8
Matosinhos	3.9
Sintra	2.2
Almada	1.7
Braga	3.9
Mafra	1.7
Amadora	1.7
Maia	1.7
Faro	2.2
Aveiro	4.4
Oeiras	2.8
Leiria	3.9
Vila Nova de Famalicão	0.6
Valongo	1.7
Évora	1.7

Coimbra	2.2
Santarém	2.2
Setúbal	1.7
Viana do Castelo	0.6
Guimarães	0.6
Portalegre	0.6
Viseu	0.6

**Table 1. Descriptive analysis**

Source: Research data.

#### 4.2 Partial least square structural equations modelling (PLS-SEM)

PLS-SEM was used to evaluate the hypotheses with SmartPLS 3.0 software (Hair et al., 2016). PLS-SEM was best suited to estimate the research model as (1) this research focuses on prediction and explanation of the variance of the model's constructs and dimensions (in this case, five), (2) the research model has a complex structure, (3) the relationship between emotional intelligence dimensions and transformational leadership can be measured directly, (4) the study uses first and second-order reflective constructs, and (5) the sample (n=180) is relatively small. Reflective constructs were used to estimate PLS parameters to maximize the variance explained in observed measures (Anderson & Gerbing, 1988).

*Evaluation of the measurement model.* The results showed that the measurement model met all general requirements. First, all reflective items have a load higher than 0.707, which means that the reliability of individual indicators (loadings) was higher than 0.5. Second, all-composite reliability values and Cronbach's alpha values were above 0.7, suggesting acceptable model reliability. Third, the average variance extracted (AVE) values of all constructs were higher than 0.50, indicating adequate convergent validity and implying that the indicators represent the same underlying constructs (Hair et al., 2016).

In addition, the composite reliability coefficient was used to evaluate the constructs' validities (Chin, 1998). Gefen and Straub (2005) advocate a minimum of 0.6 when the variables exceed the reference value. Fornell and Larcker's (1981) criterion was used in this study, proposing that AVEs must have a minimum value of 0.5 to prove convergent validity. All the constructs reached this value (Table 2).

First-order constructs	Item	Loadings	CR	AVE
<b>Emotional Intelligence</b>				
<b>SEA</b> ( $\alpha = 0.847$ )			0.898	0.690
	EI2	0.872		
	EI3	0.834		
	EI1	0.786		
	EI4	0.741		
<b>OEA</b> ( $\alpha = 0.837$ )			0.902	0.755
	EI7	0.874		
	EI6	0.850		
	EI5	0.801		
<b>UE</b> ( $\alpha = 0.755$ )			0.845	0.580
	EI10	0.835		
	EI9	0.785		
	EI11	0.745		
	EI8	0.730		
<b>RE</b> ( $\alpha = 0.858$ )			0.902	0.697
	EI13	0.858		
	EI15	0.852		
	EI14	0.788		
	EI12	0.703		
<b>Transformational Leadership</b>				
$(\alpha = 0.908)$			0.920	0.538
	TL22	0.854		
	TL12	0.792		
	TL4	0.789		
	TL24	0.783		
	TL11	0.768		
	TL19	0.774		
	TL8	0.773		
	TL5	0.770		
	TL13	0.760		
	TL9	0.754		
	TL17	0.752		
	TL10	0.751		
	TL6	0.747		
	TL23	0.742		
	TL18	0.730		
	TL15	0.729		
	TL16	0.728		
	TL21	0.724		
	TL7	0.718		
	TL20	0.716		
	TL14	0.704		
	TL1	0.701		
	TL22	0.854		
	TL12	0.792		

**Table 2. Standardized factor analysis loadings, CR and AVE**

Source: Research data.

The discriminant validity of the model was demonstrated as the results showed that the constructs with no theoretical relation were, indeed, not significantly correlated; this can be gauged from the principle that all cross-loadings cannot be higher than the loading of each indicator (Hair et al., 2016). Based on Chin's (1998) classification of explanatory power as

being moderate/substantial, the data in Table 8 show that the discriminant validity results were satisfactory; the measures of the constructs showed they were significantly different.

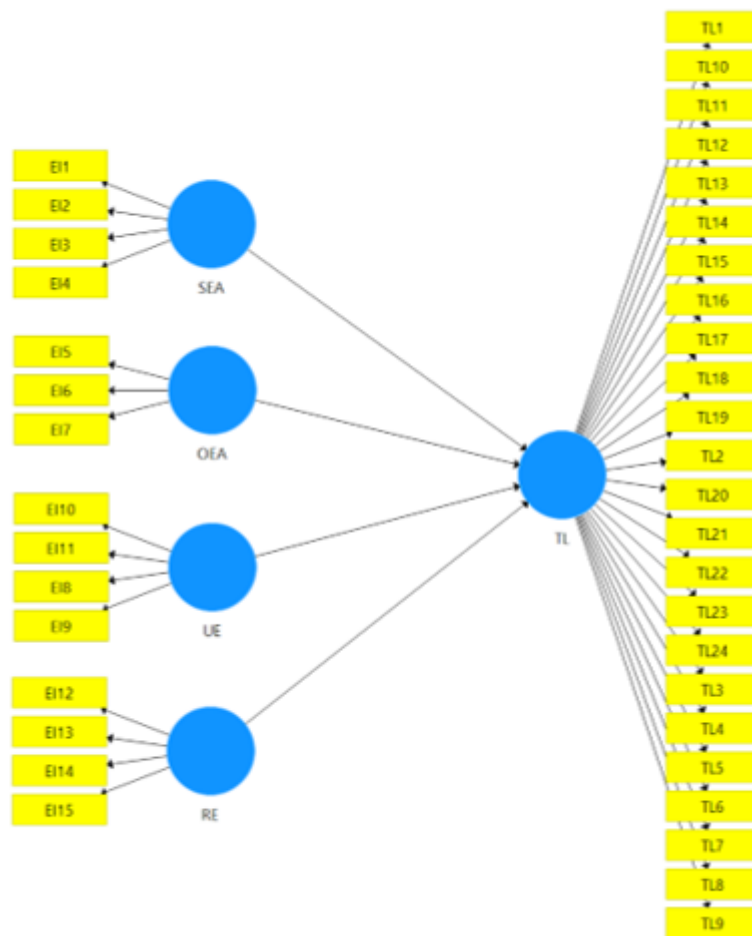
The Fornell-Larcker (1981) criterion (FLC) specifies that the AVE should be greater than the variance between constructs of the same model. Henseler et al. (2015) proposed a new and advanced criterion (Heterotrait-Monotrait Ratio – HTMT) to assess discriminant validity. They accept that the FLC is still an acceptable method for evaluating discriminant validity. However, the FLC fails to assess the lack of discriminant validity in various research situations. Therefore, the present study used the HTMT to evaluate the constructs' discriminant validity; these values are presented in Table 3. All values were less than 0.9.

<b>FLC</b>	<b>1.</b>	<b>2.</b>	<b>3.</b>	<b>4.</b>	<b>5.</b>
1. TL	0.581				
2. OEA	0.368	0.869			
3. RE	0.397	0.296	0.835		
4. SEA	0.548	0.373	0.462	0.830	
5. UE	0.652	0.240	0.379	0.437	0.762
<b>HTMT</b>	<b>1.</b>	<b>2.</b>	<b>3.</b>	<b>4.</b>	<b>5.</b>
1. TL					
2. OEA	0.418				
3. RE	0.438	0.346			
4. SEA	0.615	0.437	0.531		
5. UE	0.760	0.312	0.452	0.535	

**Table 3. FLC and HTMT**

Source: Research data.

The measurement model is displayed in Figure 2.



**Figure 2 – Measurement model assessment**

Source: Own elaboration.

*Evaluation of the structural model.* The significance of the model was assessed based on path coefficients, *t*-values, and standard errors. The hypotheses were tested for main and indirect effects through the bootstrapping procedure (Hair et al., 2017).

Based on Chin’s (1998) criterion that the minimum structural coefficient should be 0.2, the effects proposed in the hypotheses were shown to be significant. SEA had a significant and positive relationship with TL ( $\beta=0.263$ ,  $t=3.802$ ; LL=0.128, UL=0.404); thus, H1 was supported as the lower and upper limits included the value zero, indicating that the relationship was significant. OEA had a significant and positive effect on TL ( $\beta=0.159$ ,  $t=2.528$ ; LL=0.030, UL=0.275); thus, H2 was supported. UE had a significant and positive relationship with TL ( $\beta=0,504$ ,  $t=8.822$ ; LL=0.396, UL=0.610); thus, H3 was supported. Moreover, RE had not a significant and positive effect on TL ( $\beta=0.051$ ,  $t=0.801$ ; LL=-0,071, UL=0.168; thus, H4 was not supported. Results are displayed in Table 4.

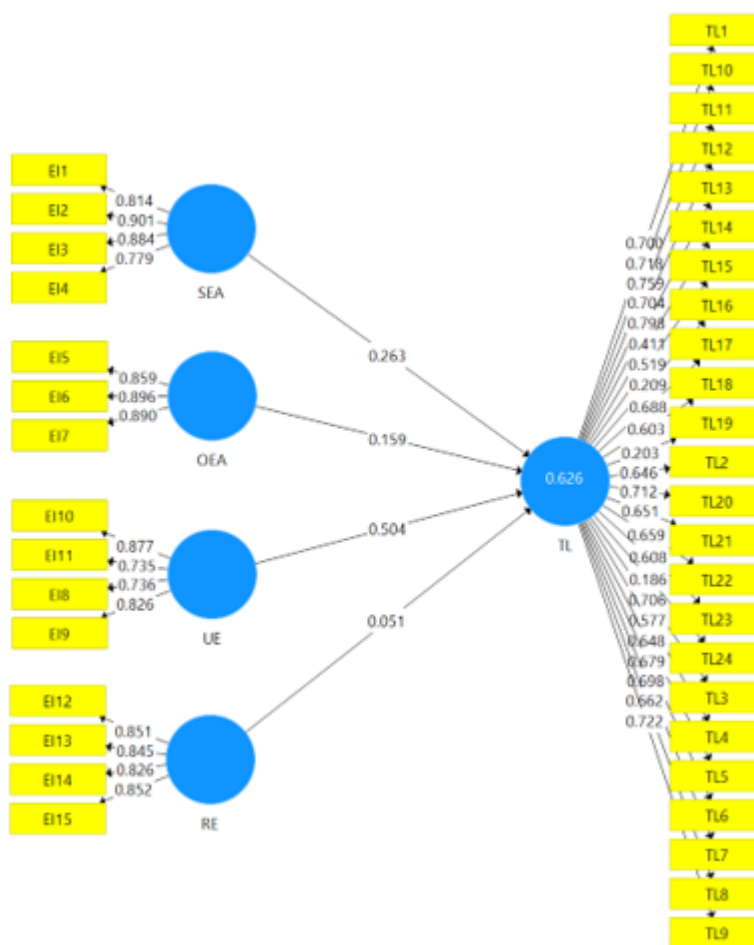
Hypotheses	Original Sample (O)	Sample Mean (M)	Standard Error (STERR)	T-Statistics (O / STERR)	L.L.	U.L.	Result
H1. SEA -> TL	0.263	0.261	0.069	3.802*	0.128	0.404	Supported
H2. OEA -> TL	0.159	0.160	0.063	2.528*	0.030	0.275	Supported
H3. UE -> TL	0.504	0.504	0.057	8.822*	0.396	0.610	Supported
H4. RE -> TL	0.051	0.053	0.063	0.801**	-0.071	0.168	Non-Supported

**Table 4. PLS direct effects**

Source: Research data.

Notes: \*  $p < 0.001$ ; \*\* non-significant.

Figure 3 shows the structural model assessment results.



**Figure 3 - Structural model assessment**

Source: Research data.

### Discussion

The main objective of this study is to investigate how emotional intelligence can impact transformational leadership. To accomplish this was formulated specific objectives: (1) to explore the concept of emotional intelligence and transformational leadership and (2) to analyze the relationship between the emotional intelligence dimensions - self-emotion



appraisal, others emotion appraisals, use of emotions and regulation of emotions - and transformational leadership.

The theoretical framework of this study allowed the theoretical analysis of the concepts of emotional intelligence and transformational leadership, making it now necessary to consider and reflect on the data and results achieved from the empirical study realized in the technological sector. In light of the results obtained, we will analyze the research hypotheses derived from the theory.

The results positively supported the relationship between the dimension of self-emotion appraisal and transformation leadership (H1).

According to Cherniss and Goleman (2005), self-awareness or self-emotion appraisal involves understanding your inner emotional state, having confidence in yourself, and realistically analyzing your skills. This is in line with the concept of transformational leadership as leaders' capacity to manage positive and negative emotions benefits motivation, optimism, innovation, and problem resolution in the organizational environment (Gilar-Corbi et al., 2019).

It is impossible to solve a problem when we do not know the problem. The same happens with our emotions, and a wide range of vocabulary regarding this theme can be a powerful tool for any leader. The ability to identify our emotions leads to more positive management of both positive and negative emotions which benefits motivation, optimism, innovation, and problem resolution in the organizational environment (Gilar-Corbi et al., 2019). This is in line with the proposed studies (Görgens-Ekermans & Roux, 2021; Nguyen et al., 2019; Pekaar et al., 2018) and allows us to answer RQ1.

Later, the positive and significant effect of others emotion appraisal in transformational leadership (H2) was supported by the results and is in line with the previous studies (e.g., Butler & Chinowsky, 2006; Sunindijo et al., 2007; Zhu et al., 2021; Goleman, 2020a; Goleman, 2020b). Others emotion appraisal or empathy is the capability to understand the emotions and reactions of the others around us, reacting in the most assertive way possible (Goleman, 2020a). This is closely related to individualized consideration as the leader should support the individual followers' needs and the capability to understand their followers' needs and provide intellectual stimulation and individualized concern to achieve high-performance expectations (Yucel, 2021). Leaders should listen to followers' concerns, add insight, and develop growth opportunities (Thompson et al., 2021).

When a leader correctly identifies the emotions of their workers, can more easily influence them to a more productive and optimistic line of thinking, leading to a quicker

problem resolution capability and pleased employees. For that, the leader needs to be empathic to others' emotions, which allows for answering RQ2.

The relationship between the use of emotions and transformational leadership was supported and is in line with previous studies (Gonzaga & Rodrigues, 2018). According to Gonzaga and Rodrigues (2018), flexibility to deal with different situations and people, the ability to disconnect from negative emotions, and the persistence in realizing what is positive to achieve better results are some characteristics of a transformational leadership style.

To conquer that level of leadership, the wise use of emotions is crucial as leaders with higher self-esteem and confidence can motivate their employees more efficiently. This allows us to answer RQ3.

Finally, the results did not support the relationship between regulation of emotions (RE) and transformational leadership; however, the literature supports the contrary (Goleman, 2020a; Görgens-Ekermans & Roux, 2021). Regulation of emotions or self-management includes achievement orientation, adaptability, emotional self-control, and a positive outlook (Görgens-Ekermans & Roux, 2021). These are crucial elements for efficient leadership. According to Ehrnrooth et al. (2021), leaders' capacity to act as an appropriate role models to their peers and followers, conquer their respect and attention, making easier a positive influence on organizational outcomes.

Even though the results did not support the relationship between regulation of emotions and transformational leadership, this allows answering RQ4. Therefore, leaders with high emotional intelligence will encounter fewer cognitive barriers when dealing with problems and are more likely to understand and maintain relationships (Zhu et al., 2021). On the other hand, emotional competencies are crucial characteristics that individuals who occupy leadership positions must have (Gilar-Corbi et al., 2019). This supports the relationship between the concepts of emotional intelligence and transformational leadership.

## Conclusions

### 6.1 Final Remarks

Considering the existing literature and the growing importance that this topic has been gaining among the scientific community, this research aimed to explore the relationship between the emotional intelligence dimensions and transformational leadership in the Portuguese technological sector. The results supported a positive relationship between three

emotional intelligence dimensions (SEA, OEA and UE) and transformational leadership. This study proved that globally emotional intelligence positively influences transformational leadership.

The technology sector aims to differentiate itself through technological innovation, investment in people, and the development of new processes, expertise, and skills (Industry 4.0), one of the fastest-growing sectors in recent years. Thus, a bet on the main dimensions of emotional intelligence (self-emotion appraisal, others emotion appraisal, use of emotions, and regulation of emotions), combined with transformational leadership, can contribute to obtaining a competitive advantage.

The Portuguese technology sector has grown constantly in recent years, being internationally referenced as a reference country in this sector. According to Silva et al. (2020), the organic growth of this sector has been boosted by Portuguese and European policies for the distribution of subsidies and support for innovation, resulting in the growing importance of information systems in society and firms.

During the pandemic Covid-19, many companies had to invest in the structures they already had to allow remote work. Others, to survive, even had to find new solutions in areas in which they had not yet ventured, such as virtual stores and electronic ordering apps (Coimbra, 2022), which led to an increase in the importance of the technology sector in our daily lives.

We can, therefore, conclude that the technology industry is in one of its most challenging phases, with several external and internal factors influencing its success. The emotional intelligence of transformational leaders can be a key determinant in ensuring the effective functioning of the organizational environment of these companies, depending on their abilities and inputs (Zhu et al., 2021). These transformational leaders with a higher level of emotional intelligence can clarify the value of work and the relationships between individuals and organizations, so they are more inclined to share resources and communicate to achieve common goals (Zhu et al., 2021).

## **6.2 Theoretical and Practical Implications**

This study advances with significant contributions to theory and practice. It not only responds to some gaps mentioned by different scholars but also presents relevant results for business managers and private and public entities.

It explores the dynamics of the relationship between emotional intelligence and transformational leadership related to the technological sector. As mentioned before, understanding the impact of emotional intelligence in developing a transformational leadership style is essential for effective organizational development. The discovery of methods that improve how we deal with our emotions and the others around us, indirectly affecting the organizational performance of the technological sector, is an essential task for today's leaders.

### **6.3 Research Limitations**

This research has some limitations regarding the methodology and methods used to analyze the data and results obtained since there are alternatives capable of presenting other types of conclusions.

- (1) We used a 5-point Likert scale in the empirical study. To better understand the respondents' perceptions and opinions, future studies have to use, for example, a 7-point Likert scale.
- (2) Although the reliability analysis was particularly good for all variables, it is necessary to consider that the answers given may not correspond precisely to companies' reality regarding their emotional intelligence and transformational leadership.
- (3) Finally, control variables such as age and educational qualifications of the respondents and company size or location were not considered in the investigation, which can also be seen as a limitation of the study.

### **6.4 Future Lines of Research**

The business world is more competitive than ever, increasing the importance of organizations being aware and constantly improving organizational culture to keep their workers motivated and their productivity high (Goleman, 2020b). In this order, organizational leaders play a crucial role in influencing the emotional and organizational experience of the employees, as emotions affect critical cognitive tasks, including information processing and decision-making (Gilar-Corbi et al., 2019).

Previous literature has studied the influence of emotional intelligence on leadership and, consequently, organizational performance. However, there is a literature lack on the

effect of emotional intelligence dimensions on transformational leadership, establishing in this way the validity of the study.

Moreover, this study focused on the influence of emotional intelligence and transformational leadership in the technological sector, which means that the results are not extended to other sectors of activity. In this order, future research should apply this study to different business areas such as furniture, footwear, and communication.

We recommend future studies developing the relationship between emotional intelligence, transformational leadership, and organizational performance because this relationship has not yet yielded results that can be generalized to all contexts, as well as questions about how and why leadership affects organizational performance (Hurduzeu, 2015). For this reason, this study could be applied to different sectors and countries in the future so that the relationship between the variables in question begins to gain greater clarity.

Finally, it would be interesting also to develop studies where emotional intelligence or transformational leadership can mediate the relationship between other constructs (e.g., knowledge, intellectual capital, open innovation, employee performance) (Ehrnrooth et al., 2021; Nguyen et al., 2022).

### Acknowledgements

This work is financed by Portuguese national funds through FCT - Fundação para a Ciência e Tecnologia, under the project UIDB/05422/2020.

### References

- Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107-133. <http://dx.doi.org/10.2307/3250961>
- Anderson, J. C., & Gerbing, D. W. (1998). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3), 411-423. <http://doi.org/10.1037/0033-2909.103.3.411>
- Antonakis, J. (2012). Transformational and Charismatic Leadership. In D. V. Day, & J. Antonakis (Eds.), *The Nature of Leadership* (pp. 256-288). Thousand Oaks, CA: Sage Publications.

- Bar-On, R., & Parker, J. D. A. (Eds.). (2000). *The handbook of emotional intelligence: Theory, development, assessment, and application at home, school, and in the workplace*. Jossey-Bass.
- Bass, B. M. (1990). *Bass & Stogdill's Handbook of Leadership: Theory, Research & Managerial Applications* (third edition). New York: The Free Press.
- Boyatzis, R. E. (2009). Competencies as a behavioral approach to emotional intelligence. *Journal of Management Development*, 28(9), 749–770. <http://doi.org/10.1108/02621710910987647>
- Cherniss, C., & Goleman, D. (2001). *The Emotionally Intelligent Workplace*. Jossey Bass: San Francisco.
- Chin, W. W. (1998). The Partial Least Squares approach to structural equation modelling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295-336). Mahwah, NJ: Lawrence Erlbaum Associates Publisher.
- Christensen, C. M., Allworth, J., & Dillon, K. (2012). *Como avalia a sua vida?* Alfragide: Lua de Papel.
- Dhoopar, A., Sihag, P., Kumar, A., & Suhag, A. K. (2022). Organizational resilience and employee performance in COVID-19 pandemic: the mediating effect of emotional intelligence. *International Journal of Organizational Analysis*, 30(1), 130–155. <https://doi.org/10.1108/IJOA-06-2020-2261>
- Ehrnrooth, M., Barner-Rasmussen, W., Koveshnikov, A., & Törnroos, M. (2021). A fresh look at the relationships between transformational leadership and employee attitudes—Does a high-performance work system substitute and/or enhance these relationships? *Human Resource Management*, 60(3), 377–398. <https://doi.org/10.1002/hrm.22024>
- Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobserved variables and measurement error. *Journal of Marketing Research*, 18, 39-50. <https://doi.org/10.2307/3151312>
- Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-graph: Tutorial and annotated example. *Communications of the Association for Information Systems*, 16(1), 91-109. <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=3020&context=cais>
- Gilar-Corbi, R., Pozo-Rico, T., Sanchez, B., & Castejon, J. L. (2019). Can emotional intelligence be improved? A randomized experimental study of a business-oriented EI training program for senior managers. *PLoS ONE*, 14(10). <https://doi.org/10.1371/journal.pone.0224254>
- Goleman, D. (2020a). *Inteligência Emocional*. Maia: Círculo de Leitores.
- Goleman, D. (2020b). *Trabalhar com Inteligência Emocional*. Lisboa: Temas e Debates.
- Gonzaga, A. R., & Rodrigues, M. C. (2018). *Inteligência Emocional nas Organizações*. <http://livrariavirtual.unilasalle.edu.br>

- Görgens-Ekermans, G., & Roux, C. (2021). Revisiting the emotional intelligence and transformational leadership debate: (How) does emotional intelligence matter to effective leadership? *Sa Journal of Human Resource Management*, 19, 1-13. <https://doi.org/10.4102/sajhrm.v19i0.1279>
- Gottfredson, R. K., & Aguinis, H. (2017). Leadership behaviors and follower performance: Deductive and inductive examination of theoretical rationales and underlying mechanisms. *Journal of Organizational Behavior*, 38(4), 558-591. <https://doi.org/10.1002/job.2152>
- Hair, J., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. London, UK: Sage.
- Hair, J., Sarstedt, M., Ringle, C., & Gudergan (2017). *Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM)*. London, UK: Sage.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43, 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hunter, J. C. (2020). *O Monge e o Executivo: Uma história sobre a essência da Liderança*. Lisboa: Marcador.
- Hurduzeu, R. E. (2015). The impact of leadership on organizational performance. *SEA—Practical Application of Science*, III(1/07), 289-293.
- Jyoti, J., & Bhau, S. (2015). Impact of Transformational Leadership on Job Performance: Mediating Role of Leader–Member Exchange and Relational Identification. *Sage Open*, 5(4). <https://doi.org/10.1177/2158244015612518>
- Khan Waglay, M., & Becker, J. (2020). *The role of emotional intelligence in transformational leadership: A leader-member exchange perspective*. Magister Baccalaureus, University of the Western Cape. <http://etd.uwc.ac.za/>
- Leite, C., & Rua, O. L. (2022). Linking Transformational Leadership and Firm Performance: The Role of Entrepreneurial Orientation. *Open Journal of Business and Management*, 10, 1900-1922. <https://doi.org/10.4236/ojbm.2022.104098>
- Mahon, E. G., Taylor, S. N., & Boyatzis, R. E. (2014) Antecedents of organizational engagement: exploring vision, mood and perceived organizational support with emotional intelligence as a moderator. *Frontiers in Psychology*, 5, 1322. <https://doi.org/10.3389/fpsyg.2014.01322>
- Mayer, J. D., & Salovey, P. (1997). What is emotional intelligence? In P. Salovey, & D. J. Sluyter (Eds.), *Emotional development and emotional intelligence: Educational implications* (pp. 3-31). New York, NY. Basic Books.
- Mura, L., Zsigmond, T., & Machová, R. (2021). The effects of emotional intelligence and ethics of SME employees on knowledge sharing in Central-European countries. *Oeconomia Copernicana*, 12(4), 907–934. <https://doi.org/10.24136/oc.2021.030>

- Nguyen, Q., Ladkin, A., & Osman, H. (2022). What helps or hinders the emotional intelligence practice? A study of Vietnamese hotel workers. *International Journal of Contemporary Hospitality Management*, 34(2), 534–554. <https://doi.org/10.1108/IJCHM-04-2021-0510>
- O'Boyle, E. H., Humphrey, R. H., Pollack, J. M., Hawver, T. H., & Story, P. A. (2011). The relation between emotional intelligence and job performance: A meta-analysis. *Journal of Organizational Behaviour*, 32, 788-818. <https://doi.org/10.1002/job.714>
- Özdemir, G. (2020). The Effect Social Intelligence Levels of School Principals on Their Leadership Behaviours: A Mixed Method Research. *International Journal of Eurasian Education and Culture*, 5(8), 270-300. <https://doi.org/10.35826/ijoecc.59>
- Pekaar, K. A., Bakker, A. B., van der Linden, D., & Born, M. P. (2018). Self- and other-focused emotional intelligence: Development and validation of the Rotterdam Emotional Intelligence Scale (REIS). *Personality and Individual Differences*, 120, 222–233. <https://doi.org/10.1016/j.paid.2017.08.045>
- Pestana, M. H. & Gageiro, J.N. (2010). *Análise de dados para ciências sociais: a complementaridade do SPSS* (5a ed.). Lisboa: Edições Sílabo.
- Podsakoff, P., Mackenzie, S., Moorman, R., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behavior. *Leadership Quarterly*, 1(2), 107-142. [https://doi.org/10.1016/1048-9843\(90\)90009-7](https://doi.org/10.1016/1048-9843(90)90009-7)
- Rahim, M. A., Ma, Z., Quah, C. S., Rahman, M. S., Jasimuddin, S. M., Shaw, L., & Ozyilmaz, A. (2019). Intelligent entrepreneurship and firm performance: A cross-cultural investigation. *Journal of International Entrepreneurship*, 17(4), 475–493. <https://doi.org/10.1007/s10843-019-00252-5>
- Rezende, H. (2010). *A Liderança Transformacional e Transaccional e as suas Influências nos Comportamentos de Cidadania Organizacional*. Manuscrito não publicado. Lisboa: Instituto Universitário de Lisboa.
- Rua, O.M. & Araújo, J.M. (2016). Linking transformational leadership and organizational trust: has organizational commitment a mediating effect on it? *Cuadernos de Gestión*, 16(1), 43-62. <https://doi.org/10.5295/cdg.140484om>
- SABI (2018). *Sistema de Análisis de Balances Ibéricos*. Madrid: Bureau Van Dijk.
- Salovey, P., & Mayer, J. D. (1990). Emotional Intelligence. *Imagination, Cognition and Personality*, 9(3), 185-211. <https://doi.org/10.2190/DUGG-P24E-52WK-6CDG>
- Sehgal, R., Balasubramanian, S., & Chanchaichujit, J. (2021). Transformational Leadership and Employee innovation: Examining the congruence of leader and follower perceptions. *Journal of General Management*, 47(1), 18-30. <https://doi.org/10.1177/03063070211013337>
- Silva, T., Rua, O.L., & Monteiro, A.P. (2021). Intraempreendedorismo e Desempenho Individual: Um Estudo Empírico do Setor Tecnológico Português. *Portuguese Journal*



- of Finance, Management and Accounting*, 7(13), 27-46.  
<https://doi.org/10.54663/2183-3826>
- Songer, A., Chinowsky, P., & Butler, C. (2006). Emotional intelligence and leadership behavior in construction executives. *Proceedings of the 2nd Specialty Conference on Leadership and Management in Construction*, Bahamas, 248-258.
- Sunindijo, R. Y., Hadikusumo, B., & Ogunlana, S. (2007). Emotional Intelligence and Leadership Styles in Construction Project Management. *Journal of Management in Engineering*, 23, 166-170. [https://doi.org/10.1061/\(ASCE\)0742-597X\(2007\)23:4\(166\)](https://doi.org/10.1061/(ASCE)0742-597X(2007)23:4(166)), 166-170.
- Taouab, O., & Issor, Z. (2019). Firm Performance: Definition and Measurement Models. *European Scientific Journal ESJ*, 15(1), 93-106.  
<https://doi.org/10.19044/esj.2019.v15n1p93>
- Thompson, G., Buch, R., Thompson, P. M. M., & Glasø, L. (2021). The impact of transformational leadership and interactional justice on follower performance and organizational commitment in a business context. *Journal of General Management*, 46(4), 274–283. <https://doi.org/10.1177/0306307020984579>
- Thorndike, E. L. (1920). Intelligence and Its Uses. *Harper's Magazine*, 140, 227-235.  
<https://www.gwern.net/docs/iq/1920-thorndike.pdf>
- Tran, T. B. H., & Vu, A. D. (2021). Transformational leadership versus shared leadership for effectiveness. *Asian Academy of Management Journal*, 26(2), 143–171.  
<https://doi.org/10.21315/aamj2021.26.2.7>
- Waglay, M., Becker, J. R., & du Plessis, M. (2020). The role of emotional intelligence and autonomy in transformational leadership: A leader member exchange perspective. *SA Journal of Industrial Psychology*, 46(1), 1-2.  
<https://dx.doi.org/10.4102/sajip.v46i0.1762>
- Wong, C. S., & Law, K. S. (2002). The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. *Leadership Quarterly*, 13(3), 243-274. [https://doi.org/10.1016/S1048-9843\(02\)00099-1](https://doi.org/10.1016/S1048-9843(02)00099-1)
- Yucel, I. (2021). Transformational Leadership and Turnover Intentions: The Mediating Role of Employee Performance during the COVID-19 Pandemic. *Administrative Sciences*, 11(3), 81. <https://doi.org/10.3390/admsci11030081>
- Zhu, F., Wang, X., Wang, L., & Yu, M. (2021). Project manager's emotional intelligence and project performance: The mediating role of project commitment. *International Journal of Project Management*, 39(7), 788–798.  
<https://doi.org/10.1016/j.ijproman.2021.08.002>

Submetido em: 16.12.2022

Aceito em: 19.01.2023