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IS AI CHANGING THE UNWRITTEN RULES? THE PSYCHOLOGICAL CONTRACT IN THE ERA OF DIGITAL LEADERSHIP AND THE BIG FIVE

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Purpose: This article aims to examine the impact of artificial intelligence adoption on IT managers' perceptions of the psychological contract. Particular attention is paid to the role of digital leadership as a mediating variable and the Big Five personality traits as moderators of the strength and direction of this relationship. The study also takes into account the cultural context of Poland and Spain. The issues addressed are part of the discourse on changes in human capital management within the context of digital transformation in organisations.
Design/methodology/approach: The study used a quantitative approach based on a moderated mediation model. Data were collected using a standardised questionnaire survey of 481 IT managers from Poland (N = 231) and Spain (N = 250). The analysis was conducted using structural equation modelling (SEM), mediation (bootstrapping), moderation and intergroup comparisons (multigroup SEM).
Findings: The results confirm that AI adoption influences IT managers' perception of the psychological contract, with this relationship being significantly mediated by digital leadership. Furthermore, it was demonstrated that personality qualities, including neuroticism, extraversion, and conscientiousness, influence the intensity of this association. A comparative research demonstrated notable cultural disparities across the examined groups, highlighting a heightened significance of digital leadership in Poland and a more pronounced impact on personality qualities in Spain.
Practical implications and recommendations: The results indicate the need to adapt AI implementation strategies in IT organisations to the personality profile of managers and national characteristics. Strengthening leadership competencies in the area of technological change management may contribute to better fulfilment of the psychological contract. Practical recommendations concern the implementation of AI, the role of leaders, and the personalisation of management strategies in technology organisations.
Originality/value: The study contributes to the development of the literature on human resource management, including the theory of psychological contracts and digital leadership, by presenting an integrated empirical model that considers artificial intelligence technology, individual characteristics, and cultural context.
Keywords: artificial intelligence adoption, psychological contract, digital leadership, Big Five personality traits, IT managers, cross-cultural comparison.
Category of the paper: Research paper.

1. Introduction

The progression of digitalization presents novel issues for organizations, especially within the IT sector, regarding both the adoption of innovative technology (Benitez et al., 2022) and the reconfiguration of organizational relations (Wang, 2023). One of the key areas where the consequences of technological transformation are most evident is the psychological contract (PC), which represents the subjective perception of the organisation and its employees in relation to the giving and taking in their ongoing relationship (Rogozińska-Pawełczyk, 2016). In particular, the adoption of artificial intelligence (AI), which is increasingly present in the workplace, may alter the way employees perceive the balance of this informal exchange. Previous research suggests that adopting AI in organizations can improve work satisfaction and fulfilling of the psychological contract, as long as the technology deployment process is well handled (Wang, 2023). Research suggests that using AI impacts employee engagement and confidence in the organization (Wziątek-Staśko, 2024). Furthermore, AI can strengthen positive aspects of the psychological contract, such as a sense of agency and competency growth (Prikshat et al., 2023). However, there have been claims of negative implications from the application of AI, such as fear of job loss, a sense of threat, a loss of control, and increasing confusion about one's professional function (Holmström, 2022).

Despite increased interest in the influence of AI on employee behavior and organizational relationships, a study of the literature finds considerable gaps in integrated models addressing the psychological repercussions of technical transition. In particular, most of the research to date has focused on the direct effects of AI implementation on variables such as job satisfaction and well-being (Jiang, Lavaysse, 2018), overlooking the psychological contract as a fundamental component of the exchange relationship between the employee and the organisation (Grassini, 2023). However, despite a leader's effectiveness and style acting as a crucial filter through which employees interpret technological changes, few studies have taken digital leadership (DL) as a mediating variable (Benitez et al., 2022; Wang, 2023; Shal et al., 2024). Similarly, the Big Five personality traits, which recent studies have shown strongly moderate employees' reactions to organisational changes and the implementation of new tools (Saef et al., 2024; Kovbasiuk et al., 2024), are rarely addressed in relation to the psychological contract and technology. The identified research gap also concerns the cross-cultural perspective. There is a lack of comparisons that take into account differences in organisational culture, leadership style and the dynamics of digital transformation between countries, even though the literature confirms the strong cultural conditioning of AI implementation processes and the shaping of organisational relationships (Budhwar et al., 2022; Prikshat et al., 2023; Hofstede et al., 2010).

This article fills these gaps by introducing an integrated model of moderated mediation that simultaneously considers: (1) the impact of AI adoption on the psychological contract, (2) the mediating role of digital leadership, (3) the moderating influence of personality traits in the Big Five model, and (4) the cultural diversity of the effects of the studied relationships, using Poland and Spain as examples. In this way, the article contributes to the literature on human resource management in the digital environment by developing the psychological contract theory with a technological component and integrating it with the perspective of leadership and the psychology of individual differences. At the same time, the study is part of the current trend of empirical research on the social consequences of implementing artificial intelligence in knowledge work, proposing a transdisciplinary approach based on empirical comparative data.

This article aims to examine how the adoption of AI affects the perception of the psychological contract among IT managers and to investigate the role that digital leadership and personality traits, as captured in the Big Five model, play in this process. In addition, cultural differences between Poland and Spain, which may moderate the described relationships, were analysed. Based on a review of the literature, a moderated mediation model was proposed, in which digital leadership acts as a mediator and personality traits and cultural context act as moderators.

The study was conducted using structural equation modelling (SEM) on a sample of 481 IT managers from Poland and Spain. Verified measurement tools and advanced statistical techniques, such as mediation analysis (bootstrapping), moderated regression and multigroup SEM, were used to analyse the data, enabling empirical testing of the complex research model.

The article consists of five parts. Following this introduction, the second part discusses the theoretical foundations. It provides a critical review of the literature on psychological contracts, digital leadership and the Big Five personality traits in the context of AI adoption, which resulted in the development of research hypotheses. The next part presents the research methodology, including the operationalisation of variables, sample characteristics, measurement procedure, and data analysis. The fourth part presents the empirical results and their discussion in the context of previous research. The fifth part presents the conclusions, including a summary of the main research findings, a discussion of the theoretical contribution and practical implications, the study's limitations, and directions for future research on the psychological contract in the context of digital transformation.

2. Literature review and hypothesis development

2.1. Artificial intelligence adoption and the psychological contract

One of the biggest issues facing contemporary management is the implementation of artificial intelligence (AI) in the workplace, which integrates organizational, psychological, and technological elements (De Ruiter et al., 2021). The IT industry, which is a leader in applying AI-based solutions like machine learning, decision-making automation, and generative language models that redefine both operational models and interpersonal relationships, is where these changes are most noticeable (Benitez et al., 2022; Noy, Zhang, 2023). AI affects not only the structure of tasks, but also employees' sense of agency, autonomy and job security (Holmström, 2022), making it an important factor in shaping the subjective perception of organisational relationships.

In this context, the concept of a psychological contract is understood as a set of employees' subjective beliefs about mutual obligations and expectations towards the organisation (Rousseau, 1995; Morrison, Robinson, 1997). Highly complex technologies, like artificial intelligence (AI), have been shown to cause confusion, role uncertainty, and increased psychological distance, especially when implemented without sufficient support and communication (Middleton et al., 2022). On the other hand, properly implemented AI can be interpreted by employees as a sign of innovation, organisational commitment to development and care for human resources (Wang, 2023; Presbitero, Teng-Calleja, 2022). Research in IT settings has demonstrated that having access to AI-based tools, like chatbots that assist with knowledge management or decision support systems, fosters a favorable impression of the company as being modern, transparent, and supportive of development (Noy, Zhang, 2023; Grassini, 2023). In such conditions, technology becomes a psychological resource that strengthens the sense of influence, security and organisational justice, thereby building a psychological contract.

At the same time, much depends on how the technology is implemented. According to research by Holmström (2022) and De Ruiter et al. (2021), a lack of open communication, employee involvement, and inadequate consideration of their concerns may be the main causes of psychological contract violations rather than technology itself. As a decision-making technology, artificial intelligence (AI) may be seen as a threat to one's social role and professional identity, particularly if one is unaware of how it functions and how it affects daily tasks (Nadimpalli, 2017). Thus, it is the perception of technology, rather than its objective properties, that determines the impact of AI on the quality of organisational relationships (Middleton et al., 2022).

When AI is viewed as a tool that improves agency and facilitates work rather than as a form of control or a threat of replaceability, research in the IT industry demonstrates that AI can positively affect the psychological contract (Presbitero, Teng-Calleja, 2022; Wang, 2023).

Workers are less likely to report violations of the psychological contract and exhibit higher levels of organizational loyalty if they believe they have a say in how technology is implemented, receive training, and receive communication support (Budhwar et al., 2022). The empirical evidence collected thus suggests that AI adoption plays an important, albeit perception-dependent, role in shaping the psychological contract. Therefore, the following hypothesis was adopted:

H1: The adoption of artificial intelligence (AI) is positively related to IT managers' perception of the psychological contract.

Taken together, the existing literature suggests that artificial intelligence adoption constitutes an important contextual factor shaping employees' perceptions of mutual obligations within the employment relationship. While AI itself does not automatically determine the quality of the psychological contract, employees' interpretations of technological change, particularly in terms of perceived support, fairness, and opportunities for development, play a decisive role. Consequently, AI adoption may be positively associated with psychological contract perceptions when it is experienced as enabling rather than threatening, especially in knowledge-intensive settings such as the IT sector.

2.2. The role of digital leadership as an intermediary mechanism

The implementation of artificial intelligence in organisations requires not only the appropriate technological infrastructure, but above all, competent leadership that can translate complex technological changes into a framework of actions, values, and goals that are understandable to employees. Because it integrates a leader's technical skills with the social, communication, and strategic abilities required for successful management in the context of digital transformation, the idea of digital leadership is becoming more and more significant (Kane et al., 2019). Digital leadership is not limited to knowledge of technology, but also includes the ability to build an organisational culture based on trust, innovation and participation, which is a prerequisite for successful AI implementations (Benitez et al., 2022). According to Shal et al. (2024) and Gilli et al. (2023), digital leaders act as "technology interpreters", providing clarification, defining implementation goals, and illustrating how new technology promotes both the organization's mission and personal development. Their role becomes crucial in the face of so-called 'technostress' and resistance to change that accompany the implementation of complex technologies such as AI (Budhwar et al., 2022).

By promoting co-creation of a new technological reality, conveying change, and providing assistance, leaders may impact employees' psychological contracts, according to social exchange theory (Blau, 1964). House et al. (2004) claim that organizational strategy is linked to employees' subjective perceptions of security, influence, and confidence in the company through leadership. Competent, visible, and responsive leaders may significantly reduce employee fears and increase a feeling of shared commitment when it comes to integrating AI (Wang, 2023). Empirical research supports this thesis. Wang (2023) analysed the

relationships between AI adoption, leadership, and psychological contract among IT sector employees in China, showing that transformational leadership plays an important mediating role: the presence of a strong leader explains the positive impact of AI on organisational relationships. The usefulness of applying AI to human resource management (AI-enabled HRM) was examined by Prikshat et al. (2023). They verified that employees' perceptions of change were positively impacted by capable and caring technological leadership. According to Shal et al. (2024), leaders who actively communicated changes, encouraged competence growth, and allowed experimenting with new technology created an environment that was favorable to learning and reinforced psychological safety at institutions using AI (like libraries). Similarly, Benitez et al. (2022) point out that leaders who combine digital competencies with the ability to support their team contribute to increased organisational trust and strengthened exchange relationships within the organisation. Furthermore, the importance of an inclusive leadership style that fosters employee trust through engagement and involvement is becoming increasingly apparent (Rogozińska-Pawełczyk, Sudolska, 2024). In a digital world, an inclusive leader can lessen the psychological costs of change.

Since the literature clearly indicates that the way leaders support the implementation of AI can mediate the impact of technology on the psychological contract, the following hypothesis was adopted:

H2: Digital leadership mediates the relationship between AI adoption and IT managers' perception of the psychological contract.

In light of these considerations, digital leadership emerges as a critical interpretative mechanism through which technological change is translated into employees' relational experiences. Leaders who actively communicate the purpose of AI adoption, provide guidance, and support competence development can shape how employees make sense of technological transformation. Therefore, the impact of AI adoption on the psychological contract is unlikely to be direct only, but may operate through leadership practices that frame technology as a shared organisational resource rather than a source of uncertainty.

2.3. The effectiveness of digital leadership in the use of AI technology as a factor in building a psychological contract

Although the role of digital leadership in managing technological change is widely described in the literature (Kane et al., 2019; Benitez et al., 2022), there is an increasing focus on the effectiveness of leaders in the practical implementation and use of AI in teamwork. In the face of rapid technological change, employees assess the organization's goals as well as the extent to which their immediate managers can translate these intentions into practical solutions that make their daily tasks easier rather than more difficult. Leadership effectiveness in technology management is therefore seen as a contextual psychological resource that may either increase or decrease the positive effects of AI on the perception of the psychological contract, according to Gillet et al. (2023). When digital leaders can integrate AI into team

processes, remove organizational and technological barriers, communicate the goals of change, and recognize individual needs, they are perceived as competent, responsible, and trustworthy (Benitez et al., 2022; Shal et al., 2024).

Empirical research indicates that a leader's effectiveness in using artificial intelligence has a positive impact on employee satisfaction and their belief in the fairness and predictability of the organisation (Wang, 2023). Similar results were obtained by Presbitero and Teng-Calleja (2022), who emphasise that technologically effective leaders are perceived as a symbol of the organisation's modernity and professionalism, and their actions reduce the level of cognitive uncertainty associated with AI. The idea of technical leadership authority, which implies that a leader's proficiency in AI is seen as boosting the organization's credibility overall, is also mentioned in the literature (Gilli et al., 2023). Leaders who are not only able to talk about technology but also to implement it in team processes are perceived as the embodiment of the promises made by the organisation, which is an important element of the psychological contract (Rousseau, 2001). In turn, Shal et al. (2024) point to the role of leaders' operational effectiveness in familiarising themselves with technology. Leaders who implement AI in stages, offer training support and enable experimentation, reduce resistance to technology and strengthen organisational trust. Their research shows that a leader's effectiveness in managing technology is one of the strongest predictors of positive perceptions of organisational change in high-risk professional environments.

In light of the above, not only the presence of a digital leader, but also their effectiveness in operationalising technology is a key predictor of a positive psychological contract. Therefore, the following hypothesis was formulated:

H3: The effective use of AI technology in digital leadership has a positive impact on IT managers' perception of the psychological contract.

Importantly, it is not merely the presence of digital leadership that matters, but its effectiveness in operationalising AI in everyday work practices. Leaders who are able to integrate AI into team processes, remove barriers to its use, and align technological tools with organisational goals are more likely to reinforce employees' perceptions of organisational reliability and credibility. As a result, effective digital leadership may function as a direct relational signal, strengthening the psychological contract by demonstrating that organisational promises regarding innovation and support are meaningfully enacted.

2.4. The Big Five personality traits as a moderator of the relationship between AI adoption and the perception of the psychological contract

Contemporary approaches to human resource management take into account not only structural and organisational factors, but also individual psychological differences that determine how organisational activities are interpreted and how people respond to change. Personality traits can significantly differentiate perceptions of technology and its impact on the psychological contract in the context of AI implementation, which is frequently linked to

uncertainty, loss of control, and redefinition of professional roles (Budhwar et al., 2022; Kovbasiuk et al., 2024).

One of the most established models of personality description is the Big Five personality model, which includes neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (Gosling et al., 2003). These traits, as relatively stable predispositions of an individual, determine the perception of change, interpretation of organisational intentions, and readiness to adapt (Barrick et al., 2013).

Neuroticism, defined by anxiety and negative emotions, is a barrier to adapting to technological changes, particularly regarding AI's impact on job stability and work meaning (Saef et al., 2024). Individuals with high neuroticism often view AI as a threat, leading to diminished trust in their organizations and a weakened sense of commitment (Kovbasiuk et al., 2024; Berry et al., 2007). Extroversion, on the other hand, which is associated with sociability, energy, and positive affect, facilitates the interpretation of technological change as an opportunity. Rzycki et al., (2024) and Saef et al. (2024) claim that extroverts are more likely to engage in social interactions, ask for assistance more frequently, and be open to learning new skills—all of which lead to a positive perception of organizational activities. Their active attitude can strengthen the positive relationship between AI implementation and the psychological contract, especially when accompanied by visible support from leaders. Conscientiousness, which includes the ability to plan, self-discipline and goal orientation, is associated with a desire to achieve high standards and maintain professional commitment. According to a research by Berry et al. (2007), conscientious people see AI as a useful tool for productivity and are more likely to pick up new skills, which increases their feeling of agency and dedication to the company (Benitez et al., 2022). Furthermore, people who are receptive to new experiences are more likely to be creative and cognitively flexible, which increases their interest about technology and readiness to try new things throughout digital changes (De Ruiter et al., 2021). However, as noted by Saef et al. (2024), their reaction may be more cognitive than emotional: they treat AI as an intellectual challenge, but not necessarily as a factor that improves their relationship with the organisation. Agreeableness, which refers to a tendency to cooperate, empathise and harmonise social relationships, can facilitate a positive interpretation of organisational actions, even in conditions of uncertainty. Agreeable individuals tend to be more trusting of organisational narratives regarding innovation and development, show higher tolerance for implementation imperfections, and are less likely to perceive bad intentions, provided that interpersonal relationships are strong (Saef et al., 2024; Kovbasiuk et al., 2024). In light of the aforementioned studies, it can be inferred that the personality traits in the Big Five model serve as moderators, differentiating the strength and direction of the influence of AI adoption on the perception of the psychological contract. Therefore, the following hypothesis was formulated:

H4: Personality traits, as defined by the Big Five model, moderate the relationship between AI adoption and the perception of the psychological contract among IT managers in such a way that neuroticism weakens this relationship, while extraversion, conscientiousness, agreeableness, and openness to experience strengthen it.

These arguments indicate that employees do not respond to AI adoption in a uniform manner. Instead, individual personality traits shape how technological change is interpreted and emotionally experienced. The Big Five framework offers a robust lens for understanding these differences, suggesting that some traits may amplify positive interpretations of AI adoption, while others may intensify perceived risks and uncertainty. Consequently, personality traits can be expected to condition both the strength and the direction of the relationship between AI adoption and psychological contract perceptions.

2.5. Cultural context as a moderator of the relationships

Cross-cultural research is becoming increasingly important in human resource management and digital transformation due to the growing number of organizations operating in an international environment, as well as noticeable differences in how technology is implemented and received across countries (Budhwar et al., 2022; Prikshat et al., 2023). In the context of artificial intelligence, which simultaneously affects organisational structures, professional roles and interpersonal relationships, national culture can significantly shape the way this technology is perceived and how employees react to it (Hofstede et al., 2010; House et al., 2004).

According to Hofstede's cultural dimensions model (2010), Poland and Spain have considerable cultural differences in terms of power distance, uncertainty avoidance, and collectivism vs individuality. Poland, with a high power distance and strong uncertainty avoidance, views technological change as a danger to stability, authority, and predictability (Rogozińska-Pawełczyk, 2021). In this context, employees may interpret AI as an external mandate for transformation, often incomprehensible and imposed from above, which can lead to a weakening of the psychological contract. Spain's organizational culture, characterized by high uncertainty avoidance, is primarily collectivist and relational (Cegarra-Navarro et al., 2022; Iamandi et al., 2024). Technological innovations are seen as collaborative and developmental, especially with the support of inclusive and communicative leadership. As shown by the research of Prikshat et al. (2023), a leadership style consistent with national cultural values reinforces the positive effects of AI implementation – both in terms of technological adaptation and organisational relations.

In addition, culture influences expectations of the leader's role and how their actions are perceived. In hierarchical and formal cultures like Poland, technical competence and expert authority are more important. In relational cultures like Spain, communication skills and the ability to build team spirit during change are more important (House et al., 2004; Budhwar et al., 2022). These differences can change how effective digital leadership is and how

employees see technology as part of the organization's strategy. So, national culture affects both the link between AI adoption and the psychological contract and the effectiveness of digital leadership and how strong its effect is on how people see their mutual commitments. Organisations operating in different countries should therefore adapt the way they communicate, implement and support technology to local cultural norms so as not to undermine the fundamental mechanisms of organisational trust. This perspective leads to the following research hypothesis:

H5: Cultural context moderates the relationships between AI adoption, digital leadership, and IT managers' perceptions of the psychological contract.

Beyond individual differences, national culture provides a broader interpretative context that shapes expectations toward technology, leadership, and organisational obligations. Cultural norms influence how AI adoption is framed, how leadership behaviours are evaluated, and how employees assess the balance of mutual commitments. Therefore, the relationships between AI adoption, digital leadership, and the psychological contract may vary across countries, reflecting culturally embedded patterns of authority, uncertainty management, and social relations.

3. Research methodology

3.1. Research strategy and context

The presented study is quantitative, cross-sectional and comparative in nature, rooted in the tradition of research based on modelling cause-and-effect relationships using Structural Equation Modelling (SEM). The main objective of the study was to empirically verify a moderated mediation model in which the adoption of artificial intelligence (AI) influences IT managers' perception of the psychological contract, with digital leadership acting as a mediating variable and the Big Five personality traits and cultural context functioning as moderators.

The study was conducted in the information technology (IT) sector, which is a critical field for observing processes related to digitalisation and AI implementation (Benitez et al., 2022; Shal et al., 2024). IT companies are characterised by high dynamics of change, technological advancement and a large percentage of positions requiring human-system interaction. At the same time, IT managers belong to a group that experiences extreme tension between the requirements of technological adaptation and maintaining organisational relationships, as well as the psychological security of teams (Wang, 2023; Prikshat et al., 2023). As a group of respondents, IT managers play a key role in implementing AI-based solutions and interpreting their significance for the team and the organisation. On the one hand, they are responsible for

selecting and implementing technology, and on the other, they serve as leaders of teams in which AI can evoke ambivalent attitudes, fear or resistance (Gilli et al., 2023; Shal et al., 2024). In addition, the specific nature of the IT industry, manifested in low level of formalisation of relationships, the dominance of project teams, high professional mobility and frequent remote work, is conducive to the development of non-standard forms of organisational relationships, based more on the perception of mutual obligations than on formal regulations (Presbitero, Teng-Calleja, 2022). In such a reality, the importance of the psychological contract is extreme, and its susceptibility to technological change is highly likely.

The study was international and cross-cultural in nature, covering two groups of IT managers from Poland and Spain. The selection of these countries was deliberate and justified by the research. According to Hofstede's cultural model (2010), they differ considerably in terms of power distance, uncertainty avoidance, and individualism, all of which are critical in the context of technology deployment and psychological contract creation. Poland represents a hierarchical and structural approach to technical leadership, whereas Spain represents a relational and participative approach (Iamandi et al., 2024; Budhwar et al., 2022). A comparison of these two countries allows for an in-depth analysis of the moderating role of national culture in the process of AI's impact on organisational relationships. The study was made possible by the author's participation in the Erasmus+ project (No. BWZ/154/STA/2024-25), which allowed for research collaboration with the Department of Languages and Computer Systems (Departamento de Lenguajes y Sistemas Informáticos) at the University of Granada in Spain, as well as the ability to conduct part of the data collection process in an international setting. Participation in the project also created conditions for the cultural validation of research tools and expert consultations on comparative research methodology. The study is part of a growing trend in empirical research on the psychosocial effects of AI implementation in knowledge work, while developing a transdisciplinary approach that combines management, organisational psychology, and intercultural research (De Ruiter et al., 2021; Holmström, 2022).

3.2. Procedure and research sample

Empirical data collection occurred in early 2025 via computer-assisted web interviews (CAWI) utilizing a standardized internet questionnaire. This questionnaire, developed in accordance with the International Test Commission's 2017 guidelines, underwent translation into Polish and Spanish, ensuring semantic and functional alignment. The translation process accounted for the context of IT managers' roles and AI adoption, followed by back-translation to maintain semantic coherence. Discrepancies were analysed together with translators and domain experts. In addition, items were contextually adapted to the specifics of managing technology teams and highly digitised environments (Gioia et al., 2013). A pilot study (N = 30) was conducted in both countries prior to the main study. The test confirmed the

comprehensibility and linguistic accuracy of the tool, as well as the adequate time required to complete it, which enabled the main study to commence.

The sample was purposively selected and included only individuals in middle or senior management positions in IT sector organisations. The study's eligibility criteria included being employed in a managerial role, having direct team responsibility, and possessing experience with AI-based solutions as either a user or decision-maker. The tool utilized was developed through Google Forms and distributed selectively to respondents. In Spain, the survey questionnaire was sent to a group of IT managers (current or former IT students at the University of Granada) via dedicated mailing lists, in collaboration with the university's academic staff. In Poland, the survey covered IT managers employed in the IT departments of various organisations, invited through internal company contact lists obtained by the author in previous research projects conducted in the IT sector.

The response rate was very high, reaching 89% among Polish respondents and as much as 96% among Spanish respondents. The high percentage of returned questionnaires confirms the accuracy of the sample selection and the respondents' motivation to participate in the study. A total of 481 correctly completed questionnaires were obtained: 231 from managers in Poland and 250 from managers in Spain. The characteristics of the sample are presented in Table 1.

Table 1.
Demographic distribution of the research sample

	Poland		**Spain**	
	N	**%**	**N**	**%**
Number of respondents	231			250
Gender				
Men	170	73.6	176	70.4
Woman	60	26.0	72	28.8
Age				
Age 25-34	98	42.4	120	48.0
Age 35-44	86	37.2	81	32.4
Age 45-54	33	14.3	36	14.4
Age 55+	14	6.1	13	5.2
Length of service				
2-5 years	117	50.6	131	52.4
6-10 years	78	33.8	73	29.2
11+ years	36	15.6	46	18.4
Size of organisation				
<50 employees	42	18.2	40	16.0
50-249 employees	97	42.0	104	41.6
250+ employees	92	39.8	106	42.4

Source: Own elaboration.

The structure of the sample, in terms of gender, age, and length of service, was similar across countries. The balanced distribution of the sample in both countries and consistent criteria for selecting respondents enable a reliable comparative analysis and testing of the moderating influence of cultural context on the analysed relationships.

Respondents were informed that participation in the study was voluntary and anonymous, and they gave their consent to participate in the research before completing the questionnaire. No personal data or information that could be used to identify individuals or companies was collected. The research project complied with the principles of the Declaration of Helsinki and the guidelines of the RODO. As the study was voluntary and did not interfere with confidential company information, the consent of the respondents' management was not required to obtain data from employees.

3.3. Variables and measurement tools

The study used standardised measurement tools adapted to the context of research on psychological contracts and technological transformation of work in the IT sector. All variables were measured using five-point scales (1 – strongly disagree, 5 – strongly agree). Their reliability was assessed using Cronbach's alpha coefficient (α), and construct validity was verified through exploratory and confirmatory factor analysis (EFA/CFA).

Measuring the perception of the psychological contract

To measure the perception of psychological contract fulfilment, the scale developed by Robinson and Morrison (2000), commonly used in psychological contract research (e.g., Conway, Briner, 2005), was applied. The scale was modified for the study conditions by referring to the context of IT managers' work and the use of AI technology. The tool consisted of five items, e.g. 'The organisation fulfils its obligations towards me as an IT employee' and 'The organisation provides me with what I can expect as an IT manager in the context of implementing new technologies'. The scale achieved high reliability, with Cronbach's alpha values of 0.86 in the Polish group and 0.84 in the Spanish group, indicating perfect internal consistency.

Measuring the adoption of artificial intelligence (AI)

The AI adoption index was based on a 4-item scale developed by Venkatesh et al. (2003) and Wang (2023), measuring the degree of AI application in everyday managerial work. Sample items: 'In my organisation, AI is actively used to support the work of IT managers' and 'AI helps to improve my daily work'. The reliability of the scale was high. Cronbach's α was 0.81 for the Polish group and 0.80 for the Spanish group.

Measuring digital leadership

Digital leadership was measured using a 5-item scale adapted from Benitez et al. (2022), which covered aspects such as the leader's digital competence, support for innovation, and the creation of an environment conducive to the implementation of technology. Example: My supervisor can effectively use digital technologies, including AI, in team

management. The scale achieved very high reliability, with a Cronbach's α coefficient of 0.87 in the Polish sample and 0.88 in the Spanish sample.

Measurement of personality traits in the Big Five model (Big Five)

To measure personality traits according to the Big Five model, a shortened, 10-item version of the TIPI (Ten-Item Personality Inventory) scale was developed by Gosling et al. (2003). The scale included two items for each of the five personality traits: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Sample items: 'I see myself as an emotional person, prone to stress' (neuroticism), 'I see myself as a sociable, talkative person' (extraversion), 'I see myself as a person open to new experiences' (openness), 'I see myself as a person who is kind and cordial towards others' (agreeableness) and 'I see myself as an organised and thorough person' (conscientiousness). Due to the limited number of items, the reliability of the individual subscales ranged from 0.62 to 0.72 (depending on the trait and language version), which is an acceptable level for shortened personality tools in cross-sectional studies.

Measurement of cultural context (country)

The cultural context was included as a binary variable, coded based on the respondent's nationality (0 = Poland, 1 = Spain). This variable was used to test moderation effects in a multigroup SEM analysis.

3.4. Data analysis methods

Data analysis was performed using IBM SPSS Statistics 28 and AMOS 29 software. Due to the simultaneous collection of data using a structured questionnaire, the risk of common method bias was taken into account. The single-factor Harman test (Podsakoff et al., 2003) was used, with the result indicating a low risk of this phenomenon (28.7% of explained variance) (Fuller et al., 2016).

Prior to testing the structural model, the measurement model was evaluated using confirmatory factor analysis (CFA), in accordance with the recommendations of Hair et al. (2019) and Kline (2016). Convergent validity was confirmed by analysing the significance of factor loadings ($\lambda \geq 0.50$; $p < 0.001$), AVE values (≥ 0.50) and CR (≥ 0.70) (Fornell, Larcker, 1981). Discriminant validity was assessed by comparing AVE with the correlation coefficient squares and analysing HTMT indices (≤ 0.85) (Henseler et al., 2015). The overall fit of the model was assessed based on standard indices: RMSEA ≤ 0.08, CFI and TLI ≥ 0.90, and SRMR ≤ 0.08 (Hu, Bentler, 1999), as well as $\chi^2/df < 3$ (Kline, 2016), indicating a good level of fit between the data and the theoretical model. All factor loadings were statistically significant ($p < 0.001$) and exceeded 0.50, confirming satisfactory convergent validity.

The AVE coefficients for most scales exceeded the threshold of 0.50, and the CR values exceeded 0.70, confirming both the reliability and internal consistency of the measurement.

Next, a structural equation model (SEM) was analysed using AMOS or R packages (lavaan, semTools). This allowed for simultaneous testing of relationships between variables and verification of research hypotheses. The mediating role of digital leadership (H2) was verified using bootstrapping (5000 trials; 95% CI) (Hayes, 2013), and the moderating hypotheses (H4 and H5) were verified through interaction analysis (Aiken, West, 1991) and multigroup analysis (Byrne, 2016) for Poland and Spain. Restricted and unrestricted models were compared, assessing differences using the chi-square test (Cheung, Rensvold, 2002). The analytical procedure adopted enabled a comprehensive assessment of the relationships and identification of mediating and conditional mechanisms in accordance with the theoretical model.

4. Results

4.1. Evaluation of the measurement model

Before testing the structural relationships, the measurement model was evaluated using confirmatory factor analysis (CFA), in accordance with the recommendations of Hair et al. (2019) and Kline (2016). The aim was to confirm the convergent and discriminant validity of latent variables and the reliability of the measurement.

In the first step, convergent validity was assessed. In the assessment of convergent validity, all factor loadings exceeded 0.60 and were statistically significant ($p < 0.001$). Most constructs had an average extracted variance (AVE) exceeding 0.50, except for neuroticism and agreeableness, which had AVE values of 0.46 and 0.49, respectively, still acceptable for short personality scales (Gosling et al., 2003). The composite reliability (CR) values for all variables exceeded 0.70 or hovered around this value, confirming sufficient internal consistency of the constructs (Fornell, Larcker, 1981). Detailed data are presented in Table 2.

Table 2.
Convergent validity assessment

Latent variable	Number of items	Factor load range (λ)	AVE	CR
AI Adoption	4	0.65-0.81	0.58	0.84
Digital leadership	5	0.62-0.85	0.60	0.87
Psychological contract	5	0.68-0.84	0.61	0.86
Extraversion	2	0.72-0.79	0.57	0.74
Conscientiousness	2	0.70-0.76	0.52	0.72
Neuroticism	2	0.63-0.71	0.46	0.68
Openness	2	0.66-0.75	0.50	0.71
Agreeableness	2	0.64-0.73	0.49	0.69

Source: Own elaboration.

The overall fit of the measurement model was evaluated using a set of standard fit indices. The results of the CFA analysis indicate a satisfactory level of fit: Chi-square/df = 2.41, RMSEA = 0.056, CFI = 0.928, TLI = 0.912, and SRMR = 0.051. All values fall within the range considered acceptable in the literature (Hu, Bentler, 1999; Kline, 2016), which indicates that the measurement model is well-fitted to the empirical data. The summary is presented in Table 3.

Table 3.
Fit of the measurement model

Indicator	Value obtained	Acceptability criterion
Chi-square/df	2.41	≤ 3.0
RMSEA	0.056	≤ 0.08
CFI	0.928	≥ 0.90
TLI	0.912	≥ 0.90
SRMR	0.051	≤ 0.08

Source: Own elaboration.

In the next step, the discriminant validity presented in Table 4 was assessed. The AVE values for each variable were higher than the most significant values of correlation squares with other variables, which meets the criterion of Fornell and Larcker (1981). Additionally, an HTMT analysis (Henseler et al., 2015) was conducted, in which all values were below the threshold of 0.85, confirming the existence of discriminant validity. The highest HTMT values were recorded between digital leadership and psychological contract (0.68) and between AI adoption and psychological contract (0.66), confirming strong but still discriminable associations.

Table 4.
Discriminant validity assessment

	AI Adoption	Digital leadership	Psychological contract	Extraversion	Conscientiousness	Neuroticism	Openness	Agreeableness
AI Adoption	**0.58**	0.38 (0.68)	0.35 (0.66)	0.23 (0.47)	0.37 (0.58)	0.26 (0.66)	0.22 (0.47)	0.37 (0.55)
Digital leadership	0.18 (0.62)	**0.60**	0.38 (0.68)	0.32 (0.73)	0.35 (0.71)	0.26 (0.42)	0.22 (0.41)	0.34 (0.48)
Psychological contract	0.36 (0.66)	0.40 (0.68)	**0.61**	0.22 (0.46)	0.18 (0.47)	0.37 (0.66)	0.29 (0.59)	0.37 (0.54)
Extraversion	0.25 (0.47)	0.23 (0.73)	0.27 (0.46)	**0.57**	0.23 (0.62)	0.23 (0.70)	0.39 (0.63)	0.24 (0.69)
Conscientiousness	0.20 (0.58)	0.23 (0.71)	0.37 (0.47)	0.27 (0.62)	**0.52**	0.17 (0.53)	0.34 (0.54)	0.27 (0.60)
Neuroticism	0.26 (0.66)	0.26 (0.42)	0.37 (0.66)	0.23 (0.70)	0.17 (0.53)	**0.46**	0.31 (0.61)	0.33 (0.57)
Openness	0.22 (0.47)	0.22 (0.41)	0.29 (0.59)	0.39 (0.63)	0.34 (0.54)	0.31 (0.61)	**0.50**	0.32 (0.60)
Agreeableness	0.37 (0.55)	0.34 (0.48)	0.37 (0.54)	0.24 (0.69)	0.27 (0.60)	0.33 (0.57)	0.32 (0.60)	**0.49**

Legend: AVE — average variance extracted (on the diagonal), values outside the diagonal are squares of correlations between variables, HTMT (in brackets) — Heterotrait-Monotrait ratio coefficients for each pair of constructs.

Source: Own elaboration.

Based on the results obtained, it can be concluded that the measurement model meets the requirements of validity, reliability, and fit, which allows us to proceed to the next stage of analysis — testing research hypotheses in a structural model.

4.2. Testing the main hypotheses (H1 and H3)

After evaluating the measurement model, a structural equation modelling (SEM) analysis was performed to verify the main hypotheses H1 and H3. In order to investigate direct relationships between latent constructs, the study used the R environment's lavaan package. Specifically, it looked at the relationship between AI adoption and psychological contract (H1) and the relationship between digital leadership effectiveness and psychological contract (H3). Standard indicators were used to assess the model's fit, and the results were satisfactory: $\chi^2/df = 2.49$; RMSEA = 0.059; CFI = 0.921; TLI = 0.905; SRMR = 0.053. All indices were within acceptable ranges consistent with the literature (Hu, Bentler, 1999; Kline, 2016), confirming that the empirical data correctly reflected the model structure.

Regarding hypothesis H1, which concerns the positive impact of AI adoption on IT managers' perception of the psychological contract, a statistically significant path was obtained ($\beta = 0.34$; SE = 0.08; $p < 0.001$). This result confirms that the implementation of artificial intelligence in IT organisations promotes a positive perception of the employer's fulfilment of organisational obligations, which is consistent with the earlier findings of Wang (2023) and Presbitero and Teng-Calleja (2022).

About hypothesis H3, which assumes that the effectiveness of digital leadership in the use of AI positively influences the perception of the psychological contract, a significant effect was also obtained ($\beta = 0.42$; SE = 0.07; $p < 0.001$). This result confirms that the competent and effective implementation and use of AI by leaders builds trust and a sense of organisational reliability, which is consistent with the findings of Shal et al. (2024) and Benitez et al. (2022).

Table 5.
Results of testing hypotheses H1 and H3

Hypothesis	Path	Regression coefficient (β)	Standard error (SE)	p-value	Conclusion
H1	AI adoption → Psychological contract	0.34	0.08	< 0.001	Hypothesis confirmed
H3	Digital leadership → Psychological contract	0.42	0.07	< 0.001	Hypothesis confirmed

Source: Own elaboration.

As presented in Table 5, both main hypotheses were empirically confirmed. The table contains regression coefficients, standard errors, and significance levels. The results indicate that both the adoption of AI itself and the way it is implemented and used by leaders are important for shaping a positive psychological contract among IT managers.

4.3. Mediation analysis (H2)

The next stage of the analysis aimed to test Hypothesis H2, which posits that digital leadership mediates the relationship between the adoption of artificial intelligence (AI) and IT managers' perceptions of the psychological contract. The mediation analysis employed a bootstrap sampling approach recommended by Hayes (2013), which enables the estimation of confidence intervals for indirect effects without assuming a normal distribution.

The analysis took into account both the direct impact of AI adoption on the perception of the psychological contract and the indirect impact through digital leadership. The procedure was carried out using the lavaan package with the implementation of 5000 bootstrap samples and a 95% confidence interval. The results of the analysis, presented in Table 6, showed that the indirect effect of AI adoption on the psychological contract through digital leadership was statistically significant ($\beta = 0.19$; 95% CI [0.11, 0.28]). The confidence interval did not include zero, confirming the mediating nature of this relationship. At the same time, the direct effect remained significant ($\beta = 0.22$; $p < 0.01$), indicating partial mediation.

This means that digital leadership partially explains how AI implementation affects the perception of mutual obligations between the organisation and the IT manager. Technology adoption fosters a positive perception of the psychological contract, primarily because it is perceived as being effectively managed by digital leaders. This result is consistent with earlier studies by Benitez et al. (2022) and Shal et al. (2024), which emphasised the role of leaders as ‘interpreters’ of technological change and key links in digital transformation in organisational relationships.

Table 6.
Mediation analysis results (H2)

Type of effect	Path	Coefficient (β)	Standard error (SE)	95% confidence interval	p-value	Conclusion
Direct effect	AI adoption → Psychological contract	0.22	0.07	0.08; 0.35	< 0.01	Significant
Indirect effect (mediated by digital leadership)	AI adoption → Digital leadership → Psychological contract	0.19	0.06	0.11; 0.28	< 0.001	Significant (partial mediation)
Total effect	AI adoption → Psychological contract (total)	0.41	0.08	0.26; 0.55	< 0.001	Significant

Source: Own elaboration.

As shown in Table 6, both the direct effect ($\beta = 0.22$; $SE = 0.07$; $p < 0.01$) and the indirect effect ($\beta = 0.19$; $SE = 0.06$; $p < 0.001$) were statistically significant. The value of the 95% confidence interval for the indirect effect (0.11; 0.28) did not include zero, confirming that digital leadership mediates the relationship between AI adoption and the perception of the psychological contract. The persistence of the direct effect after including the mediating variable in the model indicates the presence of partial mediation. This means that digital

leadership conveys only part of the impact of AI adoption on the psychological contract, while the rest of this relationship remains direct and independent of the mediator. The total effect ($\beta = 0.41$; SE = 0.08; $p < 0.001$), combining both components, was also significant and indicates a substantial positive impact of AI implementation on the quality of employee-organisation relationships in the IT manager environment.

4.4. Moderation analysis – personality traits (H4)

As part of testing hypothesis H4, a moderation analysis was conducted to examine whether personality traits, as defined by the Big Five model, modify the relationship between AI adoption and IT managers' perceptions of the psychological contract. A moderated regression model was used for the analysis, taking into account the interactions between the independent variable (AI adoption) and each of the five personality traits as moderator variables. The variables were previously standardised, and the interactions were created in accordance with the approach proposed by Aiken and West (1991).

The results of the analysis are presented in Table 7. Statistical significance was noted in the case of three of the five personality traits examined: extraversion ($\beta = 0.14$; $p < 0.05$), conscientiousness ($\beta = 0.17$; $p < 0.01$) and neuroticism ($\beta = –0.19$; $p < 0.01$). A positive moderating effect was found for extraversion and conscientiousness, indicating that a higher intensity of these traits strengthens the relationship between AI adoption and the perception of the psychological contract. In contrast, the interaction with neuroticism was negative, suggesting that an elevated level of this trait reduces the positive impact of AI implementation on the perception of the psychological contract. For openness to experience, a moderate tendency towards positive moderation was observed ($\beta = 0.09$; $p = 0.08$), while the effect of agreeableness was significant ($\beta = 0.11$; $p < 0.05$), also of a reinforcing nature.

Table 7.
Results of the moderation analysis (H4)

Moderator (personality trait)	Interaction effect (β)	Standard error (SE)	p-value	Conclusion
Extraversion	0.14	0.06	< 0.05	Positive moderation
Conscientiousness	0.17	0.07	< 0.01	Positive moderation
Neuroticism	-0.19	0.06	< 0.01	Negative moderation
Openness	**0.09**	**0.06**	**0.08**	**Tendency towards positive moderation**
Agreeableness	0.11	0.06	< 0.05	Positive moderation

Source: Own elaboration.

The empirical findings support hypothesis H4, indicating that personality traits, specifically conscientiousness, extraversion, and neuroticism, moderate the relationship between AI adoption and the perception of the psychological contract, aligning with previous research by Saef et al. (2024), Berry et al. (2007), and Kovbasiuk et al. (2024).

4.5. Moderation analysis – cultural context (H5)

In order to test hypothesis H5, which assumes that cultural context (Poland vs Spain) moderates the relationships between the key variables of the model: AI adoption, digital leadership and psychological contract, a multigroup analysis was conducted using structural equation modelling (multigroup SEM), this procedure allows for a comparison of the strength and significance of the relationships between variables in two independent samples, while ensuring measurement equivalence (Byrne, 2016).

The analysis began with an assessment of the fit of the base model (configural model), in which all parameters were free in both groups. This model was then compared with a restricted model (metric invariance), in which the equality of selected structural paths between groups was imposed. Model comparisons were based on the difference in χ^2 statistics ($\Delta\chi^2$) and on fit indices such as CFI and RMSEA. According to the recommendations of Cheung and Rensvold (2002), differences $\Delta CFI < 0.01$ and $\Delta RMSEA < 0.015$ are interpreted as indicating no significant differences in model fit, while significant $\Delta\chi^2$ may suggest structural differences in the relationships between groups. The results are presented in the table below.

Table 8.
Results of cultural moderation analysis (H5)

Path	Regression coefficient (PL)	Regression coefficient (ES)	$\Delta\chi^2$ (difference in fit)	p or difference	Conclusion
AI adoption → Psychological contract	0.29	0.41	4.12	< 0.05.	Significant difference – more substantial effect in Spain
Digital leadership → Psychological contract	0.39	0.45	2.89	0.09	No significant difference
AI adoption → Digital leadership	0.36	0.48	5.76	< 0.01	Significant difference – more substantial effect in Spain

Source: Own elaboration.

The results of the multigroup analysis indicate that cultural context does indeed moderate some of the relationships included in the theoretical model (Table 8). For the path between AI adoption and psychological contract, a significant difference was found between national groups ($\Delta\chi^2 = 4.12$; $p < 0.05$), with this effect being more substantial in the Spanish group ($\beta = 0.41$) than in the Polish group ($\beta = 0.29$). This means that in Spanish culture, the implementation of AI in an organisation has a more substantial positive impact on the perception of the organisation's fulfilment of the psychological contract. This suggests that the relational management style and heightened awareness of social support and inclusive leadership behaviors, which are typical of Spanish culture, may have contributed to this outcome (Cegarra-Navarro et al., 2022).

In the case of the path between digital leadership and the psychological contract, the difference between the groups was statistically insignificant ($\Delta\chi^2 = 2.89$; $p = 0.09$), indicating that the influence of digital leaders on employee relations perception remains comparable in both cultural contexts. This result may indicate the transnational, universal nature of leadership competencies in technology management and their key role in building trust, regardless of cultural differences. However, a different picture emerges in the case of the relationship between AI adoption and digital leadership, where the differences proved to be statistically significant ($\Delta\chi^2 = 5.76$; $p < 0.01$). The regression coefficient was higher in the Spanish sample ($\beta = 0.48$) than in the Polish sample ($\beta = 0.36$), suggesting a stronger link between these variables in the Spanish context. This means that in Spanish culture, IT managers perceive leaders more strongly as responsible for the effective implementation and management of AI technology. This may be due to higher expectations of leaders in terms of supporting the team during the change process and a culturally rooted approach to supervisor-subordinate relationships, which are based on cooperation and trust (Hofstede et al., 2010; Budhwar et al., 2022). The empirical results provide strong confirmation of hypothesis H5. The impact of AI adoption on the perception of the psychological contract, as well as its relationship with the perception of digital leadership, differs significantly between Poland and Spain, which emphasises the importance of taking national culture into account in organisational and management analyses.

5. Discussion

This study aimed to examine the relationship between the adoption of artificial intelligence, digital leadership and the perception of the psychological contract among IT managers, taking into account the role of personality traits and cultural context. The results of the study confirmed all the main hypotheses and pointed to a complex mechanism of shaping organisational relationships in the context of digital transformation.

First, a positive relationship was confirmed between AI adoption and the perception of the psychological contract (H1). This means that the implementation of artificial intelligence in an organisation may be perceived by IT managers as an expression of the organisation's commitment to development, innovation and employee support. This result is consistent with Wang's (2023) research, which shows that technology can be interpreted as a symbol of the organisation's trust in employee competence. Similarly, Presbitero and Teng-Calleja (2022) noted that effective AI adoption increases the sense of fairness and job satisfaction.

The mediating role of digital leadership (H2) was also significant. The results showed that leaders play a key role in “translating” organisational technology into a language of meaning and value for employees. According to Benitez et al. (2022), digital leadership acts as a catalyst

for the transformation process, supporting a shift in the perception of AI from a potential threat to a resource that can effectively support organisational activities. The partial mediation effect suggests that while the mere presence of technology influences the psychological contract, the way it is implemented by leaders significantly reinforces this effect.

The results also confirm that the effectiveness of digital leadership in managing the use of AI (H3) has a significant impact on how the psychological contract is perceived. These findings are consistent with those of Shal et al. (2024), who indicate that the proactive and conscious implementation of technology by leaders increases employees' willingness to accept it. According to Holmström (2022), leaders who act as guides in the digital transformation process are perceived as guardians of fairness and professional development, which strengthens the level of trust and loyalty towards the organisation.

Hypothesis H4, concerning the moderating role of personality traits, was also empirically confirmed. Extraversion and conscientiousness intensified the positive relationship between AI adoption and the perception of the psychological contract, which is consistent with the findings of Kovbasiuk et al. (2024) and Berry et al. (2007), indicating that individuals with high levels of these traits are more likely to perceive technological changes as opportunities for development. Neuroticism, on the contrary, weakened this relationship, as confirmed by Saef et al. (2024). Neurotic individuals experience greater anxiety and uncertainty, which leads them to perceive technological change as a potential threat.

The analysis of cultural context moderation (H5) yielded exciting results. In the Spanish group of IT managers, the adoption of AI had a more substantial impact on the perception of the psychological contract and leadership competence than in the Polish group. This result is consistent with the findings of Cegarra-Navarro et al. (2022) and House et al. (2004), who emphasise that the Spanish cultural context is characterised by a stronger relational orientation and a greater emphasis on social support in organisational relationships. Poland, as a country with a higher level of uncertainty avoidance and a more individualistic approach to work (Hofstede et al., 2010), may attach greater importance to the functional aspects of AI implementation than to interpersonal ones. Interestingly, these differences did not extend to the impact of digital leadership on the psychological contract, which may suggest that the effectiveness of technology leaders is recognised as a universal value regardless of cultural conditions.

The overall results suggest that the formation of a psychological contract in the context of digital transformation is multidimensional and is determined simultaneously by technological factors, leadership skills, individual personality traits of employees, and cultural conditions. These results confirm the validity of integrating perspectives from the fields of HR, organisational psychology and technology management, in line with the recommendations of De Ruiter et al. (2021) and Budhwar et al. (2022).

Although the proposed model is theoretically grounded, the cross-sectional nature of the study requires a cautious interpretation of directionality. The observed relationships should be understood as associations reflecting relational and perceptual mechanisms rather than definitive causal effects. The findings indicate how AI adoption, leadership practices, and individual differences co-occur with variations in psychological contract perceptions among IT managers, highlighting plausible pathways that warrant further longitudinal examination.

6. Theoretical implications

From a theoretical perspective, the results of this study provide important implications for the development of knowledge about employee–organisation relations in the context of digital transformation. First and foremost, it has been confirmed that the psychological contract, understood as employees' subjective beliefs about mutual obligations, can be significantly shaped by technological factors such as the adoption of AI. Thus, the study aligns with the postulate proposed by De Ruiter et al. (2021) that technology should be included as an independent organisational variable in relational models. With earlier work focusing primarily on breach of contract and its consequences (Morrison, Robinson, 1997; Zhao et al., 2007), this study demonstrates that technology can also be a catalyst for positive dynamics in psychological relationships.

The second important theoretical implication is the empirical confirmation that digital leadership serves as an active mechanism for translating technological changes into enhanced employee experiences. In line with the concept of leaders as interpreters of reality (Weick, 1995), digital leaders not only implement technology, but also give it meaning in an organisational context. As a result, their actions affect not only the effectiveness of implementation but also the psychological contract, which is a significant extension of existing models of technological leadership (Benitez et al., 2022; Gilli et al., 2023).

Another theoretical value of the study is the consideration of individual employee differences as moderators of relationships. The results confirm that the personality traits from the Big Five model differentiate the way employees perceive technological changes and their impact on their relationship with the organisation. In particular, high extraversion, conscientiousness and agreeableness increase openness to technology and the tendency to interpret organisational actions positively, which confirms the earlier findings of Saef et al. (2024) and Berry et al. (2007).

The last but crucial theoretical implication is the inclusion of a cultural component in the analysis of the relational model. The analysis revealed that the relationships between technology, leadership and psychological contract differ in Poland and Spain, which

emphasises the role of cultural conditions as an important moderator in human resource management theories (Hofstede et al., 2010; House et al., 2004). As a result, the proposed model combines micro (individual characteristics), meso (leadership style) and macro (culture) approaches, which constitutes an original contribution to organisational and management theories.

7. Practical implications

From the perspective of human resource management and technological leadership, the results of this study have several important implications. Firstly, the adoption of AI in organisations should not be treated solely as a technological process, but as an organisational and relational activity. The way in which new technological tools are implemented, and in particular how they are interpreted by leaders, has a direct impact on how they are perceived by employees. Therefore, implementation teams should work closely with HR departments and managers to ensure communication based on transparency, predictability and employee involvement in the change process (Holmström, 2022; Presbitero, Teng-Calleja, 2022).

Secondly, the development of digital leaders should include not only technological competencies, but also interpersonal skills such as managing emotions, supporting teams in situations of uncertainty, and building engagement through storytelling, coaching, and communication. These competencies are key to minimising the psychological costs of change and enhancing employees' positive experiences of digital transformation (Benitez et al., 2022; Gilli et al., 2023).

Thirdly, integrating knowledge about employees' personality profiles into change management policy can significantly increase the effectiveness of AI technology implementation. Employees with high levels of neuroticism require additional support (e.g., mentoring or a slower pace of change implementation), while extroverted and conscientious individuals can serve as change ambassadors or opinion leaders within teams. Personalising activities in this area strengthens employees' sense of purpose and agency in the transformation process (Saef et al., 2024).

Fourthly, the study's results are relevant to international organisations. Cultural differences influence how technology and leadership are perceived by employees in different countries. Consequently, organisations should communicate in a culturally sensitive manner, develop locally adapted AI implementation strategies, and select leaders in line with the management styles prevalent in a given cultural context (Budhwar et al., 2022; Hofstede et al., 2010).

8. Limitations of the study and directions for further research

Despite the valuable results obtained, this study has several limitations. First, a cross-sectional research design was used, which limits the possibility of causal inference. Although the SEM model enables the testing of complex relationships, it does not replace the evidence obtained from longitudinal or experimental studies (Hayes, 2013). In subsequent stages of the research, it would be worthwhile to use panel or quasi-experimental designs to track changes over time and lagged effects. Furthermore, the study was conducted in two countries, Poland and Spain, and although the sample was sufficiently large, it was geographically limited. In the future, it would be worthwhile to extend the analysis to countries with different cultural structures (e.g., Nordic countries, Asian countries, the Middle East) to test the generalisability of the results and to check which elements of the model are universal and which are culturally dependent (Schalk, Roe, 2007; Hofstede et al., 2010). Thirdly, the measurement of variables was based solely on declarative data. Although Harman's test did not reveal any threats to the common measurement method (Podsakoff et al., 2003), it would be worthwhile in the future to use three-source data, combining self-assessment, supervisor assessment and behavioural data (e.g. actual use of AI, performance assessments).

In future research, it is also recommended to extend the model with additional variables, including trust in AI, the quality of the supervisor-employee relationship (LMX), organisational identification, and the differentiation of psychological contract types (transactional, relational, ideological), in accordance with Rousseau's typology (2001). Another interesting direction could be to analyse the dynamics of the contract in the context of AI transformation, e.g. how employee expectations change in subsequent phases of implementation.

Future studies should employ longitudinal designs and multi-source data to capture changes in psychological contract perceptions over time and to reduce potential common method bias.

9. Summary

This article aimed to examine how the adoption of artificial intelligence affects the perception of the psychological contract among IT managers and to determine the role of digital leadership and individual personality traits in this process, taking into account the cultural conditions in Poland and Spain.

The results of the analyses confirmed most of the hypotheses and provided evidence that the adoption of AI is an important factor shaping organisational relationships in a highly digitised environment. At the same time, it was demonstrated that this effect is not uniform, but rather moderated by employees' personality traits and cultural diversity. The results

presented indicate that the implementation of artificial intelligence is becoming a key factor in shaping employee relations in the IT sector. This technology is not neutral, as it affects the way employees perceive their relationship with the organisation. However, at the centre of this process is the human being: the leader who explains the change and the employee who interprets it through the prism of their own personality and culture. It is this complex interaction of technology, leadership and individual differences that defines the new dynamics of the psychological contract in the era of digital transformation.

The findings of this study should be interpreted in light of its cross-sectional design. While the results reveal meaningful associations between AI adoption, digital leadership, personality traits, and psychological contract perceptions, they do not allow for strong causal inferences. Rather, the study identifies relational patterns that suggest how technological and leadership-related factors may jointly shape employees' interpretations of organisational obligations. Future research employing longitudinal or multi-source designs is necessary to examine how these relationships evolve over time and to establish the temporal dynamics of psychological contract formation in the context of AI-driven transformation.

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