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Acceptance of Generative AI in the creative industry: the role of UTAUT, brand recognition and trust in adoption

Aceptación de la Inteligencia Artificial Generativa en la industria creativa: el rol del modelo UTAUT, reconocimiento y la confianza de marca en su adopción

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Abstract: this study explores the factors influencing the adoption of Generative AI in the creative industry, focusing on the Unified Theory of Acceptance and Use of Technology (UTAUT) factors: performance expectancy, effort expectancy, facilitating conditions, social influence, and consumer-based brand equity factors: brand recognition and brand trust. While previous research has emphasized the importance of UTAUT constructs in technology adoption, the influence of brand equity factors remains underexplored. This study bridges this gap and provides insights to enhance adoption strategies. Standardized questionnaires were used, incorporating UTAUT constructs and brand-related variables such as Brand Recognition and Brand Trust. A sample of 208 creative professionals from the US and Spain validated the proposed model using PLS-SEM. Results reveal that performance expectancy, facilitating conditions, and brand trust positively influence the behavioral intention to use Generative AI tools, while brand recognition negatively influences behavioral intention. Social influence and effort expectancy did not present statistically significant results. The model explains 67 % of the variance in behavioral intention ($R^2 = 0.679$), indicating strong predictive power. These insights contribute to developing effective adoption strategies for Generative AI in the creative industry.

Keywords: Generative artificial intelligence, UTAUT, recognition, trust, creative industries, Adobe, brand equity, technology adoption.

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Resumen: el estudio explora los factores que influyen en la adopción de la inteligencia artificial (IA Gen) en la industria creativa, tomando como referencia la Teoría Unificada de Aceptación y Uso de Tecnología (UTAUT), y la teoría del capital de marca. Numerosos estudios han demostrado la capacidad explicativa del modelo UTAUT en la adopción tecnológica en diferentes sectores; sin embargo, no se había analizado cómo el capital de marca, especialmente el conocimiento y la confianza influye a la adopción de la Inteligencia Artificial Generativa. El capital de la marca es especialmente relevante en la industria creativa, donde el bajo conocimiento tecnológico hace que la marca de IA sea una fuente clave de información e influencia en la toma de decisiones. Una muestra de 208 profesionales creativos de EE. UU. y España validó el modelo propuesto utilizando PLS-SEM. Los resultados indican que la expectativa de rendimiento, las condiciones facilitadoras y la confianza en la marca influyen positivamente en la intención de uso de la IA Generativa, mientras que el reconocimiento de marca tiene un efecto negativo. La influencia social y la expectativa de esfuerzo no presentaron resultados estadísticamente significativos. El modelo explica el 67 % de la varianza en la intención de uso ($R^2 = 0.679$), indicando un alto poder predictivo. Se destaca la importancia del desempeño, soportes accesibles y confianza en la marca, abordando los desafíos de la percepción y reconocimiento de marca.

Palabras clave: Inteligencia Artificial Generativa, UTAUT, reconocimiento, confianza, industrias creativas, Adobe, capital de marca, adopción de tecnología.

Introduction

Currently, the creative industry is marked by the rapid changes in the wake of the digital revolution. The increased interaction of the creative sector with technologies has led to new forms of artistic expression (Abbasi *et al*., 2017). Through Generative Artificial Intelligence (Gen AI) we are experiencing transformative advancements, enabling unprecedented levels of efficiency, and creativity. Understanding the adoption criteria among professionals is crucial for the success of this innovation, especially in those industries that use it intensively. The creative sector is grounded in originality and the production of imaginative ideas, requiring human involvement. Gen AI is being integrated into creative workflows, offering potential benefits in productivity and time efficiency (Vinchon *et al*., 2023). The expanding role of Gen AI has prompted a research agenda to explore its impact on the creative workforce. Although we are witnessing the rise of Gen AI in 2024, one of the first takes on AI deployment in the creative sector took place in 2016. The Next Rembrandt was created, and the three-dimensional printed painting was produced only based on training data from Rembrandt's portfolio.

Figure 1
El Next Rembrandt

Note. Wunderman Thompson, 2016.

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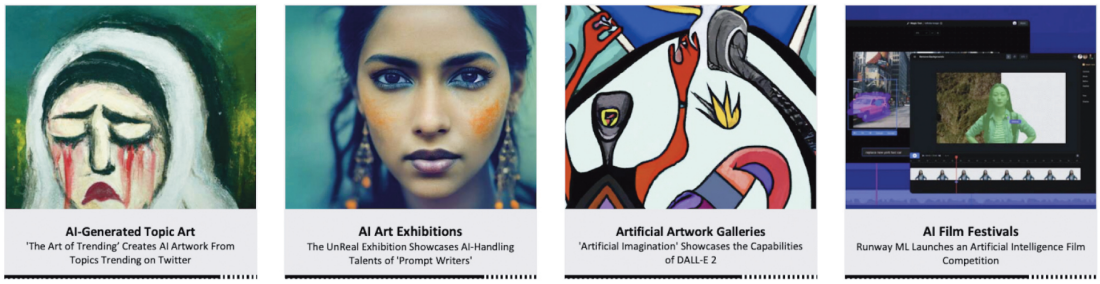
Gen AI adoption has increased exponentially since the launch of the Next Rembrandt. This is shown by embracing of AI art as a new discipline. With the boom of Gen AI-generated arts, galleries and curators are adapting by showcasing this art and their prompt writers. For example, The UnReal Exhibition, part of NSDM Fuse in Amsterdam showcases a wide variety of AI art and the prompt writers as artists, exploring the boundaries of creativity and the latest technology. Another gallery showcasing Gen AI art opened in December 2023 in New York. Artechouse- World of AI-Imagination is a captivating art installation blending human creativity and cutting-edge AI computer graphics (Artechouse, 2023). The Artechouse exhibition is built on the foundation of NVIDIA hardware and its generative AI tool. These exhibitions are a way to showcase the potential of Gen AI in the creative industry and tame its capabilities because AI is becoming an integral part of the artistic process (Smith, 2022). They satiate desires for new art forms while providing thoughtful discussion regarding art production and the meaning of creativity, providing a new perception of using Gen AI as a creative tool in the digital artistry era (Smith, 2022). The creative community embraces Gen AI in many ways, from content creation to streamlining tasks.

Figure 2
Examples of AI exhibitions



Note. Smith, 2022.

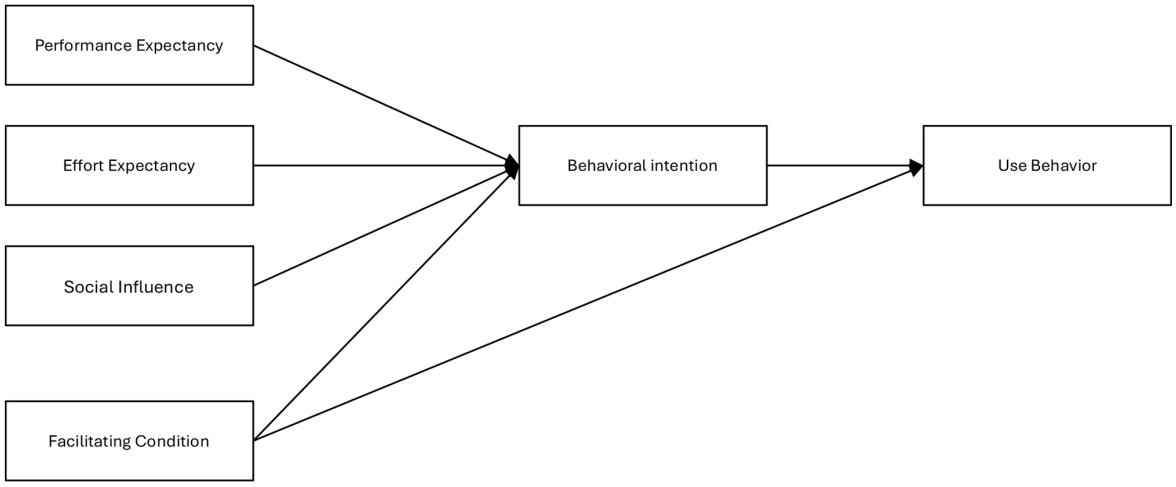
Figure 3
Artechouse-World of AI-Imagination, NewYork, 2023

As professionals in creative industries leverage Gen AI to streamline tasks and enhance their work, its adoption is growing (Sanchez, 2023). Research suggests that Gen AI could automate up to 26% of functions in the arts, design, entertainment, media, and sports sectors (Hatzius *et*

al., 2023). Similarly, other findings indicate that 75% of creative professionals consider Gen AI useful for tasks such as image editing and search, emphasizing its role as a facilitator rather than a creator (Anantrasirichai and Bull, 2022). Since the launch of ChatGPT, Gen AI has enabled original content creation using natural language prompts and has gained rapid prominence due to its user-friendly interfaces (Chui, 2023; Anantrasirichai and Bull, 2020). Amidst the growing adoption, ethical concerns arise. They are rooted in originality, authorship, and the potential for job displacement. As AI systems increasingly produce creative works, questions arise regarding ownership and can lead to ethical dilemmas and technology rejection (Chen, 2024; Caporusso, 2023). Addressing these concerns is crucial to foster the adoption. The Unified Theory of Acceptance and Use of Technology (UTAUT) model has become a useful framework for understanding and predicting the adoption of this technology (Yin *et al*., 2023, Menon and Shilpa, 2023, Cabrera-Sánchez, 2021). The UTAUT model integrates eight foundational theories, including the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), and Innovation Diffusion Theory (IDT). UTAUT considers four key factors; performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) (Venkatesh *et al*., 2003). According to this model, PE represents individuals' perceptions of the benefits and usefulness they expect to derive from using new technology, EE is defined as the degree of ease associated with the use of new technology, SI is the degree to which an individual perceives that significant others believe she or he should use the latest technology, and FC is the degree to which an individual believes that technological infrastructure exists to support the use of new technology (Venkatesh *et al*., 2003). Figure 4 presents the original UTAUT model.

Figure 4

Model of Unified Theory of Acceptance and Use of Technology



Note. Venkatesh *et al*., 2003.

UTAUT has been used to examine Gen AI adoption in various industries such as health and safety (De Almeida *et al*., 2023), financial services (Jiang *et al*., 2024), and lastly creative industries (Yin *et al*., 2023, Menon and Shilpa, 2023). The results highlight performance expectancy, effort expectancy, and social influence as significant predictors of Gen AI use, with no notable impact from facilitating condition (Yin *et al*., 2023; Menon and Shilpa, 2023; Cabrera-Sánchez, 2021). Despite its benefits, limitations of this technology, such as lack of authenticity and personal touch, remain concer-

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ns for users in the creative industry (Wang *et al*., 2023). However, most creative professionals view Gen AI as a tool to complement their skills rather than replace them, underscoring the importance of fostering understanding and acceptance (Yin *et al*., 2023). Yin *et al*. (2023) applied the UTAUT2 model, incorporating hedonic motivation, price value, and habit, while Zhang (2020) focused on music, examining factors like performance expectancy, effort expectancy, social influence, individual innovation, and perceived value. Notably, Zhang found that perceived innovativeness had the strongest impact on AI music adoption, followed by performance expectancy and effort expectancy. However, these findings are geographically constrained and fail to provide universal insights. The creative industry in Western cultures may demonstrate distinct patterns influenced by individualism, creative autonomy, and differing attitudes toward emerging technologies (Cabrera-Sánchez, 2021). As stated in the previous research behavioral intention, which determines the acceptance of AI use, can be attributed strongly to performance expectancy (Maican *et al*., 2023, Menon and Shilpa, 2023, Cabrera-Sánchez, 2021). effort expectancy (Zhang, 2020, Menon, Shilpa, 2023), facilitating condition (Menon and Shilpa, 2023), and social influence (Maican *et al*., 2023, Menon and Shilpa, 2023). The research showed that the impact of effort expectancy is more pronounced in cases of low creativity (Maican *et al*., 2023). While these studies enhance the UTAUT framework by incorporating variables such as user trust and emotional responses, they overlook additional factors that could support users in industries characterized by limited technological expertise.

Creative Industries often lack good knowledge of innovation, different levels of maturity, and lack of skills which presents a barrier to the rapid adoption of technology (Abbasi *et al*., 2017). This gap necessitates reliance on different ways to find reassurance of quality. In industries with limited technological knowledge, consumer-based brand equity is a substitute for direct quality evaluation. The confidence provided by brand factors supports decision-making and reduces uncertainty (Abbasi *et al*., 2017). Brand recognition and trust are essential components of consumer-based brand equity, shaping consumer behavior across the consumer journey. Brand recognition refers to the ability of consumers to recall or identify a brand within a product category. It progresses through three stages: recognition (aided awareness), recall (unaided awareness), and top-of-mind (preferred choice) (Kathuria *et al*., 2018). Strong brand recognition is crucial in the early stages of the consumer journey, where it ensures the brand's inclusion in consideration sets during the need recognition, information-seeking, and evaluation phases (García and Yábar, 2023). High recognition facilitates decision-making, fosters loyalty, and increases purchase intentions (Izza *et al*., 2024; Rubio *et al*., 2014). Brand trust builds upon recognition, representing confidence in a brand's ability to deliver on promises and meet expectations (García and Yábar,2023). Trust moderates risk perception, promotes customer commitment, and deepens emotional connections with a brand (Hess and Story, 2005). Trust is critical in service-based industries, where emotional evaluations and repeated positive interactions drive long-term relationships (Bowden, 2014). Both recognition and trust impact brand use. Recognition simplifies decisions by creating familiarity and positive associations (Rios and Riquelme, 2010). Trust reinforces loyalty by aligning brand values with consumers' values, fostering commitment, and reducing perceived risks (Roets *et al*., 2014).

This study seeks to address the research gap by investigating the role of brand-related factors in shaping the acceptance of Gen AI among individuals in creative industries, particularly to enhance quality assurance in sectors with limited technological expertise. This research is grounded in the UTAUT model because its validity has been proven in professional, business settings (Chatterjee *et al*., 2021; Zhang, 2020). It aims to address this gap by exploring how brand equity factors interact with established UTAUT constructs to shape user behavior and help creative professionals to adapt Gen AI effectively.

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Materials and methods

Theoretical model and hypotheses

Based on the research questions the following theoretical model and hypotheses for the study were established:

Performance expectancy

Performance expectancy is the degree to which an individual working in the creative industry believes that the Gen AI text-to-image tools will help him or her to attain gains in job performance. Gen AI tools can significantly impact workflows by automating repetitive tasks and enabling ideation or content creation. Previous studies showed that performance expectancy strongly predicts behavioral intention to use AI (Maican *et al*., 2023; Menon and Shilpa, 2023; Cabrera-Sánchez, 2021). Individuals are expecting that the use of AI technology will enhance their job performance (Yin *et al*., 2023). Hence, the hypothesis is structured as follows:

> *H1: Performance expectancy positively influences the increase of behavioral intention of use of the Generative Artificial Intelligence text to image service-based brand.*

Effort expectancy

Effort expectancy is the degree of ease associated with using Gen AI text-to-image tools by individuals working in the creative industry. Gen AI tools, while able to enhance work effectiveness, require user-friendly interfaces and intuitive usage to gain adaptation among new users. Previous studies confirm that effort expectancy positively impacts behavioral intention, especially in fields where complex or non-intuitive interfaces may deter regular use (Chuyen and Vinh, 2023). We believe that creative industry professionals prefer tools with minimized education effort (Bravo *et al*., 2020). The ease of using a new tool reduces barriers to adoption, making effort expectancy an important predictor in dynamic sectors, such as creative industry (Zhang, 2020; Menon and Shilpa, 2023). Hence, the hypothesis is structured as follows:

> *H2: Effort expectancy positively influences the increase of behavioral intention of using the Generative Artificial Intelligence text to image service-based brand.*

Social influence

Social influence is the degree to which an individual working in the creative industry perceives that people of importance believe he or she should use Gen AI text-to-image tools. Creative professionals might rely on external opinions from clients, coworkers, or industry leaders. Studies on AI adoption in the design industry demonstrated that individuals are likely to adopt such technologies if they perceive that influential peers or leaders endorse their use (Chuyen and Vinh, 2023). Additionally, other studies found that professionals in the music industry often adopt AI tools based on industry-wide trends, reflecting the impact of social influence on AI adoption (Maican *et al.*, 2023). Hence, the hypothesis is structured as follows:

> *H3: Social influence positively influences the increase of behavioral intention of use of the Generative Artificial Intelligence text to image service-based brand.*

Facilitating condition

Facilitating condition is the degree to which an individual working in the creative industry believes that the organization's technical infrastructure exists to support the use of Gen AI text-to-image tools. It encompasses the organizational, training, and technical support available to the user. Facilitating condition has been proven to improve the strategies that pro-

mote the acceptance of Gen AI (Menon and Shilpa, 2023). The availability of robust training and learning positively impacts user confidence, indicating that facilitating condition is a predictor of Gen AI adoption (Chuyen, Vinh, 2023). Hence, the hypothesis is structured as follows:

H4: Facilitating condition positively influences the increase of behavioral intention of use of the Generative Artificial Intelligence text to image service-based brand.

Brand recognition

Brand recognition is the ability of individuals working in the creative industry to recall the brand in a Gen AI text-to-image services category. Brand recognition is the first step in the consumer journey and the decision to start using a product (Sasmita and Suki, 2015). Moreover, consumers prefer to use only recognizable brands with a good performance history (Kathuria *et al.*, 2018). Therefore, the hypothesis is structured as follows:

H5: The more recognized the brand of Generative Artificial Intelligence text to image, the more positive influence it has on behavioral intention of use.

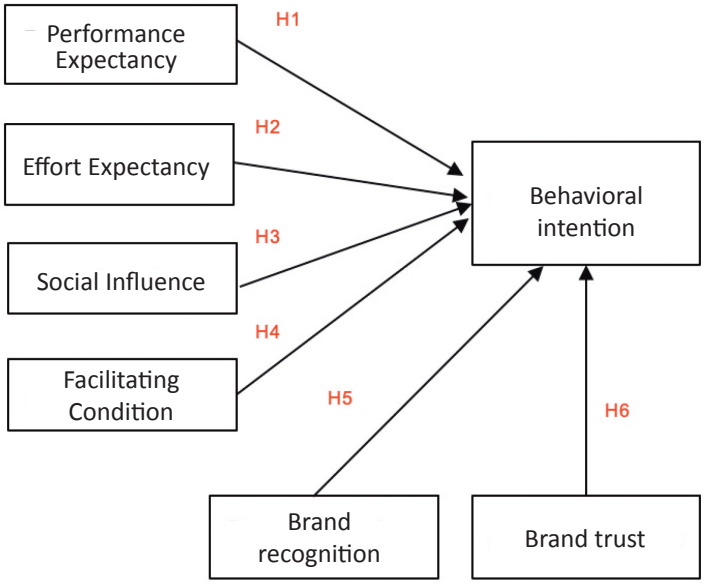
Trust of the brand

The trust of the brand is the confidence that individuals working in the creative industry have in the brand's ability to deliver on its promises. In previous studies we saw that trust in the ability of the AI tool to provide the best task performance and trust in compliance with the service promise are predictors of AI adoption (Cabrera-Sánchez, 2021). Additionally, satisfaction and service quality impacts positively on AI service adoption (Chatterjee *et al.*, 2021). Hence, the hypothesis is structured as follows:

H6: The more trusted the brand of Generative Artificial Intelligence text to image, the more positive influence it has on behavioral intention to use it.

Our theoretical model is presented in Figure 5:

Figure 5
Theoretical model and hypotheses



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Data collection

Hypotheses were validated using standardized Qualtrics questionnaire, adopting items suggested by Venkatesh *et al.* (2012) in Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. Additionally, two brand-related variables were introduced: brand recognition and brand trust adopting items suggested by Wang *et al* (2008), in *"Global brand equity model: combining customer-based with product-market outcome approaches"*. Adobe Firefly's text-to-image platform was specified as the subject for the consumer-based brand equity variables. The questionnaire comprised two sections: Sociodemographic (gender, age, place of residence, occupation- creative profile, experience with Gen AI) and factors influencing the use intention. Selected items for constructs of performance expectancy, effort expectancy, social influence, facilitating conditions, brand recognition, brand trust, and brand equity. Each construct consisted of 5 items, adapted from the original scales mentioned above. No pretest was conducted, as these items have been widely used and adapted by other researchers. Respondents evaluated each variable using a 7-point Likert scale (1: "Totally disagree" to 7: "Totally agree"). The study focused on a sample of individuals working in the creative industry in the US and Spain. The questionnaire was distributed through online creative communities using a survey link. The sample was randomly drawn from a creative collective of professionals in advertising, marketing, and other creative industries. This random selection aimed to minimize bias and enhance the generalizability of the findings. Following Westland (2010) and Soper (2024) conditions to perform PLS-SEM a total of 224 responses were collected and 208 were complete and valid responses. This number of responses provides us with an above the minimum sample size required for the model structure and the margin of error is less than 5% as desired.

Results and discussion

Data analysis

In the first instance, descriptive statistics of the sample were analyzed. The total sample of 224 has the following characteristics presented in Table 1. From the total sample, 208 were valid responses that serve as a base for the measurement model analysis.

Table 1
Description of the sample

Age	**Sample**	%
Less than 35	103	46
More than 35	121	54
Gender		
Female	93	41.5
Masculine	130	58
Prefer not to say	1	0.5
Place of residency		
Spain	104	46.5
USA	104	46.5
Others	16	7

Experience with Gen AI		
Yes	138	62
No	86	38
Experience with Gen AI text to image		
Yes	88	39
No	136	61

To validate the proposed model, the data was subjected to analysis using the Partial Least Squares (PLS) method. It allows the analysis of complex relationships between variables and puts them into practice (Hair *et al.*, 2017). The data was analyzed using the SmartPLS 4.0 software. The data analysis was structured into two key phases: assessing the measurement model and analyzing the structural model.

In the first phase, we assessed the measurement model's reliability and validity, by calculating Cronbach's Alpha (α), composite reliability (CR), and average variance extracted (AVE). Factor loadings (λ) were examined to determine individual item reliability, and discriminant validity was evaluated using the Fornell-Larcker criterion, ensuring that the square root of a construct's AVE exceeded its correlations with other constructs (Hair *et al.*, 2017). Additionally, we analyzed the individual validity for the formative construct- facilitating condition. A comprehensive literature review was performed to ensure the validity of the facilitating condition as a formative construct. Studies applying UTAUT to domains like education, mobile banking, and digital libraries consistently highlight that facilitating condition captures distinct enabling factors (e.g., technical and organizational support), justifying a formative specification (Sanmukhiya, 2020, Handayani, 2023). The value of convergent validity in Sanmukhiya's study confirms that facilitating conditions are measured effectively as a formative construct (Sanmukhiya, 2020). We assessed the multicollinearity using the Variance Inflation Factor (VIF), with values below the recommended threshold of 3 (Hair *et al.*, 2019). Outer weights and loadings were then evaluated to measure each indicator's contribution to the latent construct. Finally, discriminant validity was verified using the HTMT ratio. In the second phase, the structural model was analyzed using the bootstrapping technique to test the proposed hypotheses. This included estimating the significance of variable relationships through t-statistics, p-values, and path coefficients (β), leading to the study's conclusions.

Measurement model evaluation

First, the validity of all individual items from the original model was assessed. Outer loadings should ideally be 0.708 or higher (Bagozzi and Yi, 1988; Hair *et al.*, 2019). This indicates that the indicator explains at least 50% of the variance in the construct (since $0.708^2 \approx 0.50$). We use the theoretical model to validate the measurement model through PLS-SEM, focusing on assessing all latent variables for reliability and validity. Once validated we adjusted our measurement model shown in Figure 6.

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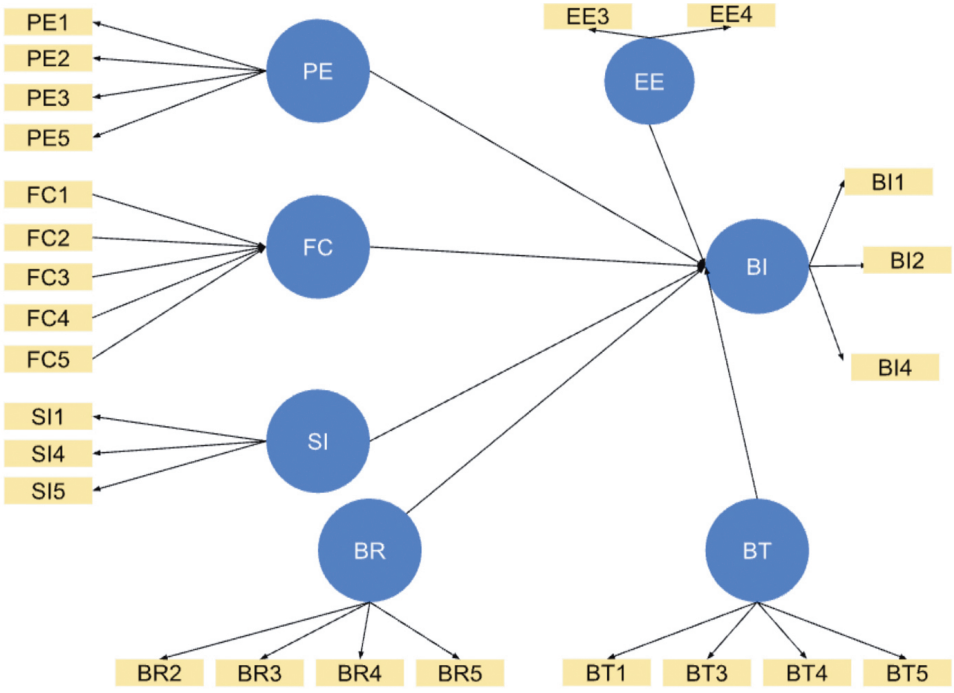
Figure 6
Measurement model



As shown in Table 2 the validity of the individual items was determined. All the outer loading for reflective constructs PE, EE, SI, BR, BT, and BI are well above 0.708, suggesting sufficient levels of indicator reliability. Only the outer loadings for FC don't meet the criteria because it is a formative construct. Composite reliability, indicating internal consistency, was deemed acceptable with all construct loadings exceeding the 0.7 threshold. Convergent validity, ensuring indicators measure the same concept, was evaluated using the AVE method. Following Fornell and Larcker's criteria of a minimum AVE value of 0.5, all constructs surpassed this threshold, indicating that each construct explains at least 50% of the variance in its indicators, demonstrated in Table 2.

Table 2
Overview of construct reliability and validity

	Outer loading		Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
PE	PE1	0.908	0.905	0.917	0.906	0.709
	PE2	0.842				
	PE3	0.900				
	PE5	0.877				
EE	EE3	0.899	0.775	0.776	0.775	0.633
	EE4	0.908				

	Outer loading		Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	AVE
PE	PE1	0.908	0.905	0.917	0.906	0.709
	PE2	0.842				
	PE3	0.900				
	PE5	0.877				
SI	SI1	0.820	0.768	0.786	0.760	0.520
	SI4	0.827				
	SI5	0.824				
BR	BR2	0.863	0.919	0.933	0.917	0.738
	BR3	0.909				
	BR4	0.892				
	BR5	0.920				
BT	BT1	0.880	0.906	0.914	0.902	0.700
	BT3	0.874				
	BT4	0.873				
	BT5	0.902				
BI	BI1	0.909	0.872	0.876	0.874	0.698
	BI2	0.914				
	BI4	0.854				

A discriminant validity test was performed using the Fornell-Larcker criterion and Heterotrait-Monotrait Ratio. Table 3 shows the results, notably, the correlations between the constructs are lower than the square root of the AVE, indicating that each construct shares more variance with its indicators than with any other constructs in the model. Consequently, all six reflective constructs exhibit strong internal consistency and convergent validity.

Table 3

Discriminant validity- Fornell-Larcker Criterion and Heterotrait-Monotrait ratio (HTMT)

	Fornell-Larcker criterion					Heterotrait-monotrait ratio (HTMT)					
	PE	**EE**	**SI**	**BR**	**BT**	**PE**	**EE**	**SI**	**BR**	**BT**	**BI**
PE	0.842										
EE	0.637	0.795				0.639					
SI	0.711	0.517	0.721			0.713	0.515				
BR	0.324	0.340	0.474	0.859		0.332	0.332	0.494			
BT	0.337	0.287	0.512	0.809	0.837	0.347	0.285	0.532	0.827		
BI	0.892	0.613	0.679	0.290	0.384	0.890	0.612	0.669	0.288	0.382	

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The assessment of the formative construct started by assessing multicollinearity for the FC variable using the VIF, with values below the recommended threshold of 3 (Hair *et al.*, 2019), confirming no critical multicollinearity issues as demonstrated in Table 4. Outer weights and loadings were then evaluated to measure each indicator's contribution to the latent construct. While 4 of 5 indicators showed strong contributions (loadings > 0.5), FC1 displayed low contribution but was retained for conceptual importance. Bootstrapping confirmed that 4 indicators were statistically significant ($p < 0.05$).

Table 4
Multicollinearity evaluation - VIF

	VIF
FC1	1,022
FC2	1,314
FC3	1,280
FC4	1,223
FC5	1,127

Finally, discriminant validity was verified using the HTMT ratio, which fell within acceptable thresholds, validating the construct as shown in Table 5.

Table 5
Heterotrait-Monotrait ratio

	01.PE	02.EE	03.SI	04.FC	05.BR	06.BT	08.BI
01.PE							
02.EE	0.639						
03.SI	0.713	0.515					
04.FC	0.577	0.620	0.509				
05.BR	0.332	0.332	0.494	0.333			
06.BT	0.347	0.285	0.532	0.377	0.827		
08.BI	0.890	0.612	0.669	0.608	0.288	0.382	

Structural model evaluation

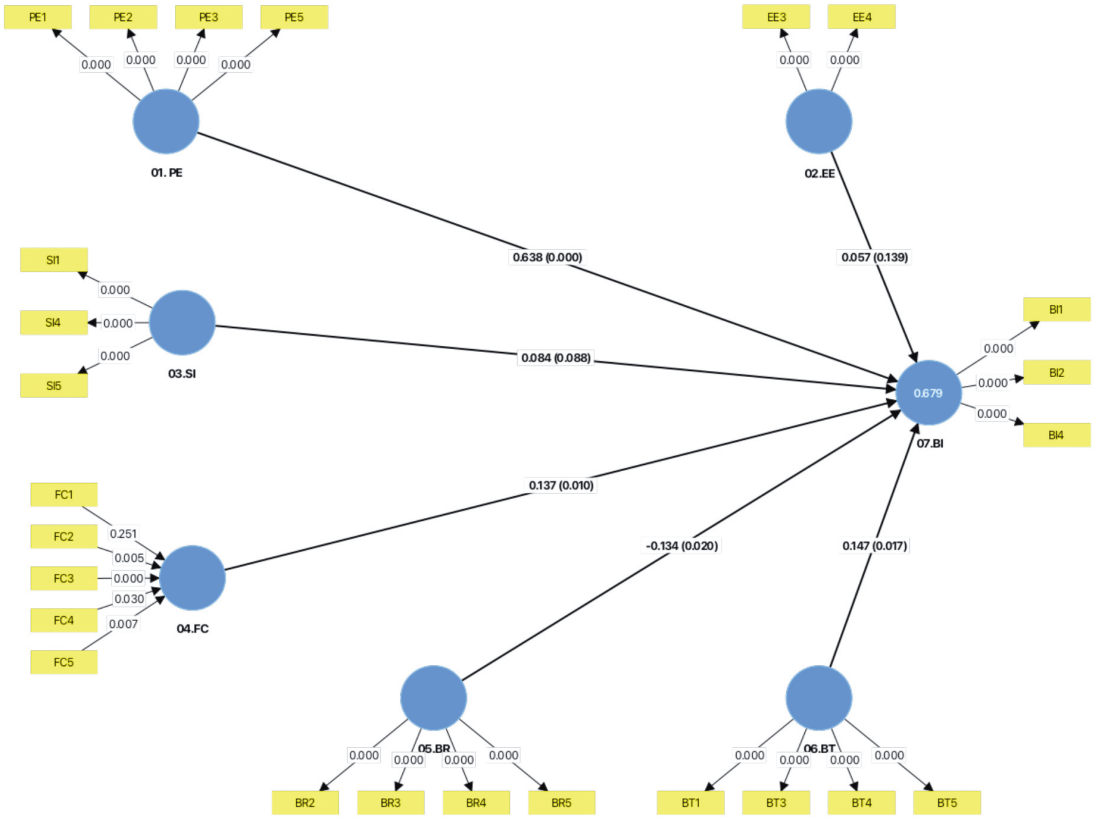
The model was assessed by obtaining path coefficients, p-values, T-values, Coefficient of determination (R2), and predictive relevance (Q2). Path coefficients of Performance Expectancy and Behavioral Intention of use of Gen AI text to image (H1), Facilitating Condition and Behavioral Intention of use of Gen AI text to image (H4), Brand Recognition and Behavioral Intention of use of Gen AI text to image (H5), and Brand Trust and Behavioral Intention of use of Gen AI text to image (H6) were 0.638, 0.137, -0.134, 0.147 with p-values 0.000, 0.011, 0.019, 0.017 respectively. Table 6 presents the path coefficients along with their corresponding p-values. Four path coefficients are statistically significant out of the six hypothesized relationships, thereby supporting four of the six proposed hypotheses.

Table 6
Path coefficients

Model R^2=0,679 (67%)		Model Q^2 = 0,649 (64%)	
	Path coefficients	**P Values**	**Support**
H1: PE ->BI	0.638	0.000	H1 accepted
H2.EE -> BI	0.057	0.139	H2 rejected
H3 SI ->BI	0.084	0.088	H3 rejected
H4 FC ->BI	0.137	0.010	H4 accepted
H5. BR ->BI	-0.134	0.020	H5 partially accepted
H6.BT ->BI	0.147	0.017	H6 accepted

As indicated in Table 6 (R^2), the model accounts for 67% of the variance in Behavioral Intention to use Gen AI text-to-image services in creative industries, driven by the factors of Performance Expectancy, Facilitating Condition, Brand Recognition, and Brand Trust. Performance Expectancy is identified as the strongest predictor ($\beta = 0.638$, $p < 0.001$). According to established thresholds for explained variance, this effect can be classified as moderate, suggesting that the model provides a substantial explanation of the variation in users' intentions to adopt the technology.

Figure 7
Final structural model with Path coefficients, p values and R square



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The Q^2 value of 0.649 presented in Table 6, indicates that the model has substantial predictive relevance for Behavioral Intention. Values of Q^2 greater than zero suggest that the model has predictive power, and a value of 0.649 implies a strong ability of the model to predict BI based on the predictors used.

Discussion

This study aimed to identify the primary factors influencing the adoption of Gen AI text-to-image tools in the creative industry, extending the UTAUT model by incorporating Brand Recognition and Brand Trust. The findings highlight Performance Expectancy as the strongest predictor of Behavioral Intention, with Facilitating Conditions and Brand Trust also showing positive influence. However, Brand Recognition has a negative influence on Behavioral Intention, potentially due to Adobe's established brand identity in traditional creative services conflicting with its new generative AI offerings. Effort Expectancy and Social Influence show no significant influence, resulting in four out of six hypotheses being supported.

The findings align with existing literature on technology adoption, particularly the predictive power of Performance Expectancy (Maican *et al.*, 2023; Upadhyay *et al.*, 2022) and Facilitating Condition in behavioral intention (Anantrasirichai and Bull, 2020). It reinforces Performance Expectancy as the strongest predictor of Behavioral Intention to adopt Gen AI tools. Creative professionals increasingly see value in Gen AI tools that enhance productivity and workflows, aligning with previous research (Maican *et al.*, 2023; Menon and Shilpa, 2023). For professionals in the creative industry Performance Expectancy is the most significant adoption driver. Emphasizing how Gen AI tools streamline workflows, enhance efficiency, and improve output quality is critical, particularly in high-pressure environments. Facilitating Conditions, such as resource availability, external support, and hardware compatibility (Anantrasirichai and Bull, 2020), also positively impact adoption. Comprehensive support systems and resources allow creatives to navigate the learning curve, develop new skills, and remain competitive in a rapidly evolving industry. Tools that offer robust support and align with professional goals are more likely to succeed. However, Effort Expectancy and Social Influence showed no significant effect on Behavioral Intention, which contradicts previous research where these factors were found to positively influence Behavioral Intention (Alhwaiti, 2023; Maican *et al.*, 2023; Menon and Shilpa, 2023; Upadhyay *et al.*, 2022). Previous studies confirm that Effort Expectancy has a positive impact on behavioral intention, especially in fields where complex or non-intuitive interfaces may deter regular use (Chuyen and Vinh, 2023). Similarly with social influence, studies on AI adoption in the design industry demonstrated that individuals are more likely to adopt such technologies if they perceive that influential peers or leaders endorse their use (Chuyen and Vinh, 2023). Additionally, other studies found that professionals in the music industry often adopt AI tools based on the industry-wide trends, reflecting the impact of Social Influence on AI adoption (Maican *et al.*, 2023).

When it comes to consumer-based brand equity, it provides reassurance of quality in industries with limited specialized knowledge. The confidence provided by brand factors supports decision-making and reduces uncertainty (Abbasi *et al.*, 2017). Familiarity with the brand increases the chance to engage with its AI offerings, especially when talking about new, non-renewed technologies (Cabrera-Sánchez *et al.*, 2021). However, our findings suggest a contrary relationship within the context of Adobe's Gen AI text-to-image tools. Individuals familiar with Adobe as a brand were less likely to adopt these tools. This finding contradicts prior research which generally supports a positive association between brand recognition and behavioral intention to use a new product (García and Yábar,2023, Izza *et al.*, 2024). This suggests that strong brand associations with traditional creative tools may create resistance toward adopting Gen AI solutions. Future stu-

dies should explore this phenomenon further, potentially incorporating qualitative research to understand the cognitive biases and brand perceptions affecting adoption. Our research, focusing on the Adobe Firefly, suggests that this negative influence might stem from misalignments between the parent brand's established identity and the new product offering (Hem *et al.,* 2003).

For Adobe the negative influence of Brand Recognition on the behavioral intention to use Gen AI tools might stem from the lack of authenticity in the generative AI field. Gen AI is an emerging and nascent field, therefore when the new technology is attached to a well-established brand in another field, these new tools might appear as a non-secure deviation from the brand's core. Familiarity with a reputable brand like Adobe can paradoxically increase scrutiny and raise expectations for new products. While Brand Recognition negatively influences adoption, likely due to misalignment between established brand identity and new product offerings, Brand Trust mitigates this barrier. Trusted brands alleviate concerns about data security, reliability, and output quality, fostering sustained use and loyalty. Professionals prefer tools from brands they trust, which reduces perceived risks and encourages long-term adoption. Our findings corroborate these insights, demonstrating that Brand Trust has a positive, significant relationship with Behavioral Intention to use Gen AI text to image. Users who trusted Adobe as a Gen AI text-to-image service provider were likely to adopt and engage with this service. Prior research also demonstrates that trust in a brand has a positive influence on Behavioral Intention when the users trust the brand behind the technology to fulfill its promises and offer a positive user experience (Ameen *et al.,* 2021).

Additionally, there is a risk that Gen AI technology may be perceived as overshadowing human creativity, leading to a decline in adoption (Caporusso, 2023). However, trusted brands could help mitigate these negative perceptions and foster a more positive view of Gen AI's contribution to creative fields.

From a brand management perspective, marketing strategies should emphasize performance benefits and align brand communications with user expectations. Sub-branding can address misalignment by differentiating AI services from traditional offerings, as seen in Adobe's case. Building Brand Trust through ethical practices, partnerships with industry influencers, and transparent messaging can further enhance adoption, ensuring Gen AI integrates seamlessly into creative workflows.

The methodology employed in this research offers several strengths and limitations that must be considered. The use of PLS-SEM provided robust validation of the research model, ensuring reliability and validity of findings. However, the sample selection process, which relied on online surveys targeting creative professionals in Spain and the US, may have introduced selection bias. The sample size only slightly exceeded the required minimum to apply the PLS-SEM statistical technique. Additionally broader representation across different creative sectors and geographical regions would strengthen generalizability. Investigating how different creative disciplines (e.g., design, advertising, filmmaking) engage with Gen AI could yield more nuanced insights. Second, no multigroup analysis was performed, leaving a research gap in understanding differences between groups based on age, gender, place of residence, or prior experience with Gen AI. This suggests a direction for further research. Another limitation is the representativeness of the sample within the broader creative industry. Although random sampling was used, the sample is skewed towards creative direction and content creation, with limited diversity in creative profiles in music, or writing. This may impact the generalizability of the findings. Future studies should also examine how brand fit and perceived AI ethics influence adoption, given the growing discourse around ethical AI practices. Methodologically, employing experimental designs to test causality or conducting longitudinal studies to assess evolving perceptions over time could further

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enrich the understanding of Gen AI adoption trends. Another limitation relates to brand fit: Adobe was chosen as the primary subject for brand factors. However, the results indicated a negative influence of Brand Recognition on Behavioral Intention. This suggests that selecting different brands for future studies may help generalize findings. Additionally, further research could expand the measurement model by incorporating other consumer-based brand equity variables, such as Brand Loyalty and Perceived Quality. It could benefit from understanding specific users' expectations and branding aspects that are not aligned with their perception. Despite these limitations, this study provides a foundation for advancing theoretical and practical insights into the adoption of Gen AI in the creative industries. While this focus provides valuable insights into how AI tools are adopted in creative fields, this may not fully capture the views of professionals in other sectors with less familiarity with AI.

Conclusions

In conclusion the study contributes to the growing body of knowledge on Gen AI adoption in the creative industries, by offering a nuanced understanding of the influences of Consumer Based Brand Equity factors. The findings highlight that Performance Expectancy and Facilitating Conditions significantly drive adoption, while Brand Trust also plays a crucial role. Interestingly, Brand Recognition negatively impacted adoption, suggesting that strong associations with traditional creative tools may create resistance to Gen AI.

While Gen AI service-based brands are gaining traction in the market, the academic landscape is still developing a robust framework to help understand the adoption process and mitigate the barriers. This research contributes to the growing body of evidence on Gen AI adoption, particularly in the creative industry. The study also provides practical implications for both professionals in the creative industry and brand managers of AI service-based brands. From a practical perspective, these insights help creative professionals, AI developers, and policymakers understand key adoption drivers and barriers. For the empirical field, this research contributes by extending the UTAUT framework with brand-related constructs, offering a novel perspective on technology acceptance in creative industries. Future research can build on these findings by exploring industry-specific variations, cross-cultural differences, and the evolving role of AI ethics in adoption decisions. This research lays the foundation for future studies on Gen AI adoption and offers insights that could guide both theoretical advancements and practical strategies for promoting AI tools in creative industries.

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Factors affecting auditors' decisions to adopt Big Data analytics: a mixed method study

Factores que influyen en la adopción del análisis de Big Data por los auditores: un estudio mixto

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Abstract: the purpose of this study is to investigate the primary research question: To what extent do perceived ease of use (PEOU) and perceived usefulness (PU) explain auditors' behavioral intentions (BI) to adopt big data analytics (BDA) in auditing firms in Palestine? A mixed-method approach was employed, combining quantitative data from a census survey of 94 auditors at the Big Four accounting firms in Palestine (achieving an 86 % response rate) with qualitative data from semi-structured interviews conducted with 9 auditors at the managerial level or higher. This methodological integration enhanced the validity and reliability of the research findings. The results demonstrated that PU significantly and directly impacts auditors' intentions to adopt BDA, while PEOU also influences BI, though to a lesser extent. The study validated the applicability of the Technology Acceptance Model (TAM) in the auditing profession and addresses the research gap on BDA adoption in developing economies. Findings highlight perceived usefulness as the key driver and suggest that improving ease of use could further boost adoption. Practical implications include training for firms, supportive policies from regulators, and user-friendly solutions from technology providers. By offering insights for resource-constrained environments, this study guides BDA adoption in auditing for both academia and industry

Keywords: audit transformation, behavioral intentions, big data analytics, perceived ease of use, perceived usefulness, technology acceptance model, Palestine, Big Four.

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Resumen: el objetivo de este estudio es analizar: ¿En qué medida la percepción de facilidad de uso (PEOU) y la percepción de utilidad (PU) explican las intenciones conductuales (BI) de los auditores para adoptar el análisis de grandes datos (BDA) en firmas de auditoría en Palestina?. Se utilizó un enfoque mixto, combinando datos cuantitativos de una encuesta censal a 94 auditores de las cuatro grandes firmas en Palestina (tasa de respuesta del 86 %) con datos cualitativos de entrevistas semiestructuradas a nueve auditores en niveles gerenciales o superiores. Esta integración metodológica fortaleció la validez y confiabilidad de los resultados. Los hallazgos mostraron que la PU influye significativamente en las intenciones de adopción de BDA, mientras que la PEOU tiene un impacto menor pero relevante. El estudio confirmó la aplicabilidad del Modelo de Aceptación Tecnológica (TAM) en la profesión de auditoría y aborda la brecha de investigación sobre la adopción de BDA en economías en desarrollo. Los hallazgos destacan que la percepción de utilidad es el principal impulsor y sugieren que mejorar la facilidad de uso podría aumentar aún más la adopción. Las implicaciones prácticas incluyen capacitación para las firmas de auditoría, políticas de apoyo por parte de los reguladores y soluciones de BDA accesibles y fáciles de usar para los proveedores de tecnología. Al ofrecer *insights* adaptados a entornos con recursos limitados, este estudio orienta la adopción de BDA en auditoría, beneficiando tanto a la academia como a la industria.

Palabras clave: transformación de la auditoría, intenciones de comportamiento, Big Data Analytics, percepción de facilidad de uso, percepción de utilidad, modelo de aceptación tecnológica, Palestina, los Cuatro Grandes.

Introduction

In today's data-driven world, the exponential growth of data production presents both challenges and opportunities for organizations worldwide. One approach to harnessing this vast volume of information is through the adoption of big data analytics (BDA) technologies, which enable organizations to process large datasets, identify meaningful patterns, and improve overall efficiency (Bumblauskas *et al.*, 2017). While BDA is widely adopted in large organizations across developed economies, companies in developing countries, such as Palestine, often struggle to implement and utilize these advanced analytics tools effectively. Limited resources, infrastructure constraints, and shortages of skilled personnel pose significant barriers to adoption in these regions (Dagilienė and Klovienė, 2019; Abu Al Rob *et al.*, 2024b). Understanding these unique challenges is essential to exploring how BDA might be more effectively leveraged in developing contexts, where its potential impact on organizational performance and decision-making is substantial.

Organizations often struggle to leverage data effectively to meet their goals due to a shortage of personnel with the necessary analytical skills. Even large firms, including the Big 4 auditing firms, face challenges in introducing BDA for their auditors and make them implies it in their work. (Dagilienė and Klovienė, 2019; Abu Al Rob *et al.,* 2024a). In regions like Palestine, the transformation from the traditional audit approach to a BDA technique represents a significant challenge for the Big 4 firms seeking to implement BDA successfully (Abu Al Rob *et al.*, 2024a). Although existing literature has thoroughly examined the technology acceptance model (TAM) and BDA, there is still a lack of research on how perceived ease of use (PEOU) and perceived usefulness (PU) impact auditors' intentions to adopt BDA within Big 4 auditing firms operating in developing contexts like Palestine.

This study is grounded in the TAM as its theoretical framework. Olufemi (2018) noted that TAM is widely used by researchers to understand the factors influencing individuals' decisions to adopt new technologies. Empirical studies have consistently shown a positive relationship between TAM constructs, which helps explain users' acceptance and use of innovative technologies (Brock and Khan, 2017; Verma *et al.,* 2018). According to Olufemi (2018), TAM primarily focuses on a user's intention to use technology, rather than the broader organizational processes involved in adoption. This makes TAM particularly relevant for exploring auditors' decisions to adopt BDA in Big 4 firms in Palestine, where unique economic and infrastructure challenges may further influence their adoption behavior.

Although previous research has explored the adoption of BDA and the TAM in various contexts, most studies have focused on developed economies and fields other than auditing

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(Brock and Khan, 2017; Shahbaz *et al.*, 2019; Verma *et al.*, 2018). Additionally, research indicates that organizations in resource-limited settings, such as those in developing countries, face substantial barriers to adopting BDA, including infrastructure constraints, skills shortages, and organizational resistance (Abu Al Rob *et al.,* 2024a; Olufemi, 2018). However, limited research explores how these factors influence auditors' BI to adopt BDA within Big 4 firms in developing regions.

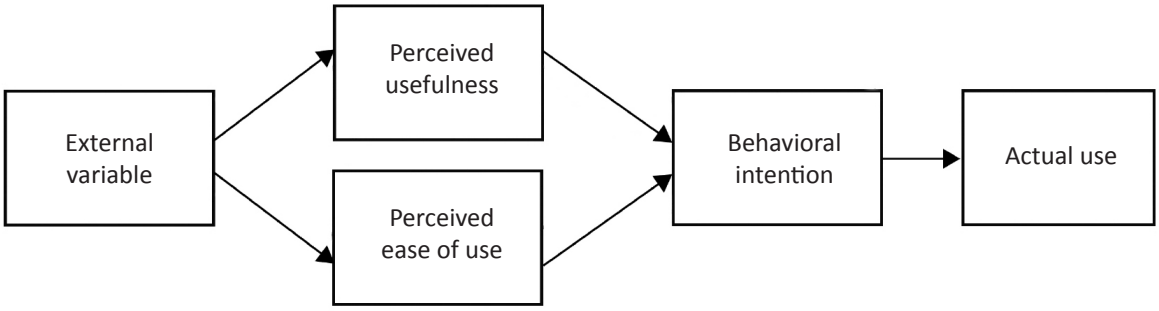
Despite BDA's benefits in auditing, its adoption in developing economies remains underexplored, particularly among Big 4 auditors in Palestine. Research on PU and PEOU's impact on BI in resource-constrained settings is also scarce. This study addresses these gaps, offering insights that contribute to technology acceptance literature and the practical implementation of BDA in auditing firms.

The findings of this study are relevant to researchers, auditors, and auditing firms seeking to understand the factors influencing BDA adoption in auditing. For Big 4 auditors, leveraging BDA can transform raw data into actionable insights (Müller and Jensen, 2017). However, many auditors remain hesitant due to challenges like resource constraints and skills shortages (Abu Al Rob *et al.,* 2024a; Dagilienė and Klovienė, 2019; Verma, 2018). This reluctance poses risks for firms, as delayed adoption of innovative technologies could impact competitiveness in an increasingly data-driven industry.

Literature review

As depicted in Figure 1, the TAM framework posits that external variables influence PU and PEOU, which in turn impact BI and, ultimately, actual usage (Davis and Venkatesh, 1996). This theoretical model provides a foundation for understanding user acceptance of technology, making it highly applicable for studying technology adoption in various contexts.

Figure 1
Technology Acceptance Model (TAM)



Note. Davis and Venkatesh (1996, p. 20).

TAM and technology adoption

While multiple models exist to examine technology acceptance, TAM has gained importance for its robustness and reliability in explaining user attitudes and behaviors across diverse fields (Davis *et al.*, 1989; Verma *et al.,* 2018; Demoulin and Coussement, 2020; Grimaldo and Uy, 2020). For example, Chopdar *et al.* (2018) explored factors affecting mobile shopping app adoption, emphasizing the influence of perceived privacy and security risks on adoption decisions across cultural contexts, particularly in India and the USA. Their findings highlighted that while core constructs of the Unified Theory of Acceptance and Use of Technology

(UTAUT) like performance expectancy and effort expectancy are significant predictors of BI, cultural differences alter the impact of perceived risks.

Numerous studies have expanded TAM by integrating additional factors to gain deeper insights into BI. For instance, Ofori and Appiah-Nimo (2019) included perceived cost and risk in their study on online shopping behavior, finding that cost savings and security concerns significantly impact user intention. Similarly, Ajibade (2018) noted that TAM's simplicity contributes to its widespread application in organizational settings, observing that employees' intentions to use technology are shaped by PU and PEOU, as well as personal and professional motivations for success.

Overall, a substantial body of research has validated BI as a central TAM factor in predicting technology adoption, with Cronbach's alpha consistently confirming the reliability of TAM variables across diverse studies (Mei and Aun, 2019; Tarabasz and Poddar, 2019; Hossain *et al.*, 2020). Davis and Venkatesh (1996) proposed that external variables significantly impact PU and PEU, which in turn affect users' adoption decisions, a finding supported by subsequent research (Tarabasz and Poddar, 2019; Davis *et al.,* 1989).

Big Data Analytics and the technology acceptance model

Interest in the adoption of BDA has grown substantially, with numerous studies addressing the benefits and challenges associated with BDA implementation (Olufemi, 2018; Brock and Khan, 2017; Verma *et al.,* 2018). Research on BDA adoption often emphasizes the importance of selecting an appropriate theoretical framework to assess adoption behavior (Ajibade, 2018; Demoulin and Coussement, 2020). Despite various barriers to BDA adoption, studies consistently highlight the value of BDA for organizations across industries and economies (Lutfi, 2022).

Bumblauskas *et al.* (2017) argued that BDA enhances an organization's capacity to mitigate risks by leveraging large volumes of data from diverse sources. They emphasized the importance of adopting technologies capable of storing, managing, visualizing, and analyzing data to transform it into actionable knowledge. Similarly, Brock and Khan (2017) noted that TAM provides insights into users' motivations for adopting BDA, although it does not fully account for practical considerations in system adoption.

Olufemi (2018) criticized TAM for its limitations in addressing contextual factors such as cost, management support, and organizational culture, all of which impact technology adoption intentions. Experience and familiarity with BDA have also been identified as significant factors; for instance, Muller and Jensen (2017) found that organizations with prior BDA experience report higher confidence in using such technologies. Alyoussef and Al-Rahmi (2022) studied BDA adoption in education, recommending guidelines for educators to foster students' BI toward BDA in multi-sector programs, thus advancing digital evolution in academic settings.

Gangwar (2020) developed a research framework that combines TAM with the Task-Technology Fit (TTF) model to examine BDA's impact on organizational performance. This integrated model, tested on a sample of 523 organizations in India, revealed that factors such as technology fit, organizational fit, and task compatibility significantly influence BDA adoption. Gangwar concluded that adoption intentions are strongly linked to task-technology alignment, highlighting the need for organizations to manage PU and PEOU through targeted data strategies and employee satisfaction initiatives.

While BDA adoption has been studied across sectors, limited research explores its use in Big 4 auditing firms in developing economies. Additionally, despite TAM's extensive application, the impact of PU and PEOU on auditors' BI in resource-constrained settings

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remains untested. This study fills this gap by providing empirical evidence from Palestine, offering insights for both academia and industry.

Big data analytics in auditing

The application of BDA in auditing is a growing area of research, driven by BDA's potential to enhance business insights and improve decision-making processes (Adrianto, 2018). BDA is increasingly used in financial reporting and accounting, with professionals adopting it to improve analytical capabilities and align with complex accounting standards (İdil and Akbulut, 2018). This trend reflects a shift toward real-time data processing, enabling companies to better capture and analyze financial activities.

Dagilienė and Klovienė (2019) examined the role of BDA in external auditing, emphasizing its importance for analyzing non-financial data and supporting regulatory compliance. They noted that factors such as competition and regulatory requirements drive BDA adoption in auditing, although high costs and limited competencies restrict its use to larger audit firms. Effective application of BDA requires user-friendly visualizations and real-time reporting capabilities, which challenge traditional auditing methods. Eilifsen *et al.* (2020) conducted an exploratory study on data analytics adoption among large public accounting firms, finding that data analytics implementation in auditing is still in its early stages. Their findings reveal thet although data analytics in auditing enhances audit quality, its use is limited by regulatory constraints and the absence of a mandate for advanced data analytics tools. For data analytics in Auditing to become widely adopted, it must be integrated into audit firms' processes, supported by training, and endorsed by regulators. No *et al.* (2019) explored BDA's application for fraud detection and substantive testing in auditing. Their study suggests that BDA can improve audit accuracy by analyzing 100% of journal entries, thereby enhancing audit quality. However, implementing BDA also requires auditors to adapt to new technologies and conduct comprehensive evaluations to ensure audit objectives are met.

Hypothesis development

Building on the literature regarding the impact of PU and PEOU on BI to adopt BDA in auditing, as well as other findings presented in the literature review, we propose hypotheses H1 and H2 in response to the set research questions.

Main Research Question: Do PEU and PU influence auditors' BI to adopt BDA tools within the audit process?

The above research question is then divided onto two sub-questions: To what extent PU explains auditors' BI to adopt BDA in auditing? and to what extent PEOU explains auditors' BI to adopt BDA in Big 4 auditing firms?

The literature supports the notion that PU and PEOU significantly impact users' intentions to accept and utilize a specific technology (Davis and Venkatesh, 1996). This intention, in turn, drives the actual adoption and use of the technology (Diop *et al.*, 2019). Within the TAM, PU and PEOU are widely regarded as the most influential variables in shaping users' intention to adopt technology in practice (Davis and Venkatesh, 1996). Several studies underscore the importance of understanding how PU and PEOU affect technology adoption behaviors (Al Amin *et al.*, 2020; Cabrera-Sánchez and Villarejo-Ramos, 2020; Olufemi, 2018). For example, Grimaldo and Uy (2020) concluded that users' perceptions of a technology's usefulness and ease of use are directly related to their intention to adopt that technology. BI, understood as a user's intention to engage in certain behaviors in the future, is a strong predictor of actual technology adoption, indicating that a positive intention to use a technology often leads to its actual usage (Shahbaz *et al.*, 2019).

Based on these findings, as well as insights from the literature review regarding the effects of PU and PEOU on BI, we propose the following hypotheses:

H1: PU has a positive effect on the BI to adopt BDA tools in the audit process.

H2: PEOU has a positive effect on the BI to adopt BDA tools in the audit process.

The literature underscores PU and PEOU as key drivers of technology adoption within TAM. However, few studies examine these factors among Big 4 auditors in developing economies like Palestine. To fill this gap, this study uses a mixed-methods approach, integrating quantitative and qualitative data for a comprehensive analysis of auditors' BDA adoption intentions. The next section details the methodology, including statistical analysis and in-depth interviews.

Materials and methods

This study employs a mixed-methods approach, combining quantitative and qualitative research methods in alignment with Creswell's framework (2009) to provide a comprehensive understanding of auditors' perspectives. The research begins with a quantitative phase, utilizing questionnaires to statistically analyze the relationships between variables related to the TAM and BDA (Khaldi, 2017). Data will be collected from auditors employed by the Big Four auditing firms in Palestine, aiming to address the study's research questions. This quantitative approach allows for correlation analysis, examining variable relationships without altering respondent behavior, although causation cannot be implied (Glasofer and Townsend, 2020).

Following the quantitative phase, the study incorporates a qualitative component through semi-structured interviews with nine auditors who also participated in the questionnaire phase. This qualitative phase provides deeper insights and context for the quantitative findings, using thematic analysis to interpret the data (DiCicco-Bloom and Crabtree, 2006; Braun and Clarke, 2006).

Sampling techniques

The study's target population consists of auditors from the Big Four auditing firms operating in Palestine. The decision to focus exclusively on the Big Four firms is based on their advanced use of data transformation and strategic application of BDA in auditing, in contrast to smaller audit firms that have yet to adopt emerging BDA practices (Li and Lai, 2011; Dagiliene and Kloviene, 2019).

A census approach was adopted, selecting the entire population as the sample to enhance data accuracy and eliminate sampling errors, particularly valuable in studies with smaller populations (Levy and Lemeshow, 2013). Initially, 105 auditors from the Big Four firms were included in the sample; however, those with less than one year of experience were excluded to ensure participants had adequate professional exposure, resulting in a final sample of 94 auditors. The questionnaire yielded an 86% response rate from the targeted auditors.

For the qualitative phase, interview participants were selected from among those who had completed the questionnaire and held managerial positions or higher. This selection aimed to gather insights on BDA adoption from auditors with significant decision-making roles. Out of the 26 eligible managers and partners, nine agreed to participate in the semi-structured interviews, enriching the depth of the qualitative analysis.

Measurement development

The research questionnaire is divided into three sections, comprising a total of 14 items, in addition to demographic information. The first section contains 6 items that measure the PU of BDA. The second section contains 6 items that assess the PEOU of BDA The last two items is related to the behavioral intention independent variable. This section utilizes Davis's (1989) measurement scales, with specific items allocated to PU (C.1.1 to C.1.6) and PEOU (C.2.1 to C.2.6). Although Davis's original TAM did

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not include behavioral intention as a construct, this study incorporates behavioral intention based on Davis and Venkatesh's (1996) extended TAM, using two items (C.3.1 and C.3.2) to measure auditors' intentions to adopt BDA. To provide a clearer understanding of how the study variables are measured, the operationalization of each theoretical construct in the structural model is presented in Table 1. This table outlines the items used for each construct, providing a detailed view of the measurement instruments employed in the study.

Table 1

Operationalization of study variables and corresponding measurement items

Reflective constructs	Instrument items	N.º of ítems	Source
PU	• Using big data analytics tools in my job would enable me to accomplish tasks more quickly. • Using big data analytics tools would improve my job performance. • Using big data analytics tools in my job would increase my productivity. • Using big data analytics tools would enhance my effectiveness on the job. • Using big data analytics tools would make it easier to do my job. • I would find big data analytics tools useful in my job.	6	(Davis, 1989)
PEU	• Learning to operate big data analytics tools would be easy for me. • I would find it easy to get big data analytics tools to do what I want them to do. • My interaction with big data analytics tools would be clear and understandable. • I would find big data analytics tools to be flexible to interact with. • It would be easy for me to become skillful at using big data analytics tools. • I would find big data analytics tools easy to use.	6	(Davis, 1989)
BI	• Assuming I had access to big data analytics tools, I intend to use them. • Given that I had access to big data analytics tools, I predict that I would use them.	2	(Davis y Venkatesh, 1996)

To supplement the quantitative findings, the study employs a semi-structured interview approach in the qualitative phase. This method enables a richer understanding of complex issues, allowing auditors to provide in-depth insights into the core research topics related to BDA adoption and professional skepticism (DiCicco-Bloom and Crabtree, 2006). Qualitative data from semi-structured interviews were analyzed using thematic analysis (Braun and Clarke, 2006). After transcription, initial coding identified key concepts, which were grouped into broader themes aligned with research objectives. An iterative process ensured accuracy in reflecting auditors' perceptions of BDA adoption.

To reduce bias, auditors with varying expertise levels were included, and follow-up questions clarified whether perceptions stemmed from experience or industry views, ensuring a balanced representation.

Bias control

Several measures ensured validity and reliability by minimizing bias. Selection bias was reduced through census sampling of all eligible auditors. Response bias was controlled with anonymous, self-administered surveys. Social desirability bias was mitigated using neutral wording and confidentiality assurances. Measurement bias was minimized with validated scales (Davis, 1989; Davis and Venkatesh,

1996) and a pilot test for clarity. These steps enhance the study's accuracy and reliability.

Results and discussion

Analysis of questionnaires

To achieve the research objectives and test the proposed hypotheses, this study utilized SMARTPLS 4 software. Path analysis, a component of Structural Equation Modeling (SEM), was employed as the primary statistical method. This study uses Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis. While CB-SEM is suited for theory testing with large samples, PLS-SEM is preferred for exploratory research, smaller samples, and predictive modeling (Hair *et al*., 2019). Given the under-researched nature of BDA adoption among auditors in developing economies, PLS-SEM's flexibility and suitability for complex models make it the appropriate choice.

Measurememt model assessment

The assessment of the measurement model is essential for estimating the relationships between latent variables and their observed indicators, with a primary focus on evaluating reliability, internal consistency, and validity. This is especially relevant for reflective constructs such as the dimensions of the TAM; namely, PU, PEOU, and behavioral intention. Table 2 presents the results of the measurement model, evaluated through three key metrics: item loading, convergent validity (assessed via Average Variance Extracted, AVE), and internal consistency (measured by Composite Reliability, CR).

According to Hair *et al.* (2019), CR values exceeding 0.708 indicate sufficient reliability. Item loadings should also exceed the threshold of 0.708 to confirm construct validity. Additionally, an AVE value greater than 0.50 is required to validate the applicability of each construct (Fornell and Larcker, 1981). The results of the measurement model, as shown in Table 2, indicate that item loadings for the constructs ranged from 0.839 to 0.977. Furthermore, each construct demonstrated a CR value above 0.951, reflecting high internal consistency. The AVE for all constructs also exceeded the threshold of 0.5, confirming their convergent validity. Discriminant validity was assessed to ensure that each construct is distinct from the others, which is crucial for the uniqueness of measurement instruments across different factors. This was confirmed by verifying that the square root of the AVE for each construct was greater than the correlations among the constructs (Fornell and Larcker, 1981).

Table 3 provides the results based on the Fornell-Larcker criterion, confirming compliance with this discriminant validity requirement. Additionally, discriminant validity was further evaluated using the heterotrait-monotrait ratio (HTMT) of correlations, as recommended by Ab *Hamid et al.* (2017). An HTMT value below 0.90 is generally considered acceptable, indicating adequate discriminant validity, while values above this threshold suggest otherwise. The HTMT test results are shown in Table 4, with all values falling below the 0.90 threshold, thereby confirming the model's discriminant validity.

Table 2

Reflective constructs measurement properties

Reflective constructs	Construct items	Items loading	CR	AVE	Reference
PU	C.1.1	0.930	0.971	0,874	Davis (1989)
	C.1.2	0.964			Davis (1989)
	C.1.3	0.949			Davis (1989)
	C.1.4	0.947			Davis (1989)

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Reflective constructs	Construct items	Items loading	CR	AVE	Reference
	C.1.5	0.900			Davis (1989)
	C.1.6	0.920			Davis (1989)
PEOU	C.2.1	0.868	0.951	0.804	Davis (1989)
	C.2.2	0.904			Davis (1989)
	C.2.3	0.943			Davis (1989)
	C.2.4	0.923			Davis (1989)
	C.2.5	0.899			Davis (1989)
	C.2.6	0.839			Davis (1989)
BI	C.3.1	0.976	0.976	0.954	Davis and Venkatesh (1996)
	C.3.2	0.977			Davis and Venkatesh (1996)

Table 3
The measurement model discriminant validity- Fornell-Larcker criterion

Constructs	BI	PEOU	PU
BI	0.977		
PEOU	0.633	0.897	
PU	0.713	0.712	0.935

Table 4
Heterotrait-monotrait (ratio HTMT)

Construcciones	BI	PEOU	PU
BI	-		
PEOU	0,661	-	
PU	0,739	0,738	-

Descriptive statistics

The descriptive analysis provides an overview of the numerical data collected, laying the groundwork for further interpretation. This analysis primarily examines the mean and standard deviation for each construct under study. Presenting these statistical measures allows for the identification of constructs with the highest and lowest mean values, highlighting variations in respondents' perceptions. The primary goals of this analysis are twofold: first, to determine the central tendency of responses, as indicated by the mean values; and second, to assess the variability within the dataset, as represented by the standard deviation. A lower standard deviation reflects a high level of consensus among respondents, indicating strong agreement with a particular statement. In contrast, a higher standard deviation suggests a wider range of opinions, reflecting differing views on the same statement (Hair *et al.*, 2019).

For this study, a 7-point Likert scale was used, where a score of 7 indicates strong agreement and a score of 1 represents strong disagreement. Table 5 provides the calculated mean and standard deviation for each construct, offering insight into respondents' overall tendencies and the consistency of their responses.

Table 5
Descriptive statistics on each component scale

Component	Mean	Standard Deviation	Level
PU	5.42	1.02	High
PEOU	5.16	0.94	High
BI	5.44	1.07	High

Table 5 reveals that, on average, all 3 constructs evaluated among auditors employed at Big Four auditing firms in Palestine received high ratings, with an overall mean score of 5.34. Each construct scored within the high range, with mean values ranging from 5.16 for the PEOU construct to 5.44 for the PU construct.

Evaluation of the structural model

Henseler *et al.* (2009) categorize acceptable values for the coefficient of determination (R^2) as follows: R^2 values of 0.67 or higher are considered substantial, values between 0.33 and 0.67 are classified as moderate, and values ranging from 0.19 to less than 0.33 are deemed weak.

Table 6
Results of Coefficient of Determination R^2 Analysis

Component	R square	R square adjusted
BI	0.539	0.527
PEU	0.622	0.591
PU	0.706	0.678

As shown in Table 6, the R^2 adjusted values provide insights into the explanatory power of the model concerning various constructs. For BI, the adjusted R^2 value is 0.527, indicating that 52.7% of the variance in BI is explained by the predictor variables. PEOU has an adjusted R^2 value of 0.591, suggesting that 59.1% of its variance is accounted for by the predictors. Finally, PU shows an adjusted R^2 value of 0.678, which means that 67.8% of the variance in PU is explained by the predictor variables. These adjusted R^2 values reflect the robustness of the model in explaining the variances in the respective constructs despite the adjustments for the number of predictors.

Hypothesis testing

For hypothesis testing, path coefficients were utilized to evaluate the hypothesized relationships. The analysis followed the approach recommended by Hair *et al.* (2019), employing the bootstrapping technique to generate reliable estimates. The results, presented in Table 7 and Figures 2 and 3, include numerical data for beta coefficients, standard deviations, and p-values based on a two-tailed test.

The results, presented in Table 7 and Figures 2 and 3, include numerical data for beta coefficients, standard deviations, and p-values based on a two-tailed test. As shown in Table 7, and figures 2 and 3, the hypothesis testing results reveal significant insights into the relationships among the variables. Hypothesis H1, which posits a relationship between PU and BI, is strongly supported with a beta coefficient of 0.715, a t-value of 9.650, and a p-value of 0.000. This indicates a statistically significant positive association between PU and BI. Similarly, H2, which proposes a link between PEOU and BI, is also supported, with a beta coefficient of 0.640, a t-value of 6.157, and a p-value of 0.000. These

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findings confirm the hypothesized relationship between PEOU and BI, albeit with a smaller effect size compared to H1.

Table 7
Result of the hypothesis testing

	Hypothesis	Path coefficient	T statistics	P values	Accepted/ rejected
H1	Perceived Usefulness -> Behavioral Intention	0.715	9,650	0.000	Accepted
H2	Perceived Ease of Use -> Behavioral Intention	0.640	6,157	0.000	Accepted

Figure 2
Model Fit Estimation Using the Bootstrapping Procedure (PU – BI)

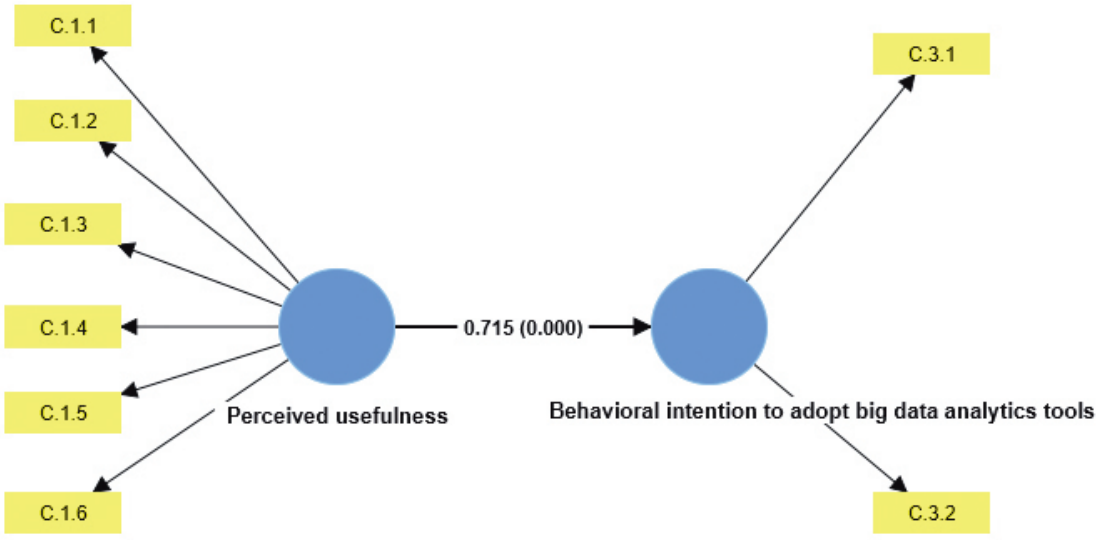
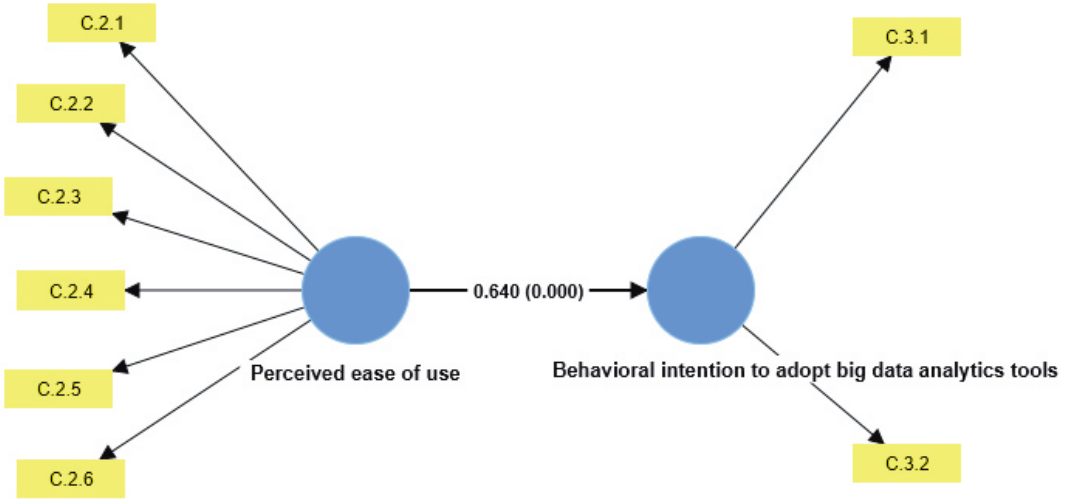


Figure 3
Model Fit Estimation Using the Bootstrapping Procedure (PEOU – BI)



Interview analysis

The second phase of this study involved semi-structured interviews with external auditors at the managerial level or above (managers to partners), who had also participated in the questionnaire phase (nine auditors). This qualitative phase aimed to deepen the understanding of the quantitative findings, particularly regarding how PU and PEOU impact the BI of BDA adoption in auditing. Additionally, it explored the factors influencing BDA adoption and its evolving role in modern auditing practices. The qualitative analysis revealed several key themes, shedding light on the auditors' perceptions of BDA integration into their work. These themes also provided further explanation for the quantitative results and highlighted the practical challenges and opportunities associated with BDA adoption.

Perceived usefulness

A major theme emerging from the interviews was the significant influence of PU on auditors' intention to adopt BDA technologies. The interviewees consistently highlighted the practical benefits of BDA, including enhanced audit quality, efficiency, and strategic insights.

Enhanced Audit Capabilities: BDA was seen as a transformative tool that improves audit processes by enabling more efficient analysis of large datasets. For instance, Auditor 6 shared, "We extensively utilize BDA for risk assessment, transaction testing, and fraud detection. This approach enables us to efficiently analyze large datasets, identify patterns, and focus on areas with higher risks, thereby contributing to improved audit quality." Similarly, Auditor 3 emphasized that BDA tools "allow us to analyze vast datasets more efficiently, leading to more accurate and insightful audit results."

Strategic Decision-Making: Several auditors highlighted how BDA supports better decision-making and risk identification. Auditor 8 explained, "The insights gained from BDA allow us to make more informed decisions, identify risks more effectively, and offer more strategic advice to our clients." This demonstrates that PU extends beyond efficiency, influencing the value-added services that auditors can provide to clients. These qualitative insights align with the quantitative results, where PU significantly impacted BI ($\beta = 0.715$, $p < 0.001$). This confirms that auditors are more likely to adopt BDA when they perceive clear benefits like enhanced efficiency and fraud detection.

Perceived use of use

The ease of using BDA tools also influenced adoption, with PEOU linked to user-friendliness, system integration, and training effort. Survey results showed a positive PEOU rating (mean = 5.16) but a weaker effect on BI than PU. Interviewees reinforced that while ease of use matters, perceived usefulness remains the stronger motivator.

Ease of Integration: Auditors noted that tools that integrate seamlessly with existing systems are more likely to be adopted. For example, Auditor 8 stated, "Tools which are user-friendly and integrate well with our existing systems are more readily adopted." This emphasizes the importance of ensuring that BDA tools do not disrupt existing workflows.

Learning Curve and Simplicity: Tools that require minimal training or effort to use were seen as more appealing. Auditor 9 explained, "If it is easy to use, it will increase my intention to adopt." Similarly, Auditor 4 observed, "The simpler the BDA tools are, the more likely they are to be perceived as useful and be fully utilized." These comments highlight that the ease of use directly impacts adoption rates, particularly among auditors who are less familiar with advanced technologies.

The evolving role of BDA in Auditing

The interviewees expressed a strong belief in the growing importance of BDA in the auditing field. Several auditors described BDA as a

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cornerstone of modern auditing practices, particularly in dynamic markets such as Palestine.

Increasing Integration: BDA is becoming more widely integrated into auditing workflows, particularly for larger clients or industries with extensive datasets. Auditor 7 noted, "BDA became a critical function within the audit of banks and insurance clients starting in 2021 and forward."

Future Potential: Many auditors anticipated that BDA would continue to evolve and play an increasingly central role in auditing. Auditor 9 shared, "BDA is fast becoming a cornerstone in modern auditing practices. As these technologies advance, I expect they will become more integrated into our everyday auditing practices, further enhancing our ability to provide high-quality, insightful audit services."

Analysis of the results

The primary research question and sub-questions and their related hypotheses served as a basis for determining the relationship between PU, PEOU, and auditors' BI to adopt BDA in developing countries such as Palestine. Path analysis confirmed that PU has a stronger influence on BI than PEOU, a finding reinforced by qualitative insights. Interviewees noted that while ease of use is beneficial, BDA's perceived usefulness in enhancing efficiency and accuracy is the key adoption driver. They also highlighted the need for better training and integration, which, though not measured quantitatively, could impact long-term adoption. These findings support TAM's predictions while suggesting that contextual factors may also shape adoption decisions.

Sub question 1 examined the relationship between PU and auditors' BI to adopt BDA. According to Davis (1989) PU is defined as the degree to which an individual believes that using a system will enhance their job performance. The path analysis revealed that PU was a strong and statistically significant predictor of BI. As a result, the hypothesis related to Sub-question 1 was supported. The positive relationship between PU and BI indicated that higher levels of PU were associated with an increased intention to adopt BDA. These findings suggest that PU is the most influential factor for auditors when deciding whether to adopt BDA in developing countries such as Palestine.

Sub question 2 addressed the relationship between PEOU and auditors' BI to adopt BDA. According to Davis (1989), PEOU reflects an individual's belief that a system will be easy to learn and require minimal effort to use. The path analysis revealed a significant correlation between PEOU and BI, leading to the acceptance of Sub-question 2's hypothesis. However, the findings indicate that PEOU is not a primary factor for auditors when deciding whether to adopt BDA in developing countries such as Palestine. Among the two independent variables in the TAM, PU demonstrated a stronger statistical significance than PEOU in predicting BI.

The interview phase provides rich insights into the factors influencing BDA adoption, as well as its perceived benefits and challenges. The findings suggest that PU and PEOU are critical determinants of BDA adoption, with client characteristics and task specificity also playing a role. However, barriers such as data compatibility and industry-specific constraints highlight the need for continued innovation and support to enhance the adoption of BDA tools. Overall, the interviews confirm that BDA is becoming an indispensable component of modern auditing, offering transformative benefits that are expected to grow in significance over time.

The findings provide practical insights for audit firms adopting BDA. Since PU is the strongest predictor of adoption, firms should emphasize its benefits, such as risk assessment, fraud detection, and efficiency, through training, case studies, and pilot projects. As PEOU also influences BI, firms should ensure user-friendly tools, seamless software integration, and ongoing technical support. Addressing barriers like cost and expertise gaps through gradual adoption, partnerships, and upskilling can further drive adoption, enhancing audit effectiveness in a data-driven environment.

While PU and PEOU significantly influence adoption, these perceptions may evolve. With increased familiarity, ease-of-use concerns may decline, while new challenges like data security, cost, and regulations may arise. Advancements in AI and automation could also reshape perceived usefulness, altering adoption drivers. Future research should examine these shifts and identify emerging factors influencing long-term adoption.

Interpretation of the results

This study's findings highlight th*et al*l participating auditors from Big 4 firms in Palestine had prior knowledge of or experience with BDA, suggesting positive perceptions of the technology, which may have influenced their BI to adopt it. User attitudes have been shown to shape perceptions and BI (Dixit and Prakash, 2018). While the TAM is widely regarded as the leading framework for studying technology adoption, alternative models have also been utilized (Davis *et al.,* 1989; Verma *et al.,* 2018; Demoulin and Coussement, 2020; Grimaldo and Uy, 2020). The TAM, adapted from the Theory of Planned Behavior (TPB) and the Theory of Reasoned Action (TRA), has been found to predict actual behavior more effectively than its predecessors (Davis, 1989). However, as Diop *et al.* (2019) cautioned, BI does not always translate into actual adoption.

Examining the interview responses from auditors working in Big Four firms in Palestine offers valuable perspectives on their adoption of BDA tools in auditing processes. These insights are particularly relevant when viewed through the lens of the TAM.

The questionnaire results confirm that PU positively influences BI to adopt BDA. Interviewees reinforced this, noting that while PU drives adoption, practical barriers such as cost and efficiency concerns can limit implementation.

This aligns with TAM's proposition that PU significantly shapes users' attitudes and intentions toward adopting technology (Davis, 1989; Brock and Khan, 2017). Furthermore, the interviewees' responses resonate with findings from Grimaldo and Uy (2020), who demonstrated a positive and direct correlation between PU and the intention to use technology. The potential of BDA tools to enhance business insights and improve decision-making processes further supports this positive relationship (Adrianto, 2018). PEOU also emerged as a significant factor influencing the adoption of BDA. Interviewees noted that BDA perceived as easy to use and flexible would likely encourage auditors to adopt them due to their efficiency and time-saving benefits. Conversely, if the BDA are perceived as complex, auditors may be reluctant to use them.

These findings support TAM's assertion that PEOU influences BI (Davis, 1986). The interviewees' observations are also consistent with prior studies emphasizing PEOU's importance in shaping technology adoption behaviors (Al Amin *et al.,* 2020; Cabrera-Sánchez and Villarejo-Ramos, 2020; Olufemi, 2018).

Conclusions

The findings of this study have important implications for auditors in Big 4 firms operating in developing countries, particularly in Palestine. In today's competitive environment, large organizations increasingly rely on BDA to enhance decision-making, efficiency, and market position. However, auditors have been slow to adopt BDA due to nuclear adoption criteria and various implementation challenges (Abu Al Rob *et al.,* 2024b; Olufemi, 2018). Understanding factors like PEOU and PU provides valuable insights for practitioners, helping them overcome adoption barriers. If auditors in large firms fail to adopt BDA, they risk falling behind in a profession that increasingly depends on data-driven insights. This study reinforces TAM's applicability in auditing by focusing specifically on PEOU and PU, isolating them from external influences.

From a practitioner's perspective, the findings indicate that auditors' perceptions stron-

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gly influence their intention to adopt BDA. The results confirm TAM as an effective model for measuring technology adoption in BDA and auditing within Palestine. Hypothesis testing and interview findings suggest that auditors value BDA's ability to simplify tasks and enhance performance, making it crucial for audit firms to emphasize these benefits to encourage adoption. The study also found that PEOU had less impact on auditors' BI than PU, indicating that ease of use alone is not a decisive factor unless auditors perceive BDA as beneficial. As PU increased, so did auditors' intention to adopt BDA, reinforcing the idea that perceived usefulness is the primary motivator. Auditors in large firms who recognize the practical benefits of BDA are more likely to adopt and utilize the technology. This relationship between usefulness and adoption aligns with the growing trend of organizations implementing BDA (Bumblauskas *et al.*, 2017; Dagilienė and Klovienė, 2019; Abu Al Rob *et al.*, 2024a).

This study supported the TAM by identifying significant relationships between PEOU, PU, and BI to adopt BDA. However, its focus on auditors from Big Four firms in Palestine limits the generalizability of the findings to other contexts. Additionally, the study only examined two TAM variables (PEOU and PU), excluding external factors like self-efficacy or training, which may also influence BDA adoption. Finally, relying solely on the TAM framework may have overlooked insights th*et al*ternative theories could provide for understanding technology adoption in auditing.

The study found that PEOU and PU significantly influenced auditors' BI to adopt BDA. However, it recommended that future research broaden the scope to include auditors from different regions and sectors, incorporate additional external variables (e.g., self-efficacy or training) to better understand factors influencing BI, and explore alternative frameworks like the Unified Theory of Acceptance and Use of Technology (UTAUT) to provide deeper insights into technology adoption in auditing. Moreover, Long-term BDA adoption may be influenced by regulatory changes and technological advancements beyond PU and PEOU. As firms integrate data analytics, future research should assess whether auditors' perceptions of usefulness remain stable or evolve. Practical implications include training investments for firms, supportive policies from regulators, and user-friendly solutions from technology providers.

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Financial inclusion and Fintech: catalysts for the Sustainable Development Goals in Latin America

Inclusión financiera y Fintech: catalizadores de los Objetivos de Desarrollo Sostenible en América Latina

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Abstract: fintech are critical players in the inclusive digitalization of finance, helping to reduce inequality by providing access to a range of financial services that banks do not normally serve. They thus contribute to financial inclusion as a fundamental factor for sustainable development. The aim of the study is to assess how financial inclusion and Fintech growth contribute to the achievement of the sustainable development goals in Latin America. A quantitative approach is employed with a descriptive-correlational and longitudinal scope. It works with evidence based on information from six Latin American countries with the highest nominal GDP in US$ (Argentina, Brazil, Chile, Colombia, Mexico, Peru). The data analysis method used is Pearson's correlation. The overall SDG index and the individual indices of SDG 2, SDG 7, SDG 9, SDG 16 and SDG 17 are significantly, positively and with a large effect size associated with the study variables on financial inclusion in Latin America. Examining the SDG9 Index in depth, it is the most statistically significant of all the SDG indices with related variables, both in terms of financial inclusion and in terms of measuring the Fintech ecosystem. This work contributes to promoting further research on the SDGs achievement, financial inclusion, and Fintech development in Latin America.

Keywords: 2030 Agenda, correlation, financial inclusion, Fintech, indexes, Latin America, Sustainable Development Goals, sustainability.

Resumen: las Fintech son actores esenciales para la digitalización inclusiva de las finanzas ayudando a reducir la desigualdad al brindar acceso a variados servicios financieros que los bancos normalmente no atienden y aportando así a la inclusión financiera como factor fundamental para el desarrollo sostenible. El propósito del estudio es evaluar si la inclusión financiera y el crecimiento Fintech contribuyen al logro de los objetivos de desarrollo sostenible en Latinoamérica. El diseño de investigación es cuantitativo, descriptivo correlacional en su alcance y de corte longitudinal. Se trabaja con evidencia basada en información de seis países del ámbito latinoamericano con mayor PIB nominal en US$ (Argentina, Brasil, Chile, Colombia, México, Perú). El método de análisis de datos utilizado es la correlación de Pearson. El índice general de los ODS y los índices individuales del SDG2, SDG7, SDG9, SDG16 y SDG17 están asociados significativa, positivamente y con un tamaño del efecto grande con las variables de estudio sobre inclusión financiera en América Latina. Analizando en profundidad el Índice SDG9, es de todos los índices por ODS el que mayor relevancia estadística ha tenido con una gran cantidad de variables relacionadas, tanto de inclusión financiera como de medición del ecosistema Fintech. Este trabajo contribuye a promover nuevas investigaciones sobre la relación entre la inclusión financiera el desarrollo Fintech y el cumplimiento de los ODS en América Latina.

Palabras clave: Agenda 2030, correlación, Fintech, inclusión financiera, índices, Latinoamérica, Objetivos de Desarrollo Sostenible, sostenibilidad.

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Introduction

Financial inclusion focused on access to useful and affordable financial products that meet the needs of individuals and businesses in a responsible and sustainable manner, is a crucial element in addressing today's global challenges including inequality, poverty, environmental degradation, peace, prosperity and justice, being a central axis in achieving the Sustainable Development Goals (SDGs) (Demirguc-Kunt *et al*., 2022).

The 17 SDGs, with their respective 169 targets, were established by the United Nations (UN), through the United Nations Development Program (UNDP) and the 2030 Agenda, valid over fifteen years and involving one hundred and ninety-three countries from all over the planet (Orzes *et al*., 2018). With the emergence of the 2030 Agenda during September 2015, it was considered important that the global population be able to access a broader level of financial services in order to directly impact the fulfillment of at least seven SDGs: SDG1 End of Poverty, SDG2 Zero Hunger, SDG3 Health and Well-being, SDG5 Gender Equality, SDG8 Decent Work and Economic Growth, SDG9 Industry, Innovation and Infrastructure, and ODS10 Reduction of Inequalities (Deloitte, 2021; UNSGSA, 2023).

In turn, tech-finance startups – Fintech – essential players in the inclusive digitization of finance, help reduce inequality by providing access to a variety of financial services and reaching out to groups and geographic areas that banks typically do not serve. Thousands of people can pay, collect, save and invest without having an institutionalized bank account thanks to these entities that provide new sources of services in order to accelerate the adoption of sustainable business models, thus contributing to the achievement of the SDGs and financial inclusion (Arner *et al*., 2020).

Sustainable Development Goals - SDGs

Due to the globalization of business, technological advances, fierce competition for natural resources, and growing awareness of climate change, all sectors of the economy are expected to participate in the development of solutions and in the provision of a global response to these problems (Salvia *et al*., 2018), so the UN 2030 Agenda was created with the purpose of aligning international cooperation to achieve ambitious and quantitative objectives that help countries move towards a sustainable development model, taking into account the three main dimensions of the sustainable model: economic development, social inclusion and environment. The SDGs, which were outlined in order to protect the planet, ensure peace and prosperity and eliminate poverty for all the people of the world without discrimination, are therefore broader in scope than that proposed in the previous Millennium Development Goals (MDGs), challenging national governments to align their goals with what the community requests around sustainable development (Orzes *et al*., 2018).

The study by Confraria *et al*. (2024) has linked the SDGs that countries distinguish as priorities with those to which the greatest research and development resources have been contributed in order to improve them, with SDG1, SDG2 and SDG9 being the ones that stand out in a sample of 125 countries. Works like that of Boto-Álvarez and García-Fernández (2020) investigate the voluntary disclosures of certain countries and their help to achieve the SDGs, from a macroeconomic perspective, considering the government actions carried out. In this line, Sachs *et al*. (2017) studied the SDGs and their respective achievements in Latin America and the Caribbean, finding that insecurity and violence are the most important challenges at the Latin American level, as well as improvements in education and health systems.

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Financial Inclusion

Developing countries have the highest proportion of the world's unbanked population and lower levels of financial inclusion than developed countries (Dupas *et al.*, 2018). Financial inclusion is a key element in solving today's global challenges and is established as the quest for all economic actors to have access to and be able to use formal financial services effectively, which has become a public policy priority after the global financial crisis. It is a concept that is constantly evolving, constructed and debated and whose development and measurement can be analyzed and promoted from different perspectives.

Multiple studies have sought to operationalize and measure financial inclusion through selected indicators and indices. Various authors (Gautam *et al.*, 2022; Wang Tok and Heng, 2022) consider the "access" dimension of financial inclusion using variables obtained based on financial service providers, considering the number of ATMs each certain distance or population density, number of bank branches per adult or per kilometer, internet penetration, among other elements. When assessing financial inclusion under this approach, the contribution of digital financial inclusion is left aside (Khera *et al.*, 2022; Tay *et al.*, 2022), which has been enhanced with the emergence of new financial participants such as Fintech, distinguishing that currently the equipment and physical facilities of traditional banks are not useful to recognize a real development in financial inclusion (Demir *et al.*, 2022; Gabor and Brooks, 2017; Ozili, 2023; Yang and Zhang, 2022). On the other hand, there are authors such as Feghali *et al.* (2021); Lyons *et al.* (2022) and; Orazi *et al.* (2021) who have preferred to carry out the study under a "demand" perspective of financial services, with data collected from the database with greater scope and depth at the international level in the subject, the Global Findex Database (Demirguc-Kunt *et al.*, 2022), a criterion that will be considered in this research.

Currently and at the Latin American level, Martínez *et al.* (2022) have analyzed the changes in financial inclusion and its main demographic determinants, assessing formal financial accounts, formal savings and formal loans as a "proxy" of financial inclusion in seven Latin American countries using the Global Findex of 2011 and 2014. With the same tool, Orazi *et al.* (2023) study the progress of financial inclusion in South American countries considering the evolution of variables of formal "access" and "use" of the main financial instruments, the access gaps that exist among the population, and the barriers that prevent the development of the financial services market.

Fintech Ecosystem

The financial industry is constantly changing and in recent years has left the door open for the immersion of a new financial actor, which distances from the rest by not having participated in the non-transparent era that burned down traditional banks. These startups, which are a fundamental part of the technological innovations that arise in the financial field, are the so-called "Fintech" as its express term, a contraction of the English phrase "Financial Technology" – "Financial Technology". Fintech can offer unprecedented opportunities to overcome barriers to financial inclusion and close gaps in access and use of accounts in financial institutions, taking advantage of the increasing penetration of mobile technology (Demir *et al.*, 2022).

Companies that focus on combining emerging technologies associated with finance for the benefit of consumers have been increasing dramatically in terms of number and quality (Demirguc-Kunt *et al.*, 2022). Saksonova and Kuzmina-Merlino (2017) stated that competition between banks and Fintech companies is growing in advanced economies, but even more so in emerging markets, so financial technology has a positive impact on the banking system in Latin America. In the region during the period 2017-2021, the number of Fintech

companies has quadrupled from 703 to 2482, hosting 22% of all Fintech companies in the world. The countries with the greatest relevance in the sector are Brazil and Mexico, followed by Colombia, Argentina and Chile, concentrating among them 81% of the Fintech activity of Latin America (Bakker *et al*., 2023).

Financial inclusion, the Fintech ecosystem and its contribution to the SDGs

For developing countries like most of Latin America, financial inclusion is a key pillar of economic growth, fostering the formation of strong and sustainable financial institutions that promote savings, investment, and money flows (Orazi *et al*., 2023).

Studies such as those by Arner *et al*. (2020), Demirguc-Kunt *et al*. (2018), and Dhahri *et al*. (2024) argue that financial technology is the key driver for financial inclusion and underlies balanced sustainable development. In this sense, it is recognized that financial inclusion is indispensable for sustainable progress, contributing directly or indirectly to the fulfillment of the totality of the SDGs (Klapper *et al*., 2016).

Innovative research has aimed to interrelate financial inclusion with the achievement of the SDGs at the macroeconomic level. Ozili (2022) studies developed countries belonging to the Organization for Economic Co-operation and Development (OECD), the relationship between variables of financial inclusion, focused on the supply of financial services and environmental development in each of the countries in the sample, obtaining results with positive and significant relationship especially in countries which are not part of the European Union. Research by Gautam *et al*. (2022) in 28 states in India finds a positive relationship between high levels of sustainable development and financial inclusion variables based on national cooperative banks. Nada (2019) derives as a result of the work that financial inclusion explains significantly and is a determining factor in Egypt's sustainable development at the country level between 2004 and 2017. On the other hand, considering studies that examined the relationship with SDGs on an individual basis, Yap *et al*. (2023) with a sample of fifty countries indicate in their results that financial inclusion correlates positively with SDG 2, 5 and 8 and the study of Ma'ruf and Aryani (2019) on member countries of the Association of Southeast Asian Nations obtained as a result a negative and significant relationship of financial inclusion with the achievement of SDG 1.

Some studies have used country-level measurements of the Fintech ecosystem. Haddad and Hornuf (2019) used as a dependent variable the total number or amount of such digital financial firms that were in operation per year and per country. In contrast, Lyons *et al*. (2022) used a more complex measure on Fintech, with an index called "The Global Fintech Index" (Findexable, 2022) that is used as one of their explanatory variables of study.

This feasible association between the fulfillment of sustainable development, the variables of progress of the Fintech ecosystem and the variables of financial inclusion, has not been applied from an empirical perspective in the Latin American field, becoming transcendental for research in digital financial inclusion and sustainable development to deepen the analysis of the existing link between these elements. Hernández-Pajares (2023), on a bibliographic review on sustainability in Latin America, found that there is little research on the subject of contribution towards the SDGs of the region, which exhibits the relevance of the study.

Therefore, the purpose of the paper is to assess whether financial inclusion and Fintech growth contribute to the achievement of the sustainable development goals in Latin America.

The rest of the article is presented as follows: the design and working methodology is described where the type of research, data sources, study variables and the analysis tool are exposed; later, a detail of the results obtained with theirdiscussion is presented, ending with the conclusions section.

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Materials and methods

The research design is quantitative type, descriptive correlational with a longitudinal scope. It considered information from 2017 and 2021, because these are the last two periods with data released after the Sustainable Development Goals (January 2016) and the World Bank's financial inclusion metrics.

In terms of geographical contextualization, financial inclusion, sustainable development and the Latin American Fintech ecosystem will be analyzed based on data from the most influential countries in the region. The six Latin American countries with the highest nominal GDP in US$ (World Bank, 2022), made up of the four members of the Pacific Alliance (Chile, Colombia, Mexico and Peru), were designated, and the addition of two countries relevant in the South American market, Brazil, the only Latin American member of the BRICS (emerging economies with the greatest development potential) and Argentina, due to the country's representativeness for South America and being a member of the Group of 20 (G-20), the main area of political and economic deliberation in the world.

Data

Financial Inclusion

It uses information from the two most recent periods, 2017 and 2021, presented in the World Bank's Global Findex database (2018, 2022) "World Bank" that includes detailed questions about access to and use of financial services. For each country, the World Bank has randomly selected nationally representative samples of at least 1,000 individuals and collected in-depth information through surveys on how people save, borrow, make payments, and manage financial risk. The samples were taken from the non-institutionalized civilian population of each country over the age of 15. In order to ensure nationally representative samples, the World Bank's work used a base sample weight and a post-stratification sample weight. The weighting of the base sampling was adjusted to take into account the unequal probability of selection. Post-stratification weighting was adjusted to take into account sampling and non-response errors related to population statistics for each country by sex, age, education and socioeconomic status. See Demirgüç-Kunt *et al.* (2022) for a complete presentation of the survey data, sampling and methodology. As well as being a publication of an official body, it is the largest financial inclusion database with the widest scope, depth and quantity of compilations worldwide (Sarkar *et al.*, 2022).

Chile, Colombia, Mexico and Peru completed 1000 respondents, Brazil 1002 and Argentina 1003. All of them with inhabitants with different demographic characteristics such as place of birth, economic level, sex, level of education and age.

Fintech

In order to complement the analysis and not only consider the size of the Fintech ecosystem of each country (number of companies), the database "The Global Fintech Index Ecosystem" (Findexable, 2022) is used, the first global index that establishes a common set of metrics and the same algorithm to generate a score that classifies the Fintech ecosystems of eighty-three countries and more than two hundred and sixty-four cities.

Sustainable Development Goals - SDGs

Since the creation of the 2030 Agenda, "The SDG Index & Dashboards Report", the most relevant global report that evaluates the situation of each country in the achievement of the Sustainable Development Goals, has been produced year by year (Sachs *et al.*, 2017, 2021). It is used by governments and the community to determine priorities for action, understand key implementation challenges, track progress, ensure accountability, and identify situations to be corrected to achieve the SDGs. The SDG

Index is an assessment of each country's overall performance on the seventeen SDGs at a given measurement point, giving equal importance to each goal in crafting the overall index, using a total of 115 indicators. The score indicates the position of a country between the worst possible value (0) and the best, or target result (100).

Variables

Financial inclusion variables derive from the review of previous empirical studies (Feghali *et al.*, 2021; Lyons *et al.*, 2022; Orazi *et al.*, 2023), where categorizing between access and use of financial services determines the following as presented in Table 1:

Access: Account opening: includes the proportion at country level of individuals holding an account with a financial institution or mobile money provider in the last 12 months.

Card opening: The proportion at the country level of individuals who have a debit or credit card in their name for the past 12 months.

Usage: Loans/Credits: the proportion at country level of respondents who have borrowed money formally (financial institution) or informally (credits with family or friends) during the last 12 months.

Savings: the proportion at the country level that respondents report having saved in the past 12 months, either generally or for retirement purposes.

Payments/Collections: The proportion at the country level of individuals who have made payments or collections digitally or through a debit or credit card during the last 12 months.

Table 1
Operationalization of variables

Category		Subcategory	Variable	Code	Code database World Bank (Demirguc-Kunt *et al.*, 2022)
Financial Inclusion	1. Access	1.1 Account Opening	1.1.1 Financial Institution Account	ACEF	FIN1.T.D
			1.1.2 Mobile Money Account (CDM)	ACDM	MobileAccount.T.D
		1.2 Opening Card	1.2.1 Debit or Credit Card	ATDTC	FIN2.7.T.D
	2. Use	2.1 Loans/credits	2.1.1 Loan application	UPR	borrow.any
			2.1.2 Loan in a Financial Institution or CDM	UPRFOR	fin22a.c.MM.d
			2.1.3 Loan from family and friends	UPRINF	FIN22B.T.D
		2.2 Savings	2.2.1 Savings (general)	UAHO	save_any
			2.2.2 Retirement Savings	UAHJUB	FIN16_T_D
			2.2.3 Savings in entity or CDM	UAHOFOR	FIN17A.17A1.D
		2.3 Payments/Receipts	2.3.1 Use of debit or credit cards	UTDTC	FIN4.8.T
			2.3.2 Digital payment/collection	UPCDIG	g20_t_d
Fintech			Global Fintech Index	GFI	
			Fintech Quantity	QFIN	

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Category	Subcategory	Variable	Code	Code database World Bank (Demirguc-Kunt *et al.*, 2022)
SDG	General	Overall SDG Index	SDGI	
	Individuals	SDG Index 1…17	SDG1…17	

Regarding the variables selected to measure the Fintech ecosystem, the variables Global Fintech Index and Fintech quantity were defined. The Global Fintech Index, also called "Global Fintech Index" is developed by Findexable (2022) based on a three-dimensional weighting:

The number or number of Fintech companies, Fintech centers, coworking spaces, accelerators, global influencers, called the size of the Fintech ecosystem.

The quality or impact of Fintech companies, depending on factors such as size, growth, investment, web presence, monthly visits, customer base, website ranking, events, international collaboration, the number of unicorns, among others.

The environment, a measure of the ease of doing business and the attractiveness of a particular country; based on technological infrastructure, critical mass, and the regulatory environment Fintech.

Regarding the amount variable, Fintech represents the delimitation of the ecosystem size by year and country (Inter-American Development Bank [IDB] *et al.*, 2022).

Finally, in the same Table 1, the variables "SDG Index general level" and the seventeen "Individual SDG Indices" are observed for each of the six countries studied, collected through the database of Sachs *et al.* (2017, 2021), where the progress of each country towards the achievement of the SDGs is rated.

Data analysis

The statistical technique used through STATA v.16 to assess the association between financial inclusion indicators, Fintech variables, and the overall SDG Index and Individual SDG Indices (SDGI and SDG1-17) is Pearson's correlation, a statistic widely used to measure the strength of the linear association between two variables.

Pearson's correlation coefficient was calculated for each of the eighteen sustainability indexes proposed with the eight financial inclusion variables and the two Fintech ecosystem variables individually, considering the levels of significance ($p<0.01$; $p<0.05$; $p<0.10$) for additional analysis.

Results and discussion

Table 2 below presents the descriptive statistics of the sample studied. It reflects the number of observations obtained for each variable, the indices of sustainable development and financial inclusion with rational values ranging from 0 to 1; the variables Fintech, QFIN, with a minimum integer value of 16 and maximum of 771, and GFI, with rational values ranging from 1,007 to 8,163.

Table 2

Descriptive statistics. Sustainable development, financial inclusion and fintech variables

Variable	Obs.	Average	Dev. Std.	Min.	Max. Max.
SDGI	12	0.705	0.032	0.648	0.771
SDG1	12	0.941	0.056	0.834	1
SDG2	12	0.634	0.064	0.527	0.719
SDG3	12	0.812	0.034	0.771	0.887
SDG4	12	0.884	0.084	0.75	0.991

Variable	Obs.	Average	Dev. Std.	Min.	Max. Max.
SDG5	12	0.712	0.049	0.642	0.81
SDG6	12	0.875	0.072	0.786	0.985
SDG7	12	0.867	0.058	0.746	0.948
SDG8	12	0.657	0.072	0.522	0.773
SDG9	12	0.428	0.111	0.233	0.625
SDG10	12	0.272	0.137	0.108	0.51
SDG11	12	0.849	0.074	0.724	0.958
SDG12	12	0.766	0.054	0.699	0.867
SDG13	12	0.88	0.032	0.841	0.939
SDG14	12	0.596	0.122	0.351	0.782
SDG15	12	0.553	0.057	0.42	0.607
SDG16	12	0.583	0.094	0.44	0.773
SDG17	12	0.67	0.065	0.576	0.812
GFI	*6	3,715	2,439	1,007	8,163
QFIN	12	233	215,453	16	771
ACEF	12	0.591	0.169	0.354	0.871
ACDM	**11	0.141	0.11	0.024	0.351
ATDTC	12	0.476	0.183	0.273	0.792
UPR	12	0.426	0.076	0.318	0.588
UPRFOR	12	0.238	0.078	0.118	0.407
UPRINF	12	0.199	0.051	0.137	0.291
UAHO	12	0.399	0.08	0.303	0.581
UAHJ	12	0.153	0.048	0.068	0.264
UAHOFOR	12	0.144	0.072	0.072	0.311
UTDTC	12	0.34	0.184	0.145	0.706
UPCDIG	12	0.531	0.17	0.317	0.843

Note. Descriptive statistics of all study variables. *There are only six observations in GFI, being a data available for 2021 and not for 2017. **In the ACDM variable, there are eleven observations because Chile has not submitted data during 2021. Both constraints (*,**) are solved with pairwise elimination, using all available observations for a pair of variables, even if other variables are missing for the same observations.

With less than 50 observations, the Shapiro–Wilk test was implemented to examine the normality of the data. This test compares the cumulative distribution of samples to an ideal normal distribution. The results (Table 3) revealed p-values greater than 0.05 accepting the null hypothesis that the data follow a normal distribution in each of the variables to be correlated.

Table 3
Shapiro-Wilk normality test

Variable	Obs.	W	V	z	Prob>z
SDGI	12	0.952	0.798	-0.440	0.670
SDG1	12	0.904	1,600	0.915	0.180

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Variable	Obs.	W	V	z	Prob>z
SDG2	12	0.936	1,069	0.131	0.448
SDG3	12	0.925	1,253	0.439	0.330
SDG4	12	0.933	1,125	0.229	0.409
SDG5	12	0.940	0.995	-0.011	0.504
SDG6	12	0.923	1,293	0.501	0.308
SDG7	12	0.958	0.706	-0,678	0.751
SDG8	12	0.956	0.741	-0.583	0.720
SDG9	12	0.958	0.706	-0.680	0.752
SDG10	12	0.935	1,085	0.158	0.437
SDG11	12	0.957	0.719	-0.642	0.740
SDG12	12	0.916	1,408	0.667	0.252
SDG13	12	0.890	1,831	1,178	0.119
SDG14	12	0.928	1,201	0.357	0.360
SDG15	12	0.845	2,590	1,854	0.062
SDG16	12	0.967	0.552	-1,157	0.876
SDG17	12	0.932	1,133	0.243	0.404
GFI	6	0.876	1,535	0.671	0.251
QFIN	12	0.828	2,879	2,060	0.060
ACEF	12	0.943	0.946	-0.108	0.543
ACDM	11	0.899	1,634	0.915	0.180
ATDTC	12	0.893	1,782	1,126	0.130
UPR	12	0.962	0.630	-0.901	0.816
UPRFOR	12	0.965	0.584	-1,050	0.853
UPRINF	12	0.931	1,148	0.269	0.394
UAHO	12	0.913	1,452	0.726	0.234
UAHOJUB	12	0.936	1,075	0.141	0.444
UAHOFOR	12	0.851	2,488	1,776	0.058
UTDTC	12	0.902	1,638	0.961	0.168
UPCDIG	12	0.946	0.897	-0.211	0.583

The test performed determines the decision of selecting the appropriate statistical method. In this case and having the variables a linear tendency and being continuous numerical, it allows to use a parametric test for the analysis, the Pearson correlation coefficient, which measures the linear statistical relationship between two continuous variables.

Table 4

Pearson correlations - Sustainable development variables, financial inclusion and fintech

	GFI	QFIN	ACEF	ACDM	ATDTC	UPR	UPRFOR	UPRINF	UAHO	UAHJ	UAHFOR	UTDTC	UPCDIG
SDGI	-0.191	0.154	0.692**	0.580*	0.731***	0.364	0.368	0.230	0.446	0.513*	0.687**	0.776***	0.757***
SDG 1	-0.233	-0.584**	-0.026	-0.432	0.257	-0.426	-0.044	-0.733***	0.365	0.005	0.064	0.278	-0.045
SDG 2	0.041	0.354	0.778***	0.569*	0.720***	0.582**	0.587**	0.432	0.206	0.425	0.627**	0.686**	0.789***

	GFI	QFIN	ACEF	ACDM	ATDTC	UPR	UPRFOR	UPRINF	UAHO	UAHJ	UAHFOR	UTDTC	UPCDIG
SDG 3	-0.453	-0.554*	0.172	-0.120	0.274	-0.105	0.030	-0.343	0.545*	0.249	0.345	0.368	0.179
SDG 4	-0.769	0.296	0.252	0.618**	0.173	0.215	0.002	0.565*	0.134	0.414	0.308	0.266	0.377
SDG 5	0.039	0.347	-0.214	0.397	-0.121	-0.024	-0.169	0.266	-0.124	-0.036	-0.264	-0.045	-0.067
SDG 6	0.225	-0.388	0.268	-0.501	0.460	-0.134	0.247	-0.639**	0.252	-0.094	0.278	0.418	0.162
SDG 7	0.634*	0.632**	0.761***	0.757***	0.646**	0.789***	0.629**	0.604**	0.162	0.363	0.529*	0.639**	0.798***
SDG 8	-0.225	0.095	0.440	0.382	0.561*	0.112	0.184	0,000	0.417	0.371	0.528*	0.642**	0.521*
SDG 9	0.623*	0.640**	0.799***	0.628**	0.808***	0.512*	0.509*	0.252	0.516*	0.622**	0.789***	0.840***	0.849***
SDG 10	-0.548	-0.620**	-0.397	-0.408	-0.190	-0.381	-0.088	-0.489*	-0.284	-0.508*	-0.489*	-0.249	-0.439
SDG 11	-0.041	-0.419	-0.086	-0.539*	0.141	-0.411	-0.118	-0.694**	-0.069	-0.398	-0.119	0.097	-0.154
SDG 12	-0.524	0.275	0.084	0.483	-0.198	0.288	-0.144	0.781***	-0.035	0.336	0.173	-0.128	0.168
SDG 13	0.322	0.554*	0.369	0.487	0.173	0.538*	0.452	0.473	-0.017	0.210	0.317	0.156	0.342
SDG 14	-0.611	0.134	0.367	0.300	0.251	0.123	-0.091	0.362	0.111	0.374	0.461	0.266	0.425
SDG 15	-0.002	0.225	0.482	0.399	0.306	0.600**	0.427	0.635**	-0.041	0.249	0.224	0.237	0.474
SDG 16	-0.290	0.085	0.651**	0.779***	0.559*	0.501*	0.343	0.433	0.726***	0.805***	0.747***	0.679**	0.740***
SDG 17	0.469	0.469	0.610**	0.352	0.608**	0.370	0.267	0.203	0.578**	0.604**	0.718***	0.670**	0.669**
GFI	1,000	0.965***	0.400	0.296	0.393	0.557	0,628	-0,022	0.281	0.249	0.273	0.363	0.365
QFIN	0.965***	1,000	0.372	0.594*	0.288	0.548*	0.421	0.444	0.106	0.323	0.297	0.295	0.418

Note. *** p<0.01, ** p<0.05, * p<0.1. This table shows Pearson's correlation coefficient and its significance, between each of the SDG Indices with the Fintech ecosystem progress and financial inclusion variables. Variables described in the methodological section.

Table 4 shows the correlation coefficients between the contribution to the SDGs and each of the variables of financial inclusion and Fintech in the six Latin American countries for the periods 2017 and 2021. Analyzing the correlation with the general SDG index (SDGI), where the 17 objectives have the same weighting, a significant positive and strong correlation is observed with all the access variables of financial inclusion (Figure 1), account openings in a financial institution, in mobile money account and possession of debit/credit cards. Thus, the higher the percentage of development of financial inclusion, the higher the compliance with the SDGs for each country/year. Figure 2 presents the relationship of the general index with the variables of use. There is a strong and very significant positive correlation between the overall SDG index and the Payment/Collection usage subcategory, both for the use of debit/credit card and payment/collection with digital means (QR, transfers, keys, etc.). On the other hand, formal saving also has a significant positive relationship with SDGI, and neither of the two Fintech variables considered have demonstrated an existing correlation with the overall SDG index in the study countries.

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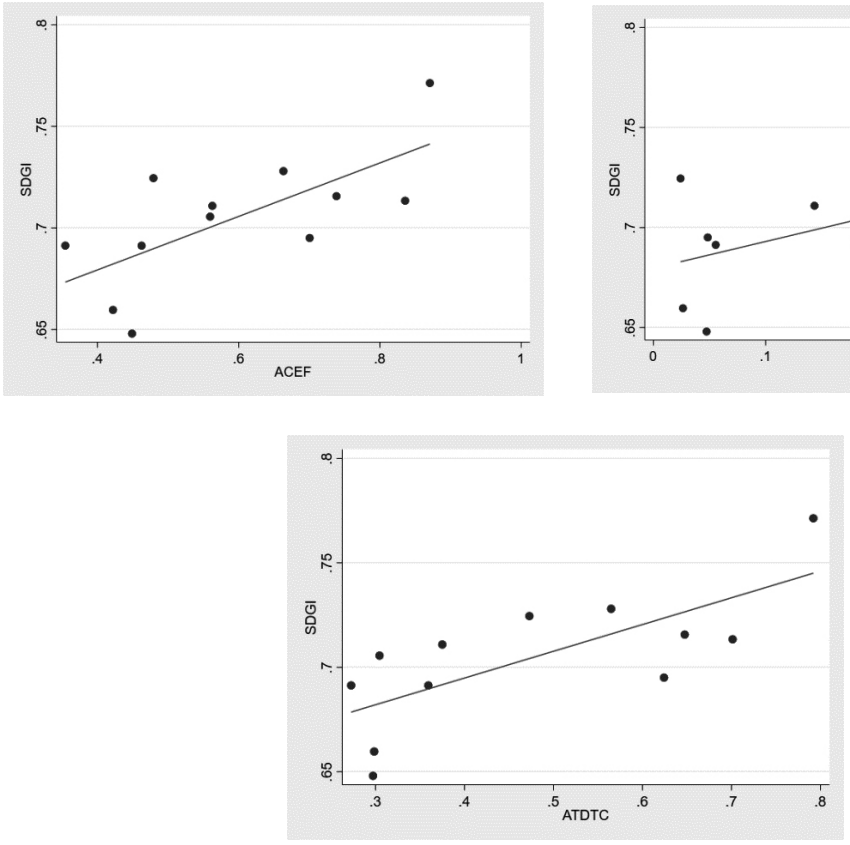
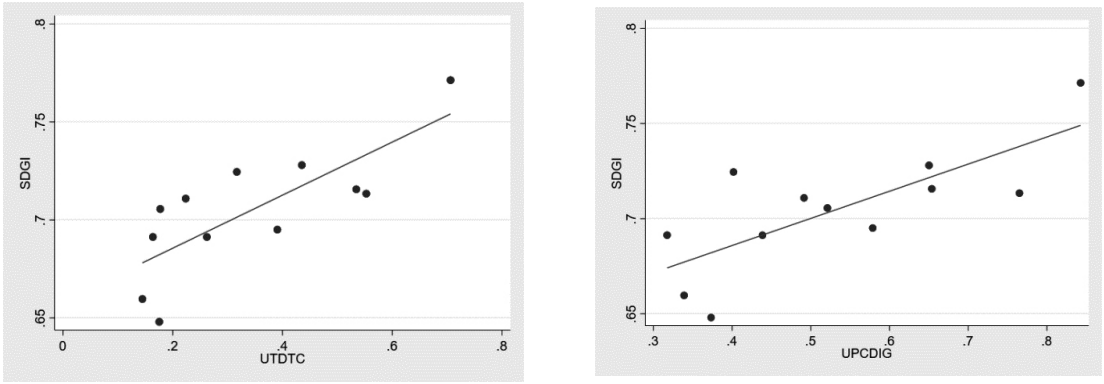
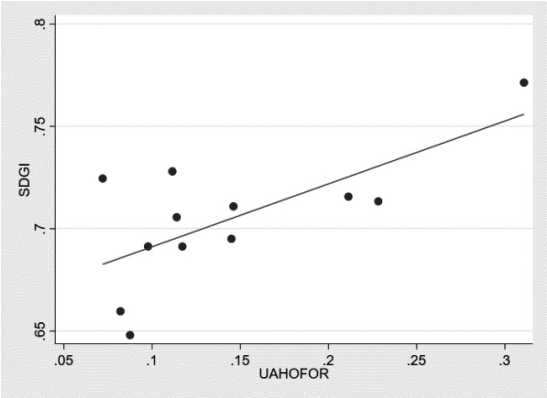
Figure 1
Dispersion diagram. SDGI- "Access"



Note. The dispersion diagrams between the SDGI General Index and the three variables of access to financial inclusion are shown: Financial Entity Account Opening (ACEF), Mobile Money Account Opening (ACDM) and Debit or Credit Card Opening (ATDTC), in their respective order.

Figure 2
Dispersion diagram. SDGI- "Use"



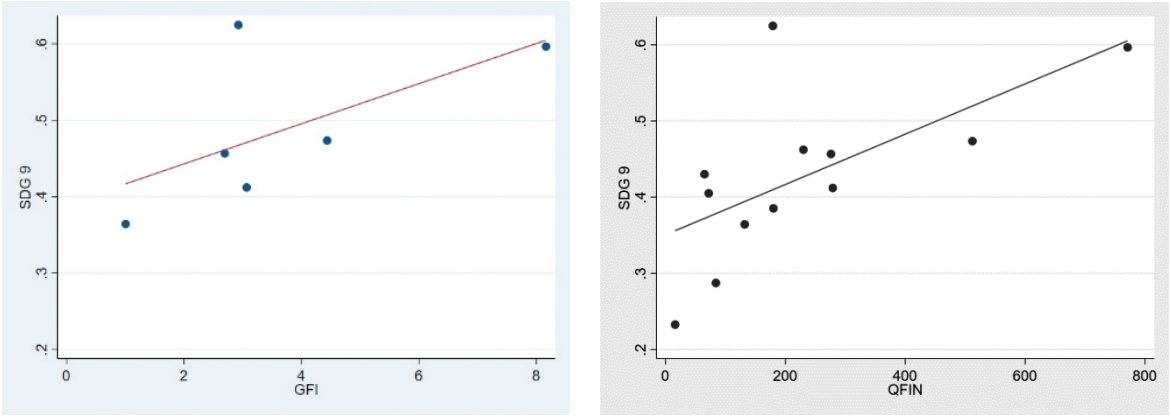


Note. It reflects the dispersion diagrams between the SDGI General Index and the three variables with the most significant correlation by using financial inclusion: Debit Card or Credit Card Use (UTDTC), Digital Payment/Collection Use (UPCDG), Formal Savings Use (UAHOFOR), respectively.

Continuing with the analysis of Table 4 and Pearson coefficients, but at the individual level of each SDG (SDG1-SDG17) it was found that the ones that most correlate the variables of financial inclusion in a significant and considerable way are: SDG9 and SDG7 in the first measure, together with SDG16, SDG17 and SDG2.

The SDG9 Index is the one of all the indexes by SDG that has had the greatest statistical relevance with a large number of related variables, both financial inclusion (with access and use) and Fintech measurement. Just as the SDG 7 Index are the only cases that reflect a positive and statistically significant association with the two defined study variables for the Fintech ecosystem of Latin American countries, note in Figure 3. In turn, the SDG 9 Index has very strong positive correlations of statistical significance with: digital payment/collection, access and use of debit/credit card, access to an account in a financial institution or mobile money account and formal savings (in descending order). See table 5 and figures 4 and 5.

Figure 3
Dispersion diagram. SDG-"Fintech"



Note. The scatter diagrams between the SDG9 Index and the two Fintech variables are shown: Global Fintech Index (GFI), Fintech Quantity (QFIN).

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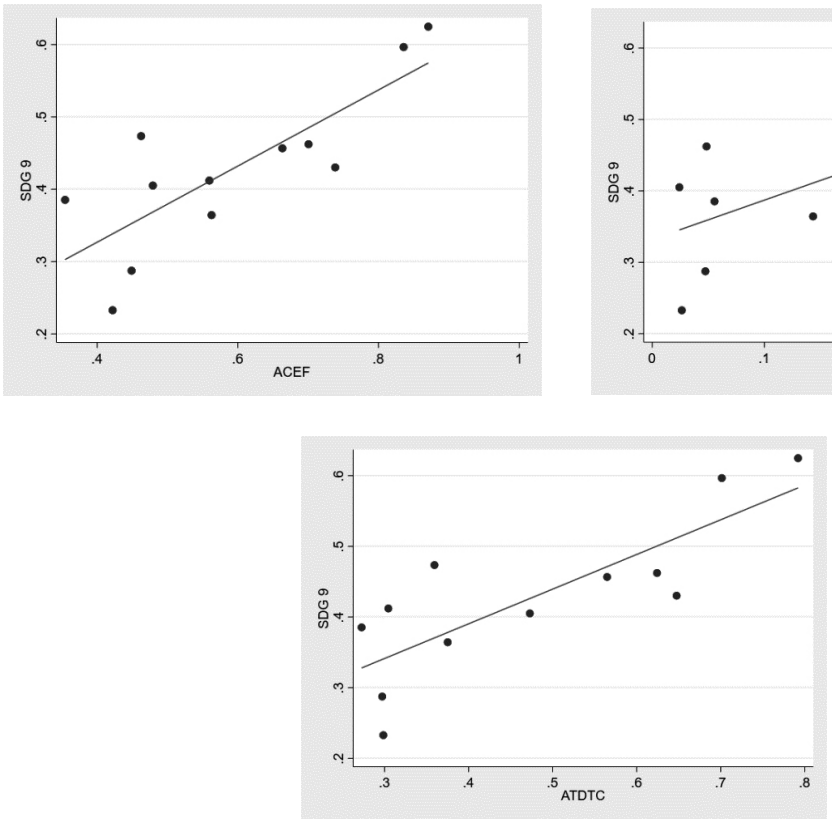
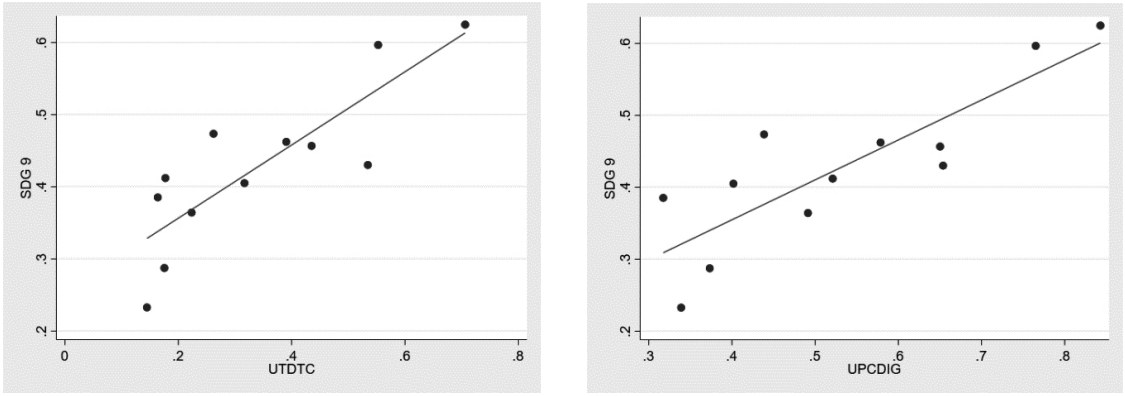
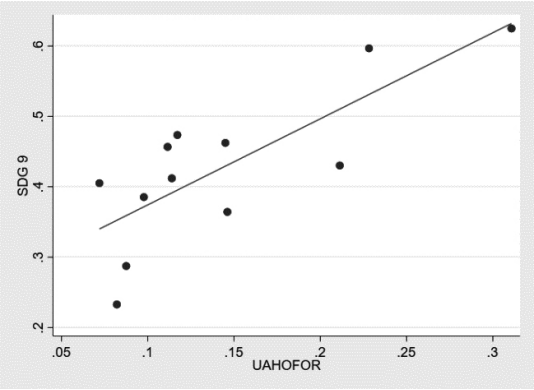
Figure 4
Dispersion diagram. SDG 9-"Access"



Note. The dispersion diagrams between the SDG9 Index and the three variables of access to financial inclusion are observed: Financial Entity Account Opening (ACEF), Mobile Money Account Opening (ACDM) and Debit or Credit Card Opening (ATDTC), in their respective order.

Figure 5
Dispersion diagram. SDG 9-"Use"





Note. It reflects the dispersion diagrams between the SDG9 Index and the three variables with the most significant and strong correlation by using financial inclusion: Debit Card or Credit Card Use (UTDTC), Digital Payment/Collection Use (UPCDG), Formal Savings Use (UAHOFOR), respectively.

Other individual indices reflected in Table 4 have significant and strong positive correlations with at least five financial inclusion variables. Among them, the positive correlation between the variables of payment/collection (digital or cards), possession of an account in a financial institution or mobile money account, and possession of debit or credit cards, with the SDG Indices 2,7,8,16 and 17 stand out.

Thus, the three financial inclusion variables classified as access to financial services show a significant and large correlation with the achievement of most of the SDGs at the individual level. In addition to the above, the usage subcategory on payments/collections also presents direct, significant positive correlation values. The variables of use through savings are not so significant; and being the variables of use, loans, the least significant and considerable for the achievement of the SDGs. The results obtained and presented in this section support the relationship between certain variables of financial inclusion and a prominent Fintech ecosystem with the fulfillment of some SDGs at the individual level and various associations with the general index that conglomerates the 17 objectives.

According to the findings of the study, the SDGI General Index, consistent with results obtained in other geographical contexts by Ozili (2022) Gautam *et al*. (2022) and Nada (2019), shows a positive and significant relationship with financial inclusion variables. Considering the classification and categorization of the study variables, it can be observed that this relationship is clearer and more determinant with all the access variables and with only a few of the ones of use.

As for the individual indices, as shown in the results, the SDG9 Index that refers to industry, innovation and infrastructure, is the one that is associated in an evident, direct and significant way with the largest number of study variables on financial inclusion; in accordance with what was exposed in the framework of the United Nations Development Program (UNDP) by the Fintech surveyed in Argentina regarding the SDG to which their products and services contribute the most (UNDP and Fintech's Argentine Chamber, 2021) and what was assured by studies of other institutions at present (Deloitte, 2021; UNSGSA, 2023). The individual indices that continue to the aforementioned one in terms of greater association with the financial inclusion variables are the SDG Indices 2,7,16 and 17, the first of them being the one that adjusts to the results obtained by Yap *et al*. (2023) although this study is differentiated from the aforementioned one because it has not found any relationship between the financial inclusion variables and the SDG Indices 5 and 8.

The incorporation in the analysis of the Fintech variables reflects that the amount of Fintech in the ecosystem of each country, a variable used by Haddad and Hornuf (2019), has obtained a better relationship with the SDG indices, especially through SDG9 and SDG7, finding no association

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with the SDGI General Index. These values obtained should be useful for the improvement in the determination and use of variables on the Fintech ecosystem in empirical works that relate the Fintech development with the achievement of the SDGs at the macroeconomic level.

Conclusions

The study evaluated through a correlation model the association between financial inclusion and Fintech development, with the fulfillment of the SDGs in Latin America, finding this as significant and positive. It has been observed that variables of access to financial services, such as opening accounts in financial institutions and the use of debit/credit cards, have a strong association with the overall SDG index (SDGI). Specifically, this means that the more people have access to opening accounts with financial institutions and using debit or credit cards, the more likely countries are to make progress on the SDGs. Evoking that the overall SDG index (SDGI) is a measure that assesses a country's progress against the 17 SDGs set by the UN, a strong partnership with SDGI suggests that financial inclusion through access to these services contributes significantly to sustainable development in the region. In addition, the use of digital means to make payments and collections, such as electronic transfers, by debit/credit card, or through mobile applications shows a significant positive relationship with their fulfillment. The results have shown th*et al*so individual indices such as SDG9 or to a lesser extent SDG2, SDG7, SDG16 and SDG17, present considerable positive correlations with the variables of financial inclusion and Fintech development.

The research highlights the importance of financial inclusion and a robust and developed country-level Fintech ecosystem in order to contribute to the SDGs. This approach allows governments, international organizations, businesses, and society to distinguish value in Fintech and in accessing and using better financial tools, identifying areas that require additional efforts to promote sustainable development.

The limitations of the study are that only secondary sources have been used without undermining their high methodological validity made by other international organizations for the operationalization of variables used in the development of the work; in addition, the methodological tool applied for analyzing the data was the correlation coefficients, which do not imply causality; therefore, the synergies observed with the SDG indexes could be independently related to other variables than those of financial inclusion and Fintech.

Despite the limitations, the work is relevant due to the empirical results, creating potential opportunities for future research in the subject. Among these possibilities, it is proposed to apply the study objective to more countries, either those that generate additional results for the Latin American region, as well as other countries that are comparable with those already selected in this work, such as the group of emerging markets. On the other hand, carrying out a comparative analysis of data discriminated at the individual level by country could be an enriching case. In turn, research complementing the variables of financial inclusion from the perspective of the demand for financial services with others obtained on the supply side, as well as the variables of the Fintech ecosystem that as new empirical work on the subject is developed; more tools, indicators and variables will be available that enrich the measurement studies on Fintech. These options would contribute to complexity and enhance the study, obtaining various proposals, approaches and challenges on a research topic that is booming.

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The role of ICT, intrapreneurship and collaborative management networks in innovation and business competitiveness

El papel de las TIC, intraemprendimiento y redes de gestión colaborativa en la innovación y la competitividad empresarial

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Abstract: this research analyzes the relationship between intrapreneurship culture, management collaboration networks, and information and communication technologies on innovation performance, as well as their direct and indirect effects on business performance and competitiveness. Using data collected from a questionnaire applied on MSMEs in the state of Aguascalientes in the Mexico's trade sector, the study tests fifteen hypotheses across three models, each examining the impact of a causal variable on innovation performance through a quantitative analysis using structural equation modeling. The results indicate significant associations between these factors and highlight the role of innovation in enhancing business outcomes. Additionally, the study considers the profound effects of the COVID-19 pandemic, which has exacerbated existing vulnerabilities in Latin American and Caribbean economies, affecting key sectors such as commerce, tourism, and transportation. The conclusions emphasize the varying impact of direct and indirect effects of causal variables (intrapreneurship culture, management collaboration networks, and information and communication technologies) on the mediator variable (innovation performance) and outcome variables (business performance and competitiveness). Across all models, a positive and significant relationship is confirmed between innovation performance and both business performance and competitiveness. However, a stronger association is found between the causal variables and business performance and competitiveness. Based on these findings, the study proposes strategic recommendations for businesses aiming to enhance their performance and competitiveness in dynamic environments.

Keywords: innovation, intrapreneurship, business network, ICT, firm performance.

Resumen: esta investigación analiza la relación entre la cultura de intraemprendimiento, las redes de colaboración en la gestión y las tecnologías de la información y comunicación en el desempeño innovador, así como sus efectos directos e indirectos en el desempeño y la competitividad empresarial. Utilizando datos recolectados a través de una encuesta aplicada a mipymes en el estado de Aguascalientes del sector comercial en México, el estudio evalúa quince hipótesis en tres modelos, cada uno examinando el impacto de una variable causal sobre el desempeño innovador mediante un análisis cuantitativo a través de ecuaciones estructurales. Los resultados indican asociaciones significativas entre estos factores y destacan el papel de la innovación en la mejora de los resultados empresariales. Adicionalmente, el estudio considera los efectos profundos de la pandemia de COVID-19, que ha exacerbado vulnerabilidades existentes en las economías de América Latina y el Caribe, afectando sectores clave como el comercio, el turismo y el transporte. Las conclusiones subrayan el impacto variable de los efectos directos e indirectos de las variables causales (cultura de intraemprendimiento, redes de colaboración en la gestión y tecnologías de la información y comunicación) sobre la variable mediadora (desempeño innovador) y las variables de resultado (desempeño y competitividad empresarial). En todos los modelos, se confirma una relación positiva y significativa entre el desempeño innovador y tanto el desempeño como la competitividad empresarial. Sin embargo, se observa una asociación más fuerte entre las variables causales y el desempeño y competitividad empresarial. Con base en estos hallazgos, el estudio propone recomendaciones estratégicas para las empresas que buscan mejorar su desempeño y competitividad en entornos dinámicos.

Palabras clave: innovación, intraemprendimiento, colaboración empresarial, TIC, desempeño empresarial.

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Introduction

The COVID-19 pandemic has profoundly reshaped life worldwide since it first emerged in Wuhan, China, at the end of 2019, exerting an unprecedented impact on the health, economic, and financial systems of countries across all income levels (Sotgiu and Dobler, 2020). The economic crisis triggered by the coronavirus (COVID-19) has significantly affected Latin American and Caribbean nations, exposing long-standing vulnerabilities in their productive and business structures (CEPAL, 2020). Moreover, the Economic Commission for Latin America and the Caribbean, in its most recent Special Report on COVID-19 published in June 2020, estimates that 34.2% of formal employment and 24.6% of GDP in the region come from sectors severely impacted by the pandemic (e.g., commerce, tourism, transportation, cultural industries, goods repair, hotels and restaurants, fashion, and automobiles). In contrast, less than one-fifth of employment and GDP are generated in sectors only moderately affected (e.g., agriculture, livestock, fisheries, food production, medical supplies and equipment, pharmaceuticals, telecommunications, and packaging) (CEPAL, 2020). Economic diversification and the implementation of appropriate policies were essential to strengthen economic resilience during and after this crisis (Sotgiu and Dobler, 2024).

In this evolving situation, innovation has become increasingly crucial, as today it is essential for businesses to navigate the challenges that have forced many companies to be out of the market. Therefore, the adoption of effective business strategies is a determining factor in improving organizational performance in a competitive and ever-changing environment. According to various studies, companies that develop and implement well-structured strategies, based on a comprehensive analysis of the market and their internal capabilities, not only increase profitability but also adapt to fluctuations in the economic environment (Porter, 2020). In particular, the diversification of strategies that consider both innovation and sustainability has become a key axis for long-term success (Grant, 2021). Additionally, the continuous evaluation of these strategies allows for adjustments in operational and administrative tactics, contributing to greater efficiency and effectiveness in decision-making processes (Johnson *et al.*, 2022). These approaches not only optimize financial performance but also strengthen business competitiveness on a global scale (Barney, 2023).

Ongoing innovation is crucial for a company to stay competitive and maintain its position in the market. It involves the introduction of new products, services, or ideas that are recognized as novel by others, playing a vital role in the company's continued success and growth (Farida and Setiawan, 2022). A company's competitiveness lies on three fundamental strategic pillars: competitive performance (output), organizational resources (input), and the processes and management capabilities that enable these resources to flourish and be utilized effectively (Kang and Na, 2020).

Accordingly, the aim of the research is to explore the relationship between intrapreneurship culture, management collaboration networks, and information and communication technologies (ICT) with innovation performance, along with the direct and indirect impacts of these variables on business performance and competitiveness. The paper is organized into four key sections: first, a theoretical framework outlining the development of the research hypotheses; second, a detailed explanation of the research methodology; third, an analysis of the results; and finally, a discussion of the findings and the conclusions drawn.

The goal is to deliver scientifically grounded insights that elucidate potential shifts in business innovation and its interplay with diverse business strategies, aiming to drive positive outcomes in both performance and competitiveness. Consequently, this research aims to provide a strategic guide with business recommendations designed to bolster the resilience, growth, and sustainability of companies in today's rapidly changing and highly volatile environment.

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Theoretical development/research hypothesis

In this section, we establish the theoretical foundation that underpins the research model, outlining the key theory and the focus of the research. We detail the conceptualization of each variable and highlight the empirical evidence supporting the proposed relationships presented in each research hypothesis.

The resource-based view (RBV) posits that resources and capabilities are valuable when they enable an organization to seize opportunities and mitigate threats. While the RBV has been widely applied, recent analyses highlight its limitations and suggest its evolution into a more comprehensive theory by integrating elements from stakeholder theory. These elements include (a) incorporating normative aspects or framework, (b) recalibrating the idea of sustainability, (c) viewing people beyond resources, and (d) allotting more room for cooperative behaviors (Freeman *et al.*, 2021).

Despite extensive research on the RBV and its application in enhancing business performance and competitiveness, there remains a gap in understanding how specific resources—such as intrapreneurship culture, management collaboration networks, and information and communication technologies (ICTs)—can be strategically developed and integrated to maximize their impact on innovation performance, particularly in the context of micro, small, and medium-sized enterprises (MSMEs). This empirical gap becomes even more pronounced in dynamic and uncertain environments, such as those shaped by the COVID-19 pandemic, where resilience and adaptability emerge as critical organizational capabilities. By focusing on MSMEs in the state of Aguascalientes in the Mexican trade sector, this study addresses this gap by exploring not only the direct and indirect effects of these resources on innovation performance but also their role in fostering business resilience and sustained competitiveness in times of crisis.

Innovation

Innovative initia tives are fundamental in influencing the performance of companies and, on a larger scale, shaping the dynamics of the entire economy. The significance of innovating business processes lies in its ability to act as a bridge that converts the advantages of external collaboration into measurable innovation results. Companies should approach business process innovation not merely as a functional requirement but as a strategic asset essential for transforming external insights into market success. By simultaneously prioritizing external partnerships and refining internal processes, organizations can effectively manage the challenges of today's dynamic business landscape. This approach fosters sustainable growth, strengthens competitive positioning, and drives improvements in both product innovation and operational performance (Yu *et al.*, 2024).

Business model innovation can pertain both to companies already established in the market with a solid position and to emerging entities by developing new business models in the form of start-ups. In this context, modifications to the business model are represented as a growth with gradual improvements or with transformative innovations. It is important to underline that the extent of innovation within the business model is determined by the specific needs of the enterprise. Identifying these needs accurately becomes a key element for achieving success in the context of value creation (Otola and Grabowska, 2020).

Intrapreneurship culture and innovation performance

Executives are tasked with fostering employees' intrapreneurial involvement by encouraging and empowering them to actively participate in their organization's entrepreneurial initiatives (Sánchez-Vidal *et al.*, 2024). The involvement of employees in intrapreneurial projects at the organizational level depends significantly on how well their individual attributes

align with the organizational environment in which they operate (Niemann *et al*., 2022).

An investigation about the rationality in intrapreneurship and innovation outputs promotes that intrapreneurship is crucial for successful innovation outputs. This body of research reveals that cognitive styles of intrapreneurs plays a significant role in the innovation outputs (Marques *et al*., 2021). It is anticipated that the presence of intrapreneurship within the organization in the context of innovation will drive growth and profitability, ultimately enhancing the company's overall performance. This implies that the effectiveness of a company in achieving its objectives can be also evaluated through its innovation orientation (Aina and Solikin, 2020). These authors mention that intrapreneurship encompasses four key sub-dimensions: innovativeness, risk-taking, proactiveness, and competitive aggressiveness. These elements positively influence a company's financial performance and competitiveness in the market.

Once the background for intrapreneurship culture and innovation performance, business performance and business competitiveness have been established, the hypothesis one, hypothesis one "a" and hypothesis one "b" are presented:

H_1: The level of intrapreneurship culture in companies positively and significantly influences their levels of innovation performance.

H_{1a}: The level of intrapreneurship culture in companies positively and significantly influences their levels of business performance.

H_{1b}: The level of intrapreneurship culture in companies positively and significantly influences their levels of business competitiveness.

Gestión de colaboración de redes y Management collaboration network and innovation performance

Collaboration can foster close interactions among project partners and promote the exchange of information, which in turn drives the development of innovations (Klijn *et al*., 2024). A study conducted in Mexico by Álvarez-Aros *et al.* (2022) confirmed a positive and significant relationship between the horizontal collaboration of open innovation (institutions of education, government and competitors) with financial performance of the firms. Keung and Shen (2017) confirmed in the case of China that the establishment of effective project networks by contractors could benefit their business competitiveness.

Based on these arguments, our study tests the following hypothesis, hypothesis two "a" and hypothesis two "b", about the association of management collaboration networks with innovation performance, business performance and business competitiveness levels:

H_2: The level of management collaboration networks positively and significantly influences their levels of innovation performance.

H_{2a}: The level of management collaboration networks positively and significantly influences their levels of business performance.

H_{2b}: The level of management collaboration networks positively and significantly influences their levels of business competitiveness.

Information and communication technologies and innovation performance

Information and Communication Technologies (ICT) are tools implemented in organizations to transmit information and enhance communication to compete in the context of the information and communication environment (Ab Wahab *et al.,* 2020). Lecerf and Omrani (2020) examines the effects of innovation on small and medium-sized enterprise (SME) internationalization and the direct and moderating impacts of information and knowledge circulation during information technology adoption. The results suggest that developing innovation, while increasing the level of information technology, can improve internationalization.

In a study conducted on Indonesian companies, Widjaja *et al.* (2020) reveal that there was a positive and meaningful relationship

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between information and communication technology and business performance. Saleem *et al.* (2020) confirmed in another study that the effects of ICT projects are not limited to social and economic development but are also classified as mixed developments in terms of strategic, managerial, informational, operational, transactional, organizational, infrastructure and transformational nature.

Once the arguments were presented, the study tests the following hypothesis three, hypothesis three "a" and hypothesis three "b", about the relationship of information and communication technologies with innovation performance, business performance and business competitiveness levels:

H_3: The level of Information and Communication Technologies positively and significantly influences their levels of innovation performance.

H_{3a}: The level of Information and Communication Technologies positively and significantly influences their levels of business performance.

H_{3b}: The level of Information and Communication Technologies positively and significantly influences their levels of business competitiveness.

Innovation performance and business performance

Business performance (BP) is directly related to the scope of the organizational objectives proposed (Morales, 2020). The idea that open innovation positively influences business performance is widely supported by empirical research and is broadly acknowledged within both industry and academia (Carmona-Lavado *et al.,* 2023; Figueira *et al.,* 2023; Haddoud *et al.*, 2023). The creation of innovative products and services enhances efficiency, generates greater earnings and expands market presence (Sahoo *et al.*, 2024).

A study conducted by Febrianti and Herbert (2022), aimed to understand the influence of business analysis and innovation performance in improving the BP of small and medium enterprises. The results in this study confirmed that business analysis and innovation performance have a high influence on business performance. This relationship shows that the variables of business analysis ability and innovation are important factors for MSMEs to improve their BP.

Thus, the role of business analysis skills and innovation has a high influence in building BP. Based on these arguments about the association of innovation performance business with the business performance levels, this study tests the following hypothesis four:

H_4: The level of innovation performance positively and significantly influences their levels of business performance.

Innovation performance and business competitiveness

In the era of globalization, where competitiveness poses significant challenges for developed economies, innovation emerges as a crucial factor in leveraging growth opportunities and developing effective employment creation strategies to ensure success in the global market (Hajighasemi *et al.,* 2022). Innovation is an ongoing governance process that offers transformative approaches to enhancing stakeholder experiences (Sørensen and Balsby, 2021).

Structural innovation, encompassing both process and institutional innovation, plays a transformative role in enhancing the competitiveness of a destination (Zhou *et al.,* 2024). In a study, it was demonstrated that innovation in service systems, characterized by idea generation, service creation, and commercialization, strengthens the competitiveness of firms. This suggests that the processes of idea generation, service creation, and commercialization are crucial for achieving higher levels of competitiveness within organizations (Ekom *et al.,* 2023).

The study tests the following hypothesis five, based on the idea that it is about the association of innovation performance with business competitiveness levels.

H_5: The level of innovation performance positively and significantly influences their levels of business competitiveness.

Once all the theoretical framework is developed to present the research hypothesis, Table 1 contains the structure of concepts and relation papers that stand our model of investigation.

Table 1
Research hypothesis (indirect effects) and supporting author(s)

Indirect effects Hypothesis	Support Author(s)
H1: The level of intrapreneurship culture in companies positively and significantly influences their levels of innovation performance.	Marques *et al.* (2021)
H2: The level of management collaboration networks positively and significantly influences their levels of innovation performance.	Klijn *et al.* (2024)
H3: The level of information and communication technologies positively and significantly influences their levels of innovation performance.	Lecerf and Omrani (2020)
H4: The level of innovation performance positively and significantly influences their levels of business performance.	Febrianti and Herbert (2022)
H5: The level of innovation performance positively and significantly influences their levels of business competitiveness.	Ekom *et al.* (2023)

This study also tests the indirect effects of the analyzed variables on competitiveness and business performance, excluding the innovation performance variable as a mediator. To achieve this, three different models have been developed (see Figures 1, 2, and 3). Consequently, additional hypotheses have been formulated to assess the direct effects, as outlined in Table 2.

Table 2
Research hypothesis (direct effects) and supporting author(s)

Hypotheses - direct effects	Support Author(s)
H_{1a}: The level of intrapreneurship culture in companies positively and significantly influences their levels of business performance.	Aina and Solikin (2020).
H_{1b}: The level of intrapreneurship culture in companies positively and significantly influences their levels of business competitiveness.	
H_{2a}: The level of management collaboration networks positively and significantly influences their levels of business performance.	Álvarez-Aros *et al.* (2022); Keung and Shen (2017).
H_{2b}: The level of management collaboration networks positively and significantly influences their levels of business competitiveness.	
H_{3a}: The level of information and communication technologies positively and significantly influences their levels of business performance.	Widjaja *et al.* (2020); Saleem *et al.* (2020)
H_{3b}: The level of information and communication technologies positively and significantly influences their levels of business competitiveness.	

Materials and methods

This study adopts a scientific approach that integrates both fundamental and practical methodologies to achieve its objectives. Its aim is to produce relevant and accurate data to enhance comprehension, validate findings, refine concepts, or apply knowledge effecti-

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vely through a systematic scientific process (Creswell and Creswell, 2021).

The data collection process was carried out in three main phases. Initially, the questionnaire was developed using validated scales (Likert scale of five points), followed by a pilot test to assess and ensure data reliability. In the subsequent phases, two key analyses were performed: the first focused on evaluating the reliability and validity of the instrument, which are critical indicators of the quality and precision of measurement tools (Hair *et al.,* 2020). The second phase involved the application of Structural Equation Modeling (SEM), a method th*et al*lows for the simultaneous analysis of multiple dependent relationships, making it highly appropriate for this study (Kline, 2023). The analysis adopts a quantitative design, gathering data from a questionnaire to MSMEs in the state of Aguascalientes in the Mexico's trade sector to examine or validate hypotheses through statistical methods grounded in numerical evaluation. This methodology encompasses both descriptive and correlational aspects.

The sample used in this study consists of 200 MSMEs located in the state of Aguascalientes, Mexico. Within the state, commercial activities represent the largest portion of the tertiary sector—accounting for roughly 40% of all economic units—and contribute significantly to the region's GDP, according to the latest data from INEGI (2024), as reported in the Statistical Directory of Economic Units (DENUE, 2024). There are 2,276 MSMEs engaged in wholesale trade, representing the total universe from which the sample was drawn.

SEM guidelines suggest at least 10 observations per observed variable, and Hair *et al.* (2021) recommend a minimum of 200 observations or over 100 observations overall. In this study, six variables were analyzed across three models, indicating that a minimum of 60 questionnaires would meet the basic threshold. However, Kline (2023) points out that while simpler SEM models may be estimated with fewer than 100 observations, more complex models require larger samples for robust estimation. Consequently, a total of 200 observations were chosen to exceed the minimal requirement and ensure reliable model fit. This sample size aligns with recognized SEM standards and provides a strong foundation for accurate and dependable statistical outcomes, particularly for the more involved models examined in this research.

The development of the data collection followed a systematic and rigorous process. It began with the selection of measurement scales for all the constructs that had already been validated and previously utilized in similar studies. Subsequently, a pilot test was conducted on a random sample of 10 companies and 5 experts to identify the appropriateness of the conceptualization of the variables, the language used in the questions, and the structure of the questionnaire. As a result, minor adjustments were made to the descriptions of certain concepts. The instrument measures the six variables: i. Innovation performance, ii. Intrapreneurship culture; iii. Management collaboration networks; iv. Information and communication technologies; v. Business performance; vi. Business competitiveness. Table 3 below presents the structure of the questionary including the variables, their dimensions, and the total items.

To ensure the reliability of the collected data, reliability and validity tests were performed, as these provide the essential language of measurement and constitute key quality indices for questionnaires (Batista-Foguet *et al.*, 2004). Various procedures exist to measure the reliability of a scale, with the main indices being Cronbach's alpha coefficient, the Composite Reliability Index (CRI), and the Average Variance Extracted (AVE). One of the best methods for estimating reliability is the use of the ordinal alpha method, especially when analyzing polytomous data obtained from a Likert scale. Therefore, scale developers and researchers should resort to this approach to obtain more accurate reliability estimates (Idaka *et al.*, 2020).

Cronbach's alpha coefficient is the most widely used reliability indicator in Social

Sciences (Zumbo and Rupp, 2004). The Composite Reliability Index (CRI) serves as another reliability measure, interpreted in a manner similar to Cronbach's alpha but taking into account the relationships between the extracted constructs. Additionally, the Average Variance Extracted (AVE) is frequently reported, as it reflects the proportion of variance explained by a factor relative to the total variance attributed to measurement error for that factor (Hair, 2021).

As shown in Table 4, the values obtained for all three indices are adequate, confirming both the proper interrelation among the items of each construct and the accurate measurement of the constructs.

Table 3
Structure of the data collection instrument

Variable	Dimensions	Elements
Innovation performance	Product innovation	12
	Process innovation	
	Management Innovation	
Intrapreneurship culture	Coworker independence	22
	Risk tolerance	
	Compensation and incentives	
	Teamwork	
	Management support	
Management collaboration networks	Government collaboration	13
	Commercial integration	
	Technological collaboration	
	Interinstitutional networks	
Information and Communication Technologies	Technological capacity	7
	Decision making integration	
Business Performance	Internal Processes	12
	Open systems	
	Rational Goals	
	Human relations	
Business Competitiveness	Financial performance	18
	Cost reduction	
	Technology approach	

Table 4
Summary of reliability and validity indices

Variables and dimensions	Cronbach's alpha	Extracted mean variation (AVE)	Compound Reliability (CRI)	p-values
Business Performance				
Internal processes	0.800	0.718	0.883	0.000
Open systems	0.844	0.763	0.906	0.000
Rational goals	0.921	0.864	0.950	0.000
Human relations	0.794	0.705	0.877	0.000

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Variables and dimensions	Cronbach's alpha	Extracted mean variation (AVE)	Compound Reliability (CRI)	p-values
Competitiveness				
Financial performance	0.917	0.700	0.933	0.000
Cost reduction	0.935	0.740	0.944	0.000
Technology approach	0.962	0.840	0.927	0.000
Innovation				
Product innovation	0.937	0.843	0.955	0.000
Process innovation	0.952	0.874	0.965	0.000
Management innovation	0.963	0.931	0.976	0.000
Management Collaborative Networks				
Government collaboration	0.941	0.895	0.962	0.000
Commercial integration	0.926	0.819	0.948	0.000
Interinstitutional networks	0.960	0.926	0.974	0.000
Technological collaboration	0.766	0.681	0.864	0.000
Entrepreneurship				
Coworker independence	0.776	0.530	0.845	0.000
Risk tolerance	0.867	0.715	0.909	0.000
Compensation and incentives	0.832	0.665	0.888	0.000
Teamwork	0.893	0.702	0.921	0.000
Management support	0.853	0.693	0.900	0.000
Information and communication technologies				
Technological capacity	0.921	0.828	0.951	0.000
Decision making integration	0.882	0.810	0.927	0.000

Results and discussion

The SEM analysis estimated three MIMIC models, with innovation performance serving as the mediator variable between business performance and competitive performance. Model 1 assesses the relationship between intrapreneurship culture and innovation performance, along with its direct and indirect effects on business competitiveness and performance. Model 2 evaluates the relationship between management collaboration networks and innovation performance, as well as their direct and indirect impacts on business competitiveness and performance. Model 3 explores the relationship between Information and Communication Technologies (ICT) and innovation performance and similarly examines their direct and indirect effects on business competitiveness and performance. Figures 1, 2, and 3 illustrate these models using path analysis, accounting for potential covariance of error among variables. Table 5 provides a summary of the results and goodness-of-fit tests for each model. Furthermore, we assessed the indirect relationships in each model using the SEM data, identifying the percentage of influence for each, as shown in Table 4. Overall, Models 1, 2, and 3 demonstrate acceptable fits for the dataset. The Chi-squared statistic (χ^2) for each model is within acceptable ranges, measuring 23.37, 24.4, and 39.7, respectively, and effectively accounting for the potential variances and covariances in the dataset.

Table 5
Results of SEM models

Model 1	Comments = 200
Intrapreneurship culture	← Innovation performance
	+0.2616 (±0.07) ***
	← Enterprise Performance
	+0.3188 (±0.06) ***
	← Business Competitiveness
	+0.4219 (±0.06) ***
Innovation Performance	← Enterprise Performance
	+0.2738 (±0.06) ***
	← Business Competitiveness
	+0.2373 (±0.06) ***
Model 2	Comments = 200
Management collaboration networks	← Innovation performance
	+0.1550 (±0.07) **
	← Enterprise Performance
	+0.2746 (±0.06) ***
	← Business Competitiveness
	+0.4213 (±0.06) ***
	← Enterprise Performance
Innovation performance	+0.3232 (±0.06) ***
	← Business Competitiveness
	+0.2891 (±0.06) ***
Model 3	Comments = 200
Information and Communication Technologies	← Innovation performance
	+0.2442 (±0.07) ***
	← Enterprise Performance
	+0.0757 (±0.07) *
	← Business Competitiveness
	+0.2473 (±0.07) ***
	← Enterprise Performance
Innovation performance	+0.3415 (±0.07) ***
	← Business Competitiveness
	+0.2885 (±0.07) ***

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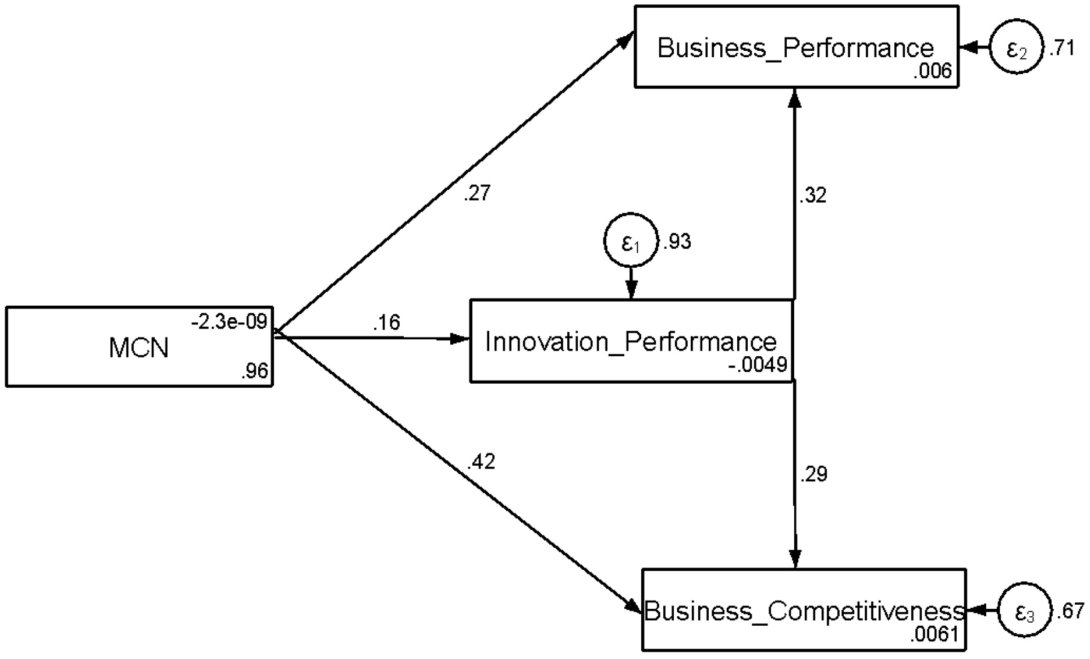
Figure 1
SEM Model 1

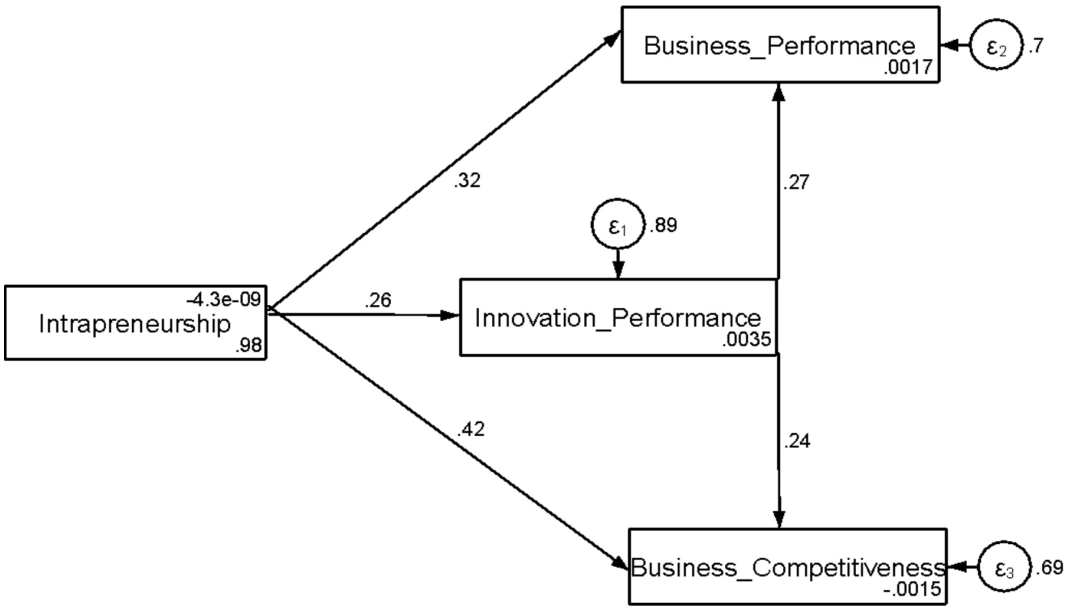


Note. Elaboration using STATA's SEM Builder application.

Model 1 tests the intrapreneurship culture in relation to innovation performance and the direct and indirect effects with business performance and business competitiveness (hypotheses 1, 1a, 1b, 4-1 and 5-1). The sign direction of the lambda coefficients (Λ) of intrapreneurship culture with innovation performance is positive and significant (Λ=+0.2616, p<0.01) as the hypothesis 1 arguments, and the coefficients for the association of innovation performance with business performance and business competitiveness as the hypotheses 4-1 and 5-1 arguments are also positive and significant (Λ=+0.2738, p<0.01 and Λ=+0.2373, p<0.01). The coefficients for the direct effect of intrapreneurship culture on business performance and business competitiveness are also positive and significant as the hypotheses 1a and 1b arguments (Λ=+0.3188, p<0.01 and Λ=+0.4219, p<0.01).

The interpretation with the results of Model 1 is that for every standard deviation increase in intrapreneurship culture, innovation performance, business performance and business competitiveness increase on average 26.0, 31.0 and 42.0 percent, respectively. These findings confirm the existing arguments in the literature about positive association of intrapreneurship culture on innovation, business, and business competitiveness. In the same way, for every standard deviation increase in innovation performance, business performance and business competitiveness increase on average 27.0 and 23.0 percent, respectively.

Figure 2
SEM Model 2



Note. Own elaboration using STATA's SEM Builder application.

The literature shows that management collaboration networks also influence innovation performance and direct and indirect effects on business performance and business competitiveness. Model 2 addresses this question and tests hypotheses 2, 2a, 2b, 4, and 5 for the association between these variables. The results show a lambda coefficient of management collaboration networks and innovation performance (Λ=+0,1550, $p<0.05$) as indicated by hypothesis 2, and the coefficients for the association of innovation performance with business performance and business competitiveness as mentioned in hypotheses 4 and 5, as they are positive and significant (Λ= +0.3232, $p<0.01$ and Λ=+0,2891, $p<0.01$). The coefficients for the direct effect of management collaboration networks on business performance and business competitiveness are also positive and significant as the arguments of hypotheses 2a and 2b (Λ=+0,2746, $p<0.01$ and Λ=+0,4213, $p<0.01$).

The interpretation of the Model 2 results shows that for each standard deviation, the increase in managerial collaboration networks, innovation performance, business performance and business competitiveness increased by approximately 15.0%; 27.0% and 42.0%, respectively. These findings confirm the existing arguments in the literature about the positive association of management collaboration networks in terms of innovation, and business competitiveness. In addition, for each increase in the standard deviation in innovation performance, business performance and business competitiveness increase on average by 32.0% and 28.0% respectively.

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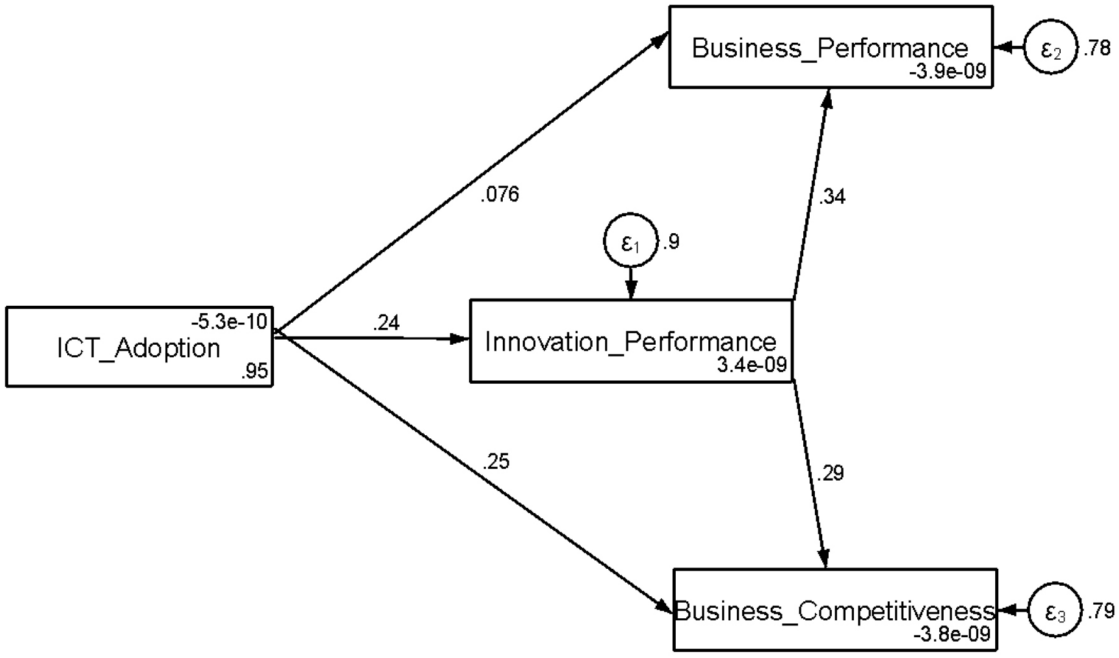
Figure 3
SEM 3 model



Note. Elaboration using STATA's SEM Builder application.

In the context of Information and Communication Technologies, the literature points out that this variable tends to positively influence innovation performance and it has direct and indirect effects with business performance and business competitiveness (hypotheses 3, 3a, 3b, 4-3 and 5-3). The sign direction of the lambda coefficients of Information and Communication Technologies with innovation performance is positive and significant (Λ=+0.2442, p<0.1) as the hypothesis 3 arguments, and the coefficients for the association of innovation performance with business performance and business competitiveness as the hypotheses 4 and 5 arguments are also positive and significant (Λ=+0.3415, p<0.01 and Λ=+0.2885, p<0.01). The coefficients for the direct effect of Information and Communication Technologies on business performance and business competitiveness are also positive and significant as the hypotheses 3a and 3b arguments (Λ=+0.0757, p<0.01 and Λ=+0.2473, p<0.1).

The interpretation of Model 3 as the results shows, is that for every standard deviation increase in information and communication technologies, innovation performance, business performance and business competitiveness increase on average 24.0, 0.7 and 24.0 percent, respectively. These findings confirm the existing arguments in the literature about positive association of Information and Communication Technologies on innovation, business, and business competitiveness. Also, for every standard deviation increase in innovation performance, business performance and business competitiveness increase on average 32.0 and 28.0 percent, respectively (Table 6).

Table 6
Results of direct and indirect effects of SEM models

Number of observations 200			
Relationships	Direct	Indirect	Total
Model 1			
Intrapreneurship culture -> Business performance	0.32 (82%)	0.07 (18%)	0.39
Intrapreneurship culture -> Business competitiveness	0.42 (87%)	0.06 (13%)	0.48
Model 2			
Management Collaboration Network -> Business performance	0.27 (84%)	0.05 (16%)	0.32
Management Collaboration Network -> Business competitiveness	0.42 (90%)	0.046 (10%)	0.466
Model 3			
Information and Communication Technologies -> Business performance	0.08 (0.0001%)	0.08 (99.9%)	0.16
Information and Communication Technologies -> Business competitiveness	0.25 (78%)	0.07 (22%)	0.32

In summary, the main conclusions of models 1, 2 and 3 are the followings. In model 1, the strongest relationship occurs between the intrapreneurship culture and business competitiveness, followed by its relationship with business performance. The strongest direct effect of innovation performance is on business performance, while the weakest relationship in this model is between innovation performance and business competitiveness. However, all relationships are positive and statistically significant. In model 2, the strongest relationship is between management collaboration networks and business performance, with the direct relationship between innovative performance and business competitiveness being the most positive and significant. The weakest relationship is between management collaboration networks and innovation performance, although all relationships in this model remain positive and significant, as supported by the literature. Model 3 reveals positive relationships between all variables, but with different levels of significance. The weakest association is between information and communications technologies and business performance, while the strongest relationship is between innovation performance and business performance.

As part of the discussions, the results obtained through structural equation modeling (SEM) provide empirical evidence supporting the relationship between internal and external organizational factors (intrapreneurship culture, managerial collaboration networks and information and communication technologies) and competitive and business performance, mediated by innovation.

The results of this research provide valuable information on the mechanisms that influence business performance through innovation. First, the mediating role of innovation outcomes highlights the importance of fostering an intra-corporate culture within organizations. This aligns with recent studies, such as Sanchez *et al.* (2024) and Niemann *et al.* (2020), which emphasize the need to empower employees to actively contribute to business initiatives and ensure alignment between individual attributes and the organizational environment. These results suggest that a strong intra-corporate culture not only improves innovation performance, but also amplifies competitive and business outcomes.

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The influence of management collaboration networks on innovation performance and business competitiveness is aligned with the conclusions of Klijn *et al.* (2024) and Álvarez-Aros *et al.* (2022). Both studies highlight the role of collaboration – whether horizontal, with external partners such as governments and educational institutions, or internal, through effective project networks – in driving innovation and financial performance. This reinforces the idea that strategic partnerships are indispensable to foster innovative capabilities and achieve sustainable competitiveness.

As for the role of Information and Communication Technologies (ICT), the studies of Widjaja *et al.* (2020) and Saleem *et al.* (2020), confirmed the multifaceted impacts of ICT on business performance, ranging from strategic and management benefits to operational and transformational development. The results also support the assertion of Lecerf and Omrani (2020) that increasing ICT adoption, while fostering innovation, contributes significantly to organizational internationalization and competitiveness. In this study, ICT emerged as a key factor for innovation performance, allowing companies to navigate and thrive in dynamic and information-rich environments. The indirect but notable impact of technological tools on competitiveness points to their ability to nurture agile and adaptable business ecosystems that can respond quickly to changing external pressures. These findings reinforce the interconnected nature of the intra-enterprise, collaborative and technological dimensions in the conduct of organizational performance, highlighting intrapreneurship as a strategic pillar, collaborative networks as conduits for resource sharing and ICT as a catalyst for operational efficiency and market responsiveness.

Table 7 summarizes the results of each hypothesis, highlighting the significant coefficients.

The analysis shows conclusive results for all indicators of the three models. The results of model 1 indicate that the lambda coefficients for each relationship between the variables were as expected. The intra-entrepreneurial culture shows a positive association with innovation results, but also shows a strong direct effect with business performance and business competitiveness; likewise, innovation performance has a positive and significant impact on business performance and business competitiveness. Therefore, hypotheses 1, 1b, 1c, 4-1 and 5-1 are confirmed. The results of Model 2 show that management collaboration networks have a positive influence on innovation performance, as well as a direct effect on business performance and business competitiveness and an indirect effect through innovation performance on business performance and business competitiveness. Therefore, hypotheses 2, 2b, 2c, 4-2 and 5-2 are confirmed. These results corroborate the existing literature and studies. The results of model 3 show that information and communication technologies have a positive impact on innovation performance and also have a positive association on business performance and business competitiveness. The performance of innovation also shows a direct positive effect on the performance of companies and the competitiveness of companies. This is an expected result that confirms that information and communication technologies increase innovation performance, business performance and business competitiveness. Therefore, hypotheses 3, 3b, 3c, 4-3 and 5-3 are confirmed.

Table 7
Summary of the results

Model 1	Association variables / Hypothesis
Intrapreneurial culture	**Innovation performance** ← H1 confirmed
	+, significant
	Commercial performance ← H_{1a} confirmed
	+, significant
	Business competitiveness ← H_{1b} confirmed
	+, significant
Innovation Performance	**Business performance** ← $H_{4.1}$ confirmed
	+, significant
	Business competitiveness ← $H_{5.1}$ confirmed
	+, significant
Model 2	**Association Variables**
Management Collaboration Networks	**Innovation performance** ← H_2 confirmed
	+, significant
	Commercial performance ← H_{2a} confirmed
	+, significant
	Business competitiveness ← H_{2b} confirmed
	+, significant
	Business performance ← $H_{4.2}$ confirmed
Innovation Performance	+, significant
	Business competitiveness ← $H_{5.2}$ confirmed
	+, significant
Model 3	Association Variables
Information and communication technologies	**Innovation performance** ← H_3 confirmed
	+, significant
	Commercial performance ← H_{3a} confirmed
	+, significant
	Business competitiveness ← H_{3b} confirmed
	+, significant
	Business performance ← $H_{4.3}$ confirmed
Innovation Performance	+, significant
	Business competitiveness ← $H_{5.3}$ confirmed
	+, significant

Conclusions

The main contribution of this research is to analyze the relationship between intrapreneurship culture, management collaboration networks and information and communication technologies with innovative performance, as well as the direct and indirect effects of these variables on business performance and competitiveness through three models, one for each

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causal variable. This study was carried out in MSMEs in the commercial sector of a developing country, specifically Mexico. Fifteen hypotheses were tested in the three models, analyzing the association between intrapreneurial culture, managerial collaboration networks and ICT with innovative performance, as well as the relationship between innovative performance and business performance and competitiveness. In addition, the direct effects of intra-corporate culture, management collaboration networks and ICTs on business performance and competitiveness were examined.

It is important to highlight several conclusions on the variable impact, comparing the direct and indirect effects of the causal variables (intra-corporate culture, management collaboration networks and information and communication technologies) on the mediating variable (performance in innovation) as well as the outcome variables (business performance and business competitiveness). In all three models, the results confirmed a positive and significant relationship between innovation performance and business performance and competitiveness. However, there is a stronger association between intrapreneurship culture, managerial collaboration networks, information and communication technologies, and business performance and competitiveness.

Therefore, the main conclusion of this research revolves around the following strategic recommendations for companies with the aim of improving both their performance and their competitiveness. These recommendations fall into three key areas: fostering an intra-corporate culture, improving collaboration through management networks, and leveraging information and communication technologies. Based on the analysis and evidence presented below, a list of practical considerations drawn from these findings is presented:

The culture of intrapreneurship promotes autonomy, tolerance, compensation, teamwork and support for management. To improve the performance and competitiveness of companies, strategic decisions and actions should allow employees the freedom to make decisions, take charge of new projects and freely express their opinions. Tolerance can be emphasized by allowing an organizational philosophy that encourages employees to accept risk and view organizational change as an opportunity. A strong compensation strategy is key to creating a workplace culture that encourages engagement and motivation, encouraging employees to undertake new projects that improve company performance. This can be achieved through a compensation plan that includes financial rewards, public recognition, and support for education and professional development. Teamwork can be strengthened by implementing a flexible organizational structure by management support. Our findings suggest that an intrapreneurship culture can only thrive in a supportive environment that values and invests in employee development, fostering innovation, performance, and competitiveness within the organization.

Management collaboration networks focus on customers, suppliers, competitors, government entities, technology intermediaries, industry associations, financing organizations, higher education institutions and technical colleges. Our findings indicate that while the implementation of management collaboration networks positively impacts innovation performance, it has an even stronger direct effect on business performance and competitiveness. Management collaboration networks should therefore be leveraged as a strategic tool to deliver direct improvements in business performance by improving the quality and efficiency of internal processes, increasing customer satisfaction, accelerating adaptation to market needs, managing corporate image, expanding market share, increasing profitability and productivity, motivating employees, and reducing

turnover and absenteeism. In addition, companies that systematically participate in management collaboration networks tend to achieve better financial performance, cost reduction, and more effective technology deployment.

Information and communication technologies (ICTs) have a low direct impact on the performance of companies. However, its role in promoting innovation results is important, as ICT strengthens business performance and competitiveness. For this reason, information technology strategies related to processes, systems and organizational communication (particularly with customers, suppliers and competitors) should focus on product innovation, innovative processes and management systems innovation. This approach is critical to achieving the best possible outcomes for the organization.

Looking ahead, future analyzes will deepen collaboration networks and information and communication technologies in each facet of intraentrepreneurship, with the aim of formulating strategic proposals that serve as a basis for organizational decision-making. These proposals will not only focus on improving business performance and competitiveness, but will also highlight how a business mindset can stimulate disruptive innovation; how collaborative links can facilitate robust knowledge sharing and resource sharing; and how ICT can be harnessed to increase operational efficiency. By conducting in-depth research on these dimensions, the research will generate viable insights for academics and practitioners, potentially revealing new ways for exploring how these interconnected factors can further shape long-term organizational success and resilience in evolving market environments.

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Variables affecting WeChat loyalty in the business environment: time and cost reduction

Variables que inciden en la lealtad hacia WeChat en el ámbito empresarial: reducción de tiempo y costes

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Abstract: this work analyzes the effect of the functional value of WeChat (considering both time and cost reduction as such value) on the attitudinal and behavioral loyalty of Chinese entrepreneurs residing in Spain. To this end, the methodology combines a qualitative and quantitative approach, first conducting in-depth interviews with ten business owners of Chinese nationality residing in Spain, which then allowed for surveys to be conducted with a sample of these individuals. The results obtained through descriptive statistics and regression models have shown the key influence of the functional value of this social network (especially that derived from cost reduction) on the attitudinal and behavioral loyalty of these entrepreneurs. The findings have led to several recommendations for management.

Keywords: WeChat, functional value, attitudinal loyalty, behavioral loyalty, Chinese residents in Spain, Chinese entrepreneurs.

Resumen: este trabajo analiza la influencia del valor funcional de WeChat (considerando como tal valor tanto la reducción de tiempo como de costes) en la lealtad actitudinal y comportamental de empresarios chinos residentes en España. Para ello, la metodología realizada combina un enfoque cualitativo y cuantitativo, en el que primeramente se realizaron entrevistas en profundidad a diez propietarios de negocios de nacionalidad china residentes en España, lo que permitió posteriormente realizar encuestas a una muestra de estos. Los resultados obtenidos mediante estadísticos descriptivos y modelos de regresión han mostrado la influencia clave del valor funcional hacia esta red social (especialmente, el derivado de la reducción de costes) en la lealtad actitudinal y comportamental de estos empresarios. Los resultados obtenidos han permitido formular diversas recomendaciones para la gestión.

Palabras clave: WeChat, valor funcional, lealtad comportamental, lealtad actitudinal, residentes, nacionalidad china en España, empresarios chinos.

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Introduction

Global development in recent decades has shown extraordinary advances in information and communication technology systems (Sheth and Parvatiyar, 1995; Jiménez-Pitre *et al*., 2023). In this context, social networks have experienced an important growth, being part of almost all activities of daily life (Luan *et al*., 2020).

In the business environment, companies have chosen to invest in technologies with the aim of increasing the visibility and sale of their products and services, thus generating a competitive advantage in both the traditional market and the online environment (Sánchez-Fernández and Jiménez-Castillo, 2020). Increased consumer interaction on social media has transformed these platforms into key tools for information and communication creation, not only between businesses and consumers, but also between consumers themselves (Luan *et al*., 2020; Raposo *et al*., 2022; Hua and Yang, 2023). In addition, the widespread use of digital platforms has allowed companies to optimize their marketing strategies, reducing costs and reaching stakeholders more quickly and directly (Primack *et al*., 2017). The high levels of satisfaction derived from their use encourage consumers to return, make purchases and recommend the company to others (Vargas, 2007). This scenario highlights the need to analyze the rapid growth of new technologies and social networks, as well as their impact on society and business development.

In the international arena, China stands out in the field of online sales for having followed a different development path than the rest of the world (Kontsevaia and Berger, 2016). Moreover, it is important to note that China has its own social networks, exclusive to the country and not available globally. Among them, WeChat stands out, the mobile social network with the largest presence in the country (Hua and Yang, 2019). WeChat has established itself as the dominant social network of the Asian giant thanks to its wide variety of services, including instant messaging, voice calls, mobile payments, and access to public and private services, among others (Hua and Yang, 2019). This diversity of functions has not only boosted its popularity among users but has also made it a global business tool. On WeChat, companies can conduct multiple business activities, positioning it as a key platform for business (Watson IV *et al*., 2018). In this regard, the perceived value generated by WeChat among its users has as one of its key objectives to promote their loyalty (Zhang *et al*., 2017). Therefore, it is essential to analyze the rise of WeChat and its growing popularity as an online marketing tool. Its model has allowed companies to reach a marketing level characterized by being direct, efficient and practically without costs.

Bilateral relations between Spain and China have undergone considerable evolution throughout history. The beginning of diplomatic relations in 1973 was the beginning of a strategic cooperation that has been strengthened over time (Rios, 2020). Since then, Spain has positioned itself as a key partner of China within the European context (Bregolat, 2013), while China has consolidated itself as Spain's largest economic and commercial ally on the Asian continent (Rios, 2020). Since the beginning of the 21st century, the socioeconomic interactions between both states have shown an increasing trend, which has manifested itself in the increase of bilateral trade. In fact, in 2017, Spanish exports to China experienced exponential growth, reflecting a pattern of constant evolution (Ríos, 2020). In this context, China has emerged as a central player in the global economy, becoming a market of high strategic relevance for Spain (Rios, 2020).

Based on these, this study focuses on analyzing the impact of functional value (considering as value the reduction of time and costs) on the loyalty, both attitudinal and behavioral, to WeChat by Chinese entrepreneurs living in Spain. The research is divided into two main areas: on the one hand, to examine the impact of functional value associated with time reduction on WeChat loyalty and the impact of WeChat functional value derived from cost reduction in relation to loyalty. In this context, the following division presents an exhaustive review of the relevant literature in this line of research, with the aim of theoretically substantiating the study and establishing the research hypotheses. The third

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section describes the methodology carried out, consisting of the elaboration and administration of a questionnaire in the urban area of Albacete, aimed at Chinese entrepreneurs living in the area, from the literature review carried out and from in-depth interviews to a small sample of these entrepreneurs. The work concludes with the presentation of the key results, as well as practical recommendations, methodological limitations and future lines of research.

Perceived value, loyalty and social media

In the literature, perceived value has been defined as a key antecedent of satisfaction, both concepts being antecedents of consumer loyalty (Lu *et al*., 2011). Several studies *have* shown that a higher perception of value can generate higher levels of loyal behaviors (Gregory *et al*., 2016) and increase the willingness of customers to buy (Chang and Wang, 2011).

The definition of perceived value, in the context of the Theory of Equity, refers to the contrast made between the benefit obtained from a service or product and the economic sacrifice made to obtain such benefit (Zeithaml, 1988; Yang *et al*., 2011). According to this theory, the perceived value affects the consumer's purchasing behavior, provided that the benefits exceed or equal the sacrifice made, the purchase will be made since the perceived value will be positive (Forero-Molina and Neme-Chaves, 2020). Previous studies have identified multiple dimensions of perceived value. Sweeney and Soutar (2001), under the PERVAL scale, identify three dimensions: emotional value, social value and functional value (associated with price and quality). Within these dimensions, functional value and emotional value have shown a greater interaction with consumer loyalty (Carvache-Franco *et al*., 2019). For their part, Ryu *et al*. (2010) distinguish between hedonic and utilitarian value, while Jamal *et al*. (2011) extend this categorization to four dimensions: functional, experiential, experimental and emotional value. Other approaches, such as that of Hur *et al*. (2012), differentiate between functional, hedonic and social value, while García *et al*. (2018) propose emotional value, price value and social value. In a broader framework, Petrick (2002) identifies five dimensions: emotional value, social value, utilitarian value, quality and price.

Despite the differences between classifications, there is a concordance in the literature that perceived value constitutes a fundamental antecedent of loyalty (Forero-Molina and Neme-Chaves, 2021). As a result, companies must prioritize strategies that reinforce the perception of value among consumers, in order to foster their loyalty and commitment to the brand.

On the other hand, the incorporation of social networks in the daily life of consumers has made these platforms essential tools for companies to attract customers (Sundararaj and Rejeesh, 2021). Through them, companies can implement marketing campaigns that strengthen relationships with their customers, understand better their needs and adapt to them. This allows them to generate additional perceived value that matches consumer expectations, thereby promoting higher levels of purchase intent and recommendation. Various studies have shown that marketing actions through social networks have a positive effect on loyalty, both attitudinal and behavioral, towards the company (Ibrahim, 2021).

In the next section, we will analyze the influence of the perception of one of the dimensions of WeChat's perceived value on loyalty—attitudinal and behavioral.

Impact of WeChat's perceived value on loyalty

Within the various dimensions of perceived value, functional value is defined as the added benefit arising from the use of a service or product (Sheth *et al*., 1991). This concept is relevant in the context of technological tools such as WeChat, since its functionality is intrinsically linked to the practical benefit it offers its users.

In the following sections, a specific study on functional value associated with two key WeChat activities will be addressed: its ability to reduce time and its ability to reduce costs. From this review, the influence of these functions on

two types of loyalty will be analyzed: attitudinal loyalty and behavioral loyalty.

Functional value derived from time reduction and its influence on loyalty

WeChat, launched in 2011 by Tencent, emerged as an instant messaging app (Plantin and De Seta, 2019) but has evolved into a multifunctional platform that integrates social networking features (adding friends, posting information), in-app payments and purchases without the need for additional software (Plantin and De Seta, 2019; Watson IV *et al*., 2018). This versatility positions it as a platform that combines the features of Facebook, WhatsApp, PayPal and LinkedIn combined (Yanes and Berger, 2017). It is the most relevant social network in China due to its dual nature: basic social network features and a robust infrastructure that expands its functionality (Plantin and De Seta, 2019). Its tools facilitate business activity, allowing direct communication with key stakeholders (Primack *et al*., 2017), which reduces time in negotiations and promotes brands and products efficiently (Seow *et al*., 2020), thus fostering relationships of trust and loyalty (Fan and Liu, 2024).

Through features like "add friends" and "Moments," companies can share documents, images, videos, and user experiences, reaching a broader audience quickly and directly (Chen *et al*., 2018; Fan and Liu, 2024; Jin *et al*., 2015). A prominent feature of WeChat is the ability to create Mini Programs, which function as in-app store shortcuts, eliminating the need to download additional apps. This allows consumers to make purchases more efficiently, reducing the time needed and improving their shopping experience (Chen *et al*., 2018). On the other hand, WeChat Payment allows to make payments directly from the application, speeding up the purchase process. Consumers can make payments both online and in stores by scanning a QR code (Plantin and De Seta, 2019). In 2017, this functionality accounted for 60% of online payments in China (Loubere, 2017), standing out as a key tool to reduce time in commercial transactions. Another service that WeChat offers is the possibility of creating Official Accounts to companies, which generates trust towards the company in less time, since the authenticity of the information provided has already been certified (Cheung and To, 2017).

WeChat has driven a significant reduction in the time required to manage business and associated costs. This translates into more positive experiences for companies and a greater likelihood that users will develop loyalty to the platform (Jiang *et al*., 2018). Due to its innovative features and its ability to combine various functionalities in a single platform, WeChat has become a highly recommended tool for companies to support the development of their innovation (Seow *et al*., 2020). Considering the positive impact of WeChat functionalities in reducing time and the positive perception generated among business users, it is feasible to propose the following research hypotheses:

> H1: The functional value of WeChat derived from the reduction of time influences positively and significantly the attitudinal loyalty towards this social network.
>
> H2: The functional value of WeChat derived from the reduction of time influences positively and significantly on the behavioral loyalty towards this social network.

The functional value derived from cost reduction and its influence on loyalty

The development of social networks as platforms for business use has transformed traditional marketing strategies (Jin *et al*., 2015), serving, among other things, to launch online marketing campaigns designed to generate value through these tools (Tuten and Solomon, 2016). Currently, social media marketing is one of the most used strategies due to its effectiveness in attracting potential customers (Ibrahim, 2021) and its positive impact on consumer loyalty (Ismail, 2017). This is due to its ability to foster direct relationships, trust and brand positioning (Ibrahim, 2021; Seow, Choong and Ramayah, 2020).

In China, WeChat has established as a key marketing tool, thanks to its functionalities that simplify communication and commercial transactions (Chen *et al*., 2018). Specifically, WeChat

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Marketing is an essential component of e-commerce (Zhang, 2015) and a pillar in contemporary marketing strategies (Min, 2024). WeCh*et al*lows companies to create advertising campaigns faster and cheaper than other traditional ways (Sun *et al*., 2023). There is no upfront cost to accessing WeChat, simply create a profile, share an ID or QR code, and start interacting and sharing information (Kontsevaia and Berger, 2016).

Given the diversity of communication tools that WeChat provides, companies and consumers can maintain direct contact at any time, allowing companies to adapt more immediately to market changes (Fan and Liu, 2024). WeChat offers different communication channels, such as individual and group messages, and allows sharing text, voice, images, videos, documents and links (Chen *et al*., 2018; Fan and Liu, 2024). These characteristics make communication more dynamic and authentic (Wedel and Kannan, 2016). In addition, being a direct communication and without cost, it contributes to customer satisfaction, which increases the probability of repurchase. A satisfied customer, in turn, is a potential ambassador, as it is more likely to make positive recommendations to other users (Qi, 2018).

On the other hand, the "Moments" function allows companies to publish information not only about their products, but also about promotions, directly on their "wall", which is accessible to all WeChat users (Yu *et al*., 2019). These publications may include a variety of elements, such as images, videos, and links, that make information more attractive to users (Gibson, 2008; Jung *et al*., 2011). In addition, the ability for other users to comment and share their opinions in Moments publications gives greater value to these recommendations, since they come from real consumers (Chen *et al*., 2018). This type of interaction significantly increases the confidence of other consumers, a key element in the online shopping process (Izquierdo Yusta and Martínez Ruiz, 2009).

Thanks to the "Official Accounts", WeChat previously verifies the authenticity of the companies, reducing the possibility of fraudulent information (Chen *et al*., 2018; Yu *et al*., 2019). The Mini Programs features allow companies to create shortcuts to their product or service catalog, eliminating the need to develop standalone applications (Jin, 2019) and, in addition, it makes it easier for consumers to make their purchases online (Jin, 2019). In short, WeChat marketing is a new form of online marketing (Zhang, 2015), characterized by lower costs (Mao, 2012), more direct communication with customers (Chen *et al*., 2018) and more real and truthful information (Yi, 2014).

These findings allows formulating the following hypotheses:

> H3: The functional value of WeChat derived from the reduction of costs positively and significantly influences the attitudinal loyalty towards this social network.

> H4: The functional value of WeChat derived from the reduction of costs positively and significantly influences the behavioral loyalty towards this social network.

Materials and methods

The methodological framework was divided into two phases. The first phase focused on a qualitative study through in-depth interviews with a sample chosen for convenience of ten Chinese entrepreneurs (five men and five women, aged 30 to 50) living in Albacete (Spain), owners of various businesses and WeChat users in their commercial activities. The questions asked focused on gathering information on the perceived functional value of WeChat (reduction of time and costs), as well as its intention of use and recommendation.

Table 1
Technical description: in-depth interviews

Data collection tool	In-depth interviews
Sample group	10 people
Field data collection interval	1-15 June 2020

The conclusions from the interviews were that 90% of respondents adopted WeChat after its launch in China (2012), while 10% did so a year later. Their use in Spain is mainly limited to communication with suppliers, due to their low penetration among final consumers. The international version features reduced functionality compared to the Chinese version, restricting its application to communication and excluding direct selling options. However, 100% of participants acknowledged that WeChat optimizes their business operations. The platform facilitates direct communication with suppliers, group videoconferences and immediate access to detailed product information (descriptions, images, videos), reducing operating costs and minimizing the need for travel. In addition, it allows to establish commercial networks and run free marketing campaigns through WeChat Marketing, reaching multiple users with a single click.

Analysis of in-depth interviews reveals that WeChat optimizes business management by reducing time spent on business operations through its ability to facilitate communication with suppliers, access detailed product information (descriptions, images, videos) and monitor order status, improving operational efficiency. In addition, WeChat contributes to cost reduction, mainly through WeChat Marketing, a free tool that, together with other features of the platform, minimizes operating expenses. Finally, the interviewees widely recommended its use, both in business and personal contexts, highlighting its multifunctional character and its consolidation as a comprehensive platform of high value in their experience.

The deductions obtained from the in-depth interviews, supported by a review of the exhaustive bibliography, allowed to configure the second phase of the study: the elaboration of a questionnaire. Data collection was carried out during the second half of June 2020 (from 15 to 30). The questionnaire was designed and distributed by email to a sample group of Chinese entrepreneurs and workers living in the city of Albacete. Over a period of fifteen days, 57 valid responses were collected (see table 2).

Table 2
Technical description: questionnaire

Data collection tool	Online questionnaire sent by email
Sample group	57 Chinese businessmen living in Albacete
Sample group selection mechanism	Non-probabilistic for convenience
Field data collection interval	15-30 June 2020

In relation to the scales used in this study, various methodologies were used. For analyzing the sociodemographic profile of the participants, nominal scales were applied. Subsequently, five-point Likert scales (1 = "I do not agree", 5 = "totally agree") were implemented to evaluate the user's perception of WeChat's functional value in reducing time and costs. Questions were asked such as *please express your degree of agreement regarding the following statement*: "I consider that WeChat saves me a lot of time in my business" or express your degree of agreement regarding the following statement: "I consider that WeChat saves me costs in my business". Five-point scales were also used to measure the endogenous variables of the model: attitudinal and behavioral loyalty. On these scales, the value 1 represented the lowest level and the value 5 represented the highest level. Questions were asked such as *Would you recommend using WeChat? Do you intend to continue using WeChat?*

Table 3 provides a summary of the scales used to measure dependent and independent variables.

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Table 3
Identification of variables

Name of the variable	Measurement scale	Variable role in the model	Description	Sources
Functional value derived from time reduction	Metric Scale	Independent Variable	WeChat provides functional value by reducing work time. 5-point Likert scale (1 = "no agreement", 5 = "totally agree")	Adapted from De Vries and Carlson (2014), Ranaweera and Karjaluoto (2017).
Functional value derived from cost reduction	Metric Scale	Independent Variable	WeChat provides functional value by reducing costs. 5-point Likert scale (1 = "no agreement", 5 = "totally agree")	Adapted from De Vries and Carlson (2014), Sweeney *et al*. (1999).
Attitudinal loyalty	Metric Scale	Dependent Variable	Would You Recommend WeChat? 5-point scale (1 = lower recommendation, 5 = higher recommendation)	Adapted from Sweeney and Soutar (2001), Hur, Kim and Park (2012), Yang and Peterson (2004).
Behavioral loyalty	Metric Scale	Dependent Variable	Do you intend to continue using WeChat? 5-point scale (1 = lower intention, 5 = higher intention)	Adapted from Sweeney and Soutar (2001) Hur, Kim and Park (2012), Yang and Peterson (2004).

Results and discussion

This section presents the results of the two methodological phases of the study: (1) qualitative research, based on in-depth interviews, and (2) quantitative research, carried out through the design and application of a questionnaire.

The results of in-depth interviews are summarized in the following table:

Table 3
Results of in-depth interviews

Question asked	Answers obtained
Are you a man or woman?	5 men and 5 women.
Age?	Age between 32 and 46 years.
Profession?	1 owner of Academia de chino 1 owner of a Chinese restaurant 3 clothing store owners 5 bazaar shop owners (multi-products)
When did you start using WeChat?	Nine out of ten started using WeChat in 2012, while only one person started 2 years later in 2014
Do you use WeChat in your business?	All the interviewees said yes, but only to be able to communicate directly with suppliers, obtain information about news, product news, place orders, etc.
What are the benefits it offers to your business?	Two main advantages. The opportunity to maintain direct contact with suppliers, which reduces the time in activities by not having to go through intermediaries. The ability to receive and consult information at any time and not just depend on when users can communicate with each other. This results in a reduction of time and costs, since WeChat is a free social network.
How much time do you spend a day using WeChat?	Nine out of ten interviewees use WeChat 24 hours a day. Only one uses WeChat 2h a day.

Question asked	Answers obtained
What is the feature you use most?	The Communication function either with providers or with friends and family. The Moments feature allows to view other people's profiles and let those people see yours and your activities.
Do you think that using WeChat has helped you talk to your providers?	Yes, WeCh*et al*lows direct communication with them, you can get immediate answers about products, order situations, etc.
Do you think that using WeChat has increased satisfaction with your providers?	Yes.
Do you think that using WeChat has increased loyalty to your providers?	Yes, they often repeat purchases with them, for the solution and reduction of problems, speed in communication...
Would you recommend using WeChat?	Yes, but the reasons of each participant were different. Because it allows direct conversations between users, improve relationships between them, know different information through the Moments function, meet people through the Shake function. It is an All-in-One app.
Why do you think WeChat is different from other apps?	It is an All-in-One application, which also has features that other applications do not offer. For companies it also allows marketing campaigns at zero cost.
Do you use the application to get information, discounts, promotions… of the products?	In Europe you can only get product information, news, etc., but you can not apply promotions or discounts because the application does not allow it, only discounts that can be applied in physical stores.
Do you think WeChat marketing provides more benefits than other marketing media?	Seven out of ten interviewees stated that WeChat marketing provides more benefits than other media, as it is a free and accessible media for everyone with many opportunities and features. Three out of ten said yes, but they think there are other, more effective means.
Do you buy using the app?	Two out of 10 interviewees confirmed that they make purchases for their businesses, because they can order directly from suppliers. The rest claimed that they only buy in China.

For analyzing the results of the questionnaire, the review of the results of the descriptive statistics was first carried out. First, within the exogenous variables, the variable "functional value in the reduction of time" presented the highest mean (4.11) and the lowest dispersion (1.16), while the variable "functional value in the reduction of costs" registered an average of 3.95 and a dispersion of 1.22. Regarding the dependent variables, "behavioral loyalty" showed the highest mean 4.63, and the lowest standard deviation 0.79. "Attitudinal loyalty" had the lowest average 4.32, and the highest standard deviation 1.00.

Finally, regarding the mode value, all variables, both endogenous and exogenous, presented a value of 5 (see table 5).

Table 5
Descriptive statistics

	Functional value: time reduction	Functional value: cost reduction	I would recommend using WeChat	You intend to continue using WeChat
Average	4.11	3.95	4.32	4.63
Mode	5	5	5	5
Typical deviation	1.16	1.22	1.00	0.79

The results obtained from the regression models indicate that attitudinal loyalty in Model 1 was analyzed as the dependent variable, while the functional value variables in the reduction of time and functional value in the reduction of costs were analyzed as the independent varia-

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bles. In Model 2, behavioral loyalty was set as a dependent variable, keeping the same variables independent of the previous model (see table 6).

Table 6
Results of the Model 1 and Model 2

Model 1 R^2		Model 2 R^2	
0.770		0.592	
Variables	**Non-standardized coefficient**	**Variables**	**Non-standardized coefficient**
Constant	2,008***	Constant	3,171***
Functional value: time reduction	-0.274**	Functional value in time reduction	0.097
Functional value: cost reduction	0.869***	Functional value in time reduction	0.471**

Note. ***p < 0.01; **p < 0.05; *p < 0.10

Analysis of Table 6 reveals that the model fit is slightly higher in Model 1 ($R^2 = 0.770$) compared to Model 2 ($R^2 = 0.592$), indicating a higher percentage of variance explained by exogenous variables relative to the endogenous variable of Model 1.

In Model 1, both exogenous variables positively and significantly influence the behavioral loyalty of WeChat, which are the functional value in cost reduction ($\beta = 0.869$, $p < 0.01$) and the functional value in time reduction ($\beta = -0.274$, $p < 0.05$). In the case of Model 2, there is only one variable that positively and significantly influences the attitudinal loyalty towards WeChat, which is the functional value in the reduction of costs ($\beta = 0.471$, $p < 0.05$), while the other variable, functional value in the reduction of time, does not influence ($\beta = 0.097$) the endogenous variable.

The results indicate that the exogenous variable "functional value in cost reduction" exerts greater influence in Model 1, while in Model 2 this variable is the only one that shows a positive impact on behavioral loyalty. On the other hand, the exogenous variable "functional value in time reduction" does not have a significant effect on the endogenous variable. Table 7 summarizes hypothesis contracting.

Table 7
Summary of hypothesis validation

Hypothesis	Contrast
H_1:	Rejected
H_2	Accepted
H_3	Rejected
H_4	Accepted

The findings confirmed two research hypotheses and rejected the remaining ones. It highlights the importance that Chinese entrepreneurs attach to the functional value of cost reduction, influencing their intention to continue using WeChat and their willingness to recommend it. On the other hand, the functional value associated with time reduction did not show relevant effects on the recommendation, but it did demonstrate a significant impact on the intention to use.

Conclusions

This research has aimed to analyze the influence exerted by functional value, considering as such the reduction of time and costs on the behavioral and attitudinal loyalty towards WeChat on Chinese businessmen living in Spain. For this reason, given the high use of WeChat by this population, it was considered a relevant research objective.

To achieve the research objective, a comprehensive review of the literature on perceived value and loyalty was conducted, which made it possible to formulate four research hypotheses. Prior to this contrast, 10 in-depth interviews were conducted with 10 Chinese entrepreneurs living in Albacete (Spain), which allowed obtaining prior knowledge about the hypotheses formulated. In particular, WeChat was found to play a significant role in reducing costs, while its impact on reducing time was less relevant.

However, to contrast these hypotheses, an online questionnaire was designed taking into account both the revised literature and the results of the qualitative study. After its distribution by email, 57 valid and reliable responses were obtained for the analysis. The analysis of descriptive statistics revealed that the variable functional value derived from the reduction in time manifested the highest mean and the lowest standard deviation of the exogenous variables, indicating homogeneity in the data. Among endogenous variables, behavioral loyalty stood out with similar consistency. Two regression models were proposed: Model 1 incorporated attitudinal loyalty as an endogenous variable, and Model 2 included behavioral loyalty as an endogenous variable. The results showed that the functional value derived from the reduction of costs significantly influences both variables, positively in behavioral loyalty and negatively in attitudinal attitude. On the other hand, functional value in time reduction only showed a positive and significant impact on attitudinal loyalty.

These data allowed to accept two of the proposed hypotheses and reject the remaining ones, highlighting the importance of functional value (derived from the reduction of costs) in loyalty to WeChat, both in its continued use (behavioral loyalty) and in the intention to recommend it (attitudinal loyalty). However, the time reduction only influenced the intention of use, with no significant impact on the recommendation.

This study represents a pioneering contribution to the analysis of the perceived value of the social network WeChat from a business perspective, addressing a line of research practically unexplored in the Spanish context.

The study presents several methodological limitations. Initially, the small sample size and the implementation of non-probabilistic sampling for convenience limit the generalization capacity of the deductions obtained to the reference population, preventing the calculation of the margin of error and affecting the generalization of the findings. In addition, the language of the participants was able to influence the interpretation of the questions and answers, both in the interviews and in the questionnaire. An additional limitation lies in the coexistence of two versions of WeChat (Chinese and international), where the international version presents functional restrictions, which could have altered the perception of functional value among respondents.

As future lines of research, it is suggested: (1) to analyze in depth the Chinese version of WeChat to evaluate its full functionality; (2) to expand the sample size and employ a probabilistic sampling th*et al*lows the generalization of results; and (3) to incorporate a greater number of items in the questionnaire to explore additional exogenous and endogenous variables, thus enriching the analysis and providing a more comprehensive understanding of the object of study.

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Women's economic empowerment: sense of belonging and participation in tourism

Empoderamiento económico de las mujeres: sentido de pertinencia y participación en el turismo

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Abstract: in developing countries like Indonesia, empowering women entrepreneurs plays a crucial role in both business development and the growth of tourist destinations. This study examines the critical role of women's economic empowerment in influencing a sense of belonging, tourism involvement, and willingness to recommend a destination. The respondents in this study are women entrepreneurs who run businesses in areas surrounding tourist destinations. A total of 299 women entrepreneurs participated in the survey. This study employs the structural equation model-partial least square (SEM-PLS) method. The findings reveal that women's economic empowerment enhances the sense of belonging to tourist destinations and increases women's involvement in these destinations. Furthermore, the sense of belonging to a tourist destination has a significant positive impact on women's involvement in the destination. The results also indicate that both a sense of belonging to a tourist destination and women's involvement in the destination positively influence the willingness to recommend the destination. This study provides valuable contributions to both theory and managerial practices.

Keywords: womenpreneurs, empowerment, sense of belonging, women's involvement, willingness to recommend.

Resumen: en países en desarrollo como Indonesia, el empoderamiento de las mujeres emprendedoras desempeña un papel crucial tanto en el desarrollo empresarial como en el crecimiento de los destinos turísticos. Este estudio tiene como objetivo examinar el papel fundamental del empoderamiento económico de las mujeres en la influencia del sentido de pertenencia, la participación en el turismo y la disposición a recomendar un destino. Las encuestadas en este estudio son mujeres emprendedoras que dirigen negocios en áreas cercanas a destinos turísticos. Un total de 299 mujeres emprendedoras participaron en la encuesta. Este estudio utiliza el método de modelo de ecuaciones estructurales con mínimos cuadrados parciales (SEM-PLS). Los hallazgos revelan que el empoderamiento económico de las mujeres mejora el sentido de pertenencia a los destinos turísticos y aumenta la participación de las mujeres en estos destinos. Además, el sentido de pertenencia a un destino turístico tiene un impacto positivo significativo en la participación de las mujeres en el destino. Los resultados también indican que tanto el sentido de pertenencia a un destino turístico como la participación de las mujeres en el destino influyen positivamente en la disposición a recomendar el destino. Este estudio proporciona valiosas contribuciones tanto a la teoría como a las prácticas de gestión.

Palabras clave: mujeres emprendedoras, empoderamiento, sentido de pertenencia, participación de las mujeres, disposición a recomendar.

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Introduction

Women's empowerment is crucial to the current catalyst for inclusive and sustainable industrial growth (Alsaad *et al.*, 2023). It is crucial in facilitating fair and equal access to opportunities, resources, and decision-making processes in many industries. As more individuals recognize the importance of equal opportunities for men, the global discourse on women's empowerment has intensified (Alsaad *et al.*, 2023; Duffy *et al.*, 2015). People view women as inferior and believe they need training and assistance (Figueroa-Domecq *et al.,* 2020). Women's empowerment is a term that refers to the comprehension of gender inequality as the absence of equal access to economic resources (McCall and Mearns, 2021; Zavaleta Cheek and Corbett, 2024). Reducing poverty and bolstering social and economic resilience are two important outcomes of empowering women by promoting gender equality. The active engagement of women in the labor force and leadership roles stimulates innovation and cultivates a more varied and inclusive industrial milieu.

Several research studies have validated a positive relationship between the empowerment of women and the tourist sector (Nassani *et al.*, 2019; Vujko *et al.*, 2019). Women play a crucial role in enhancing the tourist industry and actively participate in various social initiatives (Çiçek *et al.*, 2017; Ferguson, 2011). Women entrepreneurs in the tourist industry frequently operate at a modest, community-based level (Duffy *et al.*, 2015; Knight and Cottrell, 2016). Dadi (2021) elucidates that empowerment may be achieved through education organized by specific communities, such as the Community Learning Activity Centre. These women frequently capitalize on local cultural traditions and knowledge to develop distinctive and genuine tourist experiences that captivate visitors. In addition to generating income for their families, their enterprises also aid in the preservation of local heritage and the advancement of sustainable tourism practices. Although these entrepreneurs operate on a lesser scale, they encounter substantial obstacles, such as restricted access to financing, market networks, and training opportunities. However, their innovative approaches and resilience allow them to play a critical role in empowering other women in their communities and advancing community development.

The involvement of women in the tourist industry contributes to their empowerment by enhancing their economic and social autonomy (Duffy *et al.*, 2015; McCall and Mearns, 2021). According to Firmansyah and Sihaloho (2021), the empowerment of women has the potential to enhance socioeconomic development at the regional level. Through involvement in this industry, women have access to wealth-producing prospects that enable them to provide for their families and make investments in their communities. The attainment of financial independence frequently results in heightened self-assurance and authority in making decisions, both inside their own families and in the wider society. Moreover, participating in tourism-related activities allows women to establish connections, gain new entrepreneurial skills (Vij *et al.,* 2023), and question conventional gender norms. Active participation of women in the tourist sector, particularly through the homestay program, enables them to earn additional money, enhance family bonds, and expand their social impact, all while mitigating domestic violence (Quang *et al.,* 2023).

We identified a research gap where no prior studies have examined the relationship between women's economic empowerment, sense of belonging to a tourist destination, and willingness to recommend a tourist destination. This research focuses on investigating how women entrepreneurs participate in empowerment activities conducted by the government, private sector, or specific communities. The study aims to examine the critical role of women's economic empowerment on sense of belonging, tourism involvement, and willingness to recommend a destination.

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Women economic empowerment

Empowerment is a multidimensional notion (Abou-Shouk *et al.*, 2021). Empowerment, defined as the act of granting authority and control to someone, has served as a means to enhance the overall quality of life for women in both personal and professional domains in recent years (Setyaningsih *et al.*, 2012). Empowerment entails the active participation of women in the decision-making process and their acknowledgment of their role within it (Mathur, 2020) and exertion of control over several facets of an individual's life (Kishor and Gupta, 2004). Empowerment refers to the enhancement of an individual's ability to take action and achieve meaningful objectives (Trommlerová *et al.*, 2015). Zimmerman (1995) has examined four distinct components of empowerment: psychological, political, social, and economic.

The primary objective of this study is to examine women's economic empowerment. Pavlović *et al.* (2022) stated that several chances exist for women to enhance their socioeconomic standing via tourism. Economic empowerment is the measurement of the economic advantages that an individual obtains from tourism (Gautam and Bhalla, 2024). Scholars widely acknowledge the economic empowerment of women as a crucial element in achieving gender equality and promoting global development (Bhojani *et al.*, 2024). Ensuring the economic empowerment of women is essential for achieving sustained economic growth and development, as it effectively breaks the destructive cycle of poverty (Zelu *et al.*, 2024) and human development (Balasubramanian *et al.*, 2024). Women's economic empowerment refers to the capacity of women to achieve economic satisfaction by engaging in purposeful and lucrative forms of employment (Zelu *et al.,* 2024). Uddin and Barua (2024) elucidated that economic empowerment enables women entrepreneurs to actively participate in family expenditures, resource distribution, and decision-making processes.

Women's economic empowerment in tourist destinations has the potential to augment their feeling of affiliation with the area via their engagement and participation in social and economic endeavors. Giving women more power makes them more involved in developing their communities and tourist destinations (Abou-Shouk *et al.*, 2021), thereby fostering stronger emotional connections (Kewalramani and Agarwal, 2014) with their environment. Furthermore, this empowerment often boosts self-confidence (Ma *et al.*, 2021) and a sense of ownership (Seo, 2023), so women think they have had a big part in the region's growth and development, which makes their connection to the tourist destination stronger. Moreover, the empowerment of women promotes the establishment of inclusive communities *(Sarjiyanto et al.,* 2022) and robust social networks, therefore strengthening the sense of togetherness among members of the community. When women are empowered, they are more inclined to take on the role of catalysts for change, advocating for the preservation of local identity and culture (Pitanatri, 2016). This improves the tourist experience and strengthens the feeling of community belonging among the residents. Consequently, women's empowerment yields favorable outcomes for individuals and improves the overall standard of living within the community, thereby strengthening their emotional connection to the tourist destination.

> *H1: Women's economic empowerment has a positive and significant influence on the sense of belonging to tourist destination.*

Women's economic empowerment catalyzes increased participation by women in the tourist industry (Arisanty *et al.*, 2020; Wardhani and Susilowati, 2021), whether in the role of service providers, guides, artisans, or destination managers. Empowered women's presence and involvement in the tourism sector may enhance the authenticity and engagement of visitor experiences. Women's involvement in tourist activities is shaped by social elements

like patriarchal environments, stereotypes, and self-esteem concerns. This underscores the necessity for comprehensive empowerment initiatives and community support (Samad and Alharthi, 2022). Women's involvement in tourism might manifest as their advocacy for effective waste management, preservation of the local biodiversity (Krisnayanti and Saskara, 2024), conservation of the river culture (Arisanty *et al.*, 2020), etc. In the realm of destination development and administration, women occupying significant roles will endeavor to offer viewpoints and methodologies that prioritize humanism and social orientation. The preservation of the sustainability of tourism destinations will be facilitated by the active participation of these women, in addition to attracting visitors.

H2: Women's economic empowerment has a positive and significant influence on women's involvement in tourist destination.

Sense of belonging to tourist destination

Sense of belonging pertains to an individual's impression of being linked, embraced, and integrated into a certain social group or setting (Baumeister and Leary, 1995). The construct is multifaceted and impacted by aspects such as social connections, cultural background, personal experiences, and psychological needs (Hagerty *et al.*, 1992). In most cases, the examination of social connectedness and belonging was conducted within the context of predetermined communities (Ang, 2019; Holt-Lunstad *et al.*, 2019). Sense of belonging means emotional attachment to a destination, which encompasses sentiments of safety, comfort, and belonging to a community in that location (Hidalgo and Hernandez, 2001).

Sense of belonging pertains to an individual's perception of psychological affiliation with other group members or coworkers inside the organization (Baumeister and Leary, 1995). In the context of tourism, a sense of belonging refers to the emotional bond that women entrepreneurs experience inside the community of a tourist destination, which motivates them to collaborate in developing tourist destinations. The presence of a robust feeling of inclusion among female entrepreneurs will influence their involvement to participate in the development of tourist destinations. Procentese *et al.* (2019) elucidated that fostering a sense of community will enhance the participation of community members in mutual contributions. Their propensity to engage in activities such as cultural participation, patronage of local enterprises, maintenance of cleanliness in tourist destinations, and a range of other pursuits is higher.

H3: Sense of belonging to a tourist destination has a positive and significant influence on tourism involvement.

The concept of a sense of belonging to a tourist place pertains to the emotional connection or degree of affiliation developed with a certain destination (Cheng and Kuo, 2015). The concept of emotional connection is synonymous with the feeling of being remembered (Pine and Gilmore, 1999). The level of affiliation that an individual feels greatly impacts their relationship with the local social environment, as well as with the structures and items in their immediate vicinity ((Hagerty *et al.*, 1992). For women entrepreneur, this feeling of belonging engenders a feeling that the destination is an integral part of their identity (Dini *et al.*, 2023), or holds significant importance and significance in their life. Due of this powerful emotional bond, travelers who have a strong feeling of belonging are more likely to be eager to share their experiences with others. They desire that their closest loved ones likewise enjoy the same sense of connection and shared experience. Thus, their inclination to endorse the location to acquaintances, relatives, or even via web evaluations is heightened. Individuals who have a strong emotional attachment to a destination tend to provide more genuine and persuasive recommendations, therefore exerting an impact on the decision-making process of others visiting that place.

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H4: Sense of belonging to a tourist destination has a positive and significant effect on willingness to recommend a destination.

Women´s involvement in tourist destination and willigness to recommend a destination

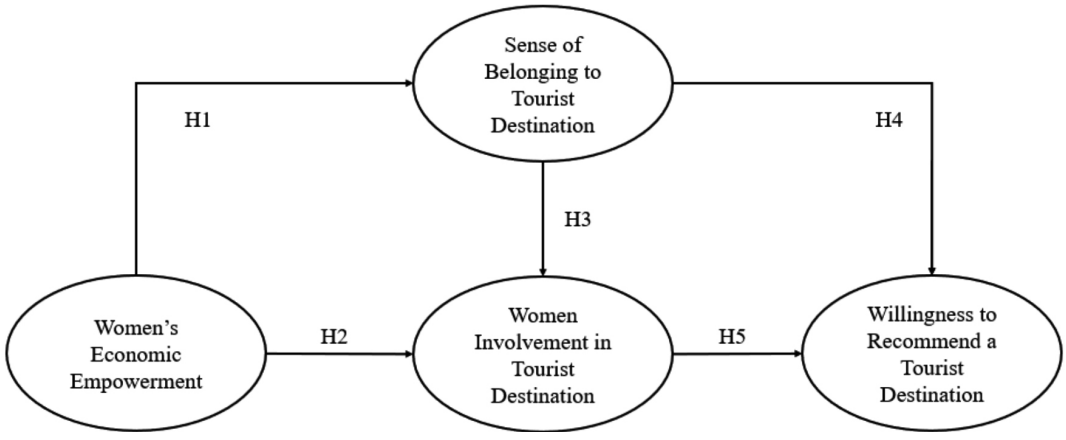
Women's involvement in tourism is any act or procedure in which women participate in the tourism industry. Promoting greater participation of women in the tourist industry is crucial for attaining gender equality (Krisnayanti and Saskara, 2024). Tourist activities offer women an opportunity to participate in the economic sphere. Community participation encompasses several methods that, at the lowest level of the participation hierarchy, begin with basic manipulation of the public and progress into a constructive and significant community engagement specifically aimed at political control (Christens, 2012). Tourism involvement is a mechanism to enhance empowerment for those residing in rural regions lacking sufficient job prospects (Ertac and Tanova, 2020). Women's involvement in tourism can increase tourist destination development (Elshaer *et al.*, 2021; Samad and Alharthi, 2022). These activities serve the dual purpose of generating revenue and fostering skill development, while also enhancing self-esteem and promoting greater autonomy.

Tristanti *et al.* (2021) elucidated the significant contribution of women in the advancement of tourism. The active participation of women in activities in tourist destinations often leads to their emotional attachment. They endeavor to demonstrate a care for tourist locations by providing suggestions to prospective guests. The advice provided to prospective travelers demonstrates their concern and commitment to tourism sites. Research indicates that the inclination to suggest is a crucial factor in demonstrating loyalty towards a tourist location (Lesjak *et al.*, 2015). Engaged visitors typically possess a wider and more comprehensive understanding of the location, therefore enhancing their confidence and enthusiasm in endorsing the site to their circles of friends, family, or network. Simply put, the greater the degree of tourist engagement, the more likely they are to endorse the place since they sense an emotional connection and contentment that motivates them to share their experiences.

H5: Women's involvement in tourist destinations has a positive and significant effect on Willingness to recommend a destination.

Based on the explanation of the hypotheses above, we propose the following research model:

Figure 1
Proposed research model



Materials and methods

The participants of this study consist of female entrepreneurs who run enterprises located near tourism destinations in several towns in Sulawesi, Indonesia. Makassar, North Toraja, Tana Toraja, Gowa, Kendari, Bulukumba, Selayar, Wakatobi, Buton, Palu, Bone, Poso, Manado, Tomohon, Tondano, Likupang, and Bunaken are among the cities in the region. The total respondents were 299 female entrepreneurs. A significant proportion of the participants, specifically 236 respondents (78.93%), have either finished high school or obtained a bachelor's degree (S1). This suggests that most respondents possess a somewhat advanced level of education. In addition, the participants cover a range of age categories, with the bulk falling between 31 and 45 years old, amounting to 119 respondents (39.80%). The educational attainment and age of these female entrepreneurs indicate that they have considerable potential and competence to make valuable contributions to the growth of the tourist sector. Their young age and advanced education suggest they are likely to be flexible in response to change and innovative, crucial elements for maintaining and expanding tourism in a competitive economic climate.

Table 1
Profile of the irespondent

Education Level	17 - 30 years old	31 - 45 years old	46 - 60 years old	< 17 years old	> 60 years old	Total
Postgraduate	3	2	1	0	0	6
S1	37	40	14	0	0	91
Diploma	6	12	1	0	0	19
High School	47	48	45	2	3	145
Junior High School	1	10	11	0	1	23
Elementary School	0	6	7	0	1	14
Not in School	0	1	0	0	0	1
Total	94	119	79	2	5	299

This study has four key constructs: women's economic empowerment, sense of belonging to a tourist destination, women's involvement in a tourist destination, and willingness to recommend a tourist destination. Each construct is measured using items adapted from previous literature. The indicators for women's economic empowerment were adapted from Abou-Shouk *et al.* (2021) and Scheyvens and van der Watt (2021), the sense of belonging to a tourist destination was adapted from Haim-Litevsky *et al.* (2023) and Hagerty *et al.* (1992), women's involvement in a tourist destination was adapted from Scheyvens and van der Watt (2021) and Samad and Alharthi (2022), and willingness to recommend a tourist destination was adapted from Lesjak *et al.* (2015). Every item in the questionnaire was assessed using a 5-point scale, with 5 representing strong agreement and 1 representing extreme disagreement. The developed items can be found in Table 2. The analysis used is a covariance-based structural equation model. We used Amos version 26 to process the data

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Table 2
Measurement

Latent variable	Elements
Women's Economic Empowerment	1. Tourism ensures a decent economic income for women in my area. 2. Tourism provides opportunities for income growth for me as a female entrepreneur in my area. 3. Through tourism, I can support my financial independence and that of my family.
Sense of Belonging to Tourist Destination	1. I have a strong sense of ownership toward the tourist destinations around me. 2. I should be a member of the tourism development community in my area. 3. I am committed to helping develop tourist destinations in my area. 4. I am willing to invest my time in the development of tourist destinations in my area.
Women's Involvement in Tourist Destination	1. I'm pleased to have the opportunity to access the tourism market by promoting local products/services. 2. I am happy to be involved in tourism activities, particularly in preserving tourist sites. 3. I believe that my presence in tourism activities is important for maintaining the sustainability of tourism in my area
Willingness to recommend a Tourist destination	1. I will recommend the tourist destinations in my area to many people. 2. I always talk about the tourist destinations in my area with my friends. 3. I always spread good news and positive information about the tourist destinations in my area

Results and discussion

Measurement model

Hair *et al.* (2021) reveals that the measurement model specifies the approach for measuring the latent variables. Essential components of the measuring paradigm are validity and reliability. The findings of the validity and reliability testing study show th*et al*l tested items had factor loadings (FL) over 0.50, indicating strong convergent validity for all items. This indicates that the items reliably assess the targeted concepts. Furthermore, the Average variation Extracted (AVE) values for all latent variables exceed 0.50, suggesting that most of the variation explained by the constructs is attributed to pertinent items rather than measurement errors. Overall, the Composite dependability (CR) scores for all constructions surpass 0.70, indicating a high level of dependability for these constructs. Furthermore, the Cronbach's Alpha (CA) values, which exceed 0.70, provide additional evidence that the items within each construct reliably assess the same notion. Hence, the instrument employed may be considered valid and trustworthy for quantifying the variables in this investigation. The findings are displayed in Table 3.

Table 3
Validity and reliability test

Latent variable	Elements	M	SD	CF	AVE	FC	CA
Women's Economic Empowerment	WEE1	4.17	0.831	0.904	0.688	0.888	0.749
	WEE2	4.25	0.772	0.851			
	WEE4	4.11	0.905	0.565			
Sense of Belonging to Tourist Destination	SOB1	4.07	0.977	0.677	0.599	0.913	0.858
	SOB2	3.98	0.983	0.720			
	SOB3	4.25	0.872	0.903			
	SOB4	4.05	0.924	0.789			

Latent variable	Elements	M	SD	CF	AVE	FC	CA
Women's Involvement in Tourist Destination	WI1	4.29	0.794	0.797	0.746	0.920	0.863
	WI2	4.31	0.781	0.871			
	WI3	4.28	0.791	0.803			
Willingness to recommend a Tourist destination	WRD1	4.33	0.803	0.831	0.616	0.929	0.875
	WRD2	4.28	0.883	0.862			
	WRD3	4.35	0.785	0,821			

Note: M= Mean; SD= Standard Deviation; FL= Factor Loading; AVE: Average Variance Extracted; CR= Composite Reliability

Structural model

A structural model examines the interrelationships among latent variables (Hair *et al.*, 2021). There are 5 hypotheses tested. The table of hypothesis testing (See Table 3) findings indicates th*et al*l hypotheses postulated in this study were accepted, with a significance level of $p < 0.05$. The first hypothesis (H1) demonstrates that women's economic empowerment has a robust and statistically significant impact on their sense of belonging to tourist destinations. The calculated coefficient for this effect is 0.615, and the p-value is 0.001. This finding suggests that there is a positive correlation between the level of economic empowerment experienced by women and their sense of belonging to tourist places. This finding aligns with the existing body of research that asserts the significance of economic empowerment in enhancing individual affiliation with a community or location. Furthermore, the second (H2) and third (H3) hypotheses also provide statistically significant findings. The hypothesis H2 posits that there is a positive correlation between Women's Empowerment and Women's Involvement as Entrepreneurs in tourist locations, with an estimated coefficient of 0.289 and a p-value of 0.001. Meanwhile, the third hypothesis (H3) indicates that the sense of belonging to a tourist destination has a favorable impact on women's involvement as entrepreneurs, with an estimated coefficient of 0.650 and a statistically significant p value of 0.001. These results underline the importance of a sense of belonging to a tourist destination as a factor that drives women's involvement in entrepreneurial activities in the tourism sector. The fourth (H4) and fifth (H5) hypotheses are also accepted, confirming that both Sense of Belonging and Women's Involvement have a significant effect on the Desire to Recommend a Tourist Destination to Others.

Table 4
Hypothesis testing

Hypothesis	Estimate	S.E.	C.R.	P Value	Result
H1: Women's Economic Empowerment → Sense of Belonging to Tourist Destination	0.615	0.102	6,034	0.001	Accepted
H2: Women Empowerment → Women's Involvement in Tourist Destination	0.289	0.072	3,996	0.001	Accepted
H3: Sense of Belonging to Tourist Destination → Women Involvement in Tourist Destination	0.650	0.070	9,056	0.001	Accepted
H4: Sense of Belonging to Tourist Destination → Willingness to Recommend a Tourist Destination	0.490	0.106	4,627	0.001	Accepted
H5: Women's Involvement in Tourist Destination → Willingness to Recommend a Tourist Destination	0.262	0.106	2,480	0.013	Accepted

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Discussion

The results of this study indicate that the higher the level of women's economic empowerment, the stronger the sense of belonging to the tourist destination. Previous research findings indicate that employees in the tourism industry are generally more proficiently trained than the national average and would be more effectively used in other economic sectors from a national standpoint (Jiménez-Marín *et al.*, 2021). Achieving empowerment in local communities can improve the economic well-being and general standard of living for the local people, especially women (Othuman Mydin *et al.*, 2014). The enhancement of economic empowerment among women facilitates their active engagement in economic endeavors, therefore fostering a deeper emotional connection to the destination. This emotional connection is significantly shaped by the notion that tourism in the vicinity of their company site has a profound impact on them or their families. This statement aligns with the assertion made by Tse (2014) that Tourism has the potential to impact persons' self-perceptions, location of residence, neighborhood, employment, social network, family, and overall life-lived experiences. Women entrepreneurs become increasingly emotionally engaged and actively participate in the development of tourism places. Participation in this activity incentivizes women to provide financial support and fortifies their social and emotional connections within the community in the selected area. The perception of affiliation with a tourist location might significantly influence women's choices to persist in their contributions and investments towards it.

The present study elucidates the considerable favorable impact of women's economic empowerment on their participation in tourism destinations. Boley *et al.* (2014) explains that personal economic benefits can increase support for tourism. Support for tourism can be in the form of involvement in tourism development (Boonsiritomachai and Phonthanukitithaworn, 2019). This empowerment may manifest as the provision of educational opportunities, skills development, and assistance from both the community and the government. The provision of this assistance enhances the prospects for women to initiate and oversee enterprises within the tourist industry (Zavaleta Cheek and Corbett, 2024). By participating in tourism, they enhance their economic standing and make valuable contributions to the social and cultural progress of tourist locations. Furthermore, the participation of female entrepreneurs in the tourist sector might introduce fresh and inventive viewpoints that enhance the industry (Setyaningsih *et al.*, 2012). The results of this study provide evidence that women's empowerment initiatives are crucial components of a sustainable tourist development plan.

Furthermore, a sense of belonging to a tourist destination has a very significant influence on women's involvement in a tourist destination. This demonstrates that when women experience a profound emotional connection to a tourist area, they are more inclined to actively participate in tourism initiatives in that specific place. This feeling of belonging might emerge from individual experiences, familial background, or strong social connections with the surrounding community (Haim-Litevsky *et al.,* 2023; Seo, 2023). This strong emotional connection motivates female entrepreneurs to perceive the destination as a location for conducting business and an integral component of their own identity. Therefore, a feeling of belonging becomes a powerful motivating element to sustain and enhance their economic activities in tourist places. Furthermore, this engagement can enhance their social ties and commercial networks within the surrounding community. Furthermore, these results emphasize the need of comprehending and enhancing emotional connections to locations in order to get more women engaged in the tourism industry.

The sense of belonging to a tourist destination has a notable and favorable impact on the willingness to recommend a tourist destination. A person's inclination to promote a trip to others is directly proportional to the intensity

of their connection to that destination. The feeling of belonging fosters a willingness among individuals to share their favorable experiences and motivates others to visit the same location. Furthermore, this feeling of belonging might evoke a sentiment of social obligation to advance the destination, particularly if the person believes that the prosperity of the destination is connected to the well-being of the local population. Individuals who experience a strong sense of connection to a location are more inclined to assume the role of active tourism advocate. This phenomenon contributes to the augmentation of tourist arrivals and enhances the favorable perception of the place among prospective tourists.

The study's findings indicate that women's involvement in tourist destinations has a favorable and substantial impact on willingness to recommend a tourist destination, therefore affirming the significance of women's contributions to the tourism sector. This engagement may encompass a range of tasks, spanning from overseeing local enterprises to actively contributing to the growth and marketing of locations. Higher levels of female involvement are associated with a heightened sense of ownership and commitment to the place, thereby fostering a propensity to promote it to others. Furthermore, the participation of women may enhance the caliber of services and tourism experiences, therefore bolstering tourist allegiance and fortifying the reputation of the location in the perception of tourists.

There exist several theoretical implications within this work. Firstly, enhancing the correlation between the perceived sense of belonging and customer behavior. The discovery that the feeling of belonging significantly impacts the engagement of women entrepreneurs and their inclination to suggest tourism locations enhances the current body of knowledge on the capacity of emotional connection to shape consumer behavior. This study validates that the feeling of belonging is an outcome of engaging in economic activities and a powerful motivating mechanism for advocacy action. Secondly, the investigation of the philosophy of engagement and social roles in tourism. This study provides evidence in favor of the hypothesis of involvement, which posits that the participation of women in tourism activities has a substantial influence on their conduct in promoting tourist destinations. This paper expands upon the current theoretical framework by incorporating aspects of social and emotional engagement as significant determinants in mobilizing tourist advocacy. This paper examines the correlation between empowerment and economic involvement. The empirical evidence from the conclusion that women's empowerment influences their engagement in tourism supports the hypothesis that empowerment is connected to economic participation. These findings indicate that empowerment plays a crucial role in enhancing personal welfare and in fostering community economic growth by increasing participation in the tourist industry.

There exist several theoretical implications within this work. Firstly, enhancing the correlation between the perceived sense of belonging and customer behavior. The discovery that the feeling of belonging significantly impacts the engagement of women entrepreneurs and their inclination to suggest tourism locations enhances the current body of knowledge on the capacity of emotional connection to shape consumer behavior. This study validates that the feeling of belonging is an outcome of engaging in economic activities and a powerful motivating mechanism for advocacy action. Secondly, the investigation of the philosophy of engagement and social roles in tourism. This study provides evidence in favor of the hypothesis of involvement, which posits that the participation of women in tourism activities has a substantial influence on their conduct in promoting tourist destinations. This paper expands upon the current theoretical framework by incorporating aspects of social and emotional engagement as significant determinants in mobilizing tourist advocacy. This paper examines the correlation between empowerment and economic involvement. The empirical evidence

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from the conclusion that women's empowerment influences their engagement in tourism supports the hypothesis that empowerment is connected to economic participation. These findings indicate that empowerment plays a crucial role in enhancing personal welfare and in fostering community economic growth by increasing participation in the tourist industry.

Conclusions

The findings of this study indicate that the economic empowerment of women has a notable influence on their emotional connection to the tourist destination. Consequently, this emotional attachment further influences their participation in tourism enterprises and their inclination to suggest the destination to others. This finding demonstrates that the empowerment of women enhances their involvement in the economic domain and reinforces their social functioning within the tourist community. This discovery underscores the need to implement a comprehensive empowerment approach that addresses the economic dimension and the social and emotional growth of women within the tourism sector. Furthermore, the study demonstrated that a strong feeling of belonging has a significant role in motivating female entrepreneurs to actively engage in tourism and in promoting tourist destinations. This suggests that emotional connection to the destination is essential for the long-term viability of the tourism sector.

Study is subject to two limitations. Firstly, the study was carried out during a certain duration, which implies that it was not possible to longitudinally assess the dynamic changes in the tourist business or the economic challenges faced by women. The analysis offers a momentary depiction at a certain moment, which may not accurately represent dynamic changes that take place over time. Hence, the reported findings may not accurately represent enduring patterns or the influence of recently introduced measures. Secondly, due to the failure to take into account several crucial factors, it is plausible that other unquantified variables, such as government assistance, tourism infrastructure, or the impact of technology, also exert effect on the outcomes. These constraints indicate that the findings of this study should be construed with prudence and should be supplemented by research that take into account other pertinent factors.

Considering the described constraints, we suggest two areas for further investigation. Firstly, a longitudinal study. A potential future study might be undertaken in a longitudinal manner to assess the temporal evolution of the correlation between women's empowerment, sense of belonging, and engagement in tourism. Longitudinal studies offer a more profound understanding of how shifts in economic, social, and political aspects impact women's participation and the long-term viability of destinations. Furthermore, it is recommended that future studies investigate the impact of governmental laws and regulations on the empowerment of women within the tourist industry. This entails examining the impact of fiscal regimes, training initiatives, and small company restrictions on the participation of women in the tourist sector. Gaining a deeper comprehension of the function of policy enables decision-makers to create more efficient approaches to assist women entrepreneurs in tourist areas.

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Productivity in Latin America. An analysis using a Cobb-Douglas function

La productividad en América Latina. Un análisis a través de una función Cobb-Douglas

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Resumen: en América Latina el limitado crecimiento de la actividad económica se ha caracterizado por su fuerte correlación con la baja productividad, es por ello que se analiza el comportamiento de la Productividad Total de los Factores (PTF) en esta región. El objetivo de esta investigación es examinar el papel del trabajo (L), el capital (K) y el cambio tecnológico (A) en la evolución de la PTF en América Latina durante el periodo 1990-2019. Se instrumenta un modelo de datos panel mediante el estimador de "Grupo de Medias Agrupadas" (PMG), para catorce economías durante 29 años. En los resultados se evidencia la existencia de dependencia transversal y raíz unitaria de orden I(1). Se presenta una relación de largo plazo entre las variables y se encuentra que el trabajo (L), el capital (K) y el cambio tecnológico (A) inciden positivamente en la PTF. Se encontró que, en el corto plazo, el capital (K) tiene un impacto mayor que el cambio tecnológico (A) en la PTF; mientras que, en el largo plazo es el cambio tecnológico (A) el que más influye. El modelo muestra una velocidad de ajuste del 18 %, lo que implica un tiempo de corrección estimado de 5.5 años. En conclusión, en el trabajo se da cuenta de la importancia de fortalecer la innovación y el desarrollo tecnológico en la región, para mejorar la productividad y el crecimiento económico.

Palabras clave: Productividad Total de los Factores (PTF), crecimiento económico, datos panel, función de producción Cobb-Douglas, Grupo de Medias Agrupadas (PMG).

Abstract: in Latin America, the limited growth of economic activity has been characterized by its strong correlation with low productivity, which is why the behavior of Total Factor Productivity (TFP) in this region is analyzed. The objective of this research is to examine the role of labor (L), capital (K), and technological change (A) in the evolution of Total Factor Productivity (TFP) in Latin America during the period 1990-2019. A panel data model is implemented using the "Pooled Mean Group" (PMG) estimator for fourteen economies over a period of 29 years. The results show the existence of cross-sectional dependence and a unit root of order I(1). A long-term relationship between the variables is presented, and it is found that labor (L), capital (K), and technological change (A) positively impact TFP. It was found that, in the short term, capital (K) has a greater impact than technological change (A) on TFP; whereas, in the long term, it is technological change (A) that has the most influence. The model shows an adjustment speed of 18%, which implies an estimated correction time of 5.5 years. In conclusion, the work highlights the importance of strengthening innovation and technological development in the region to improve productivity and economic growth.

Keywords: Total Factor Productivity (TFP), economic growth, panel data, Cobb-Douglas, Pooled Mean Group (PMG).

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Introduction

Latin American context

Slow economic growth is a problem that has characterized Latin America, according to data from the World Bank (2023), since the 1990s the countries that make up this region have had a percentage growth of their Gross Domestic Product (GDP) of 2.5%, below the world average, which for these years was 2.9% per year. This situation can be due to several structural factors; however, it is also associated with the efficiency of economies and their productivity (ECLAC, 2016).

The growth of economic activity is correlated with productivity. In the Latin American context this situation has revealed a delay, which limits the development of these countries. The analysis of Total Factors Productivity (TFP) represents a fundamental element for middle-income economies, and since it explains a part of the lag that they face, several authors identify that it is through the improvement in productive efficiency where they can close the gap in income distribution (Kim and Park, 2017; Yalçınkaya *et al*., 2017).

In Latin America there is a great limitation associated with the informality of the economy, hence workers do not have access to social security directly, affecting their productivity, and companies are outside the fulfillment of their fiscal obligations which limits access to financing (Aravena and Fuentes, 2013; Ros, 2008). This factor that has characterized the region affects the performance of the factors of production, and therefore the TFP.

Additionally, it is considered that technological progress in the region, an element that should be fundamental to achieve economic growth, has not played a key role in the development of TFP; this fact is evidenced in the light of a limited number and below the global average of patent applications (World Bank, 2023c), and low investment in R&D (World Bank, 2023b), demonstrating the technical inefficiency of the economies involved in this article that limit the development of their TFP, which negatively affects their economic growth.

Fundamentals

In this work, TFP has an important role since it is a macroeconomic indicator that is framed in the accounting of growth, which identifies the performance of factors of production labor (L), capital (K) and technological change (A) as determinants of production in the sense of Cobb-Douglas (1928), so, that its analysis is very useful for the application of economic policy measures (Barro and Sala-i-Martin, 2012).

The objective of this work is to analyze the behavior of production factors in the development of TFP for Latin American economies during the period 1990-2019. The first contribution of this research is related to the use of the Group estimator of Grouped Means proposed by Pesaran *et al*. (1999), which allows estimating the long-term coefficients and the error correction coefficients, while generating the specific short-term coefficients through a maximum likelihood estimate. The second contribution of the research is that it tests the hypothesis that labor, capital, as well as technological change have been the determinants of TFP of Latin American economies during the period 1990-2019, this from the Cobb Douglas production function.[1]

This work is divided into six sections. The first presents the introduction. The second corresponds to the review of the literature, specifically the production function and growth models. The third shows the empirical evidence of the variables. The fourth develops the methodology and databases. The fifth section presents and analyzes the results Finally, the sixth section presents the conclusions derived from this study.

1 Technique used to measure the rate of productivity growth of an economy by subtracting the growth that is due to the accumulation of growth factors (Weil, 2006).

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Revisión de literatura

Desde sus inicios, la ciencia económica ha tenido como objetivo analizar el crecimiento de los países, así como sus diferencias, desde la perspectiva neoclásica es posible abordar los elementos que son determinantes en la producción de un país, a partir del desempeño de los factores de la producción, es decir, del trabajo y del capital, así como del cambio o avance tecnológico, es por ello que en este apartado se realiza un análisis de las teorías que han explicado estas disparidades, tomando como base la función de producción Cobb-Douglas (1928).

Función de producción Cobb-Douglas

Literature review

Since its inception, economic science has aimed to analyze the growth of countries, as well as their differences. From the neoclassical perspective, it is possible to address the elements that are essential in the production of a country, from the performance of the factors of production, i.e., labor and capital, as well as change or technological advancement. For this reason, in this section an analysis of the theories that have explained these differences is made, taking as a basis the Cobb-Douglas production function (1928).

Cobb-Douglas production function

The background of the production function is found, on the one hand, in Clark's (1899) and Wicksteed's (1894) theory, which propose that it is possible to determine the size of production from the combination of labor and capital factors. On the other hand, there is the influence of Wicksell (2001), who highlights the importance of analyzing economic cycles, identifying that they are consolidated from an external force, which he called technical progress. Later, Cobb and Douglas (1928), make a contribution grounded in the empirical evidence of the U.S. economy.

In their work, Cobb and Douglas (1928) present from the information of the manufacturing industry of the United States the function of neoclassical production, expressed in the following terms:[2]

$$Y = AK^{\alpha}L^{\beta}$$

where:

Y= Production.

A= Technological progress or TFP.

K= Capital stock or capital factor (set of goods or assets used to produce).

L= Number of workers or labor factor.

α = Parameter indicating the productive capacity of the capital factor.

β= Parameter indicating the productive capacity of the labor factor.

The parameters indicate the rate of change that labor or capital exerts in the production of manufacturing industry, so that the first derivative indicates the proportion of the variation that factors have in the growth of production, i.e., the marginal productivity of capital (α) and labor (β) is presented.

Cobb and Douglas (1928), consider in their article that there are constant returns, i.e., the sum of the parameters is equal to 1, however, there are other cases such as decreasing returns, where adding the parameters gives a result lower than the unit, while if it were greater than 1 would be classified as increasing returns to scale. Cobb and Douglas (1928) mention that production, labor and capital are related, so that, if the latter two are multiplied by a factor, production increases in that amount, that is in m times, i.e., production is a first-degree homogeneous labor and capital function.

The result of Cobb and Douglas (1928) is in congruence with the production function of Clark (1899) and Wicksteed (1894). The authors consider that it is possible to quantify from the method of Ordinary Least Squares (MCO); with this contribution to economic theory, they present an innovative proposal in the studies of economic growth.

2 In the original document, the coefficients with nomenclature P', L and C are considered.

Growth Models

Within the framework of the neoclassical approach, there are various perspectives that explain economic growth. On the one hand, there are those theories that identify growth in an exogenous way, i.e., the variables that explain economic growth are outside the model, in addition, the idea that once the stationary state has been found, the capital-product relationship does not vary, thus obtaining a fixed relationship. This would imply that in the long term, productive activity is limited by exogenous factors on both the supply and demand (Perrotini *et al*., 2019). On the other hand, there are theories that determine that the growth rate is not in a steady state, therefore, human capital should be encouraged, as well as its capabilities and abilities, which would lead to an improvement in the technological factor (Jiménez, 2011).

During the 1950s to the 1990s, exogenous growth models that identified the so-called steady state predominated, where factors of production, labor, and capital did not cause an increase in output growth, i.e., they caused diminishing returns. Therefore, an exogenous force could cause this situation, i.e., this phenomenon can be observed from the technological advances of the countries, and the main exponent of this current is Solow (1956). It recognizes that, in the long term, it will be the increase in the saving rate and technological progress, i.e., the variations in constant A, that will cause economic growth. The optimal growth model developed from the works of Ramsey (1928) and later retaken by Koopmans and Cass (1965), show from the microeconomic perspective the decision of households and companies between savings and consumption, and how this situation will affect intertemporal well-being and economic growth return to the idea of technological progress exogenously.

The growth model of Mankiw *et al*. (1993), takes up the ideas of Solow's residue identifying that said author would be right to consider the factors of production, however, a greater weight should be given to the factor work since it will be the workforce which, through their skills and knowledge, generate a change in economic growth. In short, exogenous growth models identify that, in the long term, the only way to generate an increase in output will be if technological improvements are implemented.

During the 1990s, economic studies showed a strong rejection of the so-called stationary state, thus endogenizing the variables th*et al*low to achieve a growth of production. According to various authors, the role of workers will be decisive and does not come from foreign or external sources, because it is this factor either through the acquisition of knowledge and skills, or by the positive externalities generated by R&D that increases their productivity and therefore economic growth in a sustained way (Romer, 1986; Baumol, 1986; Lucas, 1988). In addition, there are other works that identify the importance of public spending and investments in R&D, as well as stability in monetary and fiscal policies and the role of institutions as elements that promote economic growth (Barro, 1991; Rebelo, 1991; Howitt, 2004).

To sum up, endogenous models consider that, in order to achieve economic growth in a sustained way, it is necessary to encourage human capital, and this will be possible through investment in R&D, since it generates positive externalities, such as the increase in productivity in this factor. In other words, it will be possible to have increasing or constant returns to scale, together with the role of institutions and macroeconomic stability to achieve economic expansion of countries.

Empirical evidence

The literature review allows to identify some aspects of TFP in different contexts, in this sense, there are works that consider the role that TFP has had in economic growth (Hofman *et al*., 2017; Kim and Park, 2017; Villalobos *et al*., 2021; Yalçınkaya *et al*., 2017). Other studies focus on quantifying the contribution of production factors in TFP growth (Ayvar and Guitrón, 2013; Maudos *et al*., 1999; Nguyen, 2021; The Conference Board, 2023). In addition, there is empirical evidence that analyzes the impact on TFP of other variables such as macroeconomic imbalances, terms of trade, volatility in trade or importance in R&D (Dańska-Borsiak and Laskowska, 2012; Gutiérrez Villca, 2020; Méndez *et al*., 2013).

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In the studies that aim to study the influence of TFP on economic growth, it is possible to generalize the similarities that exist in the results to which various authors arrive that reveal the importance of TFP, even above the factors of labor and capital production in economic growth (Kim and Park, 2017; Yalçınkaya *et al*., 2017). Latin American studies show evidence in this regard, since they present negative contributions in TFP growth, this being a consequence and explanation for the low economic growth (Hofman *et al*., 2017; Méndez *et al*., 2013; Villalobos *et al*., 2021).

The works that analyze the contribution of factors production consider, on the one hand, that the labor or human capital factor influences TFP more significantly (Ayvar and Guitrón, 2013; Maudos *et al*., 1999), while for other studies it is the capital factor that has the greatest impact on TFP (Nguyen, 2021; The Conference Board, 2023), but these results should be considered for different economies in different contexts.

There are Latin American studies, not framed in the production function approach, that consider variables that explain the behavior of TFP. On the one hand, there are studies that directly relate TFP with technical efficiency, technological progress, terms of trade, Foreign Direct Investment, savings, average productivity per worker, schooling and life expectancy (Gutiérrez, 2020; Méndez *et al*., 2013; Ramírez and Aquino, 2005). On the other hand, Gutiérrez (2020) finds a negative relationship of TFP with macroeconomic imbalances, volatility in trade, informality, fertility rate, inequality and external crises. Finally, Ramírez and Aquino (2005), present an inverse relationship between inflation crises and TFP.

The revised papers emphasize the importance of the R&D variable, since it will be the efforts in technological progress that cause the increase in TFP, and thus generate higher economic growth (Dańska-Borsiak and Laskowska, 2012; Méndez *et al*., 2013; Nguyen, 2021).

More recent studies analyze the behavior of East Asian economies, through panel data methodologies, adding other elements in which they stand out: real investment, the accumulation of physical capital, the number of average hours of work, the development of human capital, as well as the internal rate of return as key factors in TFP growth (Lee and Viale, 2023). The work conducted by Rehman and Islam (2023), focuses on the BRICS economies and highlights the importance of financial infrastructure in both the short and long term, trade openness, FDI, human capital, innovation and institutional quality as factors that affect TFP.

In another study approach, the importance of green TFP (GTFP), as an efficiency measure aimed at environmental sustainability, is highlighted. On the one hand, traditional factors of production are considered, and on the other hand, impact is integrated into the environment, promoting more sustainable approaches. This type of work has greater application in the Chinese economy (Jiakui *et al*., 2023; H. Liu *et al*., 2023; Liu *et al*., 2023). Likewise, there are works that analyze the impact of digital technology (Pan *et al*., 2024), green finance (financial flows for sustainable projects) (Feng *et al*., 2024; Yue *et al*., 2024), as well as the development of the internet and mobile broadband for determining green TFP (Edquist, 2024; Wen and Deng, 2024).

Materials and methods

In this research, growth models are analyzed using panel data methodology. The benefits of this type of models compared to a typical cross-sectional model have been taken into account, or they would also be able to control individual heterogeneity and identify the effects that would have been undetectable in traditional time series data.

In this paper, the empirical specification of the panel data model is as follows:

$$InPTF_{it} = \theta_{0i} + \theta_1 lnK_{it} + \theta_2 InL_{it} + \theta_3 InA_{it} + u_{it} \quad (1)$$

Where the value represents the average of the variables in the long term, such that the logarithm of TFP is based on the logarithm of the capital factor (K); secondly, the logarithm of the labor factor is considered and finally the TFP is defined by technological change and is the error term.

As specified by Pesaran *et al*. (1999), it is possible to carry out a reparameterization in order

to make a PMG estimate, leaving the equation in the following terms:

$$\Delta PTF_{it} = \phi_i \text{PTF}_{i.t-1} + K_{it}\beta_1 + L_{it}\beta_2 + A_{it}\beta_3 + \sum_{J=1}^{p-1} \lambda_{ij}^{*} \Delta PTF_{i.t-j} + \sum_{J=0}^{q-1} \Delta K_{i,-j} + \sum^{q-1} \Delta L_{i.-j}\, \delta_{ij}^{*} + \sum^{q-1} \Delta L_{i.-j}\, \delta_{ij}^{*} + \mu_i \iota + \varepsilon_{it} \quad (2)$$

where:

φi: = Error correction rate parameter of the adjustment term.

PTF_{it}= Vector of T x 1 of the observations of the dependent variable in Latin American economies.

K_{it}= T matrix of observations on the regressors of the capital independent variable that vary between groups in the time period.

L_{it}= T matrix of observations on the regressors of the independent variable work that vary between groups in the time period.

A_{it}= T×k matrix of observations on the regressors of the independent variable technological change that vary between groups in the time period.

ι = (1,…, 1) is a vector T x 1 of the PTFi,-j, K i-j, L i-j, A i-j are j lagging values of the period of PTFit, Kit, Lit and Ait.

λ_{it} = Scalars.

δ= Vectors of coefficients k x 1.

ε_i= Error term.

Transverse dependence test

Pesaran (2004) proposes a statistic by eliminating the calculation method that had traditionally been considered, i.e., the spatial matrix was incomplete to specify if the data had dependence. This metric did not allow the capture of common factors (economic or sociopolitical) that are determinants and that generate dependence. The Pesaran CD test (2004), is a valid routine when N and T →∞ under any order.

$$CD = \sqrt{\frac{2T}{N(N-1)}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N} \hat{\rho}ij\right)} \sim N(0,1)1 \quad (3)$$

Decision-making to determine whether or not there is cross-sectional dependence assumes that the uit error term is independent and identically distributed (i.i.d.) over periods and among cross-sectional units (Pesaran, 2004).

CADF Unit Root Test

Variables that are observed over time require a series of tests that ensure that they are stationary "generally speaking, a series of time is stationary if its mean and variance do not vary systematically over time" (Gujarati and Porter, 2010).

There is a methodology thet allows identifying the unit root when there is dependence on the cross section (Im *et al*., 2003), thus relaxing the assumption of cross-sectional independence that the first-generation tests contested since "they were quite restrictive and unrealistic in macroeconomic applications" (Hurlin and Mignon, 2006, p. 3).

The stationarity test (Im *et al*., 2003) consists of increasing the standard regressions with the cross-section averages, starting from the lags and the first differences for each series, thus having simple averages increased transversely, which would result in a new statistic called CADF. The development of the model is specified from the standard Dickey-Fuller regressions with the average of the cross-section of the lagging levels and of the first differences.

A model for N cross-sections observed at T periods is considered:

$$Y_{it} = (1 - \phi_i)\mu_i + \phi_i Y_{it-1}) + \varepsilon_{it} \quad (4)$$

The interest results in the values of testing the null hypothesis of unit roots for all i (Hi = 1), which can be expressed in the following equation:

$$\Delta Y_{it} = \alpha_i + \beta_i Y_{it-1} + \varepsilon_{it} \quad (5)$$

Where:

$\alpha_i = (1 - \varphi_i)\mu_i$

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$\beta i = -(1 - \varphi_i)$

$\Delta Y_{it} = Y_{it} - Y_{i,t-1})$

Co-integration

Panel data models have the possibility of establishing long-term relationships which can be verifiable through the cointegration test. Traditionally, the test required that short-term parameters be equal to long-term ones, which would show a failure to put a common factor constraint. The test proposed by Westerlund (2007), is designed under the null hypothesis of non-cointegration.

The cointegration model developed by Westerlund (2007), can be specified as follows.

It is considered the next data generation process

$$y_{it} = \phi_{1i} + \phi_{2i} t + z_{it}$$
$$x_{it} = x_{it-1} + v_{it} \quad (6)$$

Where it is a deterministic scalar, the vector is a random walk and is the stochastic term. While t = 1,…,T and i = 1,…,N express the time series and cross-section units, respectively.

The cointegration test presented consists of four statisticians, two of them group the information about the error and are called panel statistics (Gt and Ga), while the others show the statistics (Pa and Pt) of the means in the groups, suggesting that at least some unit is cointegrated (Persyn and Westerlund, 2008).

Pooled Mean Estimator for Dynamic Panels (Pooled Mean Group)

Traditionally, estimators for panel data assumed that the coefficients and variances of errors did not differ between groups. Given the characteristics of individuals or economic units, it was difficult to assume that the variances of the error were equal in the short term. For this reason, Pesaran *et al*. (1999), propose a new way to make estimates for panels with large N and T through the estimator for means grouped in dynamic panels Pooled Mean Group (PMG), which conditions the coefficients in the long term to be identical.

According to Pesaran *et al*. (1999), in the long-term equilibrium relations are expected to exist, which would be expressed by homogeneous, or similar variables between the groups. This would seem visible when considering certain conditions that similarly influence the panel, such as budget constraints or common technologies.

An Autoregressive Distributed Lag Model (ARDL) is one that considers lags in the variables or what is the same, delays are introduced in the variables of the vectors contemplated (Cho *et al*., 2023).

These models aim to test the cointegration of variables. The proposal of Pesaran *et al*. (2001), is made from a limit test to find the relationships in the long term through an error correction mechanism, which allows to identify the adjustment dynamics of the variables in the short and long term. The panel is given by the equation:

$$y_{it} = \sum_{J=i}^{p} \lambda_{ij} y_{i,t-j} + \sum_{J=0}^{q} \delta'_{ij} x_{i,t-j} + \mu_i + \varepsilon_{it} \quad (7)$$

Where:

Yit = Group-dependent variable i.

xit: = Vector of explanatory variables (regressors) for group i.

μi: = Fixed effects (the coefficients of the lagging dependent variables).

λij = Scalars.

δij = vectors of coefficients kx1.

Databases and information sources

In this work, Total Factor Productivity is recovered from the Penn World Table version 10.0 database (University of Groningen, 2021), and obtained through the Törnqvist index considering

the prices of the factors that are implicit in the prices of goods (Feenstra *et al*., 2015).

Total Factor Productivity is calculated using purchasing power parity rates for each country relative to the United States; and is expressed as follows:

$$CTFPjk = \frac{CGDPoj}{CGDPok} / Qt\ (vj, vk, wj, wk) \quad (8)$$

Where:

CTFPjk = is the total factor productivity at current prices of each country j relative to k. For that purpose, the reference prices of the United States are used.

$\frac{CGDPoj}{CGDPok}$ = It is the change in GDP at current prices.

Qt (vj, vk, wj, wk) = is the Törnqvist index of the endowment of factors of production.

The work factor was obtained from the World Bank database (2023c) and is defined as those workers who have a type of paid employment, this implies that they have some contract (written or oral) that guarantees their salary.

In the capital factor, the capital services indicator was used, which was obtained from the Penn World Tabble version 10. 0 databases (University of Groningen, 2021). The indicator is obtained as follows: a) through initial inventories based on the perpetual inventory method; b) through the Gross Fixed Capital Formation deflator; c) the return on capital in the economy is included, considering the Internal Rate of Return (IRR) (Inklaar and Woltjer, 2019).

For the measurement of technological change, the indicator of the industrialization intensity degree is considered as a proxy variable that reflects the technological change of Latin American economies (United Nations Industrial Development Organization, 2013).

The industrialization intensity indicator (INDint) is obtained as follows:

$$IND_{int} = \frac{MHVAsh + MVash}{2} \quad (9)$$

Where:

MHVash = is the share of the value added of medium and high-tech manufacturing in the value of total manufacturing.

MVash = is the share of manufacturing value added in total GDP (United Nations Industrial Development Organization, 2022).

Results and discussion

This section presents the results of cross-sectional dependence, stationarity of the series, long-term cointegration between the panels and the estimation process through the PMG methodology of Pesaran *et al*. (1999).

Cross-sectional dependence analysis

Through the Pesaran CD test (2004), the existence of cross-sectional dependence in the variables studied is verified. The results show that the probabilistic value, both in the dependent variable, and in the independent ones is 0.000. According to the specification and criteria referred to in the methodological development section, the null hypothesis proposes that there is transverse independence; this can be rejected, allowing to conclude that there is transverse dependence. Through the test we obtain the average of the pairwise correlation coefficients of the MCO residues of the individual regressions in the panel, and it can be used to prove the cross-section dependence of any fixed order p, as well as the case where an order of the a priori cross-section units is not assumed (see table 1).

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Table 1
Cross-section dependence test results

	lnPTF	*lnck*	*lnLw*	*lnA*
prom ρ	0.09	0.70	0.31	0.28
prom |ρ|	0.50	0.78	0.44	0.37
CD	5.00	35.94	16.91	14.40
p-value	0.00	0.00	0.00	0.00

Note. Own elaboration based on the estimates made in Stata 17.

CADF Unit Root Test

Considering that there is cross-sectional dependence on the variables studied, it is possible to use the 2nd generation unit root tests. With the stationarity methodology (Im *et al*., 2003), it is considered from the CADF statistic that the critical values consider that the null hypothesis of non-stationary series should be rejected. It is sought that the probabilistic values are less than 0.05, the summary of the test for each variable and in its first difference can be observed in table 2.

Table 2
Results of Pesaran unit root tests (2003)

lnPTF		*lnck*		*lnLw*		*lnA*	
Zt-bar	**p-value**	**Zt-bar**	**p-value**	**Zt-bar**	**p-value**	**Zt-bar**	**p-value**
2.81	1.00	5.07	1.00	-0.83	0.20	-1.20	0.11
ΔlnPTF		***Δlnck***		***ΔlnLw***		***ΔlnA***	
-9.91	0.00	-3.08	0.00	-13.9	0.00	-13.2	0.00

Note. Own elaboration based on the estimates made in Stata 17.

The variables fulfill their characteristic of being stationary in their first difference, so we can reject the null hypothesis of non-stationarity according to the test of Im *et al*. (2003), second generation, thus concluding that the variables have integration order one, I (1).

Co-integration analysis

If the Westernlund test (2007) occurs in this way, based on the cointegration of the panel, the probabilistic values of some of the four criteria would be below the levels of significance. In the test carried out for the selected Latin American economies, it is shown that two of the Gt and Pt criteria are 0.04 and 0.00 respectively, so it is possible to say that the panel is cointegrating (see table 3).

Table 3
Westerlund cointegration test results (2007)

Statistic	Value	Z-value	P-Value
Gt	-3.12	-1.81	0.04
Ga	-10.18	2.48	0.99
Pt	-11.72	-2.66	0.00
Pa	-13.23	-0.53	0.30

Note. Own elaboration based on the estimates made in Stata 17.

The Pooled Mean Group (PMG) estimator for TFP analysis

Through the estimator PMG proposed by Pesaran *et al*. (1999), which considers the maximum likelihood of long-term coefficients, it is possible to perform a grouping given the homogeneity conditions in the coefficients. As the author specifies, it is possible to determine through an error correction mechanism that the coefficients of slopes and variances of the error differ in the short term, and it is possible to present homogeneous estimators in the long term, having the results that are observed in table 4.

Table 4

Results of Pesaran's Pooled Mean Group model (1999)

Pooled Mean Group			
Variables	Coefficients	Prob Value.	Standard Error
Long term			
lnK (L1)	0.018	0.009	0.006
lnL (L1)	0.087	0.009	0.033
lnA (L1)	0.073	0.013	0.029
Short term			
lnK (D1)	0.135	0.000	0.035
lnL (D1)	0.580	0.001	0.180
lnA (D1)	0.074	0.039	0.036
Error Correction ($O\gamma$)	-0.182	0.010	0.070
Intercept	-0.046	0.000	0.012

Note. Own elaboration based on the estimates made in Stata 17.

The estimated ARDL model is of order (1, 1, 1) based on the methodology proposed by Pesaran *et al*. (1999). The first 1 assumes that there is a model that has a delay for the calculation of the long term, the second refers to the moving average, and the third one is considered as the differentiation of the variables in the model, which allow to present coefficients in the short term.

Based on the empirical evidence, it is possible to draw some conclusions regarding the variables used. At the top of the table in the long-term model are significant estimators—the probabilistic values are less than 0.05. The relationship between the variables is expected, i.e., the working hypothesis in this research is tested in which a direct relationship between TFP and independent variables is established —according to neoclassical economic theory—.

In the long term, with a change of 1% in the work variable, TFP increases by 0.0871% in the selected Latin American economies in the period 1990-2019. The interpretation of this behavior shows that jobs and firms that support workers with medical services, and various benefits have a positive impact on TFP. In this sense, informality and self-employment (which would be the workers that are not included in the selected work variable), are the sectors with the lowest productivity, i.e., the more informality and self-employment there is in Latin American countries, the lower the TFP.

A second element that is rescued in the long term is technological change. The empirical evidence reveals that, in the face of unit percentage

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changes of this variable, TFP increases by 0.073%, demonstrating the importance of having a high degree of industrial intensity in Latin America. This is consistent with the theory of economic growth proposed by Solow (1956), which specifies that, in the long term, technological progress will be decisive in achieving economic growth.

As far as the capital factor is concerned, this has a small elasticity, indicating that in the event of a change of 1 % in the variable, the TFP would increase by 0.018 %. This variable was the least representative in the long term, while labor is the most important for Latin American economies in the period 1990-2019.

Table 4 also has evidence for the short term. In this case, the estimators are significant with probabilistic values less than 0.05, and just as in the long term, these have positive relationships of labor, capital and technological change with respect to TFP.

The work factor presents a similar behavior in the short and long term, in the sense of being the variable that has a greater incidence in the TFP; however, there is a greater elasticity. In the face of unit changes in this variable, TFP increases by 0.580%, accounting for the importance of formal work in the economies studied in this research.

In this case—in the short term—the key factor is its importance in determining TFP growth, with a coefficient of 0.135. Hence, the accumulation of production factors in the short term, further define economic growth in correspondence with exogenous growth models.

Regarding technological change, in the short term we face unit percentage changes in this variable, in which the TFP increases by 0.74%. This coefficient is similar to the long-term, however, for the short term it would occupy the third position in order of importance.

Finally, the evidence for the error correction mechanism (O) shows the rate at which the model converges to equilibrium in the long term. It also meets the model specifications, i.e., it is negative, lower than unit and significant (Blackburne & Frank, 2007; Pesaran *et al*., 1999). The interpretation of (O) shows that in the face of shocks or alterations of the selected variables, the model is corrected by 0.182, i.e., by 18% annually. In this way, the adjustment speed of the model is reached in 5.5 years,[3] which would reflect the adjustment dynamics of the short to long term.

Conclusions

This paper reviews the factors that influence TFP growth from the Cobb-Douglas production function in fourteen Latin American economies—Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Jamaica, Mexico, Paraguay, Peru, Uruguay, and Venezuela, during the period 1990-2019.

The methodology used is the estimation for panel data of the "Group of Grouped Means" (PMG) to capture the behavior of the factors of production, labor and capital, as well as the technological change on TFP. In this process, the tests of cross-sectional dependence, unit root and cointegration are considered.

Tests were carried out prior to the estimation process of the panel data model, showing that there is cross-sectional dependence of the variables in the selected economies. The behavior of the series is stationary with integration degree of I(1) and the variables in the long term are cointegrated. In the estimation process, the proposal of Pesaran *et al*. (1999) PMG, which combines dynamic data panels and group mean estimators, is applied.

From the estimation results of the PMG model, evidence was found that in the short and long term, in which the variables work, capital and technological change have a direct relationship with TFP. In the coefficients of the work, it was found that in the long term before a change of 1% in this variable the TFP would increase by 0.0871%; while, in the short term the increase in the TFP would be of 0.580%.

In the long term, changes in the capital factor by 1 % cause TFP to increase by 0.018 %, while in the short term there is a greater increase of 0.135 %. As regards technological change, in the long

3. To calculate the rate at which the model converges to equilibrium, consider 1/O, resulting in the time at which variables are balanced over the long term (Asteriou & Hall, 2021).

term a change of 1 % results in an increase in TFP of 0.073 %; in the short term, the effects of this variable on TFP are similar to those in the long term (0.074 %).

In the long and short term, the order of importance of the effects of explanatory variables on TFP presents significant changes. The labor factor before the capital and technological change is the one that most influences the TFP, while the capital in the short term occupies the second place, and in the long term it has the third position. As for the technological change, in the short term it has the third order of importance and in the long term it is in the second position. Hence, the neoclassical economic theory approach of exogenous growth models proposed first by Solow (1956) is corroborated, which establish that in the long term, it will not be the accumulation of physical factors that leads to economic growth, but technological progress.

The hypothesis established in this article is confirmed according to which capital (K), labor (L), and technological change (A) were the determinants of TFP in the economies of Latin America during the period 1990-2019.

The future lines of research should: a) consider studies at the subregional level in Latin America in order to identify similar economic conditions between countries and thus, review the incidence of the independent variables of this research in the TFP of these geographical spaces; b) conduct the study at the sectoral level, to review comparatively the influence of factors of production and technological change in the TFP of Latin American economies; and, c) incorporate the environmental variables within the main guidelines of this work, given the importance that has been acquiring the green TFP (GTFP), as an indicator focused on environmental sustainability.

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Progressive tax development in the taxation system: a comparative analysis of the EU and Central Asian countries

Desarrollo fiscal progresivo en el sistema tributario: un análisis comparativo de la UE y los países de Asia Central

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Abstract: the study aims to compare the experience of implementing a progressive taxation system in the EU countries with the taxation system in Central Asia to establish the prospects for reforms in this area. The following methodological methods were used: methods of generalisation to analyse theoretical materials, methods of processing statistical results, estimation of the Gini coefficient, and assessment of the progressiveness and redistributive capacity of profitability indicators using economic and mathematical modelling methods were also used. The income tax indicators of such countries as Kazakhstan, Uzbekistan, the Kyrgyz Republic, Tajikistan and Turkmenistan were assessed. The study determined that according to the data on progressiveness and redistributive capacity due to the peculiarities of tax policy implementation, Kazakhstan, the Kyrgyz Republic and Tajikistan have a pronounced progressiveness and redistributive capacity. Turkmenistan and Uzbekistan do not have such indicators. The Gini Index (coefficient), which indicates a high degree of income inequality in these countries, is also very characteristic. On the contrary, the Gini coefficient of the leading European Union countries is higher: Belgium, Denmark, France, Germany, Spain, and Germany are characterised by a high degree of fairness in the tax structure and social sphere. Thus, the need to reform the taxation system to achieve the goals of sustainable development in Central Asian countries is an urgent problem that should be addressed and accounted for at the state level.

Keywords: taxation, system, progressivity, redistributive capacity, reforms, Gini coefficient.

Resumen: el estudio pretende comparar la experiencia de la aplicación de un sistema fiscal progresivo en los países de la UE con el sistema fiscal de Asia Central para establecer las perspectivas de las reformas en este ámbito. Se han utilizado las siguientes metodologías: métodos de generalización para analizar materiales teóricos, métodos de tratamiento de resultados estadísticos, estimación del coeficiente de Gini y evaluación de la progresividad y la capacidad redistributiva de los indicadores de rentabilidad mediante métodos de modelización económica y matemática. Se evaluaron los indicadores de rentabilidad de países como Kazajstán, Uzbekistán, la República Kirguisa, Tayikistán y Turkmenistán. El estudio determinó que, según los datos sobre progresividad y capacidad redistributiva, debido a las peculiaridades de la aplicación de la política fiscal, Kazajstán, la República Kirguisa y Tayikistán tienen una progresividad y una capacidad redistributiva pronunciadas. Turkmenistán y Uzbekistán no disponen de tales indicadores. También es muy característico el índice (coeficiente) de Gini, que indica un alto grado de desigualdad de ingresos en estos países. Por el contrario, el coeficiente de Gini de los principales países de la Unión Europea es más elevado: Alemania, Bélgica, Dinamarca, España y Francia se caracterizan por un alto grado de equidad en la estructura fiscal y en el ámbito social. Así pues, resulta necesario reformar el sistema fiscal para alcanzar los objetivos del desarrollo sostenible en los países de Asia Central.

Palabras clave: fiscalización, sistema, progresividad, capacidad redistributiva, reformas, coeficiente de Gini.

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Introduction

The peculiarity of the progressive tax and the underlying taxation system is the principle that low-income citizens pay taxes at lower rates, and those with high incomes pay higher rates, respectively. The main purpose of introducing such a system is to create a fair attitude in society depending on the income of the population and redistribute the tax burden, as well as to ensure that the state budget receives funds that are then used to cover social programs. Therefore, researchers address the possibility of transitioning developing countries or those seeking to achieve sustainable development goals to this system. Progressive tax reforms can enable developing countries to redistribute revenues and budget financing, while reducing the structure of inequality among the population, providing revenues to the social sector, and mobilizing finance for crisis sectors of the economy. This system will allow funds to be accumulated in favor of lower-income households. Such reforms and the extent of their impact on the growth of indicators reflecting the dynamics of economic development in the European Union directly depend on the taxation structure in each country and the level of implementation of reforms. Each country has different domestic regulations, tax rates and social programs (Yuliia *et al.*, 2025). The above reforms have the potential to become an effective tool for reducing poverty in developing countries. However, the success of their implementation undoubtedly depends on many aspects, including the specific circumstances of each country, the specifics of development, the level of regulation and management of tax and fiscal policy, the quality of governance, and the structure of management.

The study is based on a comparison of the relationship between tax policy and income inequality in the European Union (EU) and Central Asian countries. The study compared data on the countries that are members of the European Union and are quite successful in terms of the level of development, namely: France, Germany, Spain, Denmark and Belgium. The study examines the effects of changes in tax rates (income tax or personal income tax (PIT), social security contributions) and GDP dynamics (Atkinson *et al.*, 2011). The study also noted that there is a marginal tax rate limit, which is the percentage of tax paid for each additional dollar of income. In emerging markets, high tax rates on marginal products are commonly used by governments as a revenue-generating mechanism. However, this could have a negative impact on the national economic development. Reduction of the prospects for sustainable development. Raising tax rates, or rather their upper limits, can discourage investment and entrepreneurship, thereby reducing the revenue side of the budget, which in turn is used to cover the social sphere (Oleksy-Gebczyk and Bilianskyi, 2024; Oleksy-Gebczyk, 2024).

The countries of the Central Asian region include Kazakhstan, Uzbekistan, the Kyrgyz Republic, Turkmenistan and Tajikistan. The most promising country in terms of development is Kazakhstan, with its raw material orientation and pace of development. The fiscal policy is dynamic, the tax system is currently flat, and the current personal income tax rate is fixed at 10%, which is not subject to change regardless of income. The progressive tax rate is different – it increases in direct proportion to income (Petersone and Ketners, 2017). Analysing these systems separately from Kazakhstan, the only advantage of the current single tax rate is its simplicity of calculation, which is very convenient for taxpayers in fulfilling their tax obligations. Progressive tax rates cannot have this advantage. The main problems of the region are lack of direct access to the sea, which complicates logistics and transportation of resources; dependence on climate change; high resource dependence with a low level of economic and financial development; imperfect legislation in the field of finance and revenue, and the tax system.

Studies of the tax systems of Central Asian (CA) countries were previously addressed by Kadyrberdieva (2019) and Mayrambekov (2021). The authors noted the peculiarities of regional taxation, addressing the specifics of each country, as well as the peculiarities of financial security. Abdugafarov and Achilov (2023) addressed reforms in Uzbekistan. The country is characterized by

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a high level of commitment to tax reform. Much consideration in terms of assessing the indication of the tax system was devoted by Li *et al*. (2023). International experience and the impact of external factors on the region were compared. Mukhamedyarova and Mozgovoy (2019), and Khamitov *et al*. (2022) also studied the impact of the corruption component on the reform of the tax system.

However, although the issue has been sufficiently studied, the possibility of introducing a progressive taxation system has not been considered in depth. The possibility of using the experience of European countries in the Central Asia region is also not disclosed. Therefore, the following tasks are considered in this study:

- Analyze the peculiarities of the tax system in the Central Asia region in detail, accounting for the goals of sustainable development.
- Examine the advantages and disadvantages of progressive and flat taxation systems.
- Compare the tax systems of the European Union (characteristics) and the countries of Central Asia.
- Identify the main problems of transition to a progressive taxation system.

The results obtained will make it possible to assess the feasibility of introducing a progressive taxation system in the Central Asia region, considering the experience of European countries.

Materials and methods

To conduct research and summarize data on taxation systems, the following analytical studies were conducted using the following methods: theoretical synthesis of materials, methods of summarizing statistical data on tax payments and GDP dynamics, the European Union and the Central Asian region (Quiros-Romero *et al*., 2021; Middle East and Central Asia, 2022). The Poverty and Inequality Platform Methodology Handbook (2024) was also used. For this purpose, the methodology used by the World Bank to calculate global and regional poverty rates was used (Aron *et al*., 2023). The Gini index itself has several disadvantages, which can be levelled out by calculating the progressivity index. Similarly, the progressivity index proposed by Kakwani (1977) is defined as the difference between the Gini coefficient, which also includes the sum of all taxes and fees before they are paid. Thus, an increase in the share of taxes in the volume of income and an increase in the share of the population with a high income will increase the progressivity of the income tax. The relevant scientific contribution of Kakwani's (1977) work is the breakdown of the overall redistributive effect of taxation into its progressivity and the "magnitude" of the factors defined as (1):

$$x = \frac{\sum l_n}{\sum l_m}, \quad (1)$$

where: $\sum L_n$ - total tax liabilities; $\sum L_m$ - total income before taxes.

This breakdown assumes that progressivity is a necessary but not sufficient condition for effective redistribution. Thus, the total amount of revenues generated by the income tax at 0.001% of GDP, which can be highly progressive. If the rate is concentrated in high-income groups, but since the amount of income tax is small, it will always reach a negligible amount of income redistribution (Reynolds and Smolensky, 1977; Kakwani, 1977). In assessing progressivity, this study calculates the degree of progressivity and redistributive capacity of personal income tax in Central Asian countries, adjusted for the parameters of pre-tax distribution. This approach is based on "transferring" the compared tax regimes to a common base with the same pre-tax distribution parameters, following the approach proposed by Dardanoni and Lambert (2002) and applied by Vellutini and Benitez (2021). These calculations use a microdata model based on the Gini coefficient of pre-tax income (Jarvis *et al*., 2021).

Moreover, the shortfall in tax revenues was estimated using stochastic analysis with time-varying efficiency. It is based on research by Com-

mitteri and Pessino (2013) and covers the period from 2000 to 2019 using panel data from Central Asian countries (Verdier *et al*., 2022). The model is expressed as (2):

$$y_{it} = a + \beta' X_{it} + v_{it} - u_{it}, \quad (2)$$

where: yit=ln (amount of income received from tax levies) for the i-th country in the period under study t; Xit=ln (level of real GDP received per person), ln (level of real GDP per person), the inflation rate in the country, the impact of agricultural development, level of openness to foreign trade, dynamics of foreign direct investment (FDI) inflows, dependence on resource extraction, level of corruption control, for i-th country in the period under study t; β – index of the vector of random parameters of influence of external independent factors; vit – statistical error. Introduced into the model as it is assumed to be part of the normal distribution of the parameters; β'Xit – the boundaries of deterministic and stochastic (v) components, where the possible tax potential is taken as an optimum; uit>0 – reflects the variable that for the i-th country in the studied period t, due to specific, unaccounted factors prevented from achieving the tax optimum and created conditions of inefficiency. In this case, uit reflects a truncated normal distribution; vi and ui are statistical, independent variables that consider the impact on the amount of tax revenue.

Tax efficiency (TEit): defined as the ratio of actual tax revenues to the corresponding marginal random value of tax revenues (3):

$$TE_{it} = \frac{\exp(\alpha+\beta' X_{it}+v_{it}-u_{it})}{\exp(\alpha+\beta' X_{it}+v_{it})} = \exp(-u_{it}). \quad (3)$$

Ln (tax income): represents the total amount of tax revenues established following the laws of the country. However, if a country is an exporter of hydrocarbons, the number of hydrocarbons is not taken into account. Only those that contribute to GDP are addressed. The use of such assessment methods determines the extent to which tax reforms can be implemented to rebalance the equity and use of progressive tax systems in developing countries with higher precision.

Results and discussion

Tax policy is one of the most relevant tools for regulating the state's planned actions aimed at maintaining control over both business and budget revenues. It is based on economic, legal and controlling actions in the taxation system. In line with global practice (e.g., EU countries), the real sector of the economy – industry, services, private sector, agriculture, and raw materials production – is the most affected by structural changes in a dynamically changing environment.

The modern state tax system faces the challenge of not just filling the budget but creating a reserve of funds while maintaining a fair system of taxation of the population depending on their income level. The legal regulation of the tax system of each country is at the discretion of the government, but in practice, it consists of a set of laws and regulations that require constant revision depending on changes in economic conditions and global trends (Gootjes and de Haan, 2022; Panayi, 2021). Thus, with the advent of digital technologies, there is a need for new laws and reforms of tax systems (Mason and Parada, 2020).

This has been a major problem for the last two decades for the Central Asian countries, which include Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan. Budget revenues from taxes in these countries did not reach the level of European ones, despite the desire for reforms and the introduction of new digital technologies in the field of taxation (Abdugafarov and Achilov, 2023). The effort is also needed to implement and transition to a progressive taxation system. This will help reduce the negative economic consequences of the impact of the COVID-19 pandemic and the global financial crises, including in the energy sector. Although Central Asian countries differ in their preferences and specifics of development in some areas of the taxation system, they have quite similar strategic development issues. They are united by the structure of their taxation systems concerning the desire to reduce the gap between poverty and inequality and to build a fairer tax collection system. For example, in Kazakhstan, taxation is regulated under the current Constitution, consis-

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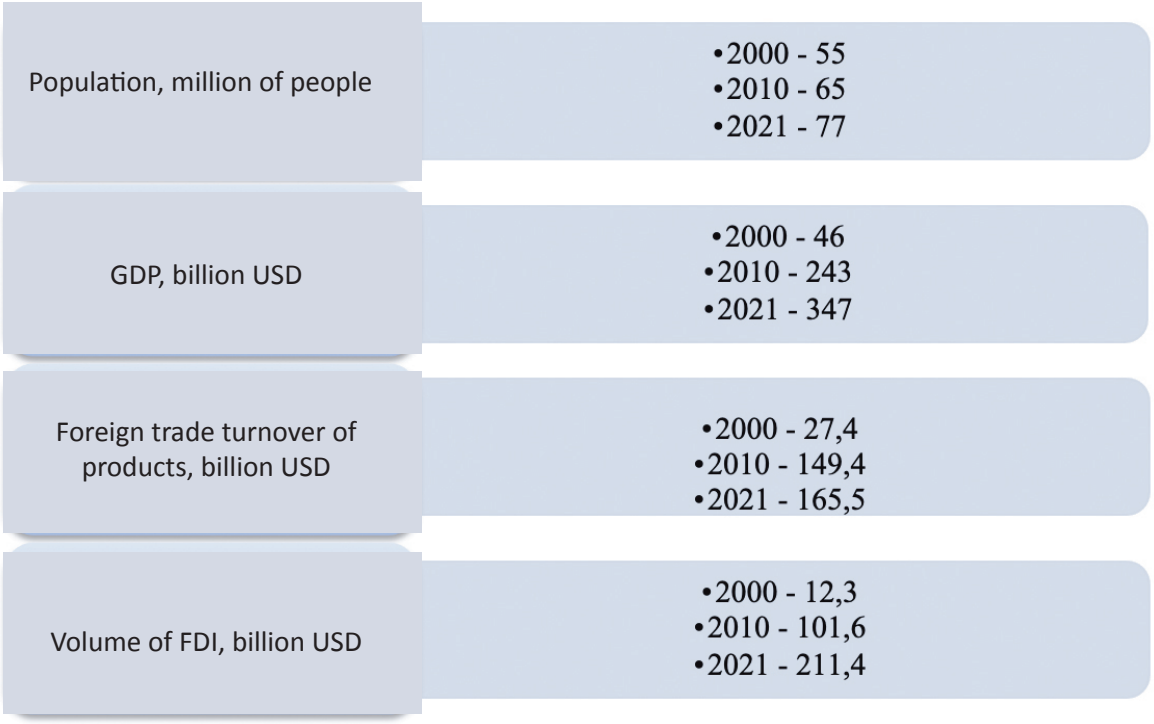
ting of the Tax Code and several regulations. At the same time, all payments are unifiedly controlled by the Ministry of Finance of the Republic of Kazakhstan (Kadyrberdieva, 2019).

This region is distinguished by its prospects in the global economic arena. Over the past 20 years, the aggregate GDP of the Central Asian countries has grown more than sevenfold. In monetary terms, it quadrupled. The foreign trade turnover of goods has increased sixfold, and there is an increase in population, which can be used to predict labor migration in the future. FDI has increased, confirming the region's attractiveness (Middle East and Central Asia, 2022) (Figure 1).

Figure 1
Structural changes in Central Asian countries



Note. Compiled by the authors based on Middle East and Central Asia (2022).

Sustaining sustainable growth and reducing poverty and inequality are important for Central Asian countries. Increasingly, studies show that creating the conditions for sustainable growth and inclusiveness requires investment in social services and infrastructure. Investing in social and infrastructure development and promoting inclusiveness are two complementary goals of sustainable development. At the same time, an economic base is required to support growth and political stability (de Mooij *et al.*, 2020).

According to the International Monetary Fund (IMF) research, the average income per person in Central Asian countries has significantly decreased over the past 10 years (2008-2018), while the trend of high unemployment among young people has continued. The availability of quality and affordable public services remains limited, which is detrimental to the achievement of sustainable development goals. The possibility of obtaining reliable information on the level of income of the population is limited, but the analysis of even a small group of CA countries suggests more con-

centrated information on the income of citizens, which allows us to assess the degree of inequality and unfairness of the taxation system between countries in the region and within each country (Poverty and Inequality..., 2024).

According to research data for the period from 1990 to 2016, the average share of income among wealthier taxpayers in the Central Asian countries was about 64%. Over the same period in the US, for example, this figure was 47% (Gootjes and de Haan, 2022). Government support in the taxation system can significantly reduce income inequality and provide opportunities for further development. According to experts, the additional expenditure required to achieve the five critical Sustainable Development Goals is projected to be an average of 5.3% of GDP annually in these countries by 2030 (Mathai *et al.*, 2020). For the European Union, such costs are projected to increase on a much larger scale (Mason and Parada, 2020).

Following the national conditions in Kazakhstan, the introduction of a progressive tax above 10% will burden employers, necessitating optimization methods that are sometimes not entirely legal. In addition, the overall burden on wage funds, which are already overburdened by social tax payments, mandatory social security contributions to healthcare and de facto mandatory pension contributions, will increase. As a result, employers' costs of hiring highly qualified specialists will increase. Progressive standards were applied in Kazakhstan until 2007. Later, they were cancelled, but the government is considering projects to introduce a progressive system by 2025, in case of a favorable economic situation.

The introduction of progressive tax rates is directly dependent on the introduction of a universal income, as it allows individuals to use certain of their expenses to reduce taxes. For instance, mortgage interest payments and the value of secondary real estate, the level of corruption in the country, and the pace of economic reforms. Kazakhstani main export destinations are the EU (accounting for almost half of its exports) and China (accounting for about 14% of exports). Kazakhstan imports from the EU (17%) and China (17%). Exports declined in 2020 due to the possibility of new contracts with EU countries, while export trade with China increased significantly (Panayi, 2021).

Uzbekistan is the second largest economy in the region, albeit significantly smaller than Kazakhstan, with a GDP per capita of just over USD 1800 (population 33 million). Over the past three years (2017-2019), Uzbekistan has been striving to reform the national economy in all areas to achieve sustainable development goals, which avoided losses, and stagnation zones and showed a 5% growth rate. Such reforms improve national attractiveness to foreign investors, although the state itself remains the main investor. Uzbekistan exports to such countries: as Turkey, Kazakhstan, China, Kyrgyz Republic. Products are imported from such countries as China, Germany, the USA, Korea, Kazakhstan, Germany, and Turkey (Middle East and Central Asia, 2022). The state budget of Uzbekistan has been running a deficit in recent years, and the deficit is financed by increasing the state debt, which has reached 160% of budget revenues. The majority of Uzbekistani public debt is external debt, with 40% being loans from international development banks. Since 2019, Uzbekistan has also been a holder of Eurobonds. The practice of issuing them has continued since 2020. The impact of social and climate factors is also increasing (Mathai *et al.*, 2020; Tabakh *et al.*, 2021; Duenwald *et al.*, 2022).

Kyrgyzstan – with a low rate of economic development of the countries of the region: GDP per capita is only USD 13,100 (the population of the country is 6.3 million). The basis of the economic state of the country is provided by gold mining. The change in the rate of extraction of this metal directly affects the change in the growth rate and dynamics of investment activity (Sayakbaev and Baktybekov, 2020). According to the results of statistical data for the period 2017-2019, the inflation rate was kept at the lower limit of the planned indicator. However, against the background of the COVID-19 pandemic and subsequent crisis phenomena in the economy, it increased to the upper limit of the expected range in 2020. At the same time, the discount rate has been 4-5% since 2017 (Tabakh *et al.*, 2021).

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The state budget of Kyrgyzstan has been in deficit for the last 10 years. It remained a deficit even in the pandemic year of 2020, with an increase to 2.7% of the country's GDP. This was due to an increase in the share of external debts, and assistance from international financial and development institutions. In 2020, the deficit increased, reaching 2.7% of GDP (Sayakbaev and Baktybekov, 2020). Kyrgyzstan is a country that imports goods and resources. The level of imported goods and resources is almost three times higher than the number of exports. The majority is foreign aid from the International Monetary Fund and the World Bank (Tabakh *et al.*, 2021). The years of the COVID-19 pandemic have had an extremely negative impact on Kyrgyzstan's economic performance. In 2020, GDP fell by 11.5%, while investment activity fell by 14.7% over the same period. By the end of 2020, this figure is expected to decline by around 9%. Inflation rose to 10%, the national currency depreciated sharply, and foreign capital fled the country. Kyrgyzstan has received a large amount of foreign investment to be earmarked for the needs related to the fight against the epidemic. Budget support remains at 9.4% of GDP. Despite the increase in benchmark interest rates, the National Bank took measures to support liquidity.

Tajikistan is one of the five countries with a low level of economic development in the Central Asian region. Its main potential is its population and the possibility of labor migration. GDP per capita is estimated at no more than USD 800. The population is reported to be about 9.1 million. At the same time, its economic growth rate is quite high, and the country is quite promising. Important parts of the economy are the agricultural sector, mining, and the provision of timber. Traditional for this region are cotton production and metallurgy. In recent years, investments have been directed to projects related to the development of the energy complex. There is stagnation (stagnation) in lending, which changed slightly towards growth in 2020 due to credit support measures, and the share of problem loans is increasing (Verdier *et al.*, 2022). In 2017, the National Bank of Tajikistan announced the implementation of an inflation-targeting policy, but the exchange rate system cannot be called fully floating. The inflation targets for 2018-2020 fluctuated in the corridor of 7-9 per cent, and from 2021 it decreased to the level of 6-8%. In 2020, there was a spike in inflation to a level of 9.4%. Starting in spring 2020, the Central Bank of Tajikistan implemented a policy of reducing refinancing interest rates and increasing the money supply. Tajikistan's state budget has been in deficit in recent years, but there is a trend towards consolidation. The increase in public debt was due to the receipt of aid and external loans for pandemic support from the IMF and development banks.

Tajikistan imports far more goods and resources than it exports. The ratio is one to three. The main export commodities are cotton and electricity. As in neighboring countries, negative foreign trade balances are offset by individual transfers. Foreign direct investment in Tajikistan does not show an increase from 2019. This is due to the lack of large projects and developed infrastructure. The main investments are concentrated in mining and manufacturing, from China. China provides more than half of the countryєs foreign investment. Important partners of Tajikistan are the UK, France, Turkey and Switzerland. Turkmenistan is one of the most closed countries in the region. Now, all data on the country are summarized only by the fact that the tax system is also based on a flat system, with fixed rates that do not depend on income. The standard of living is low, and reforms are carried out very rarely. The introduction of a progressive taxation system has not been discussed (Verdier *et al.*, 2022).

Achieving sustainable growth goals also requires providing funds to meet future expenditures without accumulating debt. Some countries have lent funds to cover their expenditures and budget deficits (Ciuła *et al.*, 2024). This has reduced fiscal space, while projections show that increased spending is needed to support developing economies in the years of recovery from the shocks of the pandemic, global crises, ongoing hostilities, increased competition over commodity markets and resource reallocation, rising oil prices, changing needs and fluctuating migration patterns, rising unemployment both within and between countries, and growing social inequalities (Verdier *et al.*, 2022). High debt levels

and increased financing needs have led to increased vulnerability and sensitivity of countries to tighter financial conditions. Reducing debt to pre-pandemic levels will require sustained increases in fiscal spending over a decade or more.

Increasing public resources through domestic revenue generation will contribute to the sustained pursuit of sustainable and equitable growth. Before the pandemic, raising tax revenues to stimulate economic growth was a priority in Central Asian countries. Revenue generation was considered necessary to replenish fiscal reserves after several unfavorable reform scenarios (Tabakh *et al.*, 2021). Increasing tax revenues became an urgent policy priority as oil-exporting countries transitioned to a post-oil economy. In low-income countries, especially those that are fragile or dependent to varying degrees on external conflicts, revenue generation is crucial to cover the emerging additional cash resources needed to cover projects aimed at development related to UN programs, namely the Sustainable Development Goals (SDGs) (Verdier *et al.*, 2022).

The reorientation of Central Asian countries towards climate change is projected to require additional public expenditure measures and the allocation of a minimum of 3.3% of GDP annually from 2023 up to and including 2033 (Middle East and Central Asia, 2022; Duenwald *et al.*, 2022). Due to the impact of the pandemic and hostility towards vulnerable households, a more balanced approach is now needed to achieve an optimal balance of efficiency in income generation and distribution. While this equilibrium is different for each country, several universal principles should be considered. It is observed that consumption taxes have a high capacity to generate revenue and promote economic development. Conversely, income taxes are more equitable (Verdier *et al.*, 2022).

In improving the tax system, should move to a balance between efficiency and fairness that will promote economic growth more effectively than raising the tax rate. Similarly, income tax can be structured so that it does not hinder economic growth. It should be noted th*et al*l reforms of tax systems to achieve equity and efficiency are achieved only after assessing the impact of taxes on economic growth and other stimulus measures, as well as the benefits of financing growth-enhancing expenditures. Despite all efforts, Central Asian countries have earned less revenue than other emerging market countries and more developed EU countries (Committeri and Pessino, 2013).

Between 2000 and 2014, the average total government revenue in Central Asian countries was 29.9% of GDP, which was much higher than in other regions due to the sector's hydrocarbon revenues. However, since 2012, there has been a decline in the average revenue level in Central Asia, which is most possibly due to the falling prices of oil and other exported resources. By 2019, the average revenue of the Central Asian countries (26.5% of their GDP) will be less than the 2008 level. Currently, domestic tax revenue mobilization in many Central Asian countries has declined. In 2019, the average percentage of tax revenues to gross domestic product in the countries was only 12.7% of GDP (Sissenova and Zharylkassyn, 2020). Countries such as Kazakhstan (commodity market) and Uzbekistan (investment-attractive market) were particularly affected by the fall in oil prices. Tajikistan and Kyrgyzstan were more affected by the pandemic years due to the reduced demand for cheap labor and the opportunity for labor migration (Piketty *et al.*, 2014). Addressing the characteristic features of the taxation systems of Central Asian countries (Table 1), the following is true:

- All domestic and foreign organizations are taxpayers.
- Income tax rates are quite high and mostly fixed.
- Rather high social tax payments.
- A flat rate of personal income tax (except in Uzbekistan).
- Tax incentives for the social sphere are envisaged.

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Table 1
Features of the tax system in Central Asia

Type of tax	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Income tax (legal entities)	10 % agriculture; 20% other	10%	25% – communal banks, telecommunication services; 15% – others	8% – domestic companies; 20% – other	9% – standard; 15% – communal banks; 35% – auctions, concerts, public events
Dividend tax	none	Equal to income tax	Equal to income tax	+15%	+10%
Value added tax (VAT)	12%	12%	18%	15%	20%
VAT non-residents	+	-	+	+	+
Sales tax	-	1-3%	3%	-	-
Social tax and pension accruals	11% – social tax + 5% to the Social Insurance Fund	17.25% for employees; 3% – for non-residents	25%	20% for legal entities; individuals and individual entrepreneurs4 for others 2% to 10%	25%
Excise duty	+	+	+	+	+
Property tax	+	+	+	+	+
Land tax	+	+	+	-	+
Income tax	10% – standard; 10-20% – non-residents	10%	8-13% – standard; 25% for non-residents	10%	Progressive rate from 9% to 22% depending on the size of the minimum wage

Notably, Kazakhstan and Uzbekistan have the greatest potential in the Central Asian region. The Republic of Kazakhstan – due to a more developed financial system and the desire to develop digitalization and become one of the thirty most developed countries. And Uzbekistan – due to rapidly developing reforms and the availability of cheap labor (Tabakh *et al.*, 2021). During the pandemic and the crisis years of 2021-2022, when the situation in commodity markets deteriorated, all countries in the region experienced a shortfall in budget revenues. This was primarily due to a reduction in tax revenues. As can be seen from the structure above, only a few countries in the region are implementing progressive taxation practices aimed at reducing the gap between poverty and wealth. In general, progressive taxation assumes that the higher the income of taxpayers, the higher the tax amount. This makes it possible to reduce the burden on the poorer segments of the population and to observe the principle of fairness.

The issue of progressivity in the taxation system has been under consideration for quite some time. For instance, a study of tax reforms in the twentieth century in the United States and Europe showed that the use of progressive taxes, such as personal income tax and property tax, significantly reduced inequality in society and had a positive impact on the overall trend in tax payments (Piketty *et al.*, 2014; Tynaliev *et al.*, 2024). At the same time, when considering the relationship between the progressive system and income inequality in developed European countries (France, Spain, Sweden, etc.), it was found that the use of this reform reduces income inequality (Duenwald *et al.*, 2022; Mohammadi *et al.*, 2025). Countries switching to a progressive taxation system reduced income inequality.

To assess the effectiveness of tax systems in different countries, indicators of progressiveness and redistributive capacity are used. As a rule, the Gini coefficient is used as the main estimation value (Poverty and Inequality, 2024). The redistributive capacity is estimated using the Kakwani (1977) index, adjusted for modelling data with pre- and post-tax distributional parameters (Table 2). The progressivity indicator is defined as the difference between the value of the Gini coefficient before and after taxes. Thus, an increase in the concentration of high incomes will lead to an increase in the progressivity index.

Table 2

Estimated indicators of progressiveness and redistributive capacity of Central Asian countries

Country	Top tax rate	Progressive indicator	Average tax rate	Redistributive capacity
Kazakhstan	10	3.8	14	0.6
Kyrgyz Republic	10	2.9	12.5	0.4
Tajikistan	13	3.8	16.2	0.7
Turkmenistan	10	0	12.9	0
Uzbekistan	12	0	15.3	0

Note. Compiled by the authors based on Verdier *et al.* (2022).

Analyzing the Gini coefficient, its value of 20-30% indicates the level of optimal income distribution between different segments of the population. This is the situation in European countries. For instance, the Czech Republic – 25%, Slovenia – 24.6%, Iceland – 26.1%, Belgium – 27.2%. The advantages of Gini coefficient estimation are the accessibility and general familiarity of the methodology (Figure 2). Using the stochastic frontier analysis method (Verdier *et al.*, 2022) described in the methodology, the following indicators were calculated for hydrocarbon importers and exporters in Central Asia (Table 3).

Table 3

Stochastic boundary analysis: efficiency of tax collection measures, tax potential and tax revenue shortfall

Country	Year	Tax income	Efficiency of tax collection measures	Tax potential	Underpayment of taxes
Hydrocarbon exporting countries					
Kazakhstan	2019	13.2	0.9	14	0.8
Countries importing hydrocarbons					
Tajikistan	2016	18.2	0.6	29	10.8
Kyrgyz Republic	2018	20.2	0.6	34.9	14.7

Note. Compiled by the authors based on Verdier *et al.* (2022).

As can be concluded from the Table 3, Kazakhstan has the greatest tax potential and the highest tax collection efficiency. At the same time, the share of tax shortfalls in the budget is the lowest. In contrast, the situation in Tajikistan and Kyrgyzstan is difficult. Additional goals are needed to regulate tax systems and the import-export balance of the raw material base.

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Such indicators of income distribution are attributed to the successful implementation of progressive taxation in European countries. Another example is Denmark, where the income tax rate ranges from 8 to 56%. The tax system there began to develop in the last century and reforms began to be implemented in 1903. The country was characterized by a high rate of personal income tax (50%). After the introduction of a progressive taxation system, the share of taxes in Denmark's GDP is about 45%. In the period from 2018 to the present, it has been among the leaders in tax charges, along with France, Belgium and Germany. However, there is the problem of the shadow economy and the need to combat it (Jarvis *et al.*, 2021). Also, until 2005, a progressive scale was introduced in Romania, where the income tax ranged from 18 to 40%. However, the experiment was not very successful and slowed down the implementation of reforms and investment inflows. In 2005, a flat income tax system was introduced with a rate of 16%. In 2018, it was reduced to 10%. This also affected the change in the Gini coefficient, which after 2018 rose from 30% to almost 40%, showing a change in economic inequality in society.

In Spain, the income tax rate varies depending on income from 21 to 52%, in France it is 5.5% to 49%, in Germany 15 to 45%, in Belgium 25 to 50%, and in Italy 23 to 43%. All EU countries use a progressive taxation system. A comparison of the taxation systems of the EU and the CA region (Table 4) reveals the following patterns:

- More developed countries use the EU progressive system.
- GDP per capita in the EU is higher.
- The mobilization of tax payments in the EU is quite high.
- The higher the percentage of socially disadvantaged people in the Central Asian region, the less fair the taxation system.

Table 4

Comparison of taxation systems in the EU and Central Asia

Characteristic	European Union	Central Asia
Taxation system	More often progressive	Often flat
Personal income tax rate	Depends on income level	Fixed
Wealth tax	Present in most cases	None
Level of corruption	Downward trend	Upward trend or stagnation
Financial sustainability	High	Low

Note. Compiled by the authors based on Mathai *et al*. (2020), Sayakbaev and Baktybekov (2020), and Tabakh *et al*. (2021).

The successful use of the progressive system also depends on the extent to which high-income taxpayers are willing to pay their taxes fairly. As soon as reforms in this area cause the opposite effect, namely tax evasion, reduced investment activity, and the transfer of assets to the shadow economy, all the expected results are not achieved. Another disadvantage of this system is the fact that its assessment using existing methods, such as the Gini coefficient, is inaccurate, as it does not address several aspects, such as the source of income, the use of tax breaks, holidays, the specifics of the country's development, etc.

The transition to a progressive taxation system could be positive for the economic growth of the Central Asia region. Such a taxation system will help to reduce inequality in the level of tax payments among different segments of the population, those with lower and higher incomes. It will help to raise funds for the state budget

and allocate additional resources for spending in the most critically needed sectors: social facilities, infrastructure, education, unemployment funds, healthcare, etc. In turn, this will ensure the creation of new jobs and an increase in labor productivity, as well as replenish the budget with additional revenues from the newly created money supply while implementing new projects. All of this contributes to the achievement of the Sustainable Development Goals. However, the experience of developed European countries shows that raising tax rates for wealthier segments of the population often serves as a destabilizing factor in investment and savings, contributing to the outflow of capital from countries to offshore and shadow areas (Tryhuba *et al.*, 2022). Moreover, in countries with very low overall living standards and high levels of corruption, such reforms may not have the expected effect.

By implementing progressive tax reforms, developed countries can increase tax revenues from the better-off and redistribute these revenues in favor of the poor (Rexhepi, 2023). Such reforms allow, first, to reduce inequality in society, preserve social justice, and attract additional funds to the most critical areas for the state: social, infrastructural, construction, health care, etc. Such state programs often mobilize funds, which then contribute to the mobilization of funds, which are then used to finance the development of the state. Such government programs also often contribute to the mobilization of funds, which are then used to subsidize the most vulnerable segments of the population.

It is also necessary to regulate the amount of concentration of wealth among the population, the gap between strata of the population, and the formation of the so-called "middle class" layer. When there are not only impoverished and destitute, but a confident "middle class". When there is a progressive system of taxation, then there is greater stability in the amount of revenues to the budget and greater confidence in the financing of government programs and development projects (Rexhepi *et al.*, 2024).

However, such a system has negative sides. As the study shows, people with high incomes often try to avoid paying their taxes at an "increased" rate. There is a desire to circumvent the system, to hide income, take it offshore. Investment activity decreases. The research has also shown that within the EU and Central Asia, there are countries which, although close in many respects (cultural, religious), are quite different. They have many differences in their structures and preferences, specifics of development, economic level, export-import opportunities, level of reforms, regulation of tax and fiscal policy. All this should be considered when developing further recommendations on the implementation of a tax system based on a progressive tax structure.

As shown by the assessment of the Gini index, progressivity indicators, as well as by the stochastic frontier analysis model, the most promising countries from the Central Asian region for the introduction of a progressive tax are Kazakhstan and Uzbekistan. Moreover, these countries have already made attempts to implement such a system earlier (Verdier *et al.*, 2022; Tabakh *et al.*, 2021). However, at that time, society and the financial and banking systems themselves were not ready for such changes. Following Abdugafarov and Achilov (2023), most taxes in Uzbekistan are burdensome for the population and inhibit such processes as investment and, the introduction of new technologies, which cannot but affect the reforms in the state. This requires immediate intervention and transition to new progressive methods in this area.

In Kazakhstan, the most developed and dynamic country in the region, whose goal is to become one of the 30 most developed countries in the world, reforms are also very important. Including the reform of the tax sphere. Sissenova and Zharylkassyn (2020) also noted that such reforms first provide financial security for the state, because tax deductions and mobilised funds create a "safety cushion" for subsequent financial shocks and are a kind of indicator of the current situation. In the regulation of the tax system in Kazakhstan, all Tax legislation is subject to the Tax Code, which is based on the Constitution. Everything is built on a system of unified principles and mechanisms and is regulated strictly vertically and subordinated to the Ministry of Finance of the Republic of Kazakhstan and its

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representative offices. Everything is strictly regulated and controlled.

Cardinal differences in the system of collecting taxes from individuals and legal entities are also noted by Sun *et al*. (2022). A comprehensive analysis of the differentiation of existing tax systems was carried out and the nature of the influence of international organizations on the formation of tax and fiscal policy in the states of the Central Asian region was determined. Particular attention in the context of the study was paid to transformational processes in the implementation of environmentally friendly energy, decentralization reforms and environmental investments. It was noted that on the one hand, the attraction of external capital, especially in the form of foreign direct investment stimulates economic development and provides great support in the years of the pandemic. However, on the other hand, it creates credit debts that will need to be compensated, and this is not always possible given the flat tax system of the state (Saez *et al*., 2020).

The issue of Central Asian countries is also the heterogeneity of its constituent countries. The study once again proves that both economically culturally and religiously the countries are at different stages of development and have different opportunities. Kazakhstan and Uzbekistan are the leaders in terms of economic and investment development potential, followed by the Kyrgyz Republic, which is confirmed by the results of the Gini index and calculated progressivity indicators. Tajikistan lags in all indicators due to a very low level of economic development and potential for investment attractiveness. Turkmenistan is the most closed country in the region, with almost no data available.

Thus, the introduction of a taxation system based on a progressive system according to a single unified scheme in Central Asian countries cannot be realized. It should address the specifics of each country separately, in fact, in the EU countries. Where the system of progressive taxation considers the peculiarities of each country. This problem was covered by Baiardi *et al*. (2019), who noted that, despite the desire to move to a fair system and the introduction of a progressive system, it is still necessary to address the specifics of each state and use variants of this system of taxation. The same idea is supported by Dourado (2022), who compared the experience of implementing a progressive system with that of the United States. Roland and Römgens (2022) relate the process of implementing a progressive tax system to the process of politicisation that was caused by changing times and industrial progress. A progressive system also helps not only to reduce the gap between rich and poor but incentivize a shift to more environmentally friendly production (Kapeller *et al*., 2023; Saez and Zucman, 2019). One way or another, the views of all authors, including the current study, is that compared to a flat system, a tax system based on a progressive tax has several advantages:

- Reducing the gap between the richer and poorer segments of the population.
- Stimulating the creation of a sustainable middle class.
- Mobilization of financial revenues to the state budget.
- A more transparent tax assessment system.
- Reducing the tax burden on socially vulnerable groups.
- Creation of budgetary reserves to achieve the country's sustainable development goals.

However, following Khamitov *et al*. (2022), noted the introduction of comprehensive measures to combat corruption, as wealthier citizens may try to avoid paying the increased tax rate in every possible way, which is a widespread problem in Central Asian countries. From this point of view, Uzbekistan is the only leader. Its investment attractiveness increases due to projects that involve investments in mining and metallurgy, as well as agriculture. The impact of climate on the motivation and activity of the population and how this further affects labour productivity and the possibility of implementing tax reforms was investigated by Duenwald *et al*. (2022) (Hix, 2022; Batrancea *et al*., 2022). To account for the unpreparedness of the legislative framework

and the managerial apparatus itself for global changes in the structure of tax and fiscal policy of the republics, the application of the experience of other countries (Nielsen *et al.*, 2021; Garbinti *et al.*, 2020; Alexandri *et al.*, 2024). Thus, the study has shown that the issue of reforming the tax system of Central Asian countries is acute and urgent in the framework of achieving development goals. Mobilizing domestic reserves through tax revenues will enable the region to increase its attractiveness in the international market.

Conclusions

The transition to a progressive taxation system proves its effectiveness by the positive experience of its use in the EU and other developed countries. This system allows to achieve a more equitable distribution of the tax burden between those who receive lower incomes and those who receive higher incomes. The study concludes that the Central Asian countries are currently quite undervalued in the world and many of them, such as Kazakhstan and Uzbekistan, have quite high potential for achieving sustainable development goals.

The years of post-pandemic development and global conflicts have intensified the struggle for energy resources, which, of course, has also affected the need to mobilize domestic reserves. This entails the need to revise approaches to the tax system. Today, most of the economies of Central Asian countries are based on the principles of fixed tax rates of personal income tax and high percentages of contributions to social funds, which places a high burden, especially on unprotected segments of the population. This, of course, affects the formation of the overall situation in the country, budget financing, and the level of social security of citizens. This is especially noticeable in countries such as Tajikistan, where the standard of living is already quite low.

The process of reforming the tax system may be negatively affected by the level of corruption in the countries, the specifics of the development of each country separately, government support, the lack of readiness of society, the change in the level of the tax burden on the richer segments of the population may reduce their investment activity. This may lead to an imbalance in the creation of new jobs and overall economic growth.

Some of the issues related to the stages of reform and smooth transition to a progressive system remained outside the scope of this study. Thus, due to insufficient data, it is impossible to address the taxation system of Turkmenistan and the possibility of applying the experience of EU countries to the introduction of progressive taxes in this region. There is also limited consideration of the environmental components and their role in the tax structure system during the reform of the system, tax rates and the most acceptable option for the whole Central Asian region. The experience of such countries as Italy and France can serve as a model and the methodologies applied there can serve as a basis for further research in this direction.

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Life and work: impact of managerial decisions on employee well-being in Mexico

Vida y trabajo: impacto de las decisiones gerenciales en el bienestar de los empleados en México

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Abstract: the focus on work-life balance has increased exponentially over the past two decades. Research has demonstrated that achieving this equilibrium leads to enhanced personal and professional satisfaction. Moreover, organizations benefit from improved work-life balance among employees, as it facilitates more efficient time and task allocation, thereby increasing productivity. The aim of this study was to estimate the effect of eight employee benefits on self-reported life satisfaction among workers. Logit equations were employed, utilizing data from National Survey of Self-Reported Well-being. The sample size exceeded 10 000 individuals, representing a population of over 30 million employees in Mexico. To assess the impact on well-being, the benefits were ranked from most to least frequent. The most common benefit was the mandatory year-end bonus ('aguinaldo'), while profit sharing was the least frequent. Results indicated that employees with a higher number of benefits have a greater probability of reporting satisfaction with their current and future life. The study also reports that the positive effect of employee benefits increases when organizations complementarily implement other labor strategies, such as annual income increases and considering employee opinions. The estimates were consistent, thus providing useful evidence for managers to design organizational policies that simultaneously contribute to employee well-being and promote higher productivity in both the short and long term.

Keywords: employment benefits, subjective well-being, life satisfaction, logit regression, decent work.

Resumen: el interés por el equilibrio trabajo-vida ha crecido exponencialmente en el último par de décadas. Se ha documentado que lograr ese balance proporciona una vida personal y profesional más satisfactoria y, a su vez, trae beneficios a las organizaciones, ya que la distribución de tiempos y tareas es más efectiva aumentando la productividad. El objetivo del artículo fue estimar el efecto de ocho prestaciones laborales en la satisfacción que reportan los empleados con su vida. Se utilizaron ecuaciones logit y datos de la Encuesta Nacional de Bienestar Autorreportado. El tamaño de la muestra superó 10 000 personas que representa un universo mayor a 30 millones de empleados en México. Para evaluar el impacto sobre el bienestar las prestaciones se ordenaron de la más a la menos frecuente, siendo la más frecuente el bono obligatorio en diciembre —el aguinaldo— y la menos el reparto de utilidades. Se encontró que los empleados con mayor número de prestaciones tienen mayor probabilidad de estar satisfechos con su vida actual y futura. Se reportó también que el efecto positivo de las prestaciones aumenta cuando las organizaciones usan complementariamente otras estrategias laborales como realizar aumentos anuales de ingreso y tomar en cuenta la opinión de los empleados. Las estimaciones mostraron estabilidad por lo que proporcionan evidencia útil a los gerentes para diseñar políticas organizacionales que simultáneamente contribuyan al bienestar laboral y que propicien mayor productividad en el corto y largo plazos.

Palabras clave: prestaciones laborales, bienestar subjetivo, satisfacción con la vida, regresión logit, trabajo decente.

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Introduction

Human resources management in organizations is responsible for recruiting people with the necessary skills, including their ability to work as a team. Decisions are made on the management of the personnel that seek to improve the business performance, the welfare of the workers or both. For example, Guest (2017) highlights policies related to health, safety, social interaction at work, income not linked to incentive schemes and active listening of employees through collective representation, surveys or direct consideration of their opinions.

With European data, Cuesta-Valiño *et al.* (2024) found that job satisfaction not only influences individual happiness, but also encourages altruistic activities. From another perspective, it has been proposed as a managerial objective to minimize worker turnover and maximize job happiness (Galván-Vela *et al.*, 2024). To identify the most effective decisions, managers need evidence, a topic of discussion that has been in place since at least the 1980s (Ichniowski and Shaw, 2003).

In each organization, quantitative studies can evaluate the set of decisions of their own. This approach, called *insider econometrics* (Shaw, 2009), seeks to provide specific answers on the effectiveness of managerial decisions in human resources management (HRM).

From a broader perspective, Ichniowski and Shaw (2003) document the growing number of companies that, during the 1990s, experienced and innovated in human resources management. The authors highlight three main findings:

i) There is complementarity between management policies, so companies should focus on multiple simultaneous decisions, rather than on single or sequential decisions.

(ii) The most innovative organizations in staff management achieved 7 per cent higher productivity compared to those with a traditional focus on human resources.

(iii) Companies that do not explore new decisions could face uncertainty about future productivity or avoid the costs associated with the transition.

This last point coincides with the conclusions of the literature on human resources analytics (Abellán-Sevilla *et al.*, 2024).

Additionally, a line of research focused on self-reported well-being has been consolidated (Kahneman and Krueger, 2006), which includes studies on job satisfaction. This aspect has generated articles that postulate that well-being at work translates into greater productivity and better financial performance of organizations.

Using panel data from England, Bryson *et al.* (2017) suggest that the predominant causal direction is from job satisfaction to productive performance, while reverse causality is less likely. This Satisfaction-Productivity hypothesis was also tested with Canadian data (Fang *et al.*, 2019), obtaining the same conclusion: labor benefits, such as flexible hours, remote work or care services for children and adults, increase work well-being, which in turn improves organizational results.

However, Fang *et al.* (2019) warn that many managers are reluctant to implement these benefits due to perceived costs and the difficulty of documenting their positive impact. Therefore, they recommend corroborating these findings with experimental data.

The Satisfaction-Productivity hypothesis, also known as the happy and productive worker hypothesis (Isham *et al.*, 2021), posits that the presence of high-quality supervisors promotes higher levels of well-being and productivity. This occurs when supervisors efficiently manage teams and provide both motivation and the resources needed for the job.

However, Isham *et al.* (2021) warn that excessive pursuit of higher productivity can harm workers' well-being and, in the long run, negatively affect productivity. In the same line, Guest (2017) argues that organizations prioritize improving performance before addressing

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employee concerns. Meanwhile, Soukiazis and Ramos (2016) conclude that longer working hours and the imbalance between work and personal life reduce life satisfaction, well-being and ultimately productivity. These authors highlight not only the ethical reasons for promoting well-being in organizations, but also the potential benefits for both workers and companies. To this are added the social advantages derived from the greater altruism of individuals with greater job satisfaction (Cuesta-Valiño *et al*., 2024). Such gains would be achieved by eliminating psychological factors that reduce well-being and promote higher levels of job satisfaction.

To assess the impact of managerial decisions on employee well-being, there are several additional strategies to insider econometrics. Nasamu *et al*. (2021) highlight that the most robust strategy is the use of a randomized controlled trial (RCT) design, as it allows the effect of a specific business policy to be isolated with high confidence.

This ideal design requires collecting data before and after the implementation of the policy, in addition to forming a treatment group and a control group. However, meeting the amount of information needed is often a challenge, which makes assessments based on other approaches tend to be subject to greater uncertainty compared to a RCT design.

Other approaches to assessing managerial decisions, such as Return on Investment (ROI) or Cost-Benefit Analysis (CBA), present an intrinsic difficulty: they require the outcome variable (well-being or satisfaction) to be expressed in monetary terms. Because of this limitation, an alternative is to apply a cost-effectiveness ratio. In this approach, the numerator represents the change in life satisfaction or well-being, while the denominator reflects the net cost of the policy implemented.

According to Nasamu *et al*. (2021), net cost is defined as the difference between the cost per participant of implementing a policy and the productivity generated. In this way, the cost of a policy would be reduced to the extent that it improves employee well-being and, in turn, increases productivity.

About a decade ago, the OECD (2013) marked a milestone by publishing guidelines for collecting, measuring and using indicators of subjective well-being. The aim was to promote best practices, improve the quality of indicators and demonstrate that life satisfaction variables are valid and reliable measurements.

In this line, Aghion *et al*. (2016) analyzed the metropolitan areas of the United States and reaffirmed the validity of self-reported well-being as an indicator of expected material well-being. More recently, Murtin and Siegerink (2023) quantified the social cost of adverse labor practices to workers' well-being. This approach sought to avoid precarious working conditions, such as job insecurity, excessive working hours, or tensions with managers. A favorable working environment would not only improve employee well-being but could also increase organizational productivity.

Recent evidence on the relationship between well-being and productivity is supported by experimental evidence, highlighting two relevant cases. The first experiment showed that job seekers consider information about the organizational climate when choosing which companies to apply to. In particular, they prefer companies where greater job well-being prevails, suggesting that talent recruitment depends, in part, on internal working conditions (Ward, 2022).

The second case is a quasi-experiment in England on the effect of happiness on productivity. This study, carried out in 11 telesales centers, measured productivity directly through the number of sales, instead of subjective variables such as scales or managerial valuations (Bellet *et al*., 2023). The results indicated a positive impact of happiness on productivity, with explanatory mechanisms grouped into three categories: cognitive (greater speed and efficiency), motivational (increased effort and enjoyment of work) and socioemotional (positive mood).

For Latin America, no studies were found with experimental methodology on the relationship between well-being and productivity. However, there is an article with wide coverage of countries that addresses this issue (Cortés

et al., 2013). This study used data from the Latinobarómetro and focused on the subjective well-being of the self-employed, explaining the results from two main factors:

(a) Whether people were self-employed voluntarily or by necessity.
(b) The difference in welfare between employees and the self-employed.

The results showed that business owners experience greater well-being, as long as the degree of autonomy they enjoy as self-employed is considered. However, the authors highlighted the high job precariousness that characterizes the Latin American subcontinent.

In Mexico, the extent to which work can be considered decent has been analyzed (Arredondo *et al*., 2022). The authors developed a multidimensional index to evaluate the labor benefits that workers receive, including health, pension, housing, bonuses, holidays, childcare, among other benefits. This index has a range from 0 (minimum) to 1 (maximum), and its average valuation for Mexico was 0.30. As a further finding, the authors observed that foreign-capitalized firms provide more benefits to their workers compared to domestic firms. In the field of subjective well-being in Mexico, Charles-Leija (2022) performed a statistical exploration using information from the Consumer Confidence Survey, indicating that subjective well-being is an appropriate sensor of satisfaction.

In Medina-Garrido *et al*. (2017), 1500 workers in the banking sector in Spain were surveyed. The findings revealed that work benefits are not valued uniformly; workers consider some more important than others, but always want all benefits to be available and managers not to retaliate for using them. While benefits do not directly affect the performance of banking organizations, their impact is positive indirectly, mediated by well-being. This benefit translates work benefits into greater organizational performance (Medina-Garrido *et al*., 2017).

This broadcast channel gives managers the opportunity to influence employee well-being by providing a range of benefits and clearly communicating their availability.

Compared to Spain, precarious jobs persist in Mexico; however, the determinants of subjective well-being do not differ from those found in OECD countries (Dugain and Olaberría, 2015). People tend to report higher levels of well-being as their income and educational level increase (Maestas *et al*., 2023; Kapteyn *et al*., 2015). However, subjective well-being also depends on income distribution (Senik, 2005).

In the methodology used by Dugain and Olaberría (2015), an estimate of ordinary least squares (MCO) and an ordered logit model were used to take into account the response scale from 0 to 10, used to evaluate the life satisfaction.

Indeed, the appropriate estimate should employ an ordered logit, since the marginal effect varies based on the values of the predictive variable X (Soukiazis and Ramos, 2016), unlike the ordinary least squares (MCO) method, which assumes that well-being increases steadily over any value range of X.

Despite the interpretative advantages of the ordered logit, the resulting estimates usually present low adjustment values, such as the pseudo-R2. Three cases are cited: in Dugain and Olaberría (2015), no adjustment value is reported; in Pontarollo *et al*. (2020), the estimated adjustment was 0.066, and in Soukiazis and Ramos (2016), the adjustment value was 0.164.

The objective of this article is to estimate the effect of eight work benefits on the satisfaction that employees report with their lives. The hypothesis is that three variables (labor benefits, income increase and employee participation in decision-making) positively influence the life satisfaction of employees. In particular, it was postulated that those who receive these benefits and have a voice in the organization are more likely to report higher levels of life satisfaction compared to those who do not have these conditions.

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This article contributes to national studies on subjective well-being, with a particular focus on Mexico. It looked at how employee satisfaction varies as the number of work benefits increases. Mexico was chosen because of the availability of a survey that includes more than 10,000 respondents who are representative of 30 million workers.

Well-being was compared in five different groups: the first was composed of employees without benefits, followed by groups with one, three and six benefits, and finally, a group with a maximum of eight benefits. The results show that, initially, life satisfaction increases as employees receive one or three benefits. From that point on, however, satisfaction stagnates, regardless of whether employees have six or eight benefits.

The estimate reveals that it is possible to avoid stagnating satisfaction if, in addition to providing benefits, management ensures an annual increase in income and if the organization implements policies that take into account the opinion of employees.

The rest of the article describes the methodology, discusses the results and discussion, and finishes with the conclusions.

Materials and methods

This analysis looked at the benefits that employees receive. The only source of information was the National Self-Reported Welfare Survey (ENBIARE) of the National Institute of Statistics of Mexico (INEGI, 2021), the period of uprising was June-July 2021, two months after a profound labor reform aimed at improving labor conditions (Kato-Vidal and Hernández-Mendoza, 2024).

In the survey, there are about 12 thousand employees surveyed, representing a universe of 32.5 million workers in Mexico. One of the items allows identifying the workplace, the most frequent being -with 63%- the facilities of the company. The list had a total of 15 workplaces. Those options with low response rate were eliminated and the list was reduced to seven options and the new total of employees was close to 11,500 people (representing 31.3 million employees) who work in companies, fixed positions such as kiosks, at the customers' or skipper's home, in the open sky or at the site of the work, etc.

Two response variables are chosen: i) Satisfaction with current life, and ii) Perception of the living standard in five years. In both cases, interviewees could respond on a scale from zero to 10, where zero represents the worst possible life and 10 the best possible life. Most respondents answered options 8, 9 or 10.

Methodologically, it is possible to estimate a multinomial logit model to simultaneously analyze the various response options (Hansen, 2022). In the literature on subjective well-being, it has been reported that the multinomial option generates low levels of adjustment of the pseudo-R2 statistic, i.e., the estimated models fail to faithfully reproduce the observed data.

Alternatively, a logit model using a dichotomous variable was estimated in this article. To translate the multiple answer options to only two values, the value of *one* was given to options 9 and 10 and the value of zero to the rest of the answers. In this way, the model was used to find under which working conditions an employee would be more likely to respond with a value of 9 or 10 to the degree of satisfaction with their current or future life.

The main explanatory variable is labor benefits. The survey asked employees whether or not they had eight different work benefits (INEGI, 2021; Ceja, 2019). The breakdown of benefits is broader compared to the three benefits included in the employment survey (INEGI, 2024).

It was necessary to order benefits so that it was easier to chart the impact of benefits on reported life satisfaction. Instead of making an individual analysis of each benefit, it was chosen to group them and observe the cumulative effect on the welfare of workers with different numbers of benefits.

To avoid estimation problems and to be able to more easily observe statistically significant differences, the benefits were grouped, and

five groups were analyzed (see table 1). In the first group, called *Zero*, those workers without any labor benefits were brought together. At the other extreme, the *Todas* group brings together workers who responded to have each and every one of the eight benefits.

In addition, three intermediate cases were raised. The simplest is the *Una* group whose workers only have the bonus benefit – the most frequent –. Then, group *Three* was integrated with those workers who simultaneously had the most frequent benefits, including the bonus. Finally, Group Six was integrated with workers who had the sextet of the most frequent benefits; they would only need to have the benefits of paid maternity leave and profit sharing.

In addition to benefits, two explanatory variables were also added to provide managers with additional tools with which to favorably affect the well-being of employees:

- It was considered whether the opinion of the employees is considered, having as answer options: Yes, No and Sometimes. Employees who are valued and taken into account would be expected to have greater subjective well-being; and
- Those employees who had received an increase in income in the last 12 months were identified, since a higher level of income allows them to cover a greater number of needs and obtain higher levels of satisfaction.

To complete the regression analysis, control variables were included, such as: sex, age, workplace, etc. The selection of variables was done through a heuristic process, choosing variables related to life satisfaction and seeking to achieve a consistent estimate (VanderWeele, *et al*, 2020; Cameron and Trivedi, 2022).

The estimation was made by a logit model, where the dependent variable takes the value of 0 or 1, zero if its satisfaction with life is 8 or less, and one if the reported satisfaction is 9 or 10. That high life satisfaction is the event defined in the research, and estimation helps to calculate what is the probability with which the event could occur. In particular, the estimated equation was as follows:

$$Prob\ of\ event = Y_i = \propto_i + \beta_1 X_i + \beta_2 \Delta w_i + \beta_3 V_i + \beta_4 (X_i \times \Delta w_i) + \beta_5 (X_i \times V_i) + \gamma Z_i + \epsilon_i$$

wher $\propto$ is the constant of the equation, *i* is the index for each of the people analyzed, *X* represents the benefit groups analyzed, Δw is a dichotomous variable that indicates whether or not the employee received income increase, *V* is a categorical variable that records whether the employee's voice is always taken into account, sometimes or never represents the set of 13 control variables and is the random error term of the equation. In the estimation, errors were grouped according to the number of benefits received.

The above equation was used with the two life satisfaction variables, the first for estimating satisfaction with current life and the second for satisfaction with future life. The estimated equation also includes two interaction terms: ($Xi \times \Delta wi$) and (Xi × Vi), which were used to estimate the complementarity between strategies and show how much the effect of benefits is reinforced with increases in income or when taking into account employee opinion (Mize, 2019).

The interpretation of βs in logit models is somewhat more complex than in linear regression models. Since the variable Yi is the probability of an event $Y_i = logit(prob) = ln\left(\frac{prob}{1-prob}\right)$, then, where the last term is the reason for the probabilities of an event occurring. In this sense, a coefficient β measures what is the change in the probability ratio, given an increase of the variable X. The interpretation is as follows: If β>1, an increase of X increases the probability of the event; if β<1, X would decrease the probability of the event; and if β=1, X does not affect the probability of the event. The results and their discussion are set out below.

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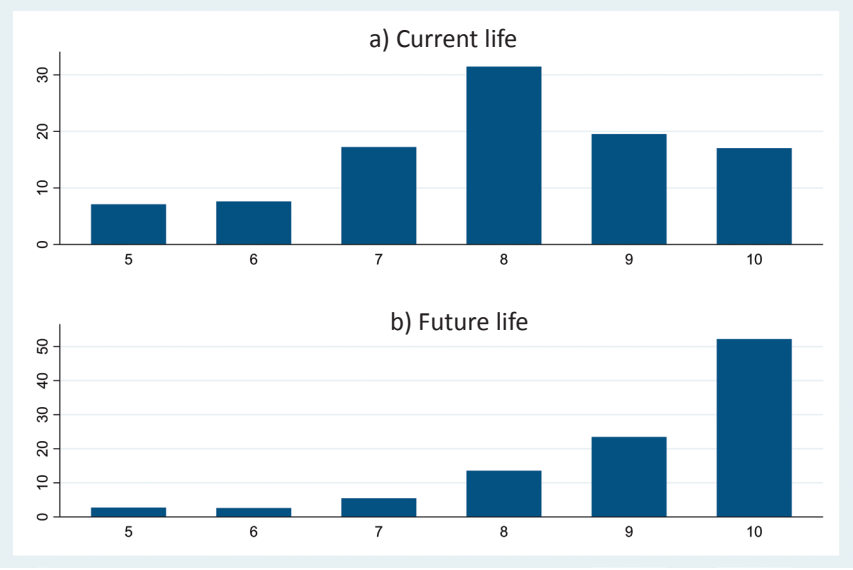
Results and discussion

Descriptive statistics

Two aspects stand out in Figure 1. First, most employees gave a value close to eight to rate satisfaction with their current life (panel a) and, second, the high optimism of half of the workers who responded that in five years their standard of living would be at the highest level (panel b) is surprising. In addition, it is observed that about a third of the responses (35.2%) answered that they have a level of satisfaction of 9 or 10 with their current life and that percentage doubles up to 73.7% when assessing the perception about their life in five years.

Figure 1

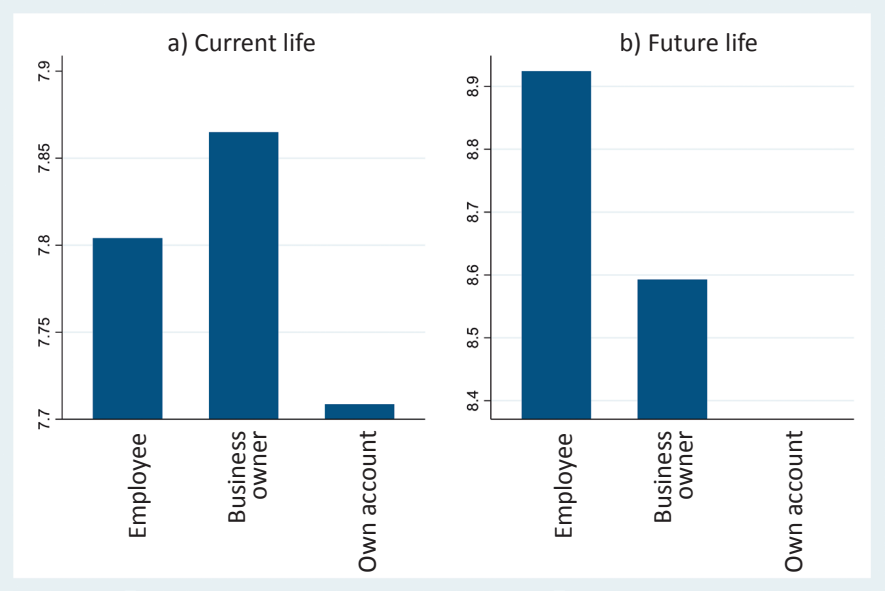
Mexico: Employee satisfaction with current and future life (percentage of responses)



Note. The percentage of employees who chose each response option is displayed. To simplify it is only reported from step five, options less than five have a very small percentage, less than 2% of the answers. Data from INEGI-ENBIARE (2021).

Comparatively, employee satisfaction with their current life is lower than that of business owners. This finding is consistent with the literature on well-being. Figure 2 shows that five-year future life satisfaction increases in all three groups of economically active people. The most noticeable increase is that of employees who even outperform business owners in their perception of satisfaction.

Figure 2
Mexico: Satisfaction Level of Employees, Business Owners and Self-Employed (Scale 0 to 10)



Note. The self-employed report the lowest level of satisfaction of the three groups, they evaluate with 7.71 their current life and with 8.37 their future life. Data from INEGI-ENBIARE (2021).

Table 1 lists these benefits and ranks them in the most frequent form, the "aguinaldo" – a mandatory bonus in December – which is the least frequent form of profit sharing: a percentage of the profit generated in the previous year paid to the worker during April or May. Benefit groups have between 3000 and 8000 people, which would support an efficient estimate. The first case is large, equivalent to 30% of all employees, corresponding to workers without any benefits. In the last case – the top – only 28% of workers reported enjoying all the benefits foreseen in the survey. The hypothesis proposed posits that if a worker has a greater number of benefits, this would reflect better working conditions (De la Torre-Ruiz *et al.*, 2019), which would translate into greater satisfaction in the current and future lives of employees (Sirgy *et al.*, 2021).

Table 1
Mexico: Percentage of employees who have work benefits

Group	Benefits	Accumulation of benefits	Yes, you do	People
Zero	None		30 %	3614
One	1 Bonus (mandatory bonus in December)	1	69 %	8211
	2 Public medical service for their work	1+2	59 %	7002
Three	3 Paid Holidays	1+2+3	55 %	6578
	4 Paid Medical disability	1+2+3+4	51 %	6122
	5 Pension Fund (retirement savings)	1+2+3+4+5	47 %	5614
Six	6 Public credit for housing	1+2+3+4+5+6	45 %	5360

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Group	Benefits	Accumulation of benefits	Yes, you do	People
	7 Paid maternity leave (or paternity leave)	1+2+3+4+5+6+7	38 %	4.514
All	8 Profit sharing	1+2+3+4+5+6+7+8	28 %	3393

Note. The benefits are ordered from most to least frequent. The percentages decrease because there are fewer workers who simultaneously have all the benefits. Data from INEGI-ENBIARE (2021).

Regression analysis

The estimated coefficients are reported in Table 2. Variants of the estimated equation are presented to evaluate the stability of the coefficients. Initially, control variables and interactions were excluded. The final estimates included some interaction, either between labor benefits and income gains, or alternatively between benefits and the variable that captures if the worker's opinion is taken into account.

In columns [1] to [4], satisfaction with current life was used as a dependent variable, while in columns [5] to [8] satisfaction with future life (at 5 years) was used. In general, it is noted that the coefficients show relative stability between the different specifications.

When adding the control variables, an increase in the pseudo-R2 and in the percentage of correctly classified cases is observed. Alongside the pseudo-R2, the area statistic under the ROC curve indicates that the fit is higher for the satisfaction with current life variables. Other statistics, such as the percentage of correctly classified cases or the deviation ratio, do not reveal significant differences between the degree of adjustment when current or future life satisfaction is used as a dependent variable.

The set of estimates is valid, since the absence of multicollinearity is verified (using the variance inflation test) and the hypothesis ($\chi 2$) that the models present a good fit is not rejected. Table 2 only presents a summary of the estimates, and the coefficients are expressed as odds ratios.

Table 2

Effect of work benefits on life satisfaction (odds ratio)

	Current life				Future life			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Benefits (base = None)								
One (i.e. bonus)	1.103**	1.096**	1.402**	1.207**	1.257**	1.050**	1.085**	1.274**
Three	1.450**	1.401**	1.522**	1.486**	1.498**	0.940	0.879**	1.167**
Six	1.401**	1.289**	1.321**	1.985**	1.836**	1.051	1.031	1.220**
All (Eight)	1.374**	1.307**	1.175**	1.934**	2.299**	1.328**	1.396**	1.460**
Income increase (base = No)								
Yes	1.124	0.988	0.907**	0.988	1.149*	1.030	1.051*	1.030
Opinion taken into account (base = Sometimes)								
Yes	1.421**	1.126	1.125	1.427**	1.492**	1.261**	1.262**	1.388**
No	0.889	1.003	1.001	1.406**	0.822	0.946	0.946	1.159**
Interactions and controls								
Interaction (Benefits × Income Increase)	No	No	Yes	No	No	No	Yes	No

	Current life				Future life			
Interaction (Services × Opinion taken into account)	No	No	No	Yes	No	No	No	Yes
Control variables	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Adjustment statistics								
Pseudo R2	0.012	0.192	0.193	0.193	0.033	12.23	0.123	0.123
Percentage correctly classified	64.73	74.26	74.19	74.25	73.83	75.58	75.66	75.63
Average Variance Inflation Factor	1.84	3.21	3.31	3.95	1.84	3.200	3.30	3.94
Area under the ROC curve	0.5716	0.7874	0.7879	0.7879	0.6256	0.7374	0.7377	0.7377
Deviation ratio	0.8575	0.8838	0.8839	0.8839	0.8784	0.8898	0.8899	0.8899
Goodness of fit (prob(χ^2))	0.2136	0.1445	0.1500	0.1398	0.2321	0.5803	0.5805	0.5502
Remarks	10 731	10 707	10 707	10 707	10 712	10 712	10 712	10 712

Note: ** p<.01, * p<.05. Logit estimation where it takes the value 1 if it was answered that life satisfaction was 9 or 10, the coefficients are expressed as odds ratio. If the coefficient = 1 indicates that the probability of the event (high life satisfaction) is the same as in the base category; if the coefficient > 1, then the probability of the event is greater than in the base category. Notes: a) Pseudo-R2 indicates the improvement in model fit compared to a model that only includes the intercept, b) The correctly rated percentage is the percentage of observations for which the model correctly predicts the category of the dependent variable, c) The Average Inflation Factor of Variance with values between 1 and 5 indicates an acceptable level of multicollinearity, d) The Area Under the ROC Curve is a metric of the performance of binary classification models, ranging from 0 to 1, where 1 represents a perfect classification, e) The deviation ratio is a measure that compares the deviation of the adjusted model with the deviation of the model using only the intercept, a value closer to one indicates a better fit of the model, and f) A p -high value of indicates that there is no evidence to reject that the model fits well. INEGI-ENBIARE (2021).

The evidence presented in Table 2 shows that workers who receive more benefits report more often being more satisfied. This finding is consistent with that of Cuesta-Valiño *et al.* (2024), who quantify that job satisfaction has an effect on happiness almost equivalent to that of satisfaction with social life. Allocation of work benefits has a significant effect, while income increases alone do not show the same pattern; their ratios fluctuated around 1, suggesting that a policy of income growth does not translate into a higher probability of satisfaction.

In perspective, an isolated income policy does not have a positive impact, but when policies are combined (benefit interaction × income increase), an *indirect* effect arises in which income increase potentiates the positive effect of benefits. Therefore, a managerial decision on labor income developments should consider that income increases have a direct impact on *future* life satisfaction and, indirectly, through benefits, on current life satisfaction (see Figure 3b).

In addition, the effect of considering the opinion of employees was estimated. Unlike income increases, considering opinion does have a direct effect on well-being. In this sense, Galván-Vela *et al.* (2024) analyze the interaction between job satisfaction, affective commitment, and job happiness. Estimated coefficients show values greater than one, indicating that the probability of reporting life satisfaction is higher when the opinion of employees is constantly heard in their workplaces, compared to when they are occasionally or never taken into account. By itself, the policy of giving workers a voice is effective in improving their well-being. In addition, considering employee suggestions also has an indirect positive effect when interacting with benefits (see Figure 3c).

Columns [4] and [8] in Table 2 report the coefficients of the equations that include the interaction between benefits and the consideration of employee opinion. Comparatively, these columns present the coefficients with the highest values,

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suggesting that organizations that simultaneously award benefits and consider employee opinions are the ones most likely to have workers with high satisfaction with both current and future life.

As a synthesis, Figure 3 is presented. The left panel shows the results using the current life satisfaction variable, and the right panel shows the future life satisfaction variable. At the top (panels a), it is observed that those employees with the highest number of benefits are those who have a higher probability of responding positively to the question of whether they are satisfied with life. These results come from the no-interaction estimates, based on columns [2] and [6] in Table 2. It was found that, when the number of benefits is low, only the satisfaction with the current life increases. However, by achieving most or all of the benefits, there is a greater likelihood of being satisfied with both current and future life. As noted above, managers can use work benefits as potential tools to increase employee well-being, and combine them with other resources, such as human resource analytics, which not only contribute to managing change in organizations, but also to increasing job well-being (Abellán-Sevilla *et al*., 2024).

The middle part of Figure 3 (panels b) elaborates on the effect of benefits and their relationship to income increases. These findings come from estimates [3] and [7] in Table 2 (benefit interaction × income increase). The central message of panels *a* continues, adding the following: regardless of the number of benefits, those workers who receive annual income increases more often respond that they are satisfied with life, compared to those who do not receive them. The behavior of the graphs in panel *b* shows that, in order to achieve the positive effect of the benefits, it is necessary to grant the benefits accompanied by annual increases in income.

Finally, at the bottom of Figure 3, another perspective is provided. Instead of showing the indirect effect of income growth, panel c show how the effect of benefits changes if, in an organization, workforce suggestions is always valued, *sometimes* valued, or *never* valued. For managers who seek to positively affect well-being, the *best* alternative is to offer work benefits and, simultaneously, take into account the opinion of employees. Underneath this better alternative, *sometimes* taking opinions into account contributes to satisfaction only with *current* life, as long as workers enjoy most or all of the benefits. Finally, the strategy with the *least* positive impact would be to provide benefits without taking into account opinions (see Figure 3c).

Estimates of the triple interaction: benefits × income increase × taking into account opinions are not reported. This analysis was considered beyond the scope of this article and could be addressed in future research. The results presented here make it possible to recommend that companies not only provide employment benefits, but that in order to achieve greater positive effects, these benefits should be accompanied by increases in income or, alternatively, attention to the opinions of workers. If all three actions were implemented together, the effect would be positive, especially when workers have few benefits.

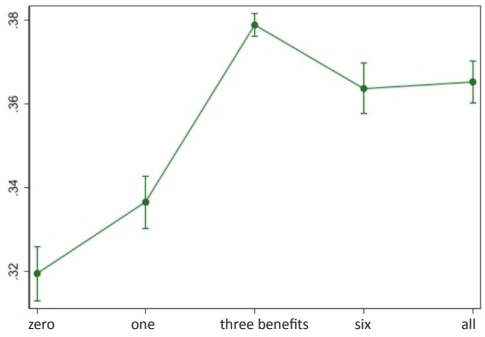
Other authors have reported that labor benefits increase worker satisfaction (Guest, 2017; Fang *et al*., 2019; Medina-Garrido *et al*., 2017). In this sense, it has been observed that full-time workers report higher well-being than part-time workers, and the latter have higher well-being than the unemployed (Layard and De Neve, 2023; Cortés *et al*., 2013). Imperfect evidence that productivity has a positive relationship with well-being is that people report higher levels of life satisfaction in larger urban concentrations. Productivity is known to be higher in larger cities (Duranton and Puga, 2020).

The estimates presented were very consistent. To show this, different specifications were compared, with and without control variables, as well as with and without interaction variables (see table 2). In addition, using the same set of predictor variables, a similar behavior was observed between the variables satisfaction with current life and satisfaction with future life. The stability of the parameters provides confidence that the findings can be used to design productivity and well-being policies in organizations (Gorard, 2021).

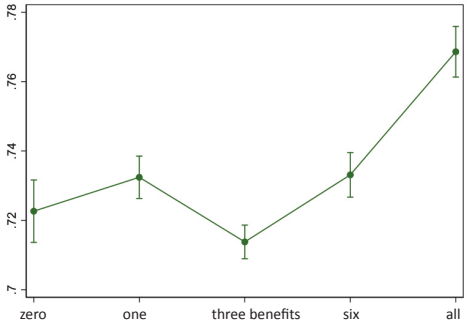
Figure 3

Model predictions: benefit effects, income increase, and considered opinion (probability of high life satisfaction)

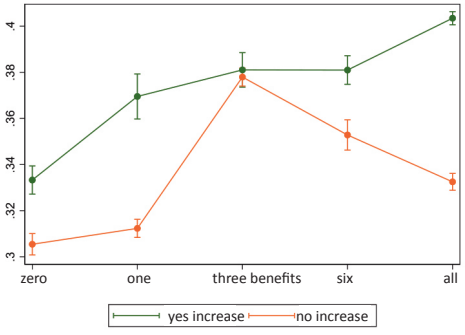
1 Current life
Panel a1
High satisfaction probability increases with initial benefits



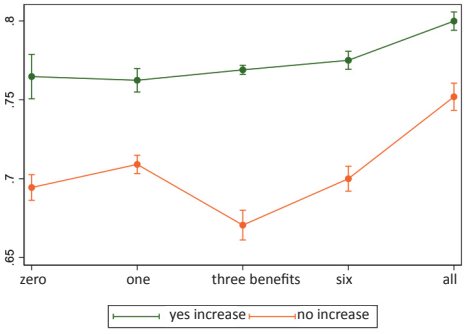
2 future life
Panel a2
Only those with all benefits achieve greater future satisfaction



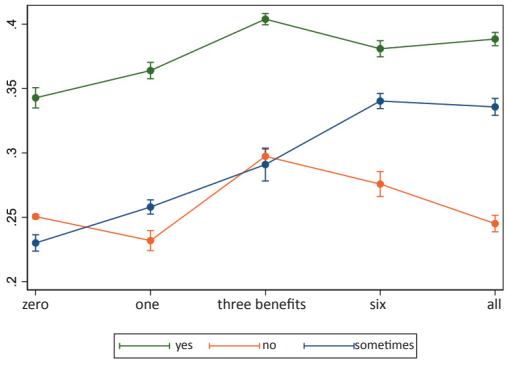
Panel b1
Income increases and having many benefits maximize the likelihood of high satisfaction



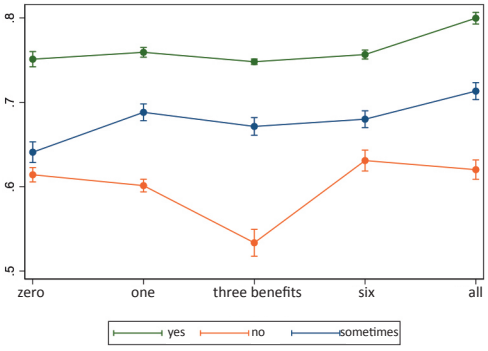
Panel b2
Probability of high future satisfaction occurs with all benefits and on receiving annual income increments



Panel c1
Taking into account the opinion of employees greatly increases the probability of high satisfaction regardless of the number of benefits granted



Panel c2
Always taking the opinion into account has the highest probability of satisfaction, compared to sometimes doing so; the lowest probability occurs when opinions are never addressed



Note. High life satisfaction is measured with answers 9 and 10. Estimates in Table 2.

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Conclusions

This article aimed to estimate the effect of eight work benefits on employees' satisfaction with their lives. Evidence is provided that work benefits positively affect the well-being of employees, both in their satisfaction with current life and with future life. The existing literature indicates that increased well-being is a contributing factor to the increase in performance indicators in organizations. Thus, managers could, at the same time, foster workers' subjective well-being and promote higher long-term productivity.

Unlike what is reported in the literature, where benefits such as flexibility of working hours or the possibility of doing work from home are studied, in the Mexican case analyzed, labor benefits are much more essential. These include the right to a pension, health care, housing, and paid holidays, among others. In this context, it is not surprising that, with more benefits, the likelihood of being satisfied with current and future life grows. It is recalled that the analysis presented showed a differentiated treatment of benefits, so that the most common among workers appeared at the beginning, while the least frequent – and probably the most valued – were included at the end.

One limitation of the study was the absence of a labor income variable in the survey content. Ideally, and to corroborate the results, one could try to identify the relationship between the level of income and the number of benefits received. It is not ruled out that the increase in welfare resulting from benefits is correlated with a higher level of income. To address the lack of an income variable, the categorical variable of locality size was used as the proxy variable of income, as well as fixed effects by state to control the unobserved variables, which partially explain income.

The scarce literature on non-monetary income and labor benefits was noted in the preparation of this article. Therefore, the analysis contributes to this poorly researched area by assessing the effects of various labor benefits and, in particular, by exposing the characteristics of a Latin American country: Mexico.

The findings bring a labor dimension to studies on subjective well-being, which usually exclude satisfaction at work, concentrating on life satisfaction in general.

Finally, based on the results obtained, it can be suggested as a future line of research the use of labor characteristics as an explanatory variable when evaluating the productive performance in organizations.

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Relationship between internal communication, corporate social responsibility, and workplace well-being in service companies

Relación entre comunicación interna, responsabilidad social corporativa y bienestar laboral en empresas de servicios

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Abstract: the aim of this study was to empirically analyze the relationships between the dimensions of organizational justice, job satisfaction, and organizational commitment with work happiness and turnover intention among academic workers in Mexico. To this end, a sample of 393 higher education faculty members in Mexico was surveyed. The statistical technique of structural equation modeling (CB-SEM) was used to analyze the data. The study's results show that, on the one hand, the variables of job satisfaction, organizational commitment, and organizational justice are interrelated among these workers, and on the other hand, that these variables positively explain work happiness and negatively explain turnover intention. This information is relevant for university leaders to undertake a strategic direction oriented towards Happiness Management. This way, their human capital can perform their professional activities in an environment of positive emotions, creativity, joy, and subjective well-being.

Keywords: internal formal communication, internal informal communication, corporate social networks, internal corporate social responsibility, work well-being.

Resumen: esta investigación explora en profundidad el efecto de la comunicación interna formal e informal a través de redes sociales corporativas, en la percepción de las acciones de responsabilidad social corporativa interna y su contribución al bienestar laboral de los empleados. El estudio se centra en dos empresas españolas pertenecientes al sector servicios (subsectores de logística y salud), de las cuales se obtuvo una muestra de 242 empleados que hacen uso de manera habitual de una red social corporativa para sus interacciones laborales. El diseño de la investigación fue cuantitativo, transversal, descriptivo y correlacional. El modelo teórico propuesto se analizó mediante ecuaciones estructurales basadas en mínimos cuadrados parciales, lo cual permitió analizar las relaciones entre las variables implicadas. Los resultados muestran un efecto diferencial de la comunicación interna formal e informal sobre las variables examinadas, evidenciando la relevancia de priorizar esta tecnología por los beneficios constatados en las variables analizadas (bienestar laboral y responsabilidad social corporativa interna). Estas observaciones aportan una perspectiva innovadora y digital a las organizaciones y ponen en relieve la necesidad de priorizar la comunicación interna a través de redes sociales corporativas. Asimismo, se pone de manifiesto la relevancia de contar con una estrategia sólida de comunicación interna para maximizar la efectividad de las acciones de responsabilidad social corporativa interna que la empresa propone y contribuir así a un mayor nivel de bienestar laboral de los empleados.

Palabras clave: comunicación interna formal, comunicación interna informal, redes sociales corporativas, responsabilidad social corporativa interna, bienestar laboral.

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Introduction

Job well-being is a growing topic that is associated with high productivity and employee satisfaction, which simultaneously favors the achievement of a sustainable competitive advantage in companies (Tabala *et al.*, 2024). Lack of well-being in the workplace has a direct impact on business costs associated with sick leave, increased absenteeism, labor turnover and decreased work performance (Galván-Vela *et al.*, 2024). According *to* Davids *et al.* (2024), there is a need to analyze how organizations promote safe, emotionally, and psychologically safe working environments to reduce these consequences.

In this context, internal communication is a very important tool, as it optimizes the flow of information and ideas, enhances collaboration and teamwork, favors the achievement of business objectives and contributes to improve the working well-being of employees (Tkalac Verčič *et al.*, 2024). Therefore, the study of internal communication has aroused a growing interest in the academia (Ravina-Ripoll *et al.*, 2023). In the field of internal communication, Lee (2022) differentiated between the communication that is established between the company as a whole and the employee of a corporate type and more formal nature, and the communication that is established between the supervisor and the employee of a more hierarchical scope and of a more informal nature. The digital transformation in society is redefining the new way of understanding communication in companies, becoming one of the areas with the greatest need for development and research (Badham *et al.*, 2024). In this new context, the use of corporate social networks (hereinafter, RRSSCC) facilitates communication between company-employee and between supervisor-employee to be much more fluent and bidirectional, both in horizontal and vertical relationships (Wuersch *et al.*, 2024).

The communication of the company and supervisors with employees influences internal relations and work well-being. Close and transparent communication strengthens emotional bonds and fosters a sense of care and connection (Lee *et al.*, 2024). Taking into account the importance of work well-being and internal communication in the current business context, the first objective of this research is to demonstrate how formal (company-employee, hereinafter, CIF-EE) and informal (supervisor-employee, hereinafter, CII-SE) digital communications can improve work well-being in companies in the service sector.

As a frame of reference, the theory of labor demands and resources (JD-R) proposed by Demerouti *et al.* (2001) is adopted to address the objectives of this study. This theory is a model that explains how labor demands and resources influence the well-being and performance of employees. Labor demands involve constant physical and/or psychological effort while labor resources promote growth, learning and personal development. Given this perspective, this study presents internal communication, both formal and informal, as a labor resource to improve well-being, since according to Stranzl and Ruppel (2024), the perception that employees have of labor demands and resources directly affect their labor welfare.

In this context, the internal corporate social responsibility actions (RSCI) that the company proposes to employees are also considered as basic labor resource to mitigate labor demands and reduce employee burnout (Ma *et al.*, 2024). In this sense, the second objective is to analyze the impact that RSCI actions have on the labor welfare. In addition, recent studies have shown that internal communication and RSCI are closely related to work well-being (e.g. Jiang and Luo, 2024), as internal communication helps employees improve connection and engage them in RSCI efforts. Therefore, this research seeks to provide evidence on this relationship, differentiating formal communication (company-employee) from informal (supervisor-employee), in order to guide organizations in strengthening this labor resource, i.e., the RSCI, and thus promote greater well-being among employees.

The article is structured as follows. First, the proposed objectives will be related through a theoretical model that links the retained varia-

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bles of interest, deriving a series of hypotheses that will be subjected to empirical contrast. The methodology used and the presentation of the results obtained will be presented below. Finally, the main theoretical and practical contributions will be highlighted, identifying possible future lines of research.

Workplace well-being

Employee welfare at work is a topic of increasing interest in recent years in both industry and academia, making its debate a must in the field of economics (Hammoudi Halat *et al*., 2023).

Considering that there is no universally recognized definition of well-being, two perspectives have dominated the literature: hedonic and eudemonic (Guzzo *et al*., 2022). The hedonic perspective refers to the attainment of a pleasant life from external sources that leads to short-term satisfaction and is usually triggered by relaxing and comfortable activities (Huang *et al*., 2024). Instead, the eudemonic perspective is perceived as a state of positive psychological functioning comprising six dimensions: self-acceptance, purpose in life, autonomy, personal growth, environmental dominance and positive relationships (Tabala *et al*., 2024).

In addition, recent studies indicate the importance of not confusing work well-being with job satisfaction, since they are considered distinct concepts (Alvarez-Torres and Schiuma, 2022). While job satisfaction refers to the judgments and feelings of employees, job well-being encompasses the perceptions, experiences and positive results they experience (Martínez-Falcó *et al*., 2024). Thus, it is important to examine the concept of work well-being, especially considering that companies increasingly operate in digital environments where the affective and emotional state can be affected (Wang *et al*., 2023).

Taking into account digital interaction, corporate social networks (RRSSCC) facilitate connectivity between employees, which improves their well-being significantly (Cernas-Ortiz and Wai-Kwan, 2021). However, discrepancies still persist in the relationship between internal communication and well-being in the workplace. While some scholars have evidenced direct implications between both constructs (Lee and Kim, 2021), others do not establish clear connections (Choi, 2023), which leads us to propose the first two hypotheses:

> H1: Formal and digital internal communication between company-employee positively impacts on work well-being.
>
> H2: Informal and digital internal communication between supervisor-employee positively impacts job well-being.

Internal Corporate Social Responsibility

In his beginnings Davis (1960) presented one of the classic definitions of social responsibility, conceptualizing it as the decisions and actions of entrepreneurs that transcend purely economic interests. However, Carroll (1979) expanded this definition by including a broader view and incorporating several additional perspectives: economic, legal, ethical, and discretionary responsibilities.

In recent decades, the unprecedented growth of corporate social responsibility (CSR) activities has driven the advancement of research in this area (Ramírez *et al*., 2022). This work expands the accumulated knowledge on this subject based on the multidimensional approach proposed by Turker (2009), who understands CSR from four different dimensions: social and non-social stakeholders, society, employees, and customers. This approach follows the model of Carroll (1979), taking a more practical and quantifiable perspective, especially with regard to the measurement of CSR practices. This research focuses exclusively on the dimension referred to employees, i.e., CSR that occurs internally in the company (hereinafter, CSR), understood from the legal and ethical perspective.

Recent research has shown that RSCI's actions are a primary labor resource that can

mitigate negative emotions, attitudes and behaviors in work environments, including decreased turnover and emotional exhaustion (Tang et al., 2024). Given that the RSCI prioritizes the well-being of employees and manages to meet the psychosocial needs of employees beyond financial ones (Carlini and Grace, 2021), this study proposes to test its impact on the well-being of employees by contrasting the following hypothesis:

> H3: Internal corporate social responsibility has a positive impact on job well-being.

Formal and informal internal communication

Internal communication, also referred to as employee communication, internal relations or internal public relations (Men and Tkalac Verčič, 2021), has been recognized as one of the fastest growing areas in today's digital age (Wuersch *et al*., 2024). Despite this, the lack of conclusive work on digital internal communication presents theoretical gaps that need to be addressed (Tkalac Verčič *et al*., 2024).

Workplace dynamics and culture have undergone notable changes with the presence of millennials and Gen Z's access to the workplace (Yılmaz et al., 2024). These changes increase by technological advances such as social networks, artificial intelligence, virtual reality and big data, which have introduced new opportunities that many business leaders must face (Men and Tkalac Verčič, 2021). For this reason, the increasing presence of digital communication in workplaces is inevitable, especially with the incorporation of new generations into the labor market (Men et al., 2020) and the evolution of internal communication tools (Tkalac Verčič *et al*., 2024).

Currently, there are different forms of online communication that the company can implement. Formal internal communication is communication that is writing and online that occur through channels that are officially recognized by the organization between the company and the employee. This communication follows a formal or hierarchical structure of the company, facilitating the flow of information, increasing job satisfaction and strengthening employee confidence (Lee, 2022). In contrast, informal internal communication is considered to be more personalized and spontaneous communication between two parties, supervisor and employee. They help to complement the weaknesses of formal communication, improve decision-making and promote innovation (Viererbl *et al*., 2022).

Taking into account that communication can take different forms within the same organization and according to To *et al*. (2015) a better formal internal company-employee communication (CIF-EE) leads to better internal informal supervisor-employee communication (CII-SE) in non-digital environments. This work focuses on instant messaging as a form of textual communication through corporate social networks (RRSSCC). The fourth hypothesis is proposed:

> H4: Formal and digital internal communication between company-employee has a positive impact on informal and digital internal communication between supervisor-employee.

In addition, academics have suggested that companies should find the best way to engage employees and turn them into advocates for the company, especially in the context of internal corporate social responsibility (RSCI) (Zhang *et al*., 2024). Given that internal communication can take place formally or informally through RRSSCC, and that these can generate positive effects, such as increasing perceived transparency and strengthening employee engagement, it is necessary to analyze the impact of this new way of communicating on the perception of the RSCI (Sandham, 2024). For these reasons, the last two hypotheses of this study are proposed:

> H5: The formal and digital internal communication between company-employee positively impacts the employee's perception of internal corporate social responsibility.

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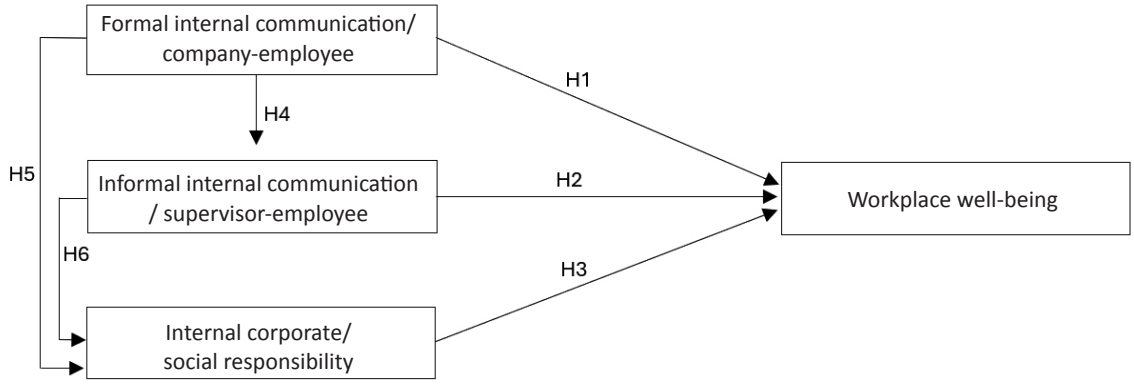
H6: Informal and digital internal communication between supervisor-employee positively impacts the employee's perception of internal corporate social responsibility.

The research model summarizing the relationships is presented in Figure 1 below.

Figure 1
Proposed model



Materials and methods

To achieve the proposed objectives, quantitative research has been developed through a self-administered structured questionnaire. The study variables have been evaluated using various scales from the literature, translated by experts in this area, as well as adapted to the specific needs. The scale to measure work well-being is based on that developed by Pradhan and Hati (2022), composed of a total of 9 items, which has been considered optimal due to its solid, recent and validated characteristic. In order to measure the internal corporate social responsibility variable, the employee-oriented dimension containing five items of the multidimensional scale proposed by Turker (2009) has been retained. This scale is particularly appropriate for evaluating employee-related CSR practices, as it aligns with the legal and ethical perspectives of Carroll's model (1979). Regarding internal communication, the To *et al.* (2015) scale that was previously adapted from the original proposal of Lings and Greenley (2005) has been used, adjusting to the specific needs of the services sector. In this way, we evaluate the two dimensions: the formal internal communication between company-employee (CIF-EE) with four items and the informal one between supervisor-employee (CII-SE) with other 4. All items have been measured with a 7-pont Likert scale (1 totally disagree; 7 totally agree) being number 7 the one that presents a more positive assessment to measure the results. This measurement scale is reliable and recommended in social science research. In addition, it allows better capturing the nuances in the opinions or perceptions of the respondents (Mumu *et al.*, 2022).

It was supported by a company that has developed a technological application of corporate social network that is already being used by companies. This study focuses on two companies in the service sector that have this corporate social network to communicate with their employees. The first company was a commercial logistics holding company, which provided the questionnaire to about 300 employees. The second organization, a hospital that made the questionnaire available to about 500 employees. Both companies were considered optimal for the study due to their size and the percentage of participants reached, which was 22% and 30% respectively, for a total of 242 responses.

Data collection took place during the months of May to July 2023. Prior to the launch of the questionnaire, we applied the best practices recommended by Podsakoff et al. (2024). We adapted the validated scales and included examples to improve the understanding of the questions. We provided an overview at the beginning and emphasized the anonymous character of the study. We also conducted a pilot test of the internal communications managers of companies in order to evaluate clarity, relevance and response time, always preserving the original meaning. We confirmed that the corporate social network was an ideal channel to distribute the questionnaire, given its ease of use and familiarity with employees. With the questionnaire adjusted, we applied a non-probabilistic sampling for convenience.

Table 1 below details the demographic profile of the people participating in the study. 62.81% of the respondents are women, almost twice as many as men (37.19%). The majority are between 30-49 years old and have more than five years in the company, reflecting a knowledge of organizational culture. The high proportion of full-time and highly educated employees could influence the interpretation of variables. These characteristics will be important to nuance the discussion and implications of the study.

Table 1
Demographic profile

Employees (n=242)	N	%
Gender		
Male	90	37.19
Female	152	62.81
Age		
< 20-29 years	53	21.90
30-49 years	160	66.11
> 50 years	29	11.98
Level of training		
No certificate	1	0.41
Primary Education	2	0.83
Secondary Education	9	3.72
Vocational Training	56	23.14
University career	100	41.32
Master or Doctorate	74	30.57
Time in the company		
< 2 years	59	24.38
2-5 years	52	21.49
> 5 years	131	54.13
Type of working day		
Full Time	235	97.11
Part Time	7	2.89
Position in the company		
Direction	38	15.70
Intermediate Command	29	11.98

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Employees (n=242)	N	%
Monitoring	20	8.26
Technical	74	30.58
Other	81	33.47

Results and discussion

Once the data were obtained, its distribution was verified by the Kolmogorov-Smirnov test, determining the non-normality, since all the items presented critical values less than 0.05. In this study, the partial least squares regression (PLS-SEM) technique was applied using SmartPLS 4 software (version 4.1). The methodology follows the recommendations of Hair *et al.* (2019), who highlight that PLS-SEM is suitable for exploratory studies or the expansion of structural theoretical models. This same study validates the mean quadratic root of standardized approximation error (SRMR.) as a suitable fit indicator in PLS-SEM. In this analysis, the SRMR. was 0.05 below the 0.10 threshold confirming a good fit of the model.

Following the PLS-SEM technique, information was obtained on the mean, standard deviation, factor loads, Cronbach's alpha, composite reliability (RHO_A), composite reliability index (IFC) and extracted average variance (AVE) for each of the compounds that make up the model (see Table 2). Our results show loads above 0.70 except for CIF-EE4, BL3 and BL7. It is observed that the CIF-EE4 item "The company surveys employees at least once a year to assess the quality of employment" and BL3 "I think my work is important in the company" have loads slightly less than 0.70. On the other hand, the BL7 "I usually maintain a balance between work and family life" has a lower burden, although it does not fall below the critical threshold of 0.40 (Hair *et al.*, 2019). Composite reliability and internal consistency show optimal values between 0.80 and 0.90, recommended values for more advanced phases of research (Hair *et al.*, 2019). Since all these indicators were significant and to preserve the validity of the construct and internal consistency, no items were excluded from the model.

Table 2 shows the mean extracted variance (hereinafter, AVE), a usual measure to determine convergent validity at the construct level. This criterion is defined as the total mean value of squared charges and is expected to reach a value of 0.50 or more (Fornell and Larcker, 1981). Therefore, the results obtained confirm the reliability and convergent validity of the measuring instrument of the structural model.

Table 2

Reliability and convergent validity of the first-order model

Factor	Item	M	DT	Loads	t	Cronbach α	RHO_A	IFC	BIRD
F1. Formal Internal Communication: Company-Employee (CIF-EE)	CIF-EE1 The company conducts regular staff assessments in which it discusses what employees want.	4.50	1.82	0.896**	46.110	0.874	0.898	0.915	0.732
	CIF-EE2 Managers interact formally and directly with employees to figure out how to make them more satisfied.	4.73	1.74	0.908**	60.465				

Factor	Item	M	DT	Loads	t	Cronbach α	RHO_A	IFC	BIRD
F1. Formal Internal Communication: Company-Employee (CIF-EE)	CIF-EE3 Managers meet regularly with employees to find out what they expect from their jobs.	4.63	1.72	0.913**	75.867	0.874	0.898	0.915	0.732
	CIF-EE4 The company surveys employees at least once a year to assess the quality of employment.	5.18	1.67	0.683**	13.177				
F2. Informal Internal Communication: Supervisor-Employee (CII-SE)	IIC-SE5 When we are at work, our supervisor regularly speaks to us to inform us about our work.	5.33	1.57	0.858**	38.030	0.935	0.942	0.954	0.838
	IIC-SE6 When we are at work and our supervisor notices that one of us is acting differently than normal, he will try to find out the reason.	5.26	1.68	0.926**	60.424				
	CII-SE7 When we are at work, our supervisor tries to find out what we want from the company.	5.12	1.66	0.944**	107.883				
	CII-SE8 When we are at work, our supervisor tries to find out our true feelings about the jobs.	5.18	1.68	0.931**	81.782				
F3. Internal Corporate Social Responsibility (ISCR)	RSCI1 Our company supports employees who want to acquire additional education.	5.26	1.60	0.860**	40.083	0.921	0.925	0.941	0.761
	RSCI2 Our company policies encourage employees to develop their skills and careers.	5.28	1.55	0.895**	61.818				
	RSCI3 Our company implements flexible policies to provide a good work-life balance for its employees.	5.19	1.56	0.899**	70.919				
	RSCI4 The management of our company is mainly concerned with the needs and desires of employees.	4.79	1.71	0.807**	27.519				
	RSCI5 Managerial decisions related to employees are usually fair.	4.83	1.66	0.897**	55.861				
F4. Workplace Welfare (BL)	BL1 I am quite satisfied with my work.	5.59	1.35	0.814**	27.492	0.914	0.927	0.930	0.598
	BL2 I really enjoy working.	5.57	1.30	0.822**	30.420				

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Factor	Item	M	DT	Loads	t	Cronbach α	RHO_A	IFC	BIRD
F4. Workplace Welfare (BL)	BL3 I think my work is important in the company.	5.86	1.22	0.645**	11.002	0.914	0.927	0.930	0.598
	BL4 Achievement in my work often acts as a source of motivation.	5.74	1.25	0.808**	24.551				
	BL5 My workplace is very welcoming.	5.47	1.55	0.716**	19.532				
	BL6 My work offers a wide field for professional growth.	5.36	1.54	0.842**	30.513				
	BL7 I tend to maintain a balance between work and family life.	5.24	1.49	0.594**	9.870				
	BL8 My company is very concerned about its employees.	4.72	1.74	0.839**	51.949				
	BL9 My work offers challenges that help improve my skills.	5.15	1.67	0.835**	35.962				

Note. M – Mean, DT – Typical Deviation, Cronbach, RHO_A – Composite Reliability, IFC – Composite Reliability Index, AVE – Extracted Average Variance, **p<0.01

Table 3 verifies that the square root of the AVE of each construct exceeds the highest correlations of any other construct, confirming the discriminant validity of the model (Fornell and Larcker, 1981). The *heterotrait-monotrait* ratio (hereinafter HTMT) of the correlations, in all cases, obtains values below 0.90 (Henseler *et al.*, 2015). Hence, the discriminatory validity of the measures used is confirmed.

Table 3
Discriminant validity

Factor	F1	F2	F3	F4
F1. Formal Internal Communication: Company-Employee	0.856	0.566	0.830	0.863
F2. Informal Internal Communication: Supervisor-Employee	0.538	0.915	0.466	0.490
F3. Internal Corporate Social Responsibility	0.756	0.435	0.872	0.867
F4. Labor Welfare	0.792	0.461	0.805	0.773

Note. Diagonal square root of the AVE. Correlations below the diagonal. On the diagonal the HTMT ratio.

Once the reliability and validity of the measuring instruments were confirmed, the structural model was analyzed. 5000 *bootstrap* samples were used to evaluate the PLS nomogram (Hair *et al.*, 2019). The results of the PLS-SEM analysis shown in Table 4 indicate that in relation to H1, the positive effect between the IPC-EE and work well-being is validated, indicating that this type of communication improves work well-being (β= 0.413, p<0.01). However,

in the H2 hypothesis it is confirmed that the IIC-SE does not favor employee welfare levels (β= 0.031, p>0.01). In relation to H3 it is shown that the actions of RSCI that the company proposes are positively correlated with the levels of employee well-being (β= 0.480, p<0.01). The H4 hypothesis confirms that the IPC-EE has a positive impact on the IPC-SE (β= 0.538, p<0.01). Regarding the H5 hypothesis, it is confirmed that the IPC-EE improves the perception of the RSCI actions that are made available to employees (β= 0.735, p<0.01). In contrast, the H6 hypothesis shows that there is no significant relationship between the IIC-SE and the perception of RSCI actions, indicating that this type of communication is not suitable for transferring RSCI actions to employees (β= 0.040, p>0.01).

The coefficients of determination (R^2 value) present optimal values and the predictive relevance of the Stone-Geisser Q^2 test show values greater than 0, thus confirming the predictive relevance of the nomogram of a dependent construction (Hair *et al.*, 2019).

Table 4

Structural model and contrast of research hypotheses

	Causal Relation	Standardized Beta	Value t	Hypothesis
H1	CIF-EE → BL	0.413**	6.457	Supported
H2	CII-SE → BL	0.031	0.675	Not Supported
H3	RSCI → BL	0.480**	6.645	Supported
H4	CIF-EE → CII-SE	0.538**	9.896	Supported
H5	CIF-EE → RSCI	0.735**	16.249	Supported
H6	CII-SE → RSCI	0.040	0.736	Not Supported

Note. BL: work well-being; CIF-EE: formal internal company-employee communication; CII-SE: informal internal supervisor-employee communication; RSCI: internal corporate social responsibility. BL: R^2=0.728 Q^2= 0.621; RSCI: R^2= 0.573 Q^2= 0.566; IIC-SE: R^2= 0.289 Q^2= 0.282. **p<0.01.

These results have important theoretical and practical implications. From the theoretical point of view, progress is made in the literature of internal communication to improve levels of work well-being. In addition, knowledge about internal communication that takes place in virtual and online environments is expanded, providing answers and shedding light on the main lines of research identified in the literature (Men *et al.*, 2020; Tkalac Verčič *et al.*, 2024).

From a practical point of view, companies must be prepared to address these new models of organizational management where internal communication and RSCI actions take great relevance in the business context. Following Berry *et al.* (1976), in the field of services, the importance of meeting the needs of employees is emphasized as a first step to then provide excellent assistance to customers. This approach highlights the importance of listening to and meeting internal needs as a foundation for business success and improving job well-being. In this way, the type of internal communication that is cultivated in the company is important to achieve the hypothesized effect of promoting internal corporate social responsibility, while the IPC-EE the power, the IIC-SE does not. In an increasingly transversal, dynamic and variable work environment, where the combination of face-to-face work and teleworking is increasingly common, it is vital to consider internal communication as indispensable to keep all employees connected and informed about everything that happens in line with the studies of Stranzl and Ruppel (2024).

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However, we must be aware that, as the results reveal, informal internal communication through corporate social networks (RRSSCC) is not the preferred type of communication to receive online messages between supervisor and employee (Ollier-Malaterre and Redston, 2024). In this sense and following the studies of Ewing *et al.* (2019) the implementation of RRSSCC faces various obstacles, since demographic differences influence the perception and effectiveness of this type of communication. Our study reveals that digital communication does not affect any variable resulting from the proposals and can be attributed to the fact that it is still preferable to communicate in a more personal and not so digital way due to the characteristics of the employees who currently occupy the workforce of the companies under study.

However, when assessing the current landscape and considering an increasingly variable and digital world, organizations can not lose sight of what will be the communication and relationship that new talent will demand in work environments. These findings provide a deeper understanding of how to implement affective internal communication among internal stakeholders to maintain an optimal welfare state and reinforce organizational culture through strong internal corporate social responsibility actions.

On the other hand, the managerial implications derived from this study result in the optimization of internal communication strategies and policies in organizations. The results suggest that managers should prioritize and strengthen formal communication channels between the company and employees using RSCI, since this form of communication has a positive impact on the work well-being and perception of RSCI's actions. It is suggested the implementation of training programs for supervisors and employees, aimed at improving formal communication skills and maximizing the effective use of CSRs. Although informal communication between supervisors and employees shows no relevant influence in these areas, it is necessary that organizations do not underestimate their potential (To et al., 2015). These actions can contribute to a more cohesive work environment aligned with the company's RSCI objectives, thus promoting greater well-being among employees (Elorza *et al.*, 2022).

This study demonstrates the impact that internal communication has on the well-being of the workplace and the actions of RSCI. There is still room for improvement in this area, which underlines the need for companies to review and strengthen their communication strategies, ensuring greater clarity and frequency in their messages. They are also increasingly committed to taking action for the benefit of their employees and society, but they must not limit themselves solely to generating sustainability reports and position themselves as benchmarks in corporate social responsibility, they must communicate and promote actions effectively. In addition, they play a decisive role in the development of technological skills among their employees, especially in new work contexts and the integration of new generations into the labor market (Ecklebe and Löffler, 2022). These actions seek to encourage greater employee participation, improve their perception of organizational initiatives and strengthen their satisfaction and commitment in the work environment.

Likewise, they must also be prepared to meet the demands of new employees, as more and more professionals look beyond a salary that covers their basic needs; they look for companies where one of their main concerns is the welfare of their employees. Therefore, it is important that they focus on offering salaries according to performance, responsibility and educational level, in addition to providing a wide range of benefits such as: good working conditions, flexible schedules, digital disconnection, family reconciliation, etc. All this, together with solid RSCI programs to become an extra attraction in front of companies and competition and in this way, recruit the best talent.

Conclusions

This study is framed in the line of a strategic management research aimed at promoting

labor welfare, especially in the service sector. One of its main contributions is to demonstrate that the formal internal communication between the company and the employee influences in a positive and relevant way their well-being. This finding is notable for promoting proper management of formal internal communication th*et al*lows companies to build a network of committed, productive and satisfied employees, thus reducing internal turnover and absenteeism. In addition, organizations that recognize the relevance of this factor and promote innovative and disruptive organizational changes will be able to enhance the talent of their employees, optimize their performance and allow them to contribute their best *know-how* (experience, knowledge, and decision-making) to the development of the company.

It has also been found that internal corporate social responsibility contributes to improving the state of labor welfare. In this sense, it is reaffirmed that internal corporate social responsibility is a valuable labor resource within the framework of the theory of labor demands and resources. However, informal internal communication between supervisor and employee does not have the same effect as formal communication between company and employee, as it is not considered relevant either for the perception of internal corporate social responsibility actions or for labor welfare. This conclusion highlights the desirability of strengthening formal communication between the company and the employee over informal communication between supervisor and employee.

The study confirms a direct and positive relationship between formal and informal internal communication in digital environments. This suggests that well-structured formal communication facilitates the transmission of strategic information and strengthens informal interactions, fostering a more collaborative work environment aligned with business objectives. The value of the current study lies in its empirical evidence on the impact of both formal and informal internal communication through corporate social networks and internal corporate social responsibility on labor welfare. These results provide a basis for companies to design more effective communication strategies aligned with the needs of their employees.

The limitations and future prospects arising from this investigation are mainly based on the sample size and the restriction to two types of companies within the services sector. Understanding informal communication in the business environment channeled through corporate social networks is an important purpose, as there is not yet a single, universally accepted scale to measure this construct. Moreover, technological advances are often faster than research and scientific evidence on their impacts. Therefore, it would be early to consider that communication through corporate social networks between supervisor-employee does not affect in any way the labor welfare and the perception of internal corporate social responsibility actions. Although a solid chain of effects of the formal company-employee communication has been evidenced in the actions of internal corporate social responsibility and labor welfare, it would be interesting to carry out this study in other companies that use different systems to carry out their internal communication.

Finally, another relevant approach for later studies would be to examine how demographic variables influence internal communication and internal corporate social responsibility in labor welfare.

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Infographics

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ACCEPTANCE OF GENERATIVE AI IN THE CREATIVE INDUSTRY: THE ROLE OF UTAUT, BRAND RECOGNITION AND TRUST IN ADOPTION

Authors: Dominika Weglarz - Cintia Pla-Garcia - Ana Isabel Jiménez-Zarco

JUSTIFICATION

The study addresses the adoption of Generative Artificial Intelligence in the creative industry, highlighting the role of trust and brand recognition, factors little explored in previous research.

OBJECTIVE

To analyze how UTAUT theory and brand capital influence the intention to use Generative AI tools in creative FF professionals. United States and Spain.

METHODOLOGY

A PLS-SEM model was used to analyze the results of a survey of 208 creative professionals, evaluating UTAUT variables and brand capital with previously validated scales.

RESULTS

Performance expectancy and enabling conditions have a significant positive impact on the intent to use Generative AI in the creative industry.

Unlike what is expected, brand recognition negatively influences the adoption of Generative AI, while trust in the brand promotes it.

CONCLUSION

To improve adoption of Generative AI, brands must build trust through clear communication strategies and demonstrate the real value of technology in creative processes.

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FACTORS AFFECTING AUDITORS' DECISIONS TO ADOPT BIG DATA ANALYTICS: A MIXED METHOD STUDY

Authors: Moath Abdelkarim Abu Al Rob - Mohd Nazli Mohd Nor - Zalailah Salleh - Alia Majed Khalaf

JUSTIFICATION

This study explores the adoption of BDA by auditors in Palestine, addressing a critical gap in developing economies where resource and technological constraints affect adoption. Understanding auditors' perceptions of the adoption of BDA is needed to improve audit efficiency and decision-making.

OBJECTIVE

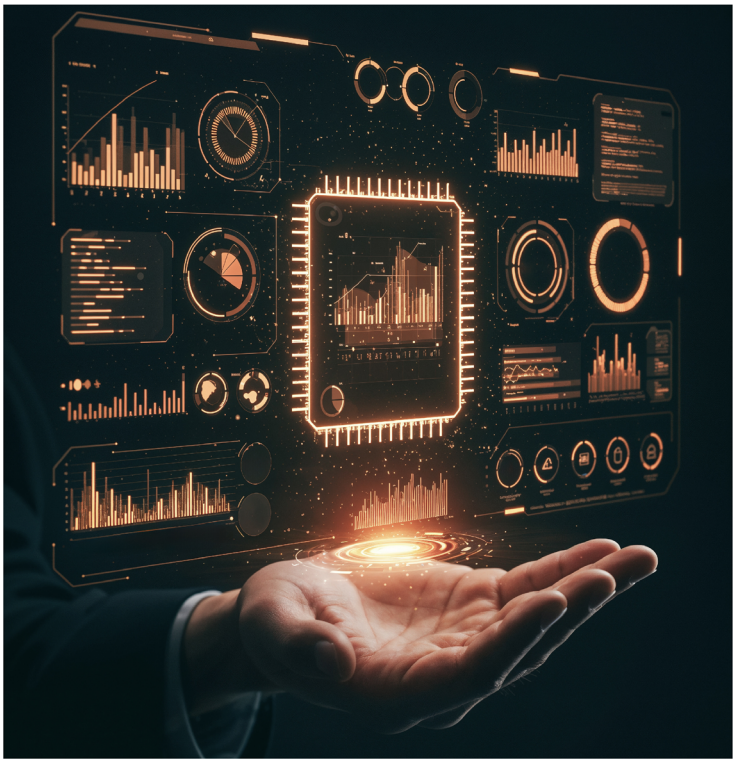
To examine how perceived ease of use (PEOU) and perceived utility (PU) influence auditors' behavioral intentions (BI) to adopt BDA tools, using TAM as a theoretical framework.

METHODOLOGY

A mixed method was used that combined quantitative data from a census survey of 94 auditors from the four largest companies in Palestine with qualitative information from semi-structured interviews with nine senior auditors. This approach ensured a global understanding of the adoption factors of the BDA.

RESULTS

The study found that PU has a significant and direct impact on auditors' intention to adopt BDA. It was not possible to prove that the auditors adopted the BDA in the belief that it improves efficiency, improves the quality of the audit, and supports risk assessment.



CONCLUSION

The study confirms that TAM is an appropriate model for understanding the adoption of BDA in audit. The findings highlight the need for training programs, policy support, and easy-to-use BDA solutions to drive adoption in resource-constrained settings.

To improve the adoption of BDA in auditing, companies should focus on improving perceived usefulness through real applications, training initiatives, and showcasing the benefits of BDA in risk detection and fraud prevention. BDA's regulatory support and accessible tools are also needed for widespread implementation.

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FINANCIAL INCLUSION AND FINTECH: CATALYSTS FOR THE SUSTAINABLE DEVELOPMENT GOALS IN LATIN AMERICA

Authors: Pablo Raffaelli - Jaime Andrés Correa-García - Carmen Stella Verón

JUSTIFICATION

Currently financial inclusion and fintech are pivots in the digitalization of finance, being relevant to analyze how these variables influence the achievement of the Sustainable Development Goals of emerging countries in Latin America.

OBJECTIVE

To assess whether financial inclusion and Fintech growth contribute to the achievement of the Sustainable Development Goals (SDGs) in Latin America.

METHODOLOGY

The research design is quantitative, descriptive, correlational, and longitudinal. It is based on data from six Latin American countries with the highest nominal GDP (Argentina, Brazil, Chile, Colombia, Mexico, and Peru). The data analysis method used is Pearson's correlation.

RESULTS

The overall SDG index and the individual SDG2, SDG7, SDG9, SDG16 and SDG17 indices are significantly positively associated with the study variables on financial inclusion in Latin America.

CONCLUSION

The importance of financial inclusion and a robust and developed country-level Fintech ecosystem in order to contribute to the SDGs. This approach allows governments, international organizations, businesses, and civil society to distinguish value in fintech and in accessing and using better financial tools, identifying areas that require additional efforts to promote sustainable development.

Suggested recommendations for future research apply the study objective to a greater number of countries, including those that may generate additional results for the Latin American region and other regions comparable to those already selected, such as the CIVETS group of countries.

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THE ROLE OF ICT, INTRAPRENEURSHIP AND COLLABORATIVE MANAGEMENT NETWORKS IN INNOVATION AND BUSINESS COMPETITIVENESS

Authors: Aura Andrea Díaz-Duarte - Gabriel Purón-Cid - Marco Eliseo Rivera-Martínez

JUSTIFICATION

This study analyzes how intra-entrepreneurial culture, managerial collaboration networks and ICT influence innovation, competitiveness and business performance. Likewise, it broadens knowledge about its direct and indirect relationships and highlights the mediating role of innovation. In addition, it provides empirical evidence to design strategies that strengthen competitiveness, especially in MSMEs affected by the pandemic.

OBJECTIVE

To evaluate the direct and indirect impact of the intra-entrepreneurial culture, the management of collaboration networks and ICT on the performance of innovation, as well as its effect on the business performance and competitiveness of MSMEs in the commercial sector of Aguascalientes, Mexico.

METHODOLOGY

A questionnaire was applied to MSMEs in the commercial sector in Aguascalientes, Mexico, and the data were analyzed using the structural equations model to test 15 hypotheses through three models, each focused on a causal variable (intra-entrepreneurship culture, management of collaboration networks and ICT).

RESULTS

There is a positive and significant relationship between innovation performance and business performance and competitiveness. Innovation highlights its mediating role in the models analyzed and shows its strong impact. However, the direct effects of intra-entrepreneurial culture, management collaboration and ICT on performance and business competitiveness show attenuated results, being another alternative in strategic decision-making within the company.

CONCLUSION

To improve business performance and competitiveness in dynamic environments, it is recommended to strengthen the intra-entrepreneurship culture, foster managerial collaboration and adopt advanced technologies. These strategies allow significant improvements in dependence, exclusively on innovation, taking advantage of the potential of networks and technology as key acquisitions of business growth.

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VARIABLES AFFECTING WECHAT LOYALTY IN THE BUSINESS ENVIRONMENT: TIME AND COST REDUCTION

Authors: Rocío Mecinas-Cantos - María Pilar Martínez-Ruiz - Inés González-González

JUSTIFICATION

This paper offers a detailed analysis of the influence of perceived value on loyalty (attitudinal and behavioral) to the social network WeChat, in a business group such as Chinese entrepreneurs living in Spain.

OBJECTIVE

To analyze the influence of the functional value of WeChat (in terms of time and cost savings) on the loyalty (attitudinal and behavioral) of these entrepreneurs.

METHODOLOGY

First, a qualitative investigation was carried out consisting of in-depth interviews with Chinese businessmen living in Spain. Second, online questionnaires were distributed to the population.

RESULTS

The key importance of Chinese entrepreneurs to WeChat's functional value (especially derived from cost-cutting), and what that represents, both for continuing to use WeChat and for recommending it.

The functional value linked to the time decrease also influences the intention to continue using WeChat, although it does not have a significant impact on the recommendation.

CONCLUSION

WeChat is a key tool for the business of Chinese entrepreneurs based in Spain, so Spanish companies that work with them should try to incorporate it to the extent of their possibilities in their management.

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WOMEN'S ECONOMIC EMPOWERMENT: SENSE OF BELONGING AND PARTICIPATION IN TOURISM

Authors: Elia Ardyan - Maichal Maichal - Afrizal Firman - Carolina Novi Mustikarini

JUSTIFICATION

Women's economic empowerment plays a key role in business development and the growth of tourist destinations. Despite its importance, there is little research examining how economic empowerment influences women's sense of belonging and participation in tourism. This study seeks to close this gap by investigating the impact of empowerment on the participation and promotion of women in tourism environments.

OBJECTIVE

To explore the relationship between women's economic empowerment, their sense of belonging to their tourist destination and their participation in tourism. In addition, to examine how these factors influence women's willingness to recommend a tourist destination. By understanding these relationships, the study offers insights for tourism policymakers and managers to support the inclusion of women in tourism development.

METHODOLOGY

A survey was conducted on 299 women entrepreneurs who run businesses near tourist destinations in Indonesia. The study applied the Models of Partial Least Squares Structural Equations (SEM-PLS) technique to analyze the relationships between key variables.

RESULTS

The results reveal that women's economic empowerment significantly increases their sense of belonging to a tourist destination. A stronger sense of belonging leads to greater engagement and participation in tourism-related activities. This suggests that women's economic empowerment strengthens their emotional and social connection to destiny.

CONCLUSION

Economic empowerment not only fosters financial independence, but also enhances the role of women in the tourism industry. Through participation in tourism-related businesses, women develop a sense of community identity and commitment. This confirms that empowerment has broader implications than economic benefits, contributing to community development and social cohesion.

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PRODUCTIVITY IN LATIN AMERICA. AN ANALYSIS USING A COBB-DOUGLAS FUNCTION

Authors: César Lenin Navarro-Chávez - René Augusto Marín-Leyva - Daniela Valenzuela-Carreño

JUSTIFICATION

Economic growth in Latin America is largely conditioned by productivity levels, hence the importance of analyzing the behavior of Total Factor Productivity (TFP) and its main determinants in this region.

OBJECTIVE

To examine the impact of labor (L), capital (K) and technological change (A) on TFP developments in Latin America during the period 1990-2019.

METHODOLOGY

An econometric model of second-generation panel data is instrumented, using the Augmented Mean Group estimator proposed by Pesaran et al. (1999), which allows to calculate the long and short-term coefficients, as well as the speed of adjustment of the variables.

RESULTS

The results give evidence of the existence of transverse dependence and unit root of order I(1). It is found that labor (L), capital (K) and technological change (A) positively affect TFP.

CONCLUSION

The established hypothesis is confirmed, according to which capital (K), labor (L), and technological change (A) were the main determinants of TFP in Latin American economies during the period 1990-2019.

In conclusion, the article highlights the importance of strengthening innovation and technological development in the region to improve productivity and economic growth.

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PROGRESSIVE TAX DEVELOPMENT IN THE TAXATION SYSTEM: A COMPARATIVE ANALYSIS OF THE EU AND CENTRAL ASIAN COUNTRIES

Authors: Azamat Baimagambetov - Serik Omirbayev

JUSTIFICATION

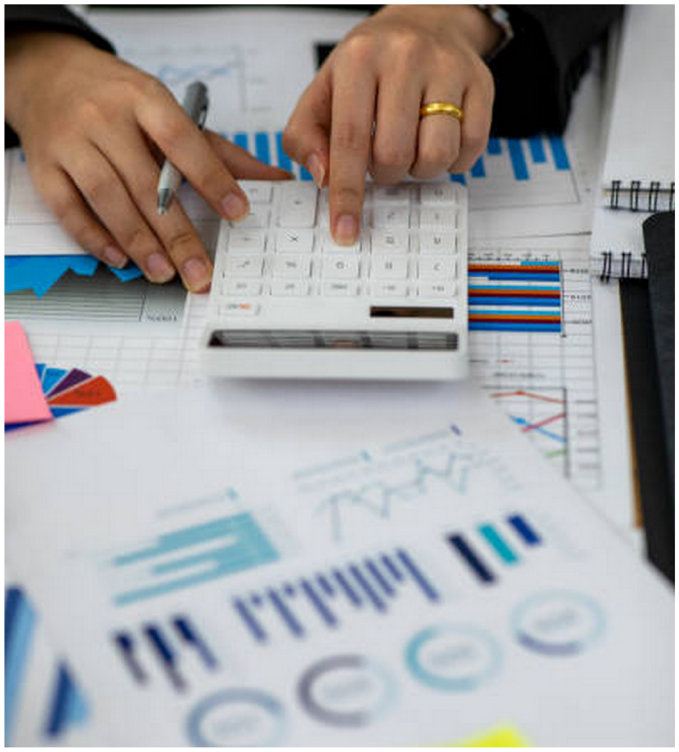
The research stems from the need to understand how progressive tax systems in EU countries inform reforms in Central Asian nations to address income inequality and achieve sustainable development goals.

OBJECTIVE

To compare and analyze the implementation of progressive tax systems between EU and Central Asian countries in order to determine the prospects for reform.

METHODOLOGY

The research uses theoretical synthesis methods, statistical data analysis, Gini coefficient calculations and stochastic boundary analysis with time-varying efficiency to evaluate tax systems.



RESULTS

Kazakhstan and Uzbekistan demonstrate the greatest potential for progressive taxation among Central Asian countries, while other nations face significant challenges due to economic constraints.

CONCLUSION

While progressive taxation could benefit Central Asia's economies, success depends largely on tackling corruption, improving legislative frameworks, and considering country-specific economic conditions.

The transition to progressive taxation in Central Asia requires country-specific planning rather than a unified regional system, modeled on EU nations.

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LIFE AND WORK: IMPACT OF MANAGERIAL DECISIONS ON EMPLOYEE WELL-BEING IN MEXICO

Autor: Enrique Kato-Vidal

JUSTIFICATION

Labor benefits have a positive impact on employee well-being, so managers could, at the same time, promote workers' subjective well-being and promote higher long-term productivity.

OBJECTIVE

To estimate the effect of eight work benefits on employee satisfaction with their lives.

METHODOLOGY

The source of information was the National Self-reported Welfare Survey (ENBIARE) of INEGI-Mexico. Two response variables were chosen: i) Satisfaction with current life; and ii) Perception of the living standard in five years. The estimation was made using a logit model.

RESULTS

Allocation of work benefits has a significant effect on life satisfaction, whereas, on its own, a policy of increasing income does not translate into a higher probability of satisfaction.

CONCLUSION

If managers seek to positively affect well-being and improve regulations, the best is to offer work benefits and, simultaneously, take into account the opinion of employees.

There is scarce literature on non-monetary income and labor benefits. Therefore, the analysis contributes to this poorly researched area by assessing the effects of various labor benefits.

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RELATIONSHIP BETWEEN INTERNAL COMMUNICATION, CORPORATE SOCIAL RESPONSIBILITY, AND WORKPLACE WELL-BEING IN SERVICE COMPANIES

Authors: Alexandra Soler-Sanchis - Irene Gil-Saura - Gloria Berenguer-Contri

JUSTIFICATION

The research brings an innovative and digital perspective to organizations and highlights the need to prioritize internal communication through corporate social networks to improve work well-being and corporate social responsibility.

OBJECTIVE

To deepen the effect of formal and informal internal communication through corporate social networks, in the perception of internal corporate social responsibility actions and their contribution to labor welfare.

METHODOLOGY

The study was carried out through a self-administered questionnaire in two companies in the service sector (logistics and health). A sample of 242 employees was obtained and the partial least squares technique was used to analyze the model.

RESULTS

From the theoretical point of view, advances are made in the literature of digital internal communication to improve the sense of well-being in work environments and the perception of internal corporate social responsibility actions.

CONCLUSION

It is shown that formal and digital internal communication between the company and the employee positively influences the well-being of employees. This contributes to the constitution of more committed, productive and satisfied teams.

The results show that internal corporate social responsibility contributes to improve the labor welfare of employees. The actions proposed by the company represent a valuable resource for the improvement of working environments.

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General information

"Retos" is a bilingual scientific publication by the Universidad Politécnica Salesiana de Ecuador, which has been edited on a bi-annual basis since January 2011. The journal focuses on Development and transdisciplinary issues including Public Administration, Social Economics, Marketing, Tourism, Entrepreneurship, Management, Administrative and Economic Science, etc.

It is an arbitrated Scientific Journal that uses an external evaluation system known as *peer-review*, employing *double-blind review*, in accordance with the American Psychological Association (APA) style rules. By using this system, the authors have access to an objective, impartial and transparent review process, which facilitates their publication being included in databases, repositories, and international indexed references.

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The Journal is published with two different editions: printed (ISSN: 1390-62911) and electronic (e-ISSN: 1390-8618), in Spanish and English, and each article is identified with a DOI (Digital Object Identifier System).

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Themes

Original contributions in Development issues, as well as related fields: Public Administration, Social Economics, Marketing, Tourism, Entrepreneurship, Management...and all other disciplines related to the central thematic issue.

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"Retos" preferably publishes the results of empirical research about Development, written in Spanish and/or English, while reports, studies, and proposals are also accepted, as well as reviews of state-of-the-art literature.

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Presentation, structure, and submission of manuscripts

Papers are to be presented with Arial 10 typeface, single line spacing, all justified, without indentation or blank spaces between paragraphs. A space is only to be included between the major sections (title, authors, abstracts, keywords, credits, and epigraphs). All margins on each page must be 2 cm.

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For papers that are empirical research, the manuscripts are to follow IMRDC structure, while Notes and Contributions epigraphs are optional. Papers that constitute reports, studies, proposals, and reviews are afforded greater flexibility in terms of epigraphs, especially in relation to Materials and Methods, Analysis and Results, and Discussion and Conclusions. All types of papers are required to include References.

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7. **Keywords (descriptores, Spanish) / Keywords (English):** Six keywords are to be included for each language, and must be directly related to the paper's theme. This requirement shall be scored based on whether the keywords can be found in the UNESCO Thesaurus.
8. **Introduction and State of the Question:** The section proposes the question, the context of the issue surrounding it, justification, basis, and proposal for the study, using bibliographic references, including the most important up-to-date literature on the theme, both nationally and internationally.
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10. **Analysis and Results:** This section should seek to highlight the most important observations, and without including any value judgments, describe the methods used. Throughout the text, essential tables and figures shall be included in a logical sequence, without repeating any data.
11. **Discussion and Conclusions:** This section summarizes the most important findings related to any observations from relevant studies, pointing out contributions and limitations, without repeating data from other sections. The discussion and conclusions paragraph is to include inferences and new lines of research for the future.
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Rules for references

Periodical publications

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Journal article (up to six authors): Ospina, M.C., Alvarado, S.V., Fefferman, M., & Llanos, D. (2016). Introducción del dossier temático "Infancias y juventudes: violencias, conflictos, memorias y procesos de construcción de paz" [Introduction of the thematic dossier "Infancy and Youth: Violence, Conflicts, Memories and Peace Construction Processes"]. *Universitas, 25*(14), 91-95. https://doi.org/10.17163/uni.n25.%25x

Journal article (more than six authors): Smith, S.W., Smith, S.L. Pieper, K.M., Yoo, J.H., Ferrys, A.L., Downs, E.,... Bowden, B. (2006). Altruism on American Television: Examining the Amount of, and Context Surronding. Acts of Helping and Sharing. *Journal of Communication, 56*(4), 707-727. https://doi.org/10.1111/j.1460-2466.2006.00316.x

Journal article (with no DOI). Rodríguez, A. (2007). Desde la promoción de salud mental hacia la promoción de salud: La concepción de lo comunitario en la implementación de proyectos sociales. *Alteridad, 2*(1), 28-40. (https://goo.gl/zDb3Me) (2017-01-29).

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Books and chapters of books

Complete books: Cuéllar, J.C., & Moncada-Paredes, M.C. (2014). *El peso de la deuda externa ecuatoriana*. Quito: Abya-Yala.

Chapters of a book: Zambrano-Quiñones, D. (2015). *El ecoturismo comunitario en Manglaralto y Colonche.* En V.H. Torres (Ed.), Alternativas de Vida: Trece experiencias de desarrollo endógeno en Ecuador (pp. 175-198). Quito: Abya-Yala.

Electronic media

Pérez-Rodríguez, M.A., Ramírez, A., & García-Ruíz, R. (2015). La competencia mediática en educación infantil. Análisis del nivel de desarrollo en España. Universitas Psychologica, 14(2), 619-630. https://doi.org.10.11144/Javeriana.upsy14-2.cmei

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