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Analysis of the relationship between educational effectiveness and organisational performance using PLS-SEM: a study in higher education institutions

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Abstract: Educational effectiveness, as a strategic management perspective, allows institutions of Higher Education (HEIs) to focus on achieving educational goals and consequently impact their performance. This study aims to establish causal relationships between decision-making for educational effectiveness and its influence on the performance of Colombian HEIs. The underlying hypothesis is that educational effectiveness has a direct and positive influence on organisational performance in HEIs. 309 administrative staff members from 44 Colombian HEIs were surveyed. Using Partial Least Squares Structural Equation Modelling (PLS-SEM), the study estimated the loadings and significances of the relationships between items and constructs. The main finding of the study confirms the direct and positive influence of decision-making for educational effectiveness on organisational performance in HEIs, which confirms the starting hypothesis. This indicates that making effective decisions in education has a significant impact on the overall performance of higher education institutions in Colombia.

Keywords: organisational performance; educational effectiveness; higher education; PLS-SEM.

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1 Introduction

The context of decision-making in higher education reveals two trends: one focused on students, and the other on management (Gharsi et al., 2024). In the former, the attention is directed towards the analysis of educational effectiveness, while the latter emphasises management aspects. Analytical techniques such as data mining, machine learning, learning analytics, big data and data science enable predictive modelling in education, which empowers, optimises and streamlines administrative processes by refocusing leadership.

Works such as Topuz et al. (2021) on Bayesian network modelling offer a futuristic perspective on the role of artificial intelligence and human behaviour in rational decision-making. Similarly, Wang (2021) conducted temporal comparisons to demonstrate the impact of artificial intelligence on decision-making processes, which sometimes encounter moral barriers faced by process leaders. Along the same lines, Nielsen et al. (2020) emphasised that digital expansion in education undoubtedly represents the creation of assets.

Based on the above, studying managerial decision-making processes in training activities and the promotion of human capital for achieving the mission of Higher Education Institutions (HEIs) through continuous improvement of educational effectiveness and attaining sustainability for the educational organisation in the long term, i.e., organisational performance, is crucial for a better understanding of social and economic development strategies. In this regard, the need arises to study, describe, analyse, comprehend, establish measures, recommendations and strategies that, based on latent variables, lead to the establishment of an organised, replicable and systematic data analytics system in HEIs. A system that promotes the utilisation of statistical techniques, mediated by developments in information and communication technologies, with the

purpose of understanding more relevant aspects of the relationships between decision-making for educational effectiveness and organisational performance in the context of HEIs.

The structure of the article includes, in addition to the abstract and introduction as starting points, the literature review and hypotheses, methodological aspects and data analysis, results, discussion, findings and closes with some conclusions, recommendations, future lines of research and references. The findings of this study reveal that academic effectiveness positively influences organisational performance in HEIs.

2 Literature review and background

2.1 Decision-making for educational effectiveness

Decision-making for educational effectiveness necessarily involves the concept of efficiency, as highlighted by Delahoz-Dominguez et al. (2022) in the case of Colombia. It is a process of decision-making in higher education that is guided by strategically explored and analysed information. This entails identifying and quantifying various aspects and limitations to achieve previously planned goals, as well as addressing the needs for university efficiency, particularly focusing on university management processes and the evaluation of determining factors to obtain, e.g., high-quality certifications in higher education systems. Similarly, there are research focuses on the strategic use of academic analytics for leadership and entrepreneurship, as discussed by Tsai et al. (2022). Additionally, the role of prediction in business cycles has been explored, as presented by Lee et al. (2022). These investigations are especially relevant considering the current rapidly changing environment.

Strategic decision-making processes in higher education can originate from various sources (Divjak and Redep, 2015), ranging from purely institutional perspectives, (Ramaditya et al., 2023), to approaches implemented by national education authorities as educational policies. Therefore, the role of information utilisation as a support for decision-making becomes relevant in the field of education, mediated by technologies and considering mixed methods for its approach and subsequent use (Freeman et al., 2021). The inclusion of educational effectiveness as a strategic pillar in management is crucial for achieving organisational performance (Rangone et al., 2022). Its importance is evident not only for sustainable socio-scientific development of extracurricular activities (Wen, 2018) but also for the evaluation of teaching and the capacity to generate added value in the opportunities and competencies that the educational system must provide to its stakeholders (Solanki and Virparia, 2022).

In conclusion, it is essential to highlight that the concept of effectiveness is closely related to decision-making processes in organisations. In the context of educational effectiveness as learning and its evaluation, the works of Kong (2021) and Zhu et al. (2021) stand out, emphasising the role of pedagogy in technology-assisted education processes. This enables greater cost efficiency and ethical advantages of technology-driven practices compared to human-centric approaches.

2.2 Organisational performance in education

Financial and budgetary matters in Higher Education Institutions (HEIs) are a top-level concern worldwide, including in developed countries (Patt et al., 2022). The development of science, technology and innovation has brought about not only the need for the creation of new programs but also the investment in technologies, laboratories and sufficient human capital updates to sustain an academic infrastructure that meets the needs of the current context. In the Colombian context, the state, through the Ministry of National Education, exercises control over HEIs and even indirectly evaluates organisational management through institutions such as the National Accreditation Council (CNA), which, through check-up visits, verify the quality of higher education, including both financial and non-financial organisational performance indicators. However, the relation between educational effectiveness and organisational performance of HEIs is not clear.

The sources of funding for higher education can be diverse and, in many cases, come from the public sector and state funding policies for higher education through special programs (He et al., 2021). Additionally, institutions generate funds from student admissions, who, in turn, obtain their incomes through their work activities (Hamid, 2021). Families also contribute resources for the maintenance, tuition and other costs (Levent et al., 2021). However, in all cases, especially in emerging economies, these funding sources become obstacles for the sustainability of university educational institutions due, among other factors, to the inability of the target populations for higher education to secure the necessary resources for their education.

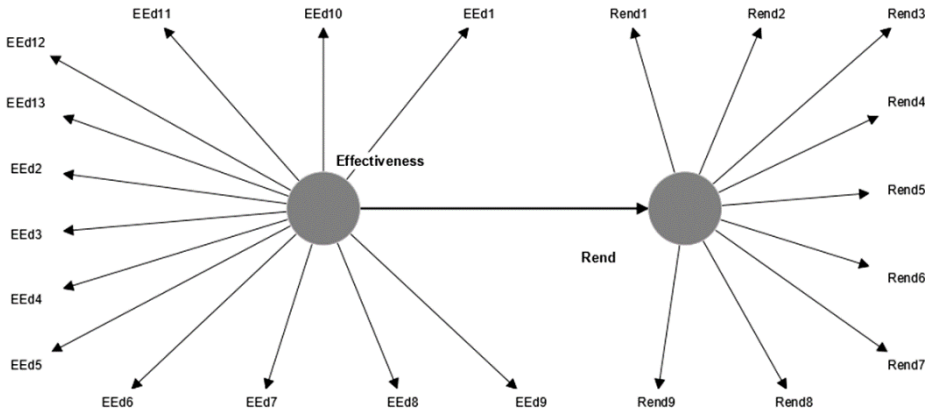
Organisational performance is understood here as a complex and multidimensional measure of an organisation's performance (Quinn and Rohrbaugh, 1983). Performance is often considered a construct with different interpretations (Zuñiga-Collazos et al., 2020a, 2020b), and it can be defined independently or complementarily based on the researcher's needs (Guo et al., 2022). Following the proposal by Quinn and Rohrbaugh (1983), as cited in Zuñiga-Collazos et al. (2019), performance can essentially encompass four aspects:

- 1 The Rational Model focuses on market growth, profitability and changes in productivity.
- 2 The Human Relations Model associates the work environment as a means to strengthen employee motivation and retention.
- 3 The Internal Model describes efficiency and effectiveness in the organisation's operations.
- 4 The Open System Model emphasises analysing organisational performance based on the evolution of its external flexibility.

Based on the above, the hypothesis and theoretical model of the study are as follows:

H1: Educational Effectiveness (EE_d) has a direct and positive influence on Organisational Performance (Rend) in Higher Education Institutions in Colombia.

Figure 1 Theoretical pathway model



3 Methodology

Statistics through Structural Equation Modelling (SEM) (Hair et al., 2012) was the technique used for empirical validation in this study. According to Sarstedt et al. (2022), SEM allows for the analysis of measures and relationships between latent variables, making it suitable for addressing qualitative-focused situations and problems using Partial Least Squares (PLS). The use of PLS-SEM aims to verify the influence of educational effectiveness on organisational performance in Higher Education Institutions (HEIs) in Colombia. To achieve this, all the necessary procedures were carried out to test the proposed hypothesis. The following steps were followed: (a) formulation of a theoretical measurement model, (b) construction of a database from survey instrument administration, (c) modelling and obtaining indicators of model fit, (d) verification of the measurement and structural model, (e) hypothesis testing, and analysis of results.

The procedures were carried out using the SmartPLS 4 software. A survey was administered to a sample of individuals with administrative roles in HEIs in Colombia. The items measuring the constructs used a 5-point Likert scale, where 1 indicates 'totally disagree' and 5 indicates 'totally agree,' following the approach proposed by Quinn and Rohrbaugh (1983) and Childress (2009), with its comprehensive measurement verified by Zuñiga-Collazos et al. (2020a). The survey provided primary information about decision-making for educational effectiveness and organisational performance. The data collection instrument is an adaptation of Childress (2009). The adapted instrument consisted of 18 items and two constructs, which are detailed in Table 1.

Table 1 Relationship of constructs, factors, items and acronyms

<i>Construct</i>	<i>Factor</i>	<i>Item</i>	<i>Acronym</i>
Educational effectiveness	Decision making in the community related to the institution. (Childress, 2009).	Used data to:	Ed
		Develop effective approaches.	Ed 1
		Measure university effectiveness.	Ed 2
		Suggest dialogue tactics with representatives.	Ed 3
		Determine committees with external community.	Ed 4
		Generate strategy with external community.	Ed 5
		Identify causes/concerns	
		Measure relationship effectiveness.	Ed 6
		Determine type of contribution.	Ed 7
		Generate alternatives to improve relationships.	Ed 8
		Mobilise common resources.	Ed 9
		Negotiate political decisions.	
		Develop communication plans.	Ed 10
organisational performance	Decision making in organisational performance according to the favourability in the use of data. (Quinn, & Rohrbaugh, J., 1983), (Zuñiga-Collazos et al., 2020a, 2020b)	Understand external community context.	Ed 11
			Ed 12
			Ed 13
		Quality in the services offered.	Rend
		Efficiency of operational processes.	Rend 1
		Organisation of staff tasks.	Rend 2
		Increase in the number of students.	Rend 3
		Increased profitability	Rend 4
		Increased productivity.	Yield 5
		Motivation of workers, teachers.	Yield 6
		Reduction of personal turnover.	Yield 7
		Reduced absenteeism.	Yield 8
			Yield 9

Note: own elaboration.

4 Data analysis

According to the Ministry of Education of Colombia – MEN, the country has 275 Higher Education Institutions (HEIs), employing an average of 62 administrators in educational administration roles. Using this information, a stratified sample with proportional

allocation of 309 records was calculated, with a confidence level of 95%. Higher Education Institutions in Colombia are classified into the following types: Technical Professional Institutions, Technological Institutions, University Institutions and Universities. Table 2 provides a breakdown of the HEIs by type, the number of employed administrators and the sample calculation.

Table 2 Relationship of HEIs Colombia, type, officials and sample size

<i>HEIs type</i>	<i>Number of HEIs</i>	<i>% HEIs character</i>	<i>Number of officials</i>	<i>% officials by character HEIs</i>	<i>Gender of respondents (Total)</i>		
					<i>Female</i>	<i>Male</i>	<i>Total</i>
Professional Technical Institution	21	7.6%	196	1.1%	3	3	6
Technological Institution	39	14.2%	333	1.9%	0	12	12
University institution	128	46.5%	5814	33.6%	18	21	39
University	87	31.6%	10935	63.3%	105	147	252
Grand Total	275	100%	17278	100%	117	192	309

Note Statistical information from the Ministry of National Education and own calculations.

The survey was conducted through Google Forms between April and June of 2023, and the participants were invited to participate through the National Association of Universities in Colombia – ASCUN.

5 Results

5.1 Educational effectiveness and organisational performance in HEIs, measurement model

According to Cepeda-Carrion et al. (2019), the validation of the measurement model begins with verifying the reliability of the item scales. Table 3 summarises the results of the validation, including the Cronbach's alpha coefficient, composite Reliability Index (CR), the internal consistency reliability indicator of the measurement model, rhoA (Henseler et al., 2016) and the Average Variance Extracted (AVE). Additionally, the Average Variance Extracted (AVE) was calculated. For convergent and discriminant validity, the criteria of Fornell and Larcker (1981) and the heterotrait-monotrait ratio (HTMT) by Henseler et al. (2015) were used, obtaining values that indicate the measurement model is adequate as it meets the established minimum criteria.

Table 3 Measurement model reliability, discriminant validity

<i>Construct/Factor</i>	<i>Item</i>	<i>t-value</i>	<i>Loads / Weights</i>	<i>Cronbach 's alpha (α)</i>	<i>rhoA</i>	<i>Composite reliability index (CR)</i>	<i>Average index variance extracted (AVE)</i>
Educational Effectiveness: EEEd	Ed 1						
	Ed 2	17,767	0.789				
	Ed 3	25,935	0.833				
	Ed 4	15,758	0.773				
	Ed 5	15,949	0.78				
	Ed 6	20,404	0.815				
	Ed 7	14,426	0.801				
	Ed 8	27,174	0.873	0.962	0.968	0.966	0.684
	Ed 9	34,987	0.893				
	Ed 10	34.71	0.877				
	Ed 11	25,752	0.866				
	Ed 12	18,939	0.812				
	Ed 13	15,952	0.794				
		23,555	0.837				
Organisational performance: Rend	Rend 1						
	Rend 2	19.6	0.797				
	Rend 3	29,058	0.861				
	Rend 4	25,285	0.834				
	Yield 5	7,314	0.686				
	Yield 6	18,398	0.798				
	Yield 7	45,276	0.908	0.940	0.949	0.950	0.677
	Yield 8	28,127	0.878				
	Yield 9	18,407	0.834				
		12,125	0.79				
<i>Discriminant validity, Fornier Lacker Criterion and HTMT.</i>			<i>Educational Effectiveness</i>		<i>Organisational Performance</i>		
Educational Effectiveness			0.827				
Organisational Performance			0.611		0.823		
<i>HTMT</i>			Educational Effectiveness		Rend_Org		
Educational Effectiveness							
Organisational Performance			0.617				

Note: Own elaboration using SmartPLS 4.

As can be observed, the values of the Cronbach's alpha coefficient for each construct are greater than 0.7, indicating good reliability of the scales, as presented by Nunnally and Bernstein (1994). The Composite Reliability index (CR) and the RhoA indicator both show values greater than 0.7 for the two measured latent variables, confirming the internal consistency of the indicators for each factor, as suggested by Fornell and

Larcker (1981) and Henseler et al. (2016). Finally, the Average Variance Extracted (AVE) index shows levels greater than 0.5, which are considered adequate according to Fornell and Larcker (1981).

5.2 Structural model validity

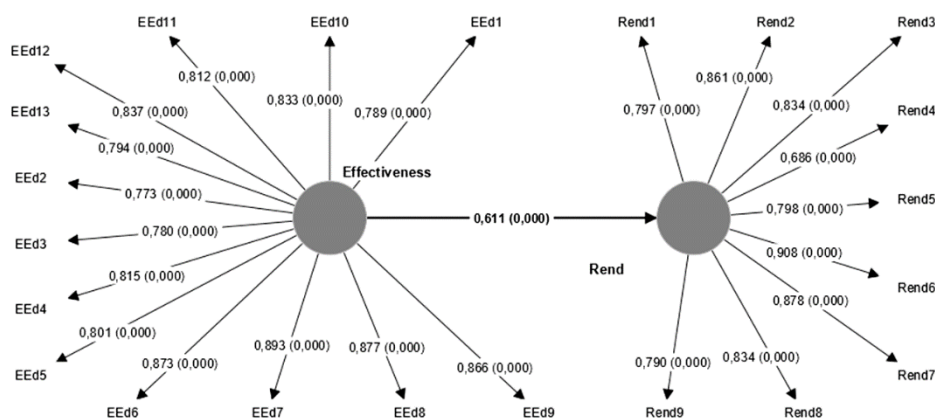
The theoretical model presented is visualised in Figure 2. The construct ‘educational effectiveness’ contains 13 items, while the construct ‘organisational performance’ contains 9 items. During the analysis process, no items were eliminated as the results for these items were favourable, validating the instrument. Following the recommendation of Cepeda-Carrion et al. (2019), a random process generated five thousand sub-samples using Bootstrapping, which provided the confidence interval for the path coefficient representing the relationship between the variables. The significance of a direct and positive relationship between them was verified, confirming the influence of decision-making for educational effectiveness on the organisational performance of the HEIs involved in the research. The details are presented in Table 4 and Figure 2.

Table 4 Structural model validity

Hypothesis	Coef. Path	Hypothesis	t- statistics	P Value
Effect_Educational -> Performance_Org	0.611	supported	8,952	0.000*

Note: Significant * $P < 0.001$; ns: Not Significant.

Figure 2 Results path model



SRMR=0.072, d_ ULS =1.326, d_ G = 1.196, Chi-square=553.2, NFI=0.763

5.3 Discussion of the results

Based on the 309 records obtained from executives and administrators of 44 Colombian Higher Education Institutions (HEIs), it was established that 30 to 37% of the surveyed executives frequently use academic analytics for decision-making. The majority of these executives, over 90%, are associated with Universities and University Institutions. This

finding demonstrates a strength, ease and adaptability in implementing new ways of decision-making. However, at the same time, it reveals a weakness due to the composition of the sample and the relatively small proportion of respondents who use data for decision-making in their leadership roles. This indicates a potential opportunity for the implementation of analytics systems for educational effectiveness in Colombian HEIs. The data suggest that there are indications of data usage for the core processes of HEIs. Nevertheless, there is a considerable gap between what is currently done and what could be accomplished in terms of management and decision-making at the executive level.

These findings highlight the potential for leveraging data and analytics to enhance decision-making processes and improve organisational performance in Colombian HEIs. By capitalising on the strengths and addressing the weaknesses identified in the survey, institutions can develop strategies to foster a data-driven decision-making culture, leading to more effective and efficient management practices. It is essential to recognise that there might be challenges in adopting analytics and data-driven decision-making fully. It may require investment in technology, data infrastructure and training to ensure that executives have the necessary skills to effectively use data for decision-making.

Overall, the data provide valuable insights for higher education policymakers and institutional leaders to identify areas for improvement and guide the implementation of analytics systems for educational effectiveness in Colombian HEIs. By bridging the gap between current practices and the potential for data-driven decision-making, these institutions can position themselves to navigate the complexities of the education landscape and enhance their overall performance.

Regarding educational effectiveness, as measured by the construct EEd, there is a clear trend in Universities and University Institutions towards the use of academic analytics in educational management. However, this trend is not observed in institutions that currently offer technological and technical-professional programs. In these latter HEIs, the proportion of using analytics-based information for decision-making in educational effectiveness is very low, ranging from 1 to 2%. The data indicate that in these institutions, there is a prevalence of making decisions, monitoring and assessing effectiveness and performance using 'traditional' processes. These decisions are often based on experience, outdated data and the absence of integration of different databases for systematic analysis. As reported by the surveyed individuals, this can lead to decisions based on intuition, individual perception or imitation of models from other HEIs.

Regarding organisational performance, approximately 90% of the participants who reported using data for decision-making related to performance work in universities, while 6% work in University Institutions, and 4% in Technological and Technical Institutions. These findings highlight the disparities in the use of data-driven decision-making practices between different types of Higher Education Institutions in Colombia. While Universities and University Institutions show a higher tendency to use academic analytics, Technological and Technical Institutions seem to be lagging in adopting these practices. This presents an opportunity for these institutions to consider adopting data-driven approaches to enhance their organisational performance and educational effectiveness. By doing so, they can better align with the practices seen in universities and university institutions and improve their overall management and decision-making processes.

In general, a strength can be observed in the use of academic analytics for decision-making in Universities, followed by University Institutions, Technological Institutions and Technical Professional Institutions, in that order, based on descriptive data.

Taking into account the findings, Table 5 provides a summary of the relevant aspects and their most significant measures of influence obtained in this study. Notably, for the construct 'Educational Effectiveness,' the effectiveness of collaboration relationships shows a high influence with a coefficient of 0.89 and a p -value <0.001 . Additionally, the type of contribution from the university community also plays a significant role, with a coefficient of 0.87 and a p -value <0.001 . Regarding 'Organisational Performance,' the increase in productivity stands out as a highly influential factor, with a coefficient of 0.90 and a p -value <0.001 . Moreover, the motivation of workers and educators also shows substantial importance, with a coefficient of 0.87 and a p -value <0.001 .

Table 5 Decision-making actions for EEd that favour more and less organisational performance in Colombian HEIs

<i>EEd actions that most favour organisational performance (from highest to lowest result on RO)</i>	<i>measure of influence (p-value)</i>	<i>EEd actions that least favour organisational performance (from lowest to highest result over Rend)</i>	<i>measure of influence (p-value)</i>
Decision making for:	0.89	Decision making for:	0.77
Measure the effectiveness of collaborative relationships with the community. EEd7.	(<0.001)	Measurement of the effectiveness of the reach of the university to the community outside the institution. EEd2	(<0.001)
Determine what type of input from the internal university community should be obtained. EEd8	0.87 (<0.001)	Suggest appropriate tactics when conversing with representatives of various community groups outside the institution. EEd3	0.78 (<0.001)
Identify the complex causes of the concerns of the university community. Eed6	0.86 (<0.001)	Development of effective approaches for the collaboration between the university and the family of the students. EEd1	0.78 (<0.001)
Develop effective communication plans. Ed12	0.83 (<0.001)	Understanding of the external community context and its effect on opportunities for students. EEd13	0.79 (<0.001)
Mobilise common resources for the benefit of student learning. EEd10	0.83 (<0.001)		

Note: Own elaboration.

These results provide valuable insights into the factors that have the most significant impact on educational effectiveness and organisational performance in Colombian Higher Education Institutions. The strong influence of collaboration relationships, community contributions, productivity enhancement and worker/educator motivation highlights the importance of fostering a collaborative and supportive environment within HEIs. This, in turn, can lead to improved educational effectiveness and overall organisational performance. These findings can serve as a basis for formulating strategic initiatives and policies to enhance decision-making processes in Colombian HEIs. By focusing on the identified influential factors, educational institutions can work towards improving their effectiveness, efficiency and overall success in a rapidly evolving higher education landscape.

6 Findings

Measuring something as complex as organisational performance in Higher Education Institutions (HEIs) requires considering performance as a multidimensional construct. In this regard, the structural equation model highlights relevant aspects for the organisational performance construct. The use of data to measure the efficiency of operational processes plays a significant role, involving a set of metrics, queries, studies or internal mechanisms for data acquisition that serve this purpose. As depicted in Figure 2, the most important item is Item 6 (0.90), which refers to productivity enhancement. This aspect is commonly used in standard evaluations of educators, quality management systems and other performance assessments. However, what stands out the most is related to worker motivation, represented by Item 7 (0.87). The PLS-SEM analysis provides key evidence regarding the psychological state of workers and educators, as well as how their perception by the executives influences the second construct (organisational performance).

The findings emphasise the importance of considering multiple dimensions when evaluating organisational performance in HEIs. While productivity is a vital aspect, it is equally critical to focus on factors like worker motivation. Understanding and enhancing the psychological well-being of employees and educators can significantly impact overall organisational performance. The utilisation of data-driven approaches for evaluating efficiency and motivation within HEIs can lead to more informed decision-making and improved management practices. By recognising the significance of these multidimensional aspects, institutions can work towards developing strategies to foster a positive work environment, promote motivation among workers and educators and ultimately improve organisational performance.

The main finding of the study was the empirical validation of the hypothesis, confirming the direct and positive influence of decision-making for educational effectiveness on organisational performance in HEIs. This result aligns well with the evidence provided in the literature regarding the use of data analytics by the scientific community. The foundation of data analytics lies in the theory and practice of statistics, which, combined with advancements in technology, increased processing power, changes in the economic landscape and evolving needs of individuals and society, has ushered in a rapid and continuous process of change, favouring strategic decision-making and the implementation of a new culture within educational organisations: the culture of data capture, transformation and management for evidence-based decision-making at all levels, as demonstrated by Hamdane et al. (2022). This study's findings highlight the importance of embracing data-driven approaches in educational institutions. As the digital era continues to evolve, the ability to effectively collect, analyse and utilise data becomes a key advantage in making informed decisions, optimising educational processes and enhancing overall organisational performance.

The validation of the hypothesis underscores the significance of educational effectiveness and its impact on organisational success. By leveraging data analytics and evidence-based practices, HEIs can identify areas for improvement, adapt to changing needs and enhance their overall performance and sustainability in a dynamic educational landscape. The adoption of a data-driven culture fosters innovation, responsiveness and the ability to achieve strategic goals in a rapidly changing and competitive environment.

Addressing these issues puts the expected change in the adoption of information and communication technologies in productive processes at the forefront. Therefore, the

practical implications in the educational sector range from establishing analytics systems that propose levels of technological readiness, Technology Readiness Levels (TRL), to identifying future opportunities in data management.

7 Conclusions

Educational effectiveness at the tertiary level urges to increasingly involve individuals in processes such as capturing, processing, generating and reusing information related to their activities, with the expectation of obtaining useful knowledge that leads to profitable action plans. Moreover, with the aid of technological tools such as software programs and cloud-based or physical devices, problem-solving processes can be guided by analysis-based strategies. From a research perspective, different levels of scope are proposed, ranging from description and process optimisation to result prediction, forecasting, alerts, strategic recommendations and the creation of corporate reports.

The comprehension of the complexity of causal relationships described in the literature review regarding educational effectiveness and organisational performance in Higher Education Institutions (HEIs) is empirically validated from the perspective of the rational model, productivity and the human relations model, which involves labour conditions. The association of these models with educational effectiveness as a generative element contributes to the state of knowledge about educational management processes from an underexplored approach by previous authors. The main contribution to the body of knowledge lies in providing evidence to understand the performance of IES from a systemic and integrative viewpoint of their mission functions.

It is worth highlighting that the study successfully confirmed the direct and positive influence of decision-making for educational effectiveness on organisational performance in IES, demonstrating the practical relevance of addressing strategies related to external collaboration networks and the role of the university community in achieving educational effectiveness. According to the starting hypothesis, the impact of effectiveness on organisational performance was empirically corroborated, particularly concerning productivity and motivation of employees and faculty, which emphasises the practical perspective of fostering and promoting human relations as drivers of performance in HEIs.

8 Recommendations

Taking the empirical evidence of the study as support, the following are recommendations for academic analytics:

- (i) Consider data related to student success.
- (ii) Establish measures and obtain data related to the performance and relationship between the teacher and the students. Empirical evidence suggests that teacher job stability and well-being influence educational effectiveness.
- (iii) Build indicators for performance that cross the variables related to the academic success of students and the behaviour of the teacher. Likewise, metrics that combine the variables of the external sector, opportunities in the labour market and economic and social policy at the national level.

9 Future lines of research

Carrying out metrics and correlational analyses to validate hypotheses that help understand the influence of educational effectiveness through constructs such as decision-making in management and training processes on organisational performance can be the key to relevant findings for the practice of higher education management and its extension to the context of secondary education. The potential effects of mediation or moderation on the relationship between Effectiveness and Performance could also be a valuable source of knowledge for managers and researchers in the field, based on gender differences in leadership or the differentiating effect of the public-private nature of HEIs.

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