Journal of Management World **2025**, 1: 291-311
DOI: 10.53935/jomw.v2024i4.665

Digital Governance Model for Peruvian University Academic Management

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Abstract. The objective was establishing a digital governance model to improve academic management at the Universidad Nacional de San Martín, Tarapoto, 2024. The study was applied with a quantitative approach, non-experimental design, and cross-sectional. The population included 537 teachers, from which a sample of 97 was selected through non-probabilistic sampling. The results showed that digital governance significantly improved academic management, especially in interoperability and data governance dimensions. However, critical areas such as digital security and digital services were identified. The validated proposal included strategies focused on digital technologies, digital identity, and interoperability to optimize academic and administrative processes. It was concluded that the digital governance model improved academic management according to the opinion of the validating experts, replicable in other higher education institutions, facilitating compliance with educational quality standards, and digital inclusion in higher education.

Keywords: Accountability, Services, Technology, Training, University.

1. INTRODUCTION

At the international level, academic management in universities is a fundamental part of developing professionals in society. Under various pedagogical and andragogical approaches, university institutions devoted much effort to providing quality education, with students as key players and, as facilitators, teachers, who were constantly trained to promote an education that met international standards, accompanied by the latest generation of technology. The pandemic generated by COVID-19 fostered the exponential advance of digital transformation worldwide (García-Peñalvo, 2021; Castellanos and Almuiñas, 2021; Salgado-García et al., 2024). Non-face-to-face education, together with active learning strategies (Rios and Rodriguez, 2021), sought to support Sustainable Development Goal 4, in target 4.3, which guaranteed to offer inclusive, more equitable, and high-quality education, fostering opportunities for adequate and efficient learning in university education (Casas-Huamanta, 2022) .

As such, this goal advocated for inclusion and equity, ensuring no one was excluded from the education system because of their gender, ethnicity, disability, or socioeconomic status. Furthermore, by promoting high-quality learning opportunities, SDG 4 contributed to fostering individual and collective professional development, equipping them with the skills and knowledge necessary to function proactively in the society around them and the globalized economy. For this reason, research and initiatives aligned with this goal not only improved access to and quality of education in every country that adopted the SDGs but also played a crucial role in effectively and efficiently reducing inequalities worldwide and promoting the sustainable development of all nations.

In Latin America, one of the most relevant milestones that significantly challenged academic management was the digital transformation (Mejía and Mejía O, 2021). In recent years, universities have opened up to implementing information systems or software that allow the radical improvement of their processes and position in international rankings, which considers the state of teaching-learning, research, student monitoring, and their link with society (Gerón-Piñón et al., 2021; Panduro, 2023) . According to Pascuci & Fishlow (2023), in the Brazilian universities, preference was given to online education, a modality that proved to be a convenient option for these institutions. However, implementing this educational practice required significant investments, as well as developing and implementing new evaluation models and methods to ensure high academic quality.

In addition, public universities underwent significant transformations in Peru due to new market demands, which led regulatory agencies to reconsider their operational requirements. Consequently, it was imperative that university processes, especially those related to teachers and students, were adapted to comply with current regulations, incorporating emerging technologies (Bravo et al., 2021; Andrade-Girón et al., 2024) . At the same time, Peruvian university managers stressed the importance of teacher training, the availability of technological tools to ensure learning, and the provision of a comprehensive academic service comparable to that of the face-to-face mode. In turn, academic management in the virtual modality focused on improving the satisfaction levels of students and teachers through adaptation processes, training, performance evaluation, attention and problem-solving, as well as the use of virtual platforms to facilitate the development of competencies in graduates and contribute to their comprehensive training (Salazar Rebaza et al., 2023).

Likewise, Chamorro-Atalaya et al. (2023) university academic management should be oriented to increase the rate of development of subjects and approval by students, who reported declining rates when changing from face-to-face to virtual mode, being more noticeable in specialty subjects. This meant that applying the new educational paradigm generated more significant challenges for university managers in Peru. Likewise, the enactment of the Digital Government Law (Legislative Decree No. 1412, 2018) established, in a historical

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manner, an essential milestone in the digital transformation of the Peruvian State.

Inclusively, this law was considered of interest to all the executing units of the Peruvian State, especially with a territorial approach (Supreme Decree N° 118-2018-PCM, 2018), which underlined the importance of its implementation throughout the country. The Presidency of the Council of Ministers (PCM), in permanent coordination with the Secretariat of Digital Government (SEGDI), was established as the governing body responsible for leading and coordinating efforts in this area. That same year, significant steps were taken to advance the digitalization of the State, including creating the Single Digital Platform of the Peruvian State (Supreme Decree N° 033-2018-PCM, 2018) and forming the Digital Government Committee in all government entities, (Ministerial Resolution N° 119-2018-PCM, 2018) according to the corresponding ministerial decrees and resolutions. These initiatives sought to improve the digital services offered to citizens, ensuring more efficient and transparent access to government information and services.

In addition, Peruvian universities, as autonomous state agencies, were obliged to align themselves with the provisions of Law No. 1421, integrating themselves into the Digital Government framework. This implied that these institutions also had to adopt digital strategies to strengthen and enrich the continuous improvement of education and academic services, facilitating more efficient and accessible management for students and academic staff. Together, these measures represented a comprehensive effort to modernize and digitize the services of the Peruvian State, promoting a more effective and citizen-centered management.

Also, in the department of San Martin, the National University of the same name provided educational services to train professionals to improve the conditions or way of life of people involved in quality production processes and public and private services that society needed. For this reason, it developed teaching-learning activities, university social responsibility, research, and the accompaniment of teachers to students through tutoring and counseling activities. However, there was inadequate academic management at the University due to inefficient standardized procedures in university didactics, inadequate digital competencies, poor interoperability in implementing information systems, deficient tutoring processes, and poor links with the environment, i.e., with business and society in general.

Consequently, these causes led to inefficient results in the university teaching-learning process, the inadequate use of academic management systems at the University, and the generation of inadequate reports on fulfilling goals. This resulted in a deficient fulfillment of the general and specific graduation competencies of the University's students. Specific causes included teachers with difficulties complying with the grading process each semester and those who developed inadequate grading systems that did not conform to the established regulations. In addition, some teachers' deficient digital competencies in using the University Academic Management System and tutoring activities, which were limited to the fulfillment of the teacher's work plan without focusing on improving the student's academic performance, aggravated the situation. The few incentives for research activity resulted in low involvement in high-impact scientific research by teachers and students.

In addition to this, some professors held administrative positions, which negatively affected their university scientific research activity. The university's social responsibility was limited to specific activities to alleviate some immediate needs of society without incorporating sustainable activities that would link the university with the community on an ongoing basis. Finally, business participation was insufficient, and the university did not find an effective model to strengthen the link between university, society, and business. These combined factors contributed to an educational environment that did not optimize students' graduation competencies, harming their comprehensive preparation and ability to face professional challenges soon.

Based on the problematic reality, it was necessary to formulate the general problem: To what extent did the digital government model improve academic management at the National University of San Martín - 2024? As specific problems, the following were presented: What were the characteristics of digital governance at the National University of San Martín - 2024? What were the characteristics of academic management at the National University of San Martín - 2024? What was the design of the digital governance model to improve academic management at the National University of San Martín - 2024?

Therefore, this will contribute to adopting more efficient and effective practices, facilitating the digital transformation in the education sector. On the other hand, the general objective of the research was to design the digital governance model to improve academic management at the Universidad Nacional de San Martín - 2024. The specific objectives were to identify the characteristics of digital governance at the Universidad Nacional de San Martín - 2024, to evaluate the characteristics of academic management at the same institution, and to design the digital governance model to improve academic management

Therefore, the general hypothesis was: Hi: The digital governance model improved academic management at the Universidad Nacional de San Martín - 2024.

2. METHODOLOGY

The type of research was applied, as it turned concepts into practical solutions, and its resulting applications could be protected through intellectual property mechanisms (OECD, 2015) . Likewise, a digital governance model was generated to academically manage higher education at the Universidad Nacional de San Martín (Castro et al., 2023) . On the other hand, the study used a quantitative approach to better measure the variables through their dimensions, which allowed them to be operationalized and converted into numerical data, which were used to develop descriptive statistics to demonstrate the hypothesis (Castañeda, 2022) . As for the design, it was non-experimental since the variables were not manipulated; however, both were characterized for a better

understanding of their situational state, which contributed to the model being developed with information from the problematic reality, bringing the solution closer to a model applicable to any university reality at the national level (Loayza-Rivas, 2021) .

Meanwhile, the study had a cross-sectional cut since the instruments were applied at a specific time during the research execution (Cvetkovic-Vega et al., 2021) . In turn, it had a propositional descriptive scope since the explanation of the variables, through its dimensions, allowed the design of the digital governance model to improve academic management at the Universidad Nacional de San Martín (García & Sánchez, 2020) .

As for the operationalization of the variables, digital governance and academic management were considered, and definitions and dimensions were detailed and attached in Annex 1. On the other hand, the study population was constituted by the total number of teachers of the Universidad Nacional de San Martín, which amounted to 537, so the value of N = 537. The sample was selected with a total of 97 teachers, representing an adequate size for analyzing the variables involved in the study. Regarding the selection criteria, the inclusion of students and teachers in the study was determined because the proposal sought to improve academic management, in which teachers are involved in all dimensions of this variable.

For this reason, it was decided to include teachers in the study while excluding all administrative staff and students since the digital governance model was specifically formulated to improve academic management at the Universidad Nacional de San Martín (Martínez and Hernández, 2023) . The sample was calculated at 97 teachers (Cortés et al., 2020), and non-probabilistic convenience sampling was used to apply the instruments (Hernández, 2021) . The teachers constituted the unit of analysis (Villarreal-Ríos et al., 2022). The technique applied was the survey, which collected information from the sample represented by the Universidad Nacional de San Martín teachers. Each one responded according to their level of satisfaction individually and anonymously (Herrero-Corona, 2021) .

In turn, the instrument used was the questionnaire, which the researcher prepared. For this purpose, two questionnaires were prepared, one for each variable, which was organized by their dimensions, each dimension with its respective indicators and each indicator with its respective statements. Seven dimensions, 30 indicators, and 30 statements were considered for the first instrument. For the second instrument, four dimensions, 15 indicators, and 32 statements were considered; for both questionnaires, the Likert scale of 5 ordinal scale values was considered, determined as follows: 1 meaning dissatisfied, two meaning partially dissatisfied, three meaning indifferent, four meaning partially satisfied and five meaning satisfied. The teachers received informed consent before the questionnaire was recorded. Subsequently, they used a time of 15 minutes for the corresponding recording (Castro et al., 2023).

As for the procedures carried out in the study, there were two well-defined stages: a) Diagnostic and b) Propositional. The first stage involved the collection of information and its corresponding numerical analysis. It began with the instruments' creation, validation, and reliability test. Then, the questionnaire was applied to the university's teachers, verifying they had answered all the questions correctly. Finally, the data were digitized into the Microsoft Excel program and imported into the SPSS v23 statistical software for processing and analysis. After this, descriptive statistical reports were obtained that reflected the reality or diagnosis of both variables in the institution.

In turn, the activities of the propositional stage will be developed. In this stage, an evaluation of the information obtained in the previous phase was carried out. Likewise, research of other authors on digital government and academic management was analyzed, and the most relevant data were filtered, which were considered for the design and creation of the proposal of the model of digital government in the academic management of the University. This design was done in parallel with the participation of experts on the subject, ensuring that the proposal has theoretical and practical value and fits the reality found. Once the proposal's design was completed, it was presented to the experts for validation. The observations presented were raised until finally approval was given. Basic descriptive statistics were used for data analysis, using measures of centralization and dispersion as part of the process. These indicators were calculated and evaluated to understand the distribution and variability of the data collected. The SPSS v23 statistical program was used to process the information.

Table 1: Characterization of digital government by indicators.

Dimensions / Statements	TD		PS		IN		PA		TA	
D1: Digital Technologies	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The implementation of information technologies at the university is adequate.	7	7.2%	14	14.4%	7	7.2%	48	49.5%	21	21.6%
The implementation of telecommunications facilitates the coordination of activities at the University.	4	4.12%	11	11.34%	8	8.25%	31	31.96%	43	44.33%
The use of mobile devices collaborates adequately in their work activities.	5	5.2%	10	10.3%	8	8.2%	29	29.9%	45	46.4%
The implementation of statistical analysis tables (data analytics) aids in decision making.	6	6.2%	10	10.3%	10	10.3%	23	23.7%	48	49.5%
Implementation of digital content collaborates in staff training	4	4.1%	9	9.3%	3	3.1%	38	39.2%	43	44.3%
The implementation of computer applications collaborates with the daily work at the University.	3	3.1%	8	8.2%	6	6.2%	31	32.0%	49	50.5%
D2: Digital identity	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Digital identification is frequently used in documentary procedures.	7	7.2%	17	17.5%	11	11.3%	29	29.9%	33	34.0%
Access to digital services is through digital identification.	8	8.2%	20	20.6%	9	9.3%	33	34.0%	27	27.8%
D3: Interoperability	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Data exchange with other vocational schools is done automatically	16	16.5%	20	20.6%	17	17.5%	31	32.0%	13	13.4%
Personal data protection is at the expected level.	13	13.4%	25	25.8%	12	12.4%	34	35.1%	13	13.4%
D4: Digital services	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Information is provided in a timely manner.	14	14.4%	23	23.7%	7	7.2%	38	39.2%	15	15.5%
The security of digital services protects personnel information.	14	14.4%	22	22.7%	6	6.2%	38	39.2%	17	17.5%
The design of the University's digital services is adequate	11	11.3%	29	29.9%	8	8.2%	32	33.0%	17	17.5%
The delivery of information from digital services satisfies information requirements	9	9.3%	26	26.8%	10	10.3%	37	38.1%	15	15.5%
Access to University assets through digital services is adequate.	9	9.3%	29	29.9%	17	17.5%	25	25.8%	17	17.5%
Access to University services through digital media is adequate.	8	8.2%	27	27.8%	10	10.3%	37	38.1%	15	15.5%
The implementation of digital services supports access to university data.	9	9.3%	18	18.6%	16	16.5%	31	32.0%	23	23.7%
The use of electronic signatures is appropriate for accessing digital services.	7	7.2%	17	17.5%	13	13.4%	33	34.0%	27	27.8%
The use of digital certificates is expected to access digital services.	6	6.2%	20	20.6%	15	15.5%	28	28.9%	28	28.9%
D5: Data governance	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
Data collection by the University allows the information to be kept up to date.	10	10.3%	18	18.6%	12	12.4%	33	34.0%	24	24.7%
Data processing is carried out in a timely manner	10	10.3%	21	21.6%	16	16.5%	35	36.1%	15	15.5%
The publication of university data enables the active participation of staff.	10	10.3%	19	19.6%	13	13.4%	39	40.2%	16	16.5%
Data storage allows queries to be performed at the expected time.	7	7.2%	21	21.6%	14	14.4%	36	37.1%	19	19.6%
D6: Digital security	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The implementation of preventive measures in digital security allows to protect the University's data	13	13.4%	18	18.6%	7	7.2%	35	36.1%	24	24.7%
The implementation of corrective measures in digital security allows to solve problems immediately (minimum 60 minutes).	15	15.5%	17	17.5%	11	11.3%	29	29.9%	25	25.8%
D7: Digital architecture	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The University's digital architecture enables collaboration with strategic objectives.	9	9.3%	25	25.8%	19	19.6%	23	23.7%	21	21.6%
The University's digital architecture allows it to exchange information with other schools to achieve its strategic objectives.	16	16.5%	17	17.5%	18	18.6%	27	27.8%	19	19.6%
The University's digital architecture collaborates with the continuous improvement process to achieve strategic objectives	9	9.3%	22	22.7%	19	19.6%	26	26.8%	21	21.6%
The University's digital architecture optimizes (time) the achievement of strategic objectives.	9	9.3%	20	20.6%	15	15.5%	32	33.0%	21	21.6%
The University's digital architecture ensures the fulfillment of strategic objectives	10	10.3%	19	19.6%	16	16.5%	32	33.0%	20	20.6%

Note: Questionnaire applied to UNSM teachers.

Meanwhile, the information from this analysis was documented in Word and Excel, allowing a detailed and precise presentation since the study's findings showed significant results. Regarding the data analysis methods, a descriptive statistical analysis process was considered to examine the information collected using technological tools specialized in data collection. In this context, Microsoft Excel software was used to tabulate and define the range scales that enable the characterization of digital governance in university academic management. SPSS v23 statistical software was used to obtain inferential statistical data. Tables and figures were prepared with the data obtained, providing a visual representation that facilitated their interpretation and understanding. This methodological approach was established as an effective tool for analyzing and communicating the results clearly and concisely, allowing a comprehensive visualization of emerging trends and patterns in the field of study (Villa et al., 2020).

3. RESULTS

For an adequate analysis of the data obtained through the instruments applied for both the digital governance variable and the academic management variable, the following was carried out:

The Likert scale was used to assess the respondents' answers. The Totally Disagree scale was represented by the acronym TD, the Partially Disagree scale by the abbreviation PD, the Indifferent scale by the acronym IN, the Partially Agree scale by the acronym PA, and the Totally Agree scale by the acronym TA. This information follows the instruments of the variables found in Annex 3 in the conversion scale section.

3.1. Interpretation

According to Table 1 and concerning the dimension of digital technologies, implementing computer applications in daily work had the lowest TD percentage, with 3.1 %, and PD at 8.2 %. However, disagreement was low, suggesting that some teachers did not perceive these tools as completely useful or adequate in their daily work, the opposite of what happened with the other scales, where there were 82.5 % agreement responses (32 % PA and 50.5 % TA). This highlighted the effectiveness and acceptance of these tools in daily work. On the other hand, concerning digital content for training, 4.1 % of teachers were in TD and 9.3 % in PD with the effectiveness of digital content for staff training. Although a large majority agreed, these values reflected that certain aspects of the digital content were not fully optimized or adapted to the needs of staff, the opposite of what happened with the other scales, since 83.5 % of the teachers agreed (39.2 % PA and 44.3 % TA), which indicated that the digital content was well valued for staff training and development.

In turn, the implementation of telecommunications in the university is 4.12 % of TD and 11.34 % of PD. This meant that a small but considerable proportion of teachers considered that the infrastructure or access to these communication services was not fully adequate for the coordination needs of the university. The opposite was true for 76.29 % of the teachers, who suggested that these technologies were well-integrated and effectively facilitated activities and coordination at the university. On the other hand, concerning the statistical analysis or data analytics tables, 6.2 % of the teachers expressed that they were TD and 10.3 % that they were PD, which suggested that the implementation of data analytics could have had areas of improvement to maximize its contribution in decision making, however, 73.2 % of the teachers agreed, which established that the implementation of data analytics contributed to decision making, although there was a small margin of disagreement that could be explored to improve this area.

Regarding the use of mobile devices in work activities, 5.2 % indicated TD and 10.3 % PD. This showed that some teachers did not perceive mobile devices as very useful tools in their work activities, which could have reflected problems of accessibility or technological integration, on the other hand, 76. On the other hand, regarding the implementation of information technologies, 7.2 % of the respondents indicated TD and another 7.2 % IN regarding the adequacy of information technologies in the university; consequently, this moderate value of disagreement could have been considered specific aspects of the technology that could be improved to increase its perceived usefulness.

These results showed that the university was widely accepted; however, some faculty perceived limitations in specific areas, such as telecommunications and data analytics. Furthermore, these results could have guided the university to focus on improving infrastructure, accessibility, or training in these key areas, ensuring that digital technologies contributed optimally to the academic environment.

According to Table 1 and concerning the dimension of digital identity, using digital identification in document procedures presented 7.2 % of responses in TD and 17.5 % in PD. Although these disagreement values were not considerably high, they established that many teachers did not perceive digital identification as a frequent or adequate tool for document procedures. In contrast to this perception, 63.9 % of the respondents agreed (29.9 % PA and 34 % TA), which highlighted that, for the majority, digital identification played a relevant role in simplifying and speeding up document procedures.

On the other hand, regarding access to digital services through digital identification, 8.2 % of responses were observed in TD and 20.6 % in PD. In turn, these results indicated that a significant segment of teachers had an unfavorable perception of using digital identification to access digital services, possibly due to problems of functionality or accessibility in the system. However, 61.8 % of the teachers agreed (34 % PA and 27.8 % TA), which suggested that most teachers recognized the value of digital identification as a mechanism for accessing digital services at the university.

The results in this dimension showed that it was accepted mainly by teachers, although with a notable degree

of variability in the perception of its implementation. However, more than 60% of teachers supported the use of digital identification both in document procedures and access to digital services. The percentages of disagreement (between 7.2% and 20.6%) suggested that challenges prevented a uniform adoption of this technology. These challenges could be related to the usability of digital identification systems, the frequency of their use, or their integration with other university processes; these results underscored the importance of strengthening and optimizing the digital identity infrastructure. Addressing areas of dissatisfaction and improving the accessibility and efficiency of digital ID systems could help maximize their acceptance and functionality, facilitating a more dynamic academic environment aligned with the institution's digital governance objectives.

According to Table 1 and concerning the interoperability dimension, the statement on the automatic data exchange with other professional schools presented a considerable percentage of disagreement, with 16.5 % in TD and 20.6 % in PD. These results reflected that a significant proportion of teachers did not perceive that data exchange between professional schools was fluid or automatic, which could be due to limitations in the technological infrastructure or poor integration between systems; on the contrary, 45.4 % of teachers agreed (32 % PA and 13.4 % TA), which suggested that, although there were areas for improvement, some teachers recognized progress in the automation of data exchange.

Regarding personal data protection, 13.4 % TD and 25.8 % PD were observed. This high level of disagreement (39.2 %) indicated that a significant part of the respondents did not consider that personal data protection was at the expected level. This could be related to problems in implementing security policies, deficiencies in staff training, or a generalized negative perception of current measures. However, 48 of the teachers agreed (35 AP and 13.4% AT), suggesting that, for almost half, data protection measures were adequate or met minimum expectations.

In turn, the high percentages of disagreement (39.2 % in personal data protection and 37.1 % in automatic data exchange) indicated that the interoperability processes presented critical limitations, these results suggested that the university should have prioritized efforts in the negative perception could have been resolved by implementing more integrated and automated systems that facilitate collaboration between professional schools, in addition, personal data protection should have been strengthened, this suggests that policies and practices related to data security and privacy should have been improved, In contrast, the agreement registered by almost 50% of the teachers in both statements suggested that there was already progress or initial efforts in these areas, although they were not yet sufficient to meet general expectations, indicating that the interoperability dimension showed partial acceptance with critical areas that required attention to ensure greater efficiency and security in the management of institutional data.

According to Table 1 and concerning the digital services dimension, the provision of information promptly registered 14.4 % TD and 23.7 % PD, which indicated that almost 38.1 % of teachers perceived deficiencies in this aspect. However, 54.7 % of teachers agreed (39.2 % PA and 15.5 % TA). The results recorded that, for a significant part, the provision of information did not meet the expectations of timeliness and efficiency. On the other hand, regarding the security of digital services and their ability to protect personnel information, 14.4 % of respondents indicated they were TD and 22.7 % PD, up to 37.1 % negative perception. This high level of disagreement reflected concerns about data protection and information security. However, 56.7% expressed agreement (39.2% AP and 17.5% AT), suggesting that, although there was progress in this area, it was insufficient to ensure a uniform perception of security.

Then, regarding the design of the digital services, 11.3 % of the teachers were TD and 29.9 % PD, which represented the highest percentage of disagreement with the statements, with 41.2 %. This reflected that almost 50 % of the teachers considered that the design of the digital services did not meet the standards required for its functionality and accessibility. However, 50.5 % of the teachers agreed (33 % PA and 17.5 % TA), which indicated that a significant proportion recognized positive aspects in the design, although with opportunities for improvement.

Also, the satisfaction of information requirements through digital services showed 9.3 % TD and 26.8 % PD, which added up to 36.1 % disagreement. This result indicated that many teachers did not find that digital services adequately met their information needs. However, 53.6 % expressed agreement (38.1 % PA and 15.5 % TA), indicating advances in digital services' capacity to respond to information demands. For its part, access to university assets through digital services obtained 9.3 % of TD and 29.9 % of PD, which reflected 39.2 % of negative perception. This level of disagreement showed that most teachers did not perceive that digital services effectively facilitate access to goods. However, 43.3 % expressed agreement (25.8 % PA and 17.5 % TA), which suggested that there was progress in this aspect, although not enough to satisfy the majority.

On the other hand, regarding access to services through digital media, 8.2 % of teachers were TD and 27.8 % PD, representing 36.0 % of disagreement. This reflected that many teachers did not consider adequate access to services through digital media. However, 53.6 % expressed agreement (38.1 % PA and 15.5 % TA), which indicated that a majority perceived progress in this aspect. On the other hand, the implementation of digital services for data access showed 9.3 % TD and 18.6 % PD, which registered 27.9 % of negative perceptions. This percentage reflected certain limitations in the effectiveness of digital services in ensuring adequate access to data. However, 55.7 % expressed agreement (32.0 % PA and 23.7 % TA), which indicated that the majority recognized progress in this aspect.

Regarding electronic signatures, 7.2 % of the teachers indicated TD and 17.5 % PD, adding up to 24.7 % of disagreement, which stated that, although there was progress, a significant minority did not perceive electronic

signatures as an adequate tool for accessing digital services. Consequently, using digital certificates obtained the lowest percentage of TD, with 6.2 % and 20.6 % of PD, which added up to 26.8 % of negative perception. These results reflected that, although the implementation of digital certificates was well valued by 57.8 % of the respondents (28.9 % PA and 28.9 % TA), there were still opportunities for improvement in its functionality.

Likewise, the results of this dimension showed divergent perceptions, with moderate to high levels of agreement in most of the statements but also significant percentages of disagreement in key aspects, such as design, security, and information provision. This evidenced the need to optimize the infrastructure and functionality of digital services to ensure a more consistent and satisfactory user experience, thus contributing to more efficient academic management oriented towards digital governance.

According to Table 1 and for the dimension of data governance, data collection registered 10.3 % of the teachers, those who expressed TD and 18.6 % PD, up to 28.9 % of negative perception. These results reflected that a significant part of the teachers did not consider the collection processes sufficient to keep the institutional information updated. However, 58.7 % expressed agreement (34 % PA and 24.7 % TA), indicating that most data collection practices met the expected objectives. In turn, this evidenced that, although there was a majority perception of agreement, almost 33 % of the teachers identified deficiencies in the collection mechanisms, which suggested the need to strengthen processes that guarantee data collection following the respective process promptly.

On the other hand, regarding data processing promptly, 10.3 % of the teachers indicated TD and 21.6 % PD, which represented 31.9 % negative perception. This result pointed out a perceived limitation in the efficiency and timeliness of the data processing processes. However, 51.6 % expressed conformity (36.1 % PA and 15.5 % TA), which showed that, although there were advances in this area, these were not enough to satisfy a significant part of the teachers, this analysis indicated that data processing, despite being accepted by the majority, still presented deficiencies in the capacity to respond in an agile manner to information needs, which could be limiting its usefulness in institutional decision making.

In turn, regarding the publication of data and its ability to promote the active participation of staff, 10.3 % of respondents expressed TD and 19.6 % PD, registering 29.9 % negative perceptions. These percentages reflected that, for a considerable proportion, the data publication processes did not sufficiently promote the inclusion of staff in decision-making. On the other hand, 56.7 % expressed agreement (40.2 % PA and 16.5 % TA), which indicated that, for the majority, data publication was perceived as a positive aspect. Although impractical, this result suggested that, although data publication was valued by more than half of the respondents, its usefulness as a communication and transparency tool needed to be improved to ensure greater active participation of teachers.

Then, about data storage and its capacity to allow queries at the expected time, 7.2 % of teachers expressed TD and 21.6 % PD, which added up to 28.8 % of negative perception. Although this percentage was relatively low compared to other statements, it reflected challenges in guaranteeing data availability for timely queries. However, 56.7 % expressed agreement (37.1 % PA and 19.6 % TA), highlighting significant progress in this area, with a predominant positive perception. This analysis showed that, although data storage received a majority positive valuation, the persistence of one-third of disagreement reflected problems in optimizing systems to ensure immediate and efficient accessibility.

Also, the results of this dimension evidenced moderate acceptance in most of the statements, with levels of agreement above 50%. These results suggested that the data collection, processing, publication, and storage processes had been successfully implemented. However, significant levels of disagreement, ranging from 28.8% to 31.9%, evidenced essential limitations in the efficiency, timeliness, and accessibility of these processes; this reflected the need to optimize the data management systems to ensure a more efficient and reliable experience.

According to Table 1 and for the digital security dimension, the implementation of preventive measures in digital security, 13.4 % of the respondents indicated to be TD and 18.6 % PD, which added up to 32 % negative perception. These results reflected that a significant part of the teachers did not consider that the preventive measures were adequate to guarantee the protection of the university's data. However, 60.8 % expressed agreement (36.1 % PA and 24.7 % TA), which evidenced that, for the majority, these measures were perceived as adequate to prevent security incidents. This highlighted that, although progress was recognized, one-third of the respondents identified limitations that could be related to the lack of updating or insufficiency in the implemented preventive policies.

Regarding implementing corrective measures in digital security and their ability to solve problems promptly (minimum 60 minutes), 15.5 % expressed TD and 17.5 % PD, representing 33.0 % of negative perception. In turn, this level of disagreement indicated that a considerable proportion of teachers did not perceive that the corrective measures were fast or effective enough to resolve incidents. On the other hand, 55.7 % of teachers expressed conformity (29.9 % PA and 25.8 % TA), which indicated that although most of them valued these measures positively, there were deficiencies that limited their perception of effectiveness. On the other hand, 55.7 % of teachers agreed (29.9 % PA and 25.8 % TA), which indicated that, although the majority rated these measures positively, there were deficiencies that limited their perception of effectiveness, suggesting that the corrective measures, although well rated by more than half, needed improvements in their implementation to ensure more immediate and effective responses.

These results showed a mostly positive perception, with more than 55% of the teachers agreeing with both statements. However, the levels of disagreement, which are recorded between 32% and 33%, showed significant challenges in the effectiveness and agility of preventive and corrective measures implemented. In addition, these

results reflected that the university should strengthen its digital security strategies, focusing on updating preventive policies and optimizing times and procedures for troubleshooting. Consequently, this dimension received a predominantly positive assessment. The disagreement indicated the need to improve preventive and corrective capabilities to ensure a more secure and reliable environment for the protection of institutional data, thus aligning with the standards expected in the framework of an efficient digital government.

According to Table 1 and the digital architecture dimension, the digital architecture allowed collaboration with the strategic objectives according to 9.3 % of the teachers who indicated being TD and 25.8 % PD, which added up to 35.1 % of negative perception. This reflected that many teachers did not consider that the university's digital infrastructure was adequately designed to facilitate strategic collaboration. However, 45.3 % expressed agreement (23.7 % PA and 21.6 % TA), which suggested that, for almost half of the respondents, the digital architecture partially fulfilled this purpose, indicating that there were initial efforts in this area. Still, they were not sufficiently robust to ensure effective strategic support.

On the other hand, regarding whether the digital architecture allowed the exchange of information with other professional schools to achieve the strategic objectives, 16.5 % of the teachers indicated being TD and 17.5 % PD, which represented a 34 % negative perception. On the other hand, 47.4 % expressed conformity (27.8 % PA and 19.6 % TA), which evidenced that, although almost half recognized progress in this area, the high levels of disagreement reflected essential limitations in the capacity of the digital architecture to foster inter-institutional integration, this highlighted the need to optimize information exchange mechanisms to strengthen collaboration between professional schools.

Regarding whether the digital architecture collaborated with the continuous improvement process to achieve the strategic objectives, 9.3 % indicated TD and 22.7 % PD, registering a 32 % negative perception. Despite this, 48.4 % expressed agreement (26.8 % PA and 21.6 % TA), suggesting that almost half of the teachers perceived that the digital architecture supported continuous improvement processes to some extent. However, the levels of disagreement indicated that challenges persisted in implementing strategies that would effectively integrate the digital architecture with continuous improvement initiatives.

Then, as to whether the digital architecture optimized time in meeting strategic objectives, 9.3 % of teachers expressed TD and 20.6 % PD, which added up to 29.9 % negative perception. On the other hand, 54.6 % expressed agreement (33 % PA and 21.6 % TA), which indicated that more than half considered that the digital architecture supported time efficiency in strategic management. However, the results showed that a significant percentage of teachers did not perceive time optimization as a clear benefit, which evidenced opportunities for improvement in the alignment between the digital architecture and strategic goals.

Also, regarding whether the digital architecture ensured compliance with the strategic objectives, 10.3 % expressed TD and 19.6 % PD, reflecting a 29.9 % negative perception. However, 53.6 % expressed conformity (33 % PA and 20.6 % TA), evidenced by a predominant positive perception, although not uniform. This suggested that, although the majority recognized advances in the capacity of digital architecture to ensure compliance with the strategic objectives, challenges persisted that limited its effectiveness in some cases.

Consequently, this dimension showed a moderate positive perception, with more than 45 % of faculty agreeing on all statements. However, significant levels of disagreement, ranging from 29.9 % to 35.1 %, reflected substantial challenges in the implementation and effectiveness of the university's digital architecture. These results indicated the need to optimize digital systems and processes to ensure more significant support for strategic objectives, promote institutional collaboration, and strengthen continuous improvement; although progress was evident, the results highlighted that current strategies were insufficient to ensure a uniform positive impact across the institution.

Table 2: Characterization of digital government by dimensions.

Dimensions	Levels	Interval	fi	%
Digital technologies	Bad	6 - 13	7	7.22%
	Regular	14 - 21	18	18.56%
	Good	22 - 30	72	74.23%
	Total		97	100.00%
Digital identity	Bad	2 - 4	22	22.68%
	Regular	5 - 7	19	19.59%
	Good	8 - 10	56	57.73%
	Total		97	100.00%
Interoperability	Bad	2 - 4	31	31.96%
	Regular	5 - 7	28	28.87%
	Good	8 - 10	38	39.18%
	Total		97	100.00%
Digital services	Bad	9 - 20	25	25.77%
	Regular	21 - 32	27	27.84%
	Good	33 - 45	45	46.39%
	Total		97	100.00%
Data governance	Bad	4 - 9	23	23.71%
	Regular	10 - 15	31	31.96%
	Good	16 - 20	43	44.33%
	Total		97	100.00%
Digital security	Bad	2 - 4	29	29.90%
	Regular	5 - 7	15	15.46%

	Good	8 - 10	53	54.64%
	Total		97	100.00%
Digital architecture	Bad	5 - 11	29	29.90%
	Regular	12 - 18	24	24.74%
	Good	19 - 25	44	45.36%
	Total		97	100.00%

Note: Questionnaire applied to UNSM teachers.

3.2. Interpretation

According to Table 2, concerning the dimension of Digital Technologies, the insufficient level reached 7.22 %, which indicated that a minority of teachers considered that digital technologies did not meet the minimum expected standards. On the other hand, the regular level obtained 18.56 %, reflecting that an additional proportion perceived that these technologies were not yet fully adequate to meet the needs of the university. However, the good level predominated with 74.23 %, highlighting that the vast majority recognized that the digital technologies implemented were practical, functional, and adequately aligned with strategic expectations.

For its part, the digital identity dimension, the bad level obtained 22.68 %, representing a significant negative perception regarding the use of digital identification at the university, which could be related to limitations in accessibility or functionality of the systems, in addition, the regular level represented 19.59 %, indicating a mixed perception and a perceived utility as intermediate, on the other hand, the good level reached 57.73 %, reflecting that more than half of the teachers considered that the digital identity fulfilled its purpose and contributed to the adequate access to digital services, in turn, the interoperability dimension presented a more critical perception, where the bad level reached 31.96 %, reflecting that almost a third of the teachers identified serious deficiencies in the exchange of data between professional schools, likewise, the fair level obtained 28.87 %, which indicated that a significant proportion considered that the interoperability processes were only partially functional, on the other hand, the good level represented 39.18 %, evidencing that, although there were advances, less than half of the teachers considered that the interoperability was fully effective.

Then, in the dimension of digital services, the bad level reached 25.77 %, which reflected that a quarter of the respondents perceived that these services did not meet the expectations of quality or functionality, on the other hand, the regular level represented 27.84 %, showing that an additional proportion considered that the digital services had an intermediate performance, on the other hand, the good level, although predominant with 46.39 %, showed that less than half of the teachers perceived an adequate implementation, which evidenced important areas for improvement, also, in the dimension of data governance, the bad level obtained 23.71 %, indicating that a significant proportion considered that data management and use processes were not effective in supporting decision making, while the fair level represented 31.96 %, suggesting that a large proportion perceived data governance efforts as moderately satisfactory, while the good level reached 44.33 %, which showed that, although a majority recognized progress, there were still limitations that impacted the overall perception.

Likewise, the digital security dimension presented a poor level of 29.90%, which reflected that almost one third of the teachers considered the protection measures implemented to guarantee data security to be insufficient, then, the regular level was lower, with 15.46 %, which indicated that few perceived an intermediate protection, however, the good level predominated with 54.64 %, which highlighted that more than half of the teachers positively valued the implemented security strategies, although with opportunities for strengthening, on the other hand, the digital architecture dimension reflected similar challenges, the bad level reached 29.90 %, evidencing a critical perception regarding its capacity to support the strategic objectives, on the other hand, the regular level obtained 24.74 %, which reflected that a vital part perceived the digital architecture as only partially functional, however, the good level predominated with 45.36 %, which showed that almost half of the teachers considered that the digital architecture was adequate, although with deficiencies that prevented an entirely positive perception.

Consequently, the dimensions of digital technologies and digital identity were the best rated, with more than 50% of teachers placing them in the good level, this highlighted that these areas showed significant progress in terms of implementation and perceived usefulness, however, the dimensions of interoperability, digital services, data governance, digital security and digital architecture presented higher levels of negative perception, with values between and 32% in the bad level, however, these results reflected that the initiatives related to these dimensions required optimization in specific areas to achieve higher levels of acceptance and effectiveness, it is worth mentioning that although we are dimensions showed important strengths, especially in digital technologies, key challenges were also identified in interoperability, security and digital architecture that limited their impact, these results highlighted the need to improve the infrastructure, functionality and integration of the dimensions to ensure that the digital government meets the expected strategic and operational standards.

Table 3: Characterization of digital government.

Levels	Intervals	fi	%
Bad	37 - 75	21	21.6
Regular	76 - 112	34	35.1
Good	113 - 150	42	43.3
Total		97	100.0

Note: Questionnaire applied to UNSM teachers.

3.3. Interpretation

According to Table 3, the bad level, obtained a frequency of 21 teachers, representing 21.6 % of the total, this represented that one fifth of the teachers perceived that digital governance at the university was significantly below expectations, this result reflected a negative perception that could be related to limitations in the implementation, functionality or integration of key dimensions, in addition, the presence of this level highlighted the need to review and strengthen technological systems, as well as to improve their alignment with the institutional strategic objectives, in turn, the regular level, was the second most representative, with 34 teachers (35.1 %), this result showed that more than a third of the teachers felt that the digital government achieved a moderate performance, partially meeting the expectations, this suggested that, although the efforts implemented were recognized, there were still areas that failed to fully meet the needs and requirements of users, reflecting a moderate functional performance.

This result indicated that almost half of the participants perceived the university's digital governance as efficient and aligned with its strategic objectives. It is worth mentioning that this level highlighted the positive aspects of the digital initiatives implemented, pointing out advances in areas such as digital technologies and digital identity, which were previously recognized as the most highly valued dimensions. Meanwhile, teachers showed a majority perception of performance between fair and good levels, totaling 78.4 % of the total. This also reflected that, although there was significant progress, there was still considerable room for improvement, evidenced by the 21.6 % of teachers who placed it in the bad level. This critical segment noted that certain key areas such as interoperability, digital services, and digital architecture, required priority attention to achieve a more uniform performance.

3.4. Interpretation

According to Table 4, for the teaching-learning dimension, the planning of activities was given in adequate time; 3.09% of the teachers indicated TD and 21.65% PD, which reflected that almost a quarter perceived deficiencies in this aspect. However, 72.16% expressed agreement (46.39% PA and 25.77% TA), which indicated that the majority considered that the activities were planned on time. Similarly, regarding whether the planning of the contents was carried out in adequate time, 4.12% indicated TD and 17.53% PD, which evidenced that almost 22% of the teachers identified problems in the planning of contents. Despite this, 73.19% expressed agreement (47.42% PA and 25.77% TA), which highlighted that most perceived this aspect as adequate and well-managed.

Table 4: Characterization of academic management by indicators.

Dimensions / Statements	TD		PS		IN		PA		TA	
D1: Teaching and learning	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The planning of activities in the teaching-learning process is given in a timely manner.	3	3,09%	21	21,65%	3	3,09%	45	46,39%	25	25,77%
The planning of the contents in the teaching-learning process is given in the appropriate time.	4	4,12%	17	17,53%	5	5,15%	46	47,42%	25	25,77%
Adequate motivation for content development is applied in the teaching and learning process.	4	4,12%	12	12,37%	13	13,40%	44	45,36%	24	24,74%
In the teaching-learning process, the students' prior knowledge is adequately gathered.	2	2,06%	14	14,43%	10	10,31%	45	46,39%	26	26,80%
In the teaching-learning process, feedback is developed based on the needs of the students.	2	2,06%	15	15,46%	9	9,28%	40	41,24%	31	31,96%
The development of activities in the teaching-learning process achieves the expected competencies in students.	2	2,06%	14	14,43%	6	6,19%	50	51,55%	25	25,77%
The development of activities in the teaching-learning process achieves the expected competencies in students.	1	1,03%	17	17,53%	8	8,25%	45	46,39%	26	26,80%
The development of the contents in the teaching-learning process achieves the expected competencies in the students.	1	1,03%	15	15,46%	7	7,22%	45	46,39%	29	29,90%
Content evaluation is developed with the application of rubrics.	4	4,12%	18	18,56%	9	9,28%	44	45,36%	22	22,68%
The evaluation of content is developed with reference to the achievement of competencies.	3	3,09%	17	17,53%	9	9,28%	38	39,18%	30	30,93%
Appropriate didactic strategies are used for content feedback	1	1,03%	16	16,49%	12	12,37%	40	41,24%	28	28,87%
The presentation of learning outcomes is delivered within the expected timeframe	2	2,06%	18	18,56%	9	9,28%	38	39,18%	30	30,93%
D2: Tutoring and counseling	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The planning of the mentoring process is carried out in accordance with university guidelines.	5	5,15%	21	21,65%	17	17,53%	38	39,18%	16	16,49%
The planning of the counseling process is carried out in accordance with university guidelines.	5	5,15%	20	20,62%	17	17,53%	38	39,18%	17	17,53%
The implementation of the mentoring process is developed in coordination with the curriculum.	7	7,22%	20	20,62%	15	15,46%	35	36,08%	20	20,62%
The implementation of the tutoring process is carried out in coordination with the University Welfare Office.	7	7,22%	20	20,62%	18	18,56%	30	30,93%	22	22,68%
The implementation of the counseling process is carried out in coordination with the study program.	8	8,25%	16	16,49%	17	17,53%	36	37,11%	20	20,62%
The counseling process is carried out in coordination with the University Welfare Office.	7	7,22%	18	18,56%	16	16,49%	34	35,05%	22	22,68%
The monitoring activities of the mentoring process are recorded in a timely manner.	6	6,19%	19	19,59%	19	19,59%	36	37,11%	17	17,53%
Counseling process control activities are recorded in a timely manner.	6	6,19%	20	20,62%	15	15,46%	38	39,18%	18	18,56%
Cases are referred to the University Welfare Office for psychological assistance when required.	4	4,12%	18	18,56%	17	17,53%	38	39,18%	20	20,62%
D3: Research	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The development of teaching research activities is carried out in an efficient manner.	2	2,06%	24	24,74%	14	14,43%	42	43,30%	15	15,46%
The development of student research activities with the guidance of a faculty member is carried out in an efficient manner.	3	3,09%	25	25,77%	15	15,46%	38	39,18%	16	16,49%
The collection of research data is done in a systematized way.	0	0,00%	26	26,80%	14	14,43%	39	40,21%	18	18,56%
The processing of research data is carried out in a systematized manner.	1	1,03%	21	21,65%	19	19,59%	38	39,18%	18	18,56%
The results of the research process are disseminated in scientific journals.	4	4,12%	21	21,65%	20	20,62%	37	38,14%	15	15,46%
Dissemination of the results of the research process takes place at conferences.	6	6,19%	24	24,74%	17	17,53%	34	35,05%	16	16,49%
Dissemination of the results of the research process is carried out at the professional school.	10	10,31%	23	23,71%	16	16,49%	33	34,02%	15	15,46%
The work of the research groups links teachers and students in an appropriate way.	6	6,19%	25	25,77%	13	13,40%	39	40,21%	14	14,43%
D4: Social responsibility	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**	**fi**	**%**
The planning of social responsibility activities is timely	7	7,22%	28	28,87%	10	10,31%	36	37,11%	16	16,49%
The development of social responsibility activities integrates the members of the university community with society.	5	5,15%	24	24,74%	14	14,43%	35	36,08%	19	19,59%
The dissemination of the results of the social responsibility processes is shared with the entire university community.	7	7,22%	26	26,80%	14	14,43%	35	36,08%	15	15,46%

Note: Questionnaire applied to UNSM teachers.

On the other hand, to the statement on whether adequate motivation was applied in the teaching-learning process, 4.12% of teachers indicated TD and 12.37% PD, adding up to 16.49% of negative perception, 70.10% expressed conformity (45.36% PA and 24.74% TA), which reflected that, although challenges existed, the majority positively valued the efforts made in student motivation, in turn, about whether students' prior knowledge was adequately collected, 2.06% indicated TD and 14.43% PD, which represented 16.49% of combined disagreement, however, 73.19% expressed agreement (46.39% PA and 26.80% TA), which indicated that the majority considered this aspect as satisfactory and well executed.

Meanwhile, concerning whether the feedback was developed from the needs of the students, 2.06% indicated TD and 15.46% PD, totaling 17.52% negative perception. However, 73.20% expressed conformity (41.24% PA and 31.96% TA), which reflected that the majority considered that the feedback was aligned with student needs, on the other hand, regarding the statement on whether the activities achieved the expected competencies in the students, 2.06% indicated TD and 14.43% PD, which reflected 16.49% of negative perception, however, 77.32% expressed agreement (51.55% PA and 25.77% TA), which highlighted that the majority perceived that the activities achieved their learning objectives.

Then, regarding whether the content assessment was developed with rubrics, 4.12% indicated TD and 18.56% PD, which added up to 22.68% negative perception. However, 68.04% expressed conformity (45.36 % PA and 22.68% TA), which reflected that, although there were challenges, the majority perceived that rubrics were adequately used, also, regarding whether the presentation of learning outcomes was done in the expected time, 2.06% indicated TD and 18.56% PD, adding up to 20.62% of negative perception, not however, 70.11 % expressed conformity (39.18 % PA and 30.93% TA), which indicated that the majority considered that the results were presented promptly.

Consequently, this dimension reflected a mostly positive perception, with more than 70% of teachers agreeing with most of the statements; however, levels of disagreement, which ranged from 16% to 22%, pointed to critical areas related to planning, motivation, and evaluation, which required attention to ensure a more uniform and efficient performance. Likewise, although most aspects were positively evaluated, these results underscored the importance of optimizing the teaching and learning processes, ensuring their alignment with the needs of students and the university's strategic objectives.

According to Table 4 and regarding the dimension of tutoring and counseling, the planning of the tutoring process was carried out according to the university guidelines; 5.15% of the teachers indicated TD and 21.65% PD, which added up to 26.80% of negative perception, however, 55.67% expressed conformity (39.18% PA and 16.49% TA), which reflected that the majority considered that the planning complied with the established guidelines, similarly, regarding the planning of the counseling process, the results showed 5.15% in TD and 20.62% in PD, adding up to 25.77% negative perception. In comparison, 56.71% agreed (39.18% PA and 17.53% TA), which indicated that, although there were areas for improvement, more than half of the teachers positively valued planning in both places.

Likewise, regarding whether the execution of the tutoring process was developed in coordination with the study program, 7.22% of the teachers indicated TD and 20.62% PD, which represented 27.84% negative perception. However, 56.70% expressed agreement (36.08% PA and 20.62% TA), which showed that the majority considered adequate coordination. On the other hand, as to whether the execution of the tutoring process was developed in coordination with the University Welfare Office, 7.22% indicated TD and 20.62% PD, totaling 27.84% negative perception. However, 53.61% expressed agreement (30.93% PA and 22.68% TA), which indicated that, although the majority recognized progress, there were still limitations in coordinating these instances.

Then, about the execution of the counseling process in coordination with the curriculum, 8.25% of the teachers indicated TD and 16.49% PD, which added up to 24.74% negative perception. In turn, 57.73% expressed agreement (37.11% PA and 20.62% TA), which reflected that the majority perceived adequate coordination in this aspect. For this part, the execution of the counseling process was developed in coordination with the Directorate of University Welfare, registering 7.22% indicated TD and 18.56% PD, which represented 25.78% of negative perception. However, 57.73% expressed conformity (35.05% PA and 22.68% TA), highlighting that the majority positively valued the coordination with the Directorate of University Welfare.

Also, regarding whether the monitoring activities of the mentoring process were recorded promptly, 6.19% of the teachers indicated TD and 19.59% PD, which added up to 25.78 % negative perception. However, 54.64% expressed conformity (37.11% PA and 17.53% TA), which reflected that, although challenges existed, the majority considered that the records were made promptly. Similarly, regarding whether the counseling process control activities were recorded promptly, 6.19% indicated TD and 20.62% PD, adding up to 26.81% negative perception. On the contrary, 57.74% expressed agreement (39.18 % PA and 18.56% TA), which highlighted that the majority positively valued the efforts made in the control of the activities.

On the other hand, regarding whether cases were referred to the University Welfare Office for psychological assistance when required, 4.12% indicated TD and 18.56% PD, which reflected 22.68% of negative perception. On the other hand, 59.80% expressed conformity (39.18% PA and 20.62% TA), which showed that, although there were limitations, the majority considered this process efficient. It is worth mentioning that the results of this dimension reflected a majority positive perception, with more than 55% of the teachers agreeing with most of the statements; however, the levels of disagreement ranged between 22% and 27%, which indicated critical areas

related to the coordination, planning, and control of activities, as well as the referral of cases for psychological assistance.

According to Table 4 and concerning the research dimension, the development of teaching research activities was carried out efficiently; 2.06% of the teachers indicated TD and 24.74% PD, which reflected that more than a quarter perceived deficiencies in this aspect. However, 58.76% expressed agreement (43.30% PA and 15.46% TA), which indicated that the majority considered that teaching research activities were carried out efficiently, although with areas for improvement.

On the other hand, regarding whether the development of student research activities with faculty advising was carried out efficiently, 3.09% indicated TD and 25.77% PD, adding up to 28.86% of negative perception. On the other hand, 55.67% expressed conformity (39.18% PA and 16.49% TA), which showed that more than half perceived these processes as effective. However, there were challenges related to the systematization and follow-up of these activities, in turn, regarding whether the collection of research data was carried out in a systematized manner, no teacher indicated TD, but 26.80% indicated PD, which reflected that more than a quarter considered that this process presented deficiencies. However, 58.77% expressed conformity (40.21% PA and 18.56% TA), which highlighted that the majority perceived progress in the systematization of data, although with opportunities for improvement in the uniformity of procedures.

Similarly, regarding whether research data processing was carried out in a systematized manner, 1.03% indicated TD and 21.65% PD, adding up to 22.68% of negative perception. On the other hand, 57.74% expressed agreement (39.18% PA and 18.56% TA), which indicated that more than half perceived that the data were adequately processed, although some aspects required attention to ensure greater efficiency, meanwhile, on whether the dissemination of research results was carried out in scientific journals, 4.12% indicated TD and 21.65% PD, which reflected 25.77% of negative perception, however, 53.60% expressed agreement (38.14% PA and 15.46% TA), which highlighted that, although there was progress, publication in scientific journals needed to be strengthened as part of the dissemination process.

On the other hand, regarding whether the results were disseminated in conferences, 6.19% indicated TD and 24.74% PD, adding up to 30.93% of negative perception. On the other hand, 51.54% expressed conformity (35.05% PA and 16.49% TA), which indicated that, although more than half valued the dissemination in this space positively, additional efforts were needed to increase its frequency and reach regarding whether the dissemination of the results was carried out in the professional school, 10.31% indicated TD and 23.71% PD, adding up to 34.02% of negative perception, the highest value among the statements analyzed, however, 49.48% expressed agreement (34.02% PA and 15.46% TA), which reflected that, although less than half perceived progress, this area required priority attention to strengthen the visibility of the results in the university community.

Consequently, as to whether the work of the research groups adequately linked teachers and students, 6.19% indicated TD and 25.77% PD, totaling 31.96% negative perception. On the other hand, 54.64% expressed conformity (40.21% PA and 14.43% TA), which indicated that, although more than half recognized efforts in the integration of teachers and students, challenges persisted in the effectiveness of this linkage, likewise, this dimension, reflected a mostly positive perception in the aspects related to the systematization of data and efficiency in research activities. However, the levels of disagreement ranged between 22% and 34%, highlighting critical areas related to the dissemination of results and the linkage between teachers and students.

According to Table 4 and concerning the social responsibility dimension, on the planning of social responsibility activities was given in adequate time, 7.22% of teachers indicated TD and 28.87% PD, which added up to 36.09% of negative perception. On the other hand, 53.60% expressed agreement (37.11% PA and 16.49% TA), which indicated that, although more than half of the respondents perceived adequate planning, one-third identified delays or deficiencies in planning times, reflecting the need to improve this aspect, on the other hand, as to whether the development of social responsibility activities integrated the members of the university community with society, 5.15% indicated TD and 24.74% PD, totaling 29.89% of negative perception, however, 55.67% expressed conformity (36.08% PA and 19.59% TA), which reflected that, although more than half of the teachers considered that these activities promoted integration, a significant proportion indicated that there were opportunities for improvement in the effective linkage between the university and society.

Meanwhile, concerning whether the dissemination of the results of the social responsibility processes was shared with the entire university community, 7.22% indicated TD and 26.80% PD, which represented 34.02% of negative perception. On the other hand, 51.54% expressed conformity (36.08% PA and 15.46% TA), which highlighted that, although the majority perceived positive efforts in the dissemination of results, this area required priority attention to achieve more excellent coverage and effectiveness in the communication of the achievements obtained, in turn, this dimension presented a mostly positive perception, with more than 50% of the teachers showing conformity in the statements analyzed. However, the levels of disagreement ranged between 29% and 36%, which evidenced essential challenges related to planning, integration with society, and dissemination of the results of social responsibility activities.

Table 5: Characterization of academic management by dimensions.

Dimensions	Levels	Intervals	fi	%
Teaching and learning	Bad	14 - 28	14	14,43%
	Regular	29 - 43	13	13,40%
	Good	44 - 60	70	**72,16%**
	Total		**97**	**100,00%**
Tutoring and counseling	Bad	9 - 20	19	19,59%
	Regular	21 - 32	28	28,87%
	Good	33 - 45	50	**51,55%**
	Total		**97**	**100,00%**
Research	Bad	12 - 21	30	30,93%
	Regular	22 - 31	29	29,90%
	Good	32 - 40	38	**39,18%**
	Total		**97**	**100,00%**
Social responsibility	Bad	3 - 7	30	30,93%
	Regular	8 - 11	23	23,71%
	Good	12 - 15	44	**45,36%**
	Total		**97**	**100,00%**

Note: Questionnaire applied to UNSM teachers.

3.5. Interpretation

According to Table 5 and concerning the teaching-learning dimension, the bad level obtained a frequency of 14.43%, which indicated that a minority of the teachers considered that the teaching-learning processes at the university did not meet the expected standards, on the other hand, the regular level represented 13.40%, reflecting that an additional proportion perceived that these processes were functional but not entirely adequate for the academic needs, however, the good level predominated with 72.16%, which highlighted that the majority of teachers recognized that the teaching-learning processes were effective, promoting an educational environment aligned with the university's strategic objectives.

Concerning the tutoring and counseling dimension, the poor level reached 19.59%, reflecting that almost one-fifth of the teachers perceived significant deficiencies in tutoring and counseling services. In comparison, the fair level reached 28.87%, indicating that a considerable proportion considered these services partially functional.87%, indicating that a significant proportion considered that these services were partially functional; on the other hand, the good level predominated with 51.55%, showing that more than half of the teachers rated tutoring and counseling efforts positively, although the poor and fair levels indicated areas for improvement in the personalization and effectiveness of these services.

Concerning the research dimension, the bad level reached 30.93%, which showed that almost a third of the teachers identified essential limitations in the research activities within the university. Likewise, the regular level represented 29.90%, reflecting that a similar proportion considered these activities functional but with intermediate results. The good level obtained was 39.18%, indicating that less than half of the teachers perceived that research efforts were effective. This highlighted the need to strengthen this dimension by investing more in and encouraging research activities.

Meanwhile, for the dimension of social responsibility, the bad level reached 30.93%, which reflected that almost one-third of the teachers considered that the university was not adequately fulfilling its commitment to society, while the regular level obtained 23.71%, indicating that a significant proportion perceived the social responsibility efforts as moderately satisfactory.71%, suggesting that a substantial proportion perceived social responsibility efforts as moderately satisfactory; however, the good level predominated with 45.36%, showing that, although there were important advances in this dimension, the high levels of negative perception highlighted the need for greater integration of the university with the communities and external actors.

On the other hand, the dimensions of teaching-learning tutoring and counseling stood out as the best valued, with more than 50% of the teachers placing them in the good level. This reflected significant advances in the educational processes and student accompaniment. On the other hand, the dimensions of research and social responsibility presented higher levels of negative perception, with values of 30.93% in the bad level, which evidenced critical limitations that negatively impacted these areas. Consequently, these results recorded the need to optimize the less valued dimensions, strengthening investment in research and interaction with society, while teaching and tutoring processes required adjustments to ensure their sustainability and continuous improvement.

Table 6: Characterization of academic management.

Levels	Intervals	fi	%
Bad	42 - 83	17	17.5
Regular	84 - 122	36	37.1
Good	123 - 160	44	45.4
Total		97	100.0

Note: Questionnaire applied to UNSM teachers.

3.6. Interpretation

According to Table 6, the bad level obtained a frequency of 17 teachers, representing 17.5% of the total. This result indicated that a smaller but significant proportion of the participants considered academic management far below expectations. This negative perception could be related to deficiencies in planning, monitoring, or

execution of academic activities. On the other hand, this level highlighted the need to evaluate and strengthen academic management systems, ensuring greater alignment with quality standards and institutional goals than the regular level, with a frequency of 36 teachers, which constituted 37. Therefore, this result reflected that more than one-third of the participants perceived that academic management achieved an intermediate performance, partially meeting expectations. However, this level indicated progress in certain aspects, and it also suggested that limitations persisted that hindered fully efficient management that aligned with the strategic objectives.

Also, the good level was the most outstanding, with a frequency of 44 teachers, representing 45.4% of the total. This result indicated that almost half of the participants valued academic management positively, considering it efficient and aligned with institutional objectives. On the other hand, this level reflected that the key processes related to educational management, such as planning, supervision, and execution, were perceived as effective in the majority. In addition, this result highlighted the positive aspects of the efforts made, pointing out significant advances in the modernization and optimization of academic management systems.

Meanwhile, academic management at the university presented a majority perception of performance between regular and good levels, totaling 82.5% of the total. This reflected that, although there was significant progress in the general perception of academic management, there was still room for improvement, evidenced by 17. Consequently, this critical segment highlighted that some specific regions required priority attention to achieve a more uniform and effective performance. In addition, there was a trend toward efficiency and partial compliance with strategic objectives. However, the results highlighted the need to optimize the less valued areas, ensuring greater integration of processes, transparency, and adaptability to achieve an entirely satisfactory performance aligned with institutional standards.

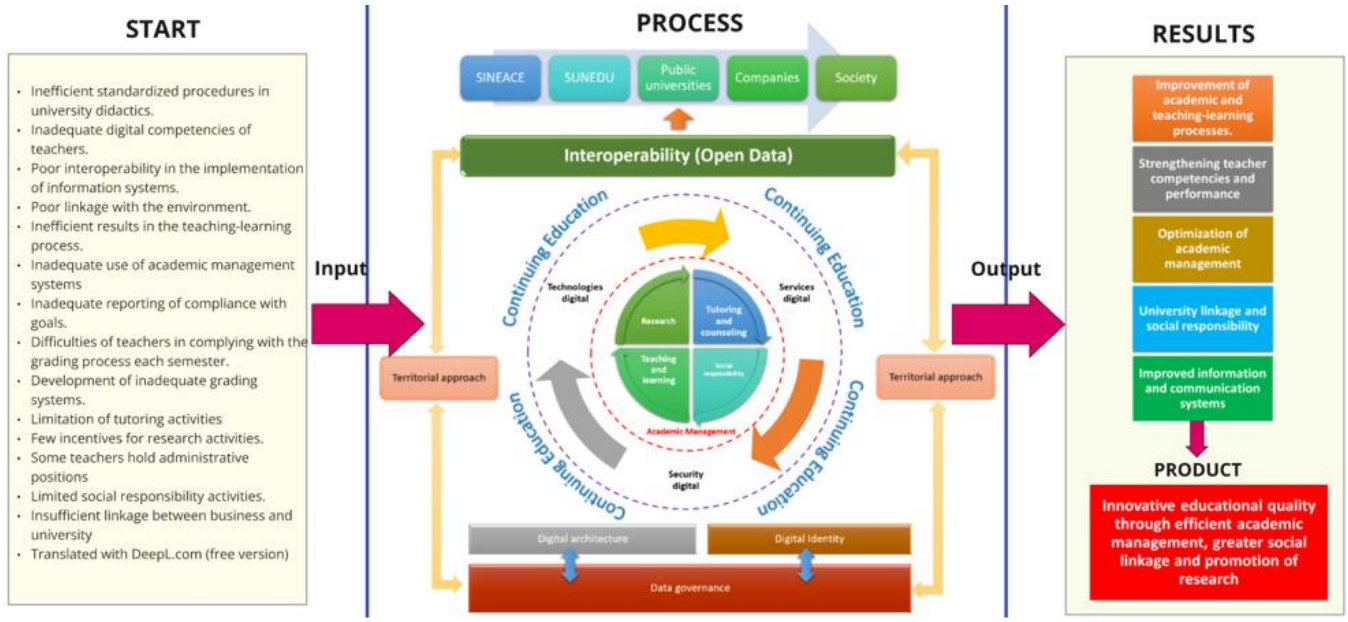

Figure 1: Digital governance model for university academic management.
Note: Digital Government Act, University Act.

The proposal for a digital governance model to improve academic management in Peruvian universities responds to the challenges facing higher education, such as the lack of administrative efficiency, low interoperability of information systems, and limited digital competencies of teachers (González et al., 2022). To address these deficiencies, the proposal focuses on implementing a comprehensive digital framework that promotes operational efficiency and academic quality and adopting advanced technologies, such as artificial intelligence, to optimize university processes (UNESCO, 2023). This approach promotes transparent academic management, where the digitization of systems modernizes infrastructure and improves the accessibility and quality of educational services (Sandoval & Álvarez, 2021).

The interoperability of open data constitutes the fundamental axis of the proposal, as it facilitates collaboration and connection between the different actors of the Peruvian university system, including regulatory bodies, universities, the business sector, and society (SUNEDU, 2024). This ability to exchange information allows more collaborative and efficient academic management, encouraging the integration of digital technologies in both teaching-learning and research (Flores & Núñez, 2023). Also, interoperability promotes social inclusion and linkage, strengthening the relationship between the university and the various actors of the socioeconomic and technological ecosystem (Rodríguez, 2021).

Academic management is divided into four strategic areas: research, tutoring and counseling, teaching-learning, and social responsibility. These areas are strengthened through digital technologies and services that not only optimize academic processes but also strengthen the social function of the university (Martínez et al., 2022). Tutoring and counseling are supported by digital platforms that improve the accessibility and quality of student support. At the same time, teaching-learning incorporates technological tools that promote methodological innovation and the personalization of learning (García & Pérez, 2020). These components must

be under the eye of continuous training to achieve a quality university education; thus, digital governance becomes a key enabler for creating a more adaptable and connected educational environment.

On the other hand, data governance emerges as an essential component to ensure information integrity and correct use. This governance model is based on a robust digital architecture and the adoption of secure digital identities that guarantee controlled access and protection of sensitive information (Cruz & Delgado, 2023). In addition, digital security is an indispensable pillar in safeguarding personal and academic data, ensuring the success of interoperability and efficient information management (Flores & Núñez, 2023). With a territorial approach, the proposal allows the adaptation of digital policies and tools to the specific characteristics of each region, which contributes to the continuous improvement of educational quality in diverse contexts (Martínez et al., 2022).

4. DISCUSSION

The discussion of the results reflects that digital technologies have proven to be a transforming element in the academic management of the Universidad Nacional de San Martín. 74.23% of the teachers rated their implementation positively, which evidences a significant advance in the operational functionality of the institution. These results are consistent with the observations of Zhang & Li (2023), who emphasize that tools such as the Seq2Seq model, used in the "One Form" platform, allow centralizing data and optimizing administrative processes, freeing human resources for more strategic activities; likewise, the findings of Churampi-Cangalaya et al. (2023) confirm that the integration of information technologies in educational institutions is highly correlated with institutional development, improving both academic and administrative management. This consensus underscores that implementing advanced technologies enhances efficiency and fosters institutional sustainability by adapting to current strategic requirements.

The challenges identified in dimensions such as interoperability, data governance, and digital security reveal critical areas that still require priority attention. The results show that 31.96% of teachers perceive serious deficiencies in interoperability processes, which reflects problems in the effective integration between systems and collaboration between academic units. Similarly, data governance, with 23.71% of negative perception, and digital security, with 29.90%, expose limitations that directly impact the reliability and functionality of the systems. These challenges coincide with Hess (2022), who emphasizes that digital transformation must be led by a strategic approach encompassing all organizational levels and ensuring dynamic and proactive management of digitization projects. As Ghamrawi & Tamim (2023) described, this strategic leadership should foster an organizational culture receptive to change based on digital competencies and effective governance.

On the other hand, the positive perception of digital identity, with 57.73% of teachers placing it at a good level, highlights that digital initiatives in this dimension have contributed to effective access to university services. However, 22.68% of the respondents evaluated it as insufficient evidence that there are still problems with accessibility and functionality that affect its widespread acceptance. This aspect resonates with the principles of equity and accessibility raised by Pittaway & Montazemi (2020), who warn that gaps in technological implementation can generate inequalities if they are not addressed with inclusive strategies. In addition, the challenges in interoperability and digital security point to the need to strengthen technological infrastructure and promote higher standards of protection and reliability, as suggested by Zhang & Li (2023) and Bing (2023).

Consequently, the results of this research show that, although teachers have widely valued digital technologies and identity, the dimensions of interoperability, data governance, and digital security face limitations that impact their effectiveness. This highlights the need to adopt a comprehensive approach that focuses on implementing technological tools and promotes ongoing training, periodic evaluation of systems, and collaborative management. Through a strategic vision and proactive leadership, as proposed by the background information reviewed, it is possible to overcome these barriers and consolidate a digital governance model that enhances institutional development and responds to the demands of the educational community efficiently and sustainably.

Similarly, the results obtained in the digital identity dimension reveal a varied and challenging panorama: while 57.73% of teachers positively value their usefulness, 22.68% express negative perceptions, which points to problems related to the accessibility and functionality of the implemented systems. These observations are consistent with the analysis of Villar et al. (2022), who warns that digital platforms, although collaborative in appearance, can generate cultural and social tensions, molding pseudo-educational identities and creating a disconnection with the actual expectations of academic communities. This finding points to the need for a more reflective and adaptive design of these platforms, ensuring that they meet operational objectives and respond to users' social and cultural expectations.

The challenges identified in this dimension also resonate with the approaches of Churampi-Cangalaya et al. (2023), who showed that technological integration significantly impacts the institutional development of Peruvian universities but can be limited by structural barriers and negative perceptions. In this sense, Bing (2023) highlights that the quality and structure of digital tools are more determinant than their scale to ensure an effective transformation. This analysis shows that, although the university has taken essential steps in implementing digital identity, it still needs to strengthen its systems to ensure more inclusive, reliable, and efficient access.

Furthermore, Pittaway and Montazemi (2020) point out that digital transformation is not limited to the adoption of technologies but requires comprehensive policy restructuring and inclusive strategic management.

This perspective is key to understanding that current limitations in digital identity could indicate a need to review not only technological infrastructure but also leadership and governance strategies. In this context, digital leadership based on Ghamrawi & Tamim's (2023) 5D typology, which encompasses digital competencies, organizational culture, and effective governance, emerges as a fundamental tool to overcome current challenges and consolidate a digital identity model that is perceived as inclusive, efficient and aligned with the university's strategic objectives.

Meanwhile, the results in the interoperability dimension reveal critical areas for improvement, with 31.96% of teachers identifying significant deficiencies in data exchange between schools. This finding, while concerning, resonates with Hess (2022), who highlights that successful digital transformation requires advanced tools, efficient resource management, and a robust technology infrastructure that enables process integration. The lack of interoperability limits the university's ability to operate as a cohesive system, affecting operational efficiency and user experience. This challenge underscores the importance of establishing common standards and methodologies that promote cohesion among stakeholders, as suggested by Vieira Da Silva et al. (2022) in their analysis of technological integration.

Data governance and digital security dimensions reflect similar challenges, with harmful perception levels of 23.71% and 29.90%, respectively. Although progress is recognized in information management and data protection, these figures indicate that concerns persist regarding their effectiveness and ability to ensure informed decisions and secure environments. This scenario is consistent with Zhang and Li (2023), who emphasize that effective digital governance not only optimizes processes but must also ensure the reliability and security of the implemented systems, and Bing (2023) highlights that the quality and structure of digital tools are essential to overcome operational barriers and strengthen institutional capacity.

In this context, the results reflect that although digital governance in the university has made significant progress, especially in dimensions such as digital technologies and identity, it faces critical challenges in interoperability, data governance, and digital security. These findings coincide with Pittaway and Montazemi's (2020) warning about the risks of fragmentation in digital processes that are not adequately coordinated. The lack of effective integration compromises day-to-day operability and reduces the institution's ability to generate trust and meet strategic expectations.

On the other hand, the convergence between the background and the results underlines that a successful implementation of digital governance requires a comprehensive approach that combines technological tools with strategic leadership and an organizational culture receptive to change, the 5D typology of digital leadership proposed by Ghamrawi & Tamim (2023), which includes competencies, culture, and governance, is presented as a valuable guide to overcoming these barriers. By promoting proactive leadership, the university can strengthen its technology infrastructure and ensure that its systems are inclusive, secure, and aligned with institutional goals.

In turn, digital services and security dimensions reveal significant progress, recognized by 46.39% and 54.64% of teachers, respectively; however, the levels of negative perception reflect significant gaps that limit their impact on academic management. These observations coincide with Zhang & Li (2023) and Churampi-Cangalaya et al. (2023), who emphasize that digital governance cannot be limited to the implementation of advanced technologies but must be integrated with training, awareness, and continuous improvement strategies to maximize its effectiveness. The Universidad Nacional de San Martín shows remarkable progress in key dimensions such as digital technologies and identity. Still, critical challenges persist in interoperability, data governance, and digital security, underscoring the need for a comprehensive approach that combines technological innovation with inclusion and constant evaluation to ensure sustainable impact.

On the other hand, the interoperability dimension presents more marked deficiencies, with 31.96% of faculty noting significant problems in integrating and sharing data between different areas of the university. This finding resonates with Pittaway and Montazemi's (2020) warning about the risks of fragmentation in digital processes that lack adequate coordination. Similarly, the perception of inadequacy in data governance, with 23.71% at a poor level, evidences the need to strengthen information management and protection strategies, ensuring informed and secure decisions. These critical dimensions reflect that, although progress has been made in infrastructure and digital tools, operational limitations still require priority attention to maximize the cohesion and efficiency of the digital governance model at the university.

Then, the dimensions of data governance and digital security show both progress and critical areas for improvement, with 44.33% and 54.64% of teachers, respectively, recognizing progress in information management and data protection; however, the levels of negative perception reached 23.71% and 29.90%, suggesting persistent challenges in the effectiveness of these strategies. These findings reflect that, although technological integration is present, its full impact depends on elements such as staff training and data infrastructure optimization, as highlighted by Churampi-Cangalaya et al. (2023) in their analysis of the positive relationship between digital governance and institutional development In the Peruvian context, this scenario highlights the need to strengthen digital governance practices to maximize their contribution to decision-making and operational efficiency.

Also, the digital security dimension highlights the urgency of ensuring data protection in an increasingly digitized environment; this challenge aligns with the observations of Hess (2022), who emphasizes the importance of a holistic approach to digital transformation that considers both technological infrastructure and organizational culture. Likewise, the 5D digital leadership typology proposed by Ghamrawi & Tamim (2023) reinforces that an organizational culture oriented towards data protection and continuous improvement is crucial

to address these constraints. In this context, fostering a strategic vision that integrates technological innovation with robust security and governance measures is essential, ensuring operational efficiency and user confidence in the digital systems implemented.

Consequently, these results indicate that, although digital governance at the Universidad Nacional de San Martín has made progress in several dimensions, significant gaps still need to be addressed. The convergence between the background and the results highlights the need to adopt comprehensive technological strategies combined with effective leadership and an organizational culture receptive to change, thus ensuring that the digital tools implemented not only optimize processes but also contribute sustainably to institutional and academic development.

Likewise, although more than half of the teachers (54.64%) value digital security strategies positively, 29.90% perceive them negatively, reflecting that the measures implemented still do not fully meet expectations. This highlights the importance of prioritizing efficient cybersecurity policies, a critical aspect of any digital governance model that seeks to be reliable and sustainable. In this sense, digital architecture also faces challenges, with 29.90% rating it as insufficient, reinforcing the need for a more robust and adaptable technological infrastructure.

Consequently, the results reflect that although digital governance at the university has made significant progress, with 78.4% of faculty members placing their performance between fair and good levels, critical areas still require priority attention. These findings emphasize the need to adopt a comprehensive approach, as suggested by Churampi-Cangalaya et al. (2023) and Pittaway and Montazemi (2020), combining technology with strategic and inclusive management. Addressing the challenges identified will allow the consolidation of a more efficient and equitable digital governance system aligned with the university's strategic objectives and the demands of an increasingly digitized educational environment.

Meanwhile, the findings obtained in the teaching-learning dimension reflect significant progress, with 72.16% of teachers positively valuing the planning and execution of activities, which indicates a general alignment with the university's strategic objectives. This result resonates with the observations of Villar et al. (2022), who highlight that collaborative platforms can optimize academic processes by facilitating coordination and efficient content management. However, they warn about possible tensions in constructing educational identities in digitized environments. In this context, teachers value timely planning as a key factor for improving the academic experience, as it allows a more effective organization of curricular activities.

Likewise, the results coincide with Bing's (2023) proposals, which emphasize that the quality and structure of educational institutions are essential to promoting academic and economic development. However, 14.43% of teachers who perceive deficiencies in these processes highlight the need for specific adjustments, especially in the planning and aligning content with students' needs. In turn, this critical segment points out that, despite progress, areas still require priority attention to ensure an entirely satisfactory and equitable educational experience.

In addition, the levels of disagreement identified (22%) suggest that certain aspects, such as coordination between departments and the personalization of content, need to be strengthened to better respond to the expectations of teachers and students; these results reinforce the importance of adopting a comprehensive approach to academic management, These results reinforce the importance of adopting a holistic approach to academic management, combining collaborative technologies with adaptive pedagogical strategies that promote an inclusive and practical educational experience. At the same time, the findings underline that although the teaching-learning dimension registers a primarily positive performance, persistent challenges in planning, personalization, and content alignment highlight the need for continuous improvement. This requires technical adjustments and proactive leadership to ensure the implementation of strategies to meet institutional objectives and satisfy the educational community's specific needs.

For their part, the dimension of tutoring and counseling reflects a mixed picture. However, 51.55% of the teachers positively value the efforts made in this area, and 19.59% identify significant deficiencies, mainly in the personalization and effectiveness of services. These findings coincide with the observations of Villalobos (2023), who highlights the need to strengthen institutional commitment in the interaction with students, especially in contexts that demand quick and adaptive responses. Likewise, Hess (2022) emphasizes that digital transformation is not only limited to adopting technologies but requires a comprehensive approach focused on human development, prioritizing adapting services to individual needs.

In turn, the challenges in the tutoring and counseling dimension highlight the importance of integrating continuous training strategies and innovative methodologies that allow these services to be adjusted to students' specific demands. The negative perception of 19.59% evidences the lack of personalization in attention, a critical aspect that can negatively impact the educational experience if not adequately addressed. Therefore, adopting approaches that combine technological tools with student-centered practices is necessary, ensuring a more meaningful and effective interaction between the institution and its academic community.

Furthermore, this situation finds resonance in the approaches of Yao et al. (2022), who warn that digitization in social contexts faces significant tensions due to the lack of alignment with local expectations, in the case of the university, the results suggest that, although progress has been made, additional effort is still required to fully integrate the needs and perspectives of students in institutional strategies, then, the findings underline that the dimension of tutoring and counseling, although showing significant progress, needs a more adaptive and inclusive approach, to maximize its impact, it is essential to implement strategies that encourage the personalization and effectiveness of services, integrating both technology and human formation, and promoting

an adequate and empathetic interaction with students, this approach would contribute not only to improve the perception of services, but also to strengthen the connection between the institution and its educational community, ensuring a positive and sustainable impact.

Meanwhile, the research dimension presents significant challenges, with 30.93% of teachers rating it as insufficient and only 39.18% considering it effective. This panorama evidences a critical need for investment in infrastructure, resources, and incentives to encourage academic production. These findings coincide with what was raised by Mergel (2019), who highlights that the success of the digital government is not limited to technological adoption. Pittaway and Montazemi (2020) emphasize that digital transformation must be accompanied by a comprehensive restructuring promoting equity and innovation. These aspects are key to overcoming the limitations observed in this dimension.

The lack of consistent research results not only limits the university's ability to position itself as a leading institution in knowledge generation but also reduces its impact on academic and social development. In this sense, Churampi-Cangalaya et al. (2023) point out that digital governance has a direct impact on institutional development, suggesting that research should be prioritized as a strategic axis. This implies not only guaranteeing adequate resources but also fostering interdepartmental collaboration, promoting synergies that enhance the quality and relevance of academic production.

Also, these results reflect that the university faces the challenge of transforming research into a central component of its institutional strategy, ensuring that its results are applicable both in the academic and social context. Implementing efficient digital governance can catalyze this process, facilitating the integration of technological tools with innovative approaches that optimize research development. This approach would allow not only to improve the perception of this dimension among teachers but also to increase the impact of the university in the generation of knowledge that contributes to sustainable development and the solution of social problems.

In turn, the research dimension requires a renewed focus that combines more significant investment, digital governance strategies, and innovative methodologies. Only through this comprehensive approach will the university be able to overcome existing barriers, strengthening its capacity to produce quality knowledge that is relevant and aligned with the demands of a constantly changing academic and social environment. This will benefit the university and expand its external projection as a key player in the generation of knowledge and innovation.

On the other hand, the dimension of social responsibility presents significant challenges, with 30.93% of the teachers rating it poorly, evidencing a disconnection between institutional initiatives and society's expectations. Although 45.36% of respondents acknowledge progress in this area, the results underscore that the university's current efforts fail to meet societal demands fully. This challenge aligns with the observations of Yao et al. (2022), who note that digitization in rural and social contexts faces significant tensions when it is not adapted to local needs. Similarly, Pittaway and Montazemi (2020) warn that digital transformation must address inequalities and foster effective community integration to ensure a positive impact.

In turn, the negative perception in this dimension highlights the need to strengthen the university's commitment to external communities, promoting strategies that integrate social actors and align with the environment's cultural and social demands. To this end, designing more inclusive and adaptive programs fostering two-way interaction between the institution and its social context is crucial. The lack of alignment between current initiatives and community expectations limits the scope of the university's impact, which reinforces the importance of adopting a comprehensive and participatory approach in the design of its social responsibility policies.

In this sense, digitalization can act as a catalyst to overcome these barriers if it facilitates the connection between the university and its environment. This implies developing technological platforms for communication and collaboration and ensuring that these tools are accessible, inclusive, and culturally relevant. As Pittaway and Montazemi (2020) suggested, an effective digital transformation must go beyond technology implementation, promoting equity and sustainability in social and institutional interactions.

Therefore, the findings reflect that the university faces the challenge of redefining its approach to social responsibility, ensuring that its initiatives respond effectively to the expectations of the communities it serves. This requires a review of its current strategies, prioritizing the design of programs that promote a tangible impact on social welfare, as well as more significant interaction and collaboration with external stakeholders. By addressing these critical areas, the institution can improve its perception in this dimension and consolidate its role as an agent of social change in its local and regional context.

Finally, 82.5% of the teachers rated academic management as fair and reasonable, reflecting a positive overall performance with room for improvement. The 17.5% who perceive this dimension as insufficient highlight deficiencies in the planning and executing activities. This finding coincides with the vision of Hess (2022), who emphasizes that effective academic management requires proactive leadership and dynamic organizational structures that respond to environmental changes. The progress recorded suggests that the university is on track to achieve its strategic objectives but must address critical areas such as transparency and process integration to ensure consistent performance.

5. CONCLUSIONS

According to the teachers' perception, digital governance was characterized by a good level of 43.3% because

divergent advances were recorded among its dimensions, with more significant advances in digital technologies and digital identity. On the other hand, the dimensions of interoperability, digital services, data governance, digital architecture, and digital security stand out at critical levels that require priority attention. In turn, the need to strengthen the technological infrastructure and adopt comprehensive strategies to maximize the positive impact of digital governance at the university is established.

Academic management was characterized by having a good level in 45.4 % of the teachers' perception because divergent advances were registered among its dimensions, evidencing more essential advances in teaching-learning tutoring and counseling. On the other hand, the dimensions of social responsibility and research stand out for their lower values. Specifically, the last dimension needs more priority attention.

Based on the findings, the digital governance model was designed to prioritize integrating digital technologies and implementing strategies to address the limitations identified in interoperability and digital services. Mechanisms were proposed to strengthen inter-institutional collaboration and continuous staff training, ensuring that the model promotes operational efficiency and user satisfaction and thus contributes to sustainable academic management.

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