Digital government, institutional development and public higher education

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CHRONICLE	ABSTRACT
	Digital governance, institutional development and public higher education in Huancayo-Perú in the new situation where remote activities are prioritized, the use of information technologies has increased in the different activities of organizations, allowing them to provide adequate services in an efficient way. The research seeks to establish the relationship between digital governance and institutional development in public higher education in Huancayo - Perú. Basic research with a quantitative approach and correlational level with a sample of 828 people made up of teaching staff, administrative staff and students who interact with the administrative activities of the UNCP. The data analysis and modeling was performed through structural equations based on PLS. As a result of the research, a value of 0.815 was obtained in Spearman's Rho and a significance level of .000, which indicates a high positive relationship, also the general hypothesis that establishes that there is a significant relationship between digital governance and institutional development is accepted.

1. Introduction

The use of the internet by citizens acquired the main role of transferring information and communication (Fabiani, 2017), a fact that, accompanied by an information revolution and easy access by huge amounts of computers remotely, established a challenge for the different governments (De Grande, 2020). The OECD (2018) has rated the implementation process of digital government in the Peruvian state with 0.5, evidencing that specific activities have not been developed within the different institutions and central government, being necessary for its reevaluation for sustainable development (Osman & Zablith, 2021). The government of Peru from the publication of Legislative Decree No. 1412 (2018) enacts the framework by which the digital government will be implemented the same that will allow identity management, digital architecture, digital services, identity management, digital security and data in the different entities of the state. From the analysis of the book of complaints located in the Documentary Management Unit of the UNCP, an increase of complaints related to non-attention or late attention of administrative processes of the university has been visualized, within which we can mention that in 2015 the number of complaints was 182, 2016 was 202, 2017 was 218, 2019 was 245 and the years 2020 and 2021 were 342 and 385 respectively, which show that within a context of pandemic and social isolation have increased considerably. According to the Internal Control Organ of the UNCP, who conducted the inquiries to determine the probable causes for the increase in complaints,

according to Report No. 102-2022-OCI/UNCP, 52% of the administrative and teaching staff stated that there are no adequate guidelines for the virtual attention of administrative processes, 22% that the virtual platforms are not adequately developed, 14% that they are not trained to develop remote activities and 12% have other causes; In this sense, the research posed the following question: What is the relationship between digital governance and institutional development in public higher education in Huancayo? The objective was to determine the relationship between digital governance and institutional development.

The present research is theoretically justified in the review of different theoretical postulates on electronic and digital government; allowing to know in a scientific way the adequate definition, as a practical justification it will allow to identify the main elements on the implementation of digital government within higher education and to elaborate a Digital Government Plan that will make possible to take necessary actions for its implementation, generating agile administrative processes with the use of fewer resources; the social justification will allow to improve the services provided by the university to the teaching, service, administrative and student staff, improving its quality. Based on the above, the following specific objectives were established: To determine the relationship between the external, internal, relational and promotional dimensions of institutional development in public higher education in Huancayo.

2. Literature review

2.1. Structural equation models

Multivariate statistical model that allows establishing the effect and relationship between variables, a technique for statistical analysis of complex patterns that validates empirical and theoretical models and incorporates unobservable constructs (unobserved and latent theoretical variables) (Ruiz et al., 2010). SEMs allow measuring dependency relationships in a multiple and cross-sectional way by representing unobserved concepts in the process of establishing relationships, positivizing their analysis of each subset of variables by measuring or observing them to each of the latent or unobserved variables, strengthening the correlations used and making more precise estimates of structural coefficients (Escobedo et al., 2016).

2.2. Digital government

During the 1990s, the implementation of digital government began in Latin American countries (Diéguez et al., 2014) gave rise to an increase in studies aimed at identifying the external, internal, relational and promotional elements for the scope of digital government, governance, will and infrastructure (Ziemba et al., 2016) becoming a model for the study of digital government. Current models in the technological area make it possible for society to have direct access to the benefits of TICs (Krishnan et al., 2017) which can be used in all activities developed by individuals and entities, it is necessary to understand that these models are covered by a normative and theoretical framework developed from the experiences through a certain time (Galvis, 2009). Digital government (Scholl, 2021) evidences the quality of the services received by users and generates structural changes in the entity, allowing it to manage, plan and execute its activities efficiently and effectively. The design and implementation stages of digital government will never be neutral (Puron-CId et al., 2022), since it must address the diversity of entities that interact with society on cultural, political and economic issues; reason for which, although there is a development of technology from rational principles, its usefulness will depend on the needs of users (Binimelis-Espinoza, 2017). The OEA (2016), considers that the electronic-digital government uses TICs in its channels of attention of state institutions, supporting the search for an effective and transparent service through which the different elements that interact with the entity improve their perspective in relation to the attention received; the procedures within the government improve from the use of technologies allowing the proper use of information and therefore improving the effectiveness and efficiency. The most appropriate method to study digital government is the one proposed by Armas and Armas (2011) who mention that its analysis can be more understandable from the following dimensions: The dimensions of governance according to Armas and Armas (2011):
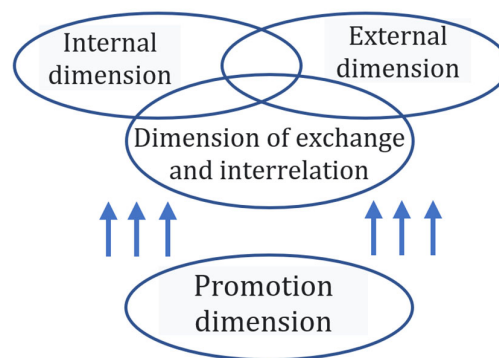

Fig. 1, Dimensions of digital government according to Armas & Armas (2011)

a. **The external dimension:** According to Troshani et al. (2022), it considers the interaction between the citizen and the government, with the objective that the population can know aspects related to the management of the institution as well as the activities that are developed and the information that it handles inside allowing the transparency of data and reliability of the procedures (Rincón & Vergara, 2017); this dimension covers relevant aspects such as: Use of information media and digital media such as web portals and information systems to disseminate the activities and processes. Level of interaction that establishes the mechanisms for measuring the use of the organization's technological tools and the Level of service which considers the quality of the service granted to users with the use of TICs making the three aforementioned as a tool for interaction with the user public. Through the triangulation of these elements, the State can identify the level of relationship with the environment of the entity (Burneo & Carrión, 2019).

b. **The internal dimension:** Its objective is the restructuring and redesign of managerial and operational processes, which will allow the search for modernization and efficiency. The use of TICs in the different processes of the organization will allow change within the organizations, making it possible to provide a timely response to the different requirements of workers, users and components of the administrative management (Rincón & Vergara, 2017), this dimension considers aspects such as Efficiency levels, which refer to the levels of use of TICs for the proper development of activities related to the organization. Degree of adaptation of personnel in the use of TICs to adequately develop their activities in internal processes of the organization. For Casas (2015), the government has the need and obligation to dynamize, optimize and make transparent the different processes that are developed within public entities, making the use of TICs for public management a primordial fact.

c. The relational dimension considers the use of TICs to facilitate relations with other entities, whether public or private, considering as the main ones with whom it maintains a more constant and intense contact (Rincón & Vergara, 2017), this dimension includes the Transparency of information through digital media which will allow knowing the different services provided by the entity. Increased service through the use of virtual platforms that allow for quick and timely interaction in different aspects (administrative and academic). Improvement of processes, refers to the constant improvement of the use of integrated systems managed by the organization in order to be able to make timely decisions.

d. **The promotion dimension** aims to promote the government from the use of TICs by raising awareness of elements of cultural and social character, making it possible for entities such as the population to use vital elements to collect information related to their needs (Rincón & Vergara, 2017), this dimension includes the change of care model by electronic services from the staff with the use of TICs either in whole or in part. Appropriate access for users through the use of different tools and systems which intuitively allow an adequate management to interact with the organization.

2.2. Institutional development

According to Áviles (2014), institutional development is defined as the set of strategies used by entities for the adoption of a planned change that allows the development of values, attitudes and beliefs within organizations. Cummings and Worley (2010), conceptualized as the transformation within an entity or organization from the systematic support of elements of innovation, infrastructure, technological, cultural, social, political, economic, etc., improving the performance of the institution; in such sense it requires a set of comprehensive changes at the organizational level of the actors involved and agents. When reference is made to the objective of institutional development, this is closely related to the effective individual and collective increase of the elements that make up the organization, making it possible to identify human resources as an important and decisive element for success or failure. Based on the above, institutional development is made up of a set of changes that are developed within an organization with the objective of maximizing and obtaining success through the improvement of procedures. Likewise, it is necessary to develop a set of strategies to obtain a certain change; this refers to a complex strategy that aims at changing the values, attitudes and beliefs of organizations. For Cummings and Worley (2010), institutional development can be understood from five dimensions such as organizational, technology, economics, innovation and infrastructure, which induce social transformation within organizations.

## 3. Methodology

3.1 Research methodology

The research considered the analysis and implications of the problem (Nieto, 2018) being of the developed type, with a non-experimental design, since it identified the characteristics in their natural context (Hernández-Sampieri & Mendoza, 2019). The research did not construct any particular situation, since already existing moments of the population were observed and through inference it was possible to establish the relationship between variables. The population was composed of teaching, administrative, service and student personnel from the different faculties of the UNCP who interact with the administrative processes that are executed within the university, from which the respective samples were obtained (Table 1), also non-probabilistic random sampling was used due to the time, cost and access to the elements comprising the population.

Table 1
Study population and sample

Group	Population	Sample
Administrative staff	352	145
Teaching staff	764	185
Service personnel	185	126
Students	11141	372

3.2 Research model

The model for the present research is presented in Fig. 2 where the relationship between the dimensions of digital governance (Armas & Armas, 2011) such as External, Internal, Relational and Promotion with Institutional Development (Cummings & Worley, 2010).
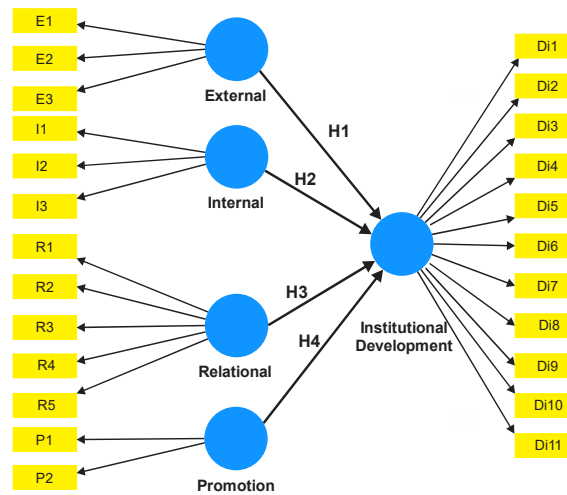
Fig. 2. Proposed Research Model

Based on the model described above, the following specific hypotheses were formulated:

Specific hypothesis 1 (H1) There is a significant relationship between the external dimension and institutional development in public higher education in Huancayo 2022.

Specific Hypothesis 2 (H2) There is a significant relationship between the internal dimension and institutional development in public higher education in Huancayo 2022.

Specific Hypothesis 3 (H3) There is a significant relationship between the relational dimension and institutional development in public higher education in Huancayo 2022.

Specific Hypothesis 4 (H4) There is a significant relationship between the promotion dimension and institutional development in public higher education in Huancayo 2022.

3.3 Data collection and processing

Data collection was carried out through the survey technique, which allowed us to develop and apply two specific instruments called: a) Digital governance questionnaire consisting of 19 items and b) Institutional development questionnaire consisting of 25 items.

The application of both instruments was carried out using the Google Form and Microsoft Form platforms; these questionnaires were shared with the members of the sample where they were able to answer the questions. Informed consent, anonymity and data confidentiality were guaranteed. Once the information was collected, the data matrix was prepared and processed with MS Excel and SPSS version 26.0 applications for descriptive analysis and SmartPLS 3.37 software.

4. Results

4.1 Data collection and processing

Table 2 shows the levels of acceptance of the dimensions of Digital Government, of the data collected 41% consider good in the external dimension, 45% in the internal dimension, 39% in the relational dimension and 32% in the promotion dimension,

which shows that the implementation of digital government has been developing adequately in the different administrative processes of the public university.

Table 2
Perception of the Dimensions of Digital Governance in Public Higher Education in Huancayo 2022

		Groups							
		External		Internal		Relational		Promotion	
		f	%	f	%	f	%	f	%
Digital Government	Poor	167	20%	156	19%	206	25%	267	32%
	Fair	322	39%	303	37%	300	36%	298	36%
	Good	339	41%	369	45%	322	39%	263	32%
Total		828	100%	828	100%	828	100%	828	100%

Source: Questionnaire on digital governance in public higher education.

Table 3
Dimensions of institutional development in public higher education in Huancayo 2022

		Dimensions									
		Organization		Technology		Economics		Innovation		Infrastructure	
		f	%	f	%	f	%	f	%	f	%
Institutional development	Poor	176	21%	143	17%	175	21%	227	27%	251	30%
	Fair	298	36%	294	36%	277	33%	260	31%	285	34%
	Good	354	43%	391	47%	376	45%	341	41%	292	35%
Total		828	100%	828	100%	828	100%	828	100%	828	100%

Source: Institutional development questionnaire in public higher education.

Table 3 shows the perception by dimensions of institutional development; of the total number of respondents, in the organization dimension, 43% consider it good, 36% consider it fair and 21% consider it deficient; in the technology dimension, 47% consider it good, 36% consider it fair and 17% consider it deficient; In the economic dimension, 45% considered good, 33% considered fair and 21% considered poor; in the innovation dimension, 41% considered good, 31% considered fair and 27% considered poor; and in the infrastructure dimension, 35% considered good, 34% considered fair and 30% considered poor, which shows that the institutional development within the organization is adequate.

4.2 Model confirmation

Table 4 shows the confirmation of the model, where Cronbach's alpha and composite reliability determined the reliability of the model. From the data obtained and according to Nunnally (1978), the internal consistency is adequate since the value of Cronbach's alpha is above 0.9 in all cases. Likewise, the composite reliability coefficients are above the value of 0.9, which evidences a very satisfactory composite reliability (1994). On the other hand, construct validity is analyzed by means of discriminant validity and convergent validity Cepeda & Roldan (2004), The AVE coefficient generates a value of the variance between a construct and its indicators; this value should be above 0.50 (Hair et al., 2017). The research shows mean values above 0.57, which indicates that there is adequate convergent validity (Fornell & Larcker, 1981). The discriminant validity is obtained on the square roots of the AVE and is compared with the correlations between latent variables (Fornell & Larcker, 1981). In conclusions, the model by which the research is measured is presented in Table 4, which shows the items.

Table 4
Confirmation of model according to dimensions

	Reliability		variance extracted	Discriminant validity				
	Cronbach Alpha	Composite reliability	Average variance extracted (AVE)	Di	E	I	R	P
Institutional Development	0.956	0.972	0.882	0.943				
External	0.966	0.978	0.910	0.931	0.938			
Internal	0.946	0.962	0.902	0.973	0.969	0.953		
Relational	0.941	0.959	0.772	0.841	0.833	0.841	0.822	
Promotion	0.922	0.931	0.745	0.889	0.873	0.851	0.828	0.954
Reference values	>0.7	>0.7	>0.5					

4.3 Structural equation model analysis

According to the results obtained in Fig. 3, the rejection or acceptance of the specific hypotheses formulated was established. According to the results obtained, hypotheses 1, 2, 3 and 4 are captured. The hypotheses show a positive relationship on institutional development (Di), since the values are as follows: External Dimension (E) β=0.282, p= 0.000. Internal Dimension (I) β=0.299, p= 0.018. Relational Dimension (R) β=0.402, p= 0.027 and Promotion Dimension (e) β=0.353, p= 0.000. Accepting all the relationships between the dimensions of digital governance and institutional development. Likewise, the SRMR (Standardized Root Mean Square Residual) was calculated, which is the absolute measure of fit between the predicted and observed correlation. For Hu & Bentler (1999) the SRMR should have values between 0 (perfect fit) to 0.08 (good fit), the SRMR value obtained for the research was 0.071 which indicates a good fit.

Hypotheses	Mean sample	Standard deviation	Path beta value	Student´s t statistic	p value	Decision
H1: E → Di	0.387	0.253	0.282	3.463	0.000	Accepted
H1: I → Di	0.362	0.223	0.299	2.664	0.018	Accepted
H1: R → Di	0.498	0.451	0.402	4.165	0.027	Accepted
H1: P → Di	0.299	0.383	0.354	2.981	0.000	Accepted

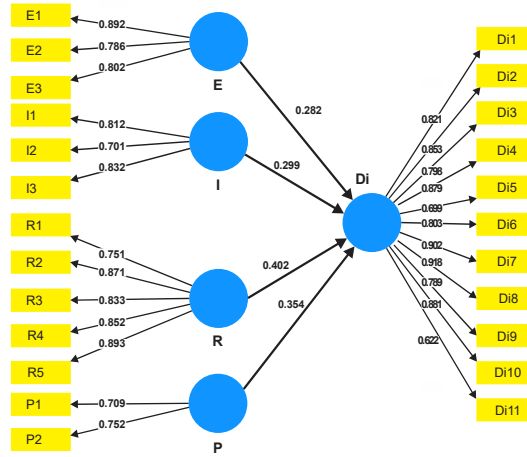t > 1.96; p < 0.05

Fig. 3. Confirmatory structural model

5. Discussion and Conclusion

5.1. In relation to external and institutional development

The study was able to corroborate the relationship between the External and Institutional Development from obtaining a value at the significance level of 0.000 and a Spearman correlation coefficient of 0. 845 which shows a high positive correlation between the study variables; this shows that the implementation of digital government in relation to external factors such as the use of information media used by the entity and the target audience or users of the services are necessary for successful communication, this will allow the levels of interaction to be adequate to be able to absolve all kinds of doubts that arise during the process of care services generating satisfaction and increased levels of care in different administrative, educational and other processes.

5.2. In relation to Intern and Institutional Development

The study was able to corroborate the relationship between Internal and Institutional Development from obtaining a value at the significance level of 0.018 and a Spearman correlation coefficient of 0. 832, which shows a high positive correlation between the study variables; this shows that the implementation of digital government, specifically those internal elements such as efficiency levels that seek to reduce costs through the use of technological resources in the activities developed within the organization and the level of adaptability and use of TICs by management and operational staff should be developed to obtain more agile results and processes, thus improving the development of the organization. These results are related to what is stated by Bieito (2015) who considers that the electronic-digital governments seek to develop different ways of acting of the institution from the use of TICs making possible a change within the organization: a fact that will improve the levels of efficiency and effectiveness of processes and services, for this it is necessary that the staff is adapted and trained in the management of digital environments and others related to TICs.

5.3. In relation to the relational environment and institutional development

The study was able to corroborate the relationship between the Relational domain and Institutional Development from obtaining a value at the significance level of 0.027 and a Spearman correlation coefficient of 0. 681, which shows a moderate positive correlation between the study variables; this demonstrates that the implementation of digital government, specifically those relational elements such as information transparency in order to generate the trust of internal users (administrative staff, teachers, service staff and students) in the information provided by the different systems and virtual environments of the organization, thus allowing the transparency of processes and activities; It is also considered the increase of the service from the identification of needs required by the users making possible the definition of different activities within the organization, this allows the improvement of different administrative processes enabling the interaction of the areas within the organization that share relevant information. Similarly, as expressed by Rea (2016) who mentions that the implementation of digital-electronic governments allows the development of different methodological strategies in the security and transparency of the organization's information, a fact that will allow examining processes, requirements and activities that interact with the user population, making it possible that these activities are properly planned and are according to the needs of the population, since

based on their requirements, the creation of digital processes should be carried out, thus allowing to meet their needs, this will require the interaction of organizations and areas in a specific way.

5.4. In relation to Promotion and Institutional Development

The study was able to corroborate the relationship between Promotion and Institutional Development from obtaining a value at the significance level of 0.000 and a Spearman correlation coefficient of 0. 705, which shows a high positive correlation between the study variables; this shows that the implementation of digital government, specifically those elements such as the change of attention model in electronic and digital services, which will make possible that the way of providing services vary from the use of technological tools, this will require that access is adequate for users in this sense, information systems should be developed with friendly environments for the understanding and management of the society; the elements already mentioned will allow the promotion of related administrative aspects and provide services to the community, consequently improving the development of the institution. The results obtained are related to what is expressed by Calle (2021) who considers that the analysis of digital electronic governments generate progress in the institutions of the state sector, from the generation of digital models that replace the traditional models referred to the attention of services, since the procedures of collection and processing of data that are generated inside the organization are developed digitally, transforming the nature of the information changing in its totality elements and internal activities, from this different virtual platforms will be generated through which it will be possible to reconcile information of the entire organization.

6. Conclusion

The investigation has been able to demonstrate that the implementation of a digital government in the institutions of the Peruvian state will make it possible to considerably improve its institutional development, turning it into an entity that provides services efficiently and responsibly with the support of society, likewise the implementation of digital government must be carried out from the external, internal, relational and promotion dimensions; since the indicators that cover these missions will allow us to know the degree of implementation and the level of development of the institution. In this sense, it is necessary to consider that institutional development as a set of interrelated activities that allow continuous improvement goes hand in hand with the degree of digitization of administrative processes.

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