Digital Competencies and their Impact on Public Servants' Productivity in Peru

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Abstract

In an increasingly digitized environment, with a heavy reliance on Information and Communication Technologies (ICT), the significance of digital competencies (DC) in the public sector is undeniably crucial. This study focuses on assessing the impact of DC on the productivity of public servants in a governmental entity in Peru during 2022. Utilizing logistic regression analysis on a sample of 134 participants, and asserting a 99% confidence level with a 3.8% margin of error, it is concluded that DC accounts for a significant proportion (24.9%) of productivity variability. The analysis identifies a deficiency in DC among older public servants, following an examination of skills in information, communication, creation, digital security, and digital empathy. While communication skills are prominent, creative abilities emerge as the most vulnerable aspect. This study advocates for the implementation of a training program aimed at enhancing DC, with a particular emphasis on creative skills, and adopting a tailored approach for digital natives and immigrants. The training plan should be underpinned by the proposed concept of DC within a directed acyclic diagram, illustrating the integration and interrelation of the five key digital skills - information, communication, creation, digital security, and digital empathy - thereby enhancing productivity through increased effectiveness and efficiency.

Keywords

Creation Skills, Digital Competencies, Digital Empathy, Digital Gap, Digital Immigrants, Digital Literacy, Digital Natives, Digital Security, Digital Skills, Digital Training, Labor Productivity, Public Administration, Public Sector, Public Servers, Technology.

1. Introduction

The escalating demand for Information and Communication Technologies (ICT) in contemporary society (**Arias**, 2019) has catalyzed the advancement of digital competencies (DC) in the public sector (**Ramírez-Armenta *et al.***, 2021). Various studies emphasize the necessity of integrating DC training into educational curricula (**Ocaña-Fernández *et al.***, 2020) to bridge existing gaps and augment productivity (**Van Laar *et al.***, 2017).

It is suggested that DC should be promoted at the governmental level to progress towards a digital society (**Leoste *et al.***, 2022; **Livingstone *et al.***, 2023; **Fan; Wang**, 2022). Additionally, in response to the context of citizen dissatisfaction in Latin America and the Caribbean (**OECD**, 2020c), there is a drive for digital transformation grounded in the innovation of the private sector (**OECD**, 2019), as exemplified by the case of Chile (**OECD**, 2020a).

DC training must account for generational divides (**Dodel; Mesch**, 2018; **Prensky**, 2001), as digital immigrants may face unique challenges during training (**Rodríguez-Hevía *et al.***, 2020; **Torres-Flórez; Pachón-Pérez**, 2021). This necessitates revising existing learning methodologies to suit the needs of this cohort (**Muñoz-Hernández *et al.***, 2021), and encourages leveraging ICT for their learning development (**González-Zamar *et al.***, 2020; **Bergdahl *et al.***, 2020).

The disparity in DC across different age groups is a recognized issue (**Cabezas González *et al.***, 2017; **Yáñez *et al.***, 2015), which is particularly relevant in Peru, where 82.6% of public servants (SP) are considered digital immigrants (**SERVIR**, 2022). Despite this, the correlation between digital skills and productivity in Peruvian public administration has not yet been thoroughly investigated.

The aim of this research is to determine the influence of DC on the productivity of public servants in a governmental entity in Peru during 2022. This study will contribute to strengthening the link between DC and the creation of public value (**Vanti *et al.***, 2018), thereby optimizing the efficiency of Peruvian public entities.

2. Theoretical Framework

The United Nations' E-Government Development Index (EGDI), which assessed 193 member countries, ranked Peru at 59th in 2022 with an EGDI score of 0.7524, slightly above the global median of 0.6235 (**United Nations**, 2022). As illustrated in Figure 1, this represents a 12-position advancement from 2020 (**United Nations**, 2020), yet it remains below other South American countries like Uruguay, Chile, Argentina, and Brazil. The **OECD** (2020c) emphasizes that global digital transformation can enhance citizen well-being by revolutionizing public administration processes, reducing costs and time, and promoting accelerated learning.

Educational fragmentation in Latin America and the Caribbean (LAC) impedes the digital transformation of society and the adoption of emerging technologies (**Katz**, 2018). This fragmentation is more pronounced in higher education, affecting the uniformity of educational offerings between public and private institutions, resulting in low levels of DC and hindering technological innovation (**Sánchez-Cruzado *et al.***, 2021). Early education teachers demonstrate deficiencies in digital content creation (**Galindo-Domínguez; Bezanilla**, 2021), a key area of DC. Strengthening these skills from the earliest stages of education is vital for fostering not just the consumption, but also the generation of technology (**Drotner**, 2020). In the same vein, **Fernández Márquez *et al.*** (2019) argue that promoting DC among educators enhances the quality of higher education and the development of these skills in students.

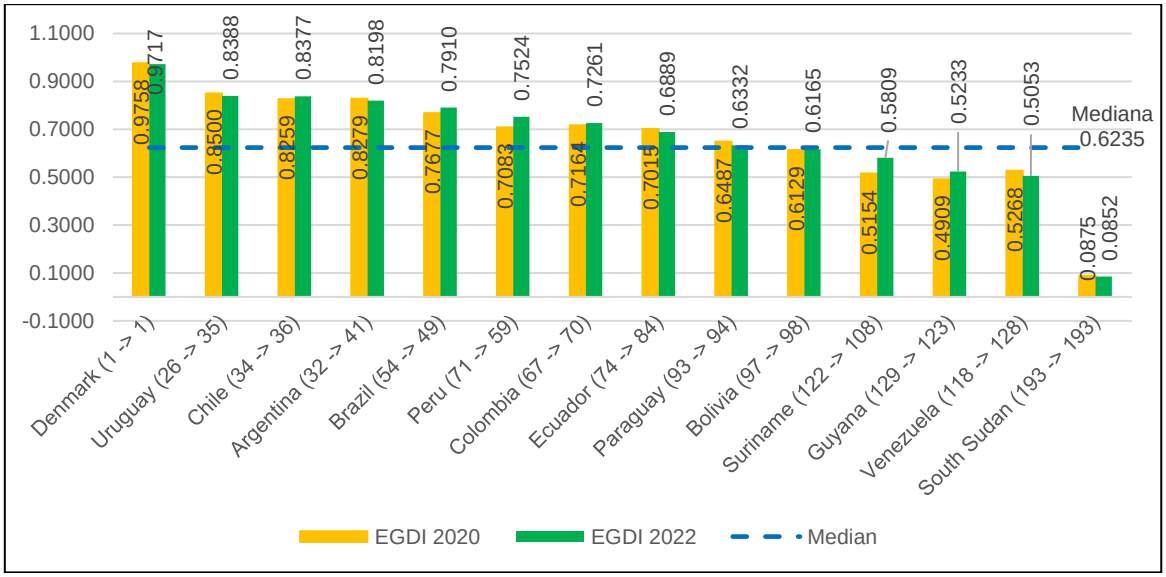

Figure 1: E-Government Development Index in South America.
Source: United Nations (2020), United Nations (2022).

The National Institute for Educational Technologies and Teacher Training (**INTEF**, 2017) emphasizes that digital competencies (DC) are essential for the success of young people in adult life and their active participation in the 21st-century knowledge society. It highlights the need to effectively integrate technology into educational spaces and promote literacy in five critical competency areas for educators: information and literacy, communication and collaboration, digital content creation, safety, and problem-solving.

It should be noted that reducing the connectivity gap would improve the lifecycle of innovation projects and optimize services provided to citizens (**OECD**, 2020b). The implementation of digital technologies directly impacts the provision of public services, enabling the establishment of electronic government (**OECD**, 2019).

In Peru, a national plan has been developed to improve services provided to citizens, comply with public policies, and optimize processes through the use of digital technologies (**CONCYTEC**, 2006). At the national policy level, the National Informatics System was established in Peru more than three decades ago, later merging with the Secretariat of Public Management of the PCM. Subsequently, the National Digital Transformation System (SNTD) was implemented in 2020, aimed at promoting the development of technological infrastructure, digital services, and training in DC. The National Agreement Forum (2017) approved State Policy No. 35, 'Information Society and Knowledge Society,' focused on the human and digital development of citizens. This policy was a precursor to the Digital Government Law (2018) and the declaration of national interest in the development of Digital Government, innovation, and the digital economy with a territorial approach. In addition, the High-Level Committee and the single digital platform of the Peruvian State were established, further promoting the development of the Digital Government. Moreover, the National Digital Transformation System emphasizes the importance of identifying current and future DC to promote the efficient development of citizens.

Consequently, a diagnostic assessment of knowledge in the public sector (**PCM**, 2020) was carried out to identify knowledge gaps in the public sector by analyzing competency in office automation in a sample of 2,252 public servants, where it was found that 79.3% of these servants are in the age range of 30 to 64 years. An interesting finding of the study was that as the age of the servants increases, advanced competence in office automation seems to decrease. On the other hand, the National Civil Service Authority (SERVIR) reported that by 2020, there were 1,514,000 SPs, most of them being 'digital immigrants' (**SERVIR**, 2022). Of these, Figure 2 shows that 82.6% are 30 years or older, representing unique challenges in digitalization due to the gap in acquiring and sharing knowledge compared to digital natives (**Prensky**, 2001).

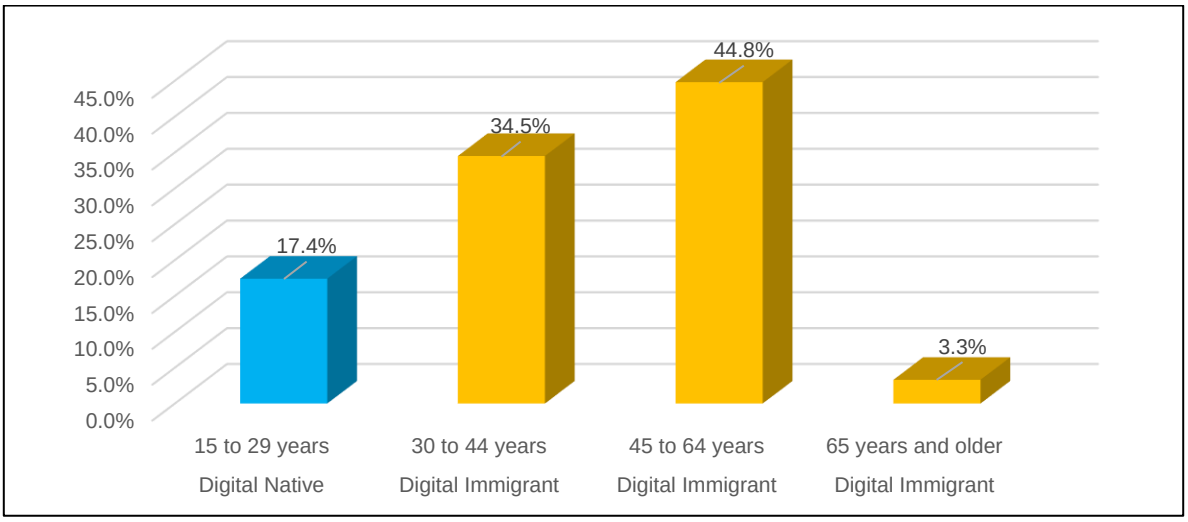

Figure 2: Age of Public Servants in Peru (Year 2020).
Source: SERVIR (2022).

Learning is a dynamic process nourished by previous experiences, an idea applied in the ALICIA initiative, led by Concytec, which provides a digital repository of theses focused on the DC of teachers and students. From 2019 to 2022, only four theses (Valdivia, Castro, Porras, and Sandoval) emphasized management and organizational quality through DC in public servants (SP), suggesting the implementation of training plans.

Investments in human capital, such as education and training in DC, can yield economic benefits, as the Commission of the European Communities (2005) highlights the importance of these competencies for continuous learning in an increasingly digitalized context. However, addressing the digital divide to ensure equitable access to technology is also essential (**Cabero Almenara**, 2008; **Nova Pinzón *et al.***, 2017). The **OECD** (2020c) recognizes that global digital transformation offers both challenges and opportunities that can enhance citizen well-being. Therefore, the formulation of strategic plans for the use of technology and training in digital tools for SP is crucial (**OECD**, 2019).

In their study, **Youssef *et al.*** (2022) support that students with advanced DC have better performance, time management, and work-leisure balance. This finding suggests that improving DC in SPs can optimize processes and services to citizens. **James** (2021) identifies two digital divides: access to ICT and the development of DC. The DC gap is particularly pronounced in developing countries, underscoring the need for public policies for CD training at educational and occupational levels. **Allmann and Blank** (2021) proposed a new methodology to measure DC, focusing on three components: sequence, simultaneity, and abstraction of the journey. This approach suggests that intensive computer use can enhance DC, despite potential barriers for lower-resource workers (**Jara *et al.***, 2015).

Peru's Multisectoral Commission for the Development of the Information Society (CODESI) published the Digital Agenda 2.0 in 2011, focused on digital literacy. The constant evolution of technology requires the creation of training models that allow continuous knowledge updating (**Flores Cabello**, 2020). DC has become a powerful tool for optimizing processes in the public and private sectors. In 2021, Peru's National Policy for the Modernization of Public Management defined instruments for the public sector to improve the effectiveness of its services, one of the cross-cutting axes being Electronic Government. To promote technological development, professionalizing human resources and developing DC in the human capital of public administration is crucial. To enhance Peru's digital environment, the Digital Agenda to the Bicentennial was initiated, approving 21 priority commitments, one of which is "Promote the Government and Digital Transformation Laboratory with priority in DC for SPs."

Huamán Coronel and Medina Sotelo (2022) emphasize that digital transformation can improve the quality of public services and maintain economic viability within governmental entities, with digital literacy and cybersecurity being strategic. Similarly, the **INEI** (2023) identifies a digital divide in the Peruvian population, with the highest Internet use among the age group of 19 to 24 years, decreasing in older age groups.

The DigSki-CUS instrument developed by **Fan and Wang** (2022), based on five dimensions of digital competencies, offers a useful tool for developing policies and training strategies. Finally, it is emphasized that digital competencies are essential for improving performance and the quality of public services (**Youssef** *et al.*, 2022), and that it is necessary to identify and close gaps in infrastructure, innovation capacity, and technology adoption (**Huamán Coronel; Medina Sotelo**, 2022).

3. Methodology

This study is classified as applied research, aiming to resolve the specific problem of the influence of DC on the productivity of public servants (SP). It employs a quantitative approach to systematically collect and analyze data. This is an explanatory non-experimental research design that examines DC as the independent variable and productivity as the dependent variable. DC were measured using the DigSki-CUS questionnaire by **Fan and Wang** (2022), which encompasses five key dimensions (information skills, communication skills, creation skills, digital security skills, and digital empathy skills). The relevance of this framework to the Peruvian context was confirmed after reviewing 155 Peruvian graduate theses on DC. As shown in Figure 3, the dimensions of the DigSki-CUS questionnaire align with those found in these theses, reinforcing the validity of its application in this context. MAXQDA Analytics Pro 2022 software (Version 22.3.0) was used for this analysis, based on criteria of a minimum frequency of 15 word repetitions and an upper limit of 40 words. Dimensions such as information, communication, creation, and security emerged as significant elements.

Productivity is conceptualized as the optimal utilization of state resources and the working time of SP, with two key dimensions: effectiveness and efficiency. To measure these dimensions, a Likert scale will be used, supported by a 17-question questionnaire. The adoption of this robust measurement approach ensures a high degree of precision and reliability in the research results.

Figure 3: Most Utilized Dimensions in the Variable 'Digital Competencies'.
Source: ALICIA Repository (https://alicia.concytec.gob.pe/) for the period from 2019 to 2022.

3.1. Population Sample

The study population comprised 222 public servants from a public entity in Peru, to whom inclusion and exclusion criteria were applied, ultimately resulting in 150 public administration servants. These criteria focused on including executives, supervisors, and professionals, due to their crucial role in management, analysis, and improvement proposals in the work environment. Interns, temporary workers, and those whose tasks are primarily supportive with minimal DC requirements were excluded.

The sample size was determined using parameters of a 99% confidence level and a 3.8% margin of error, resulting in a target sample of 134 participants, which is the number of individuals invited to participate in the study.

Sampling for this research was simple random probability, selecting 134 SPs to obtain precise results in accordance with the previously established confidence level and margin of error. The unit of analysis encompasses SPs from the studied entity, specifically those in executive, supervisory, and professional roles with indefinite-term contracts.

3.2. Data Collection and Analysis

The study was based on a questionnaire incorporating two main sections, informed consent and a set of questions to examine variables of interest. The instrument underwent review and validation by eight experts in the field, ensuring its relevance and validity. A pilot test was conducted with 49 participants, aiming to ensure the reliability of the instrument. The validated questionnaire by **Fan and Wang** (2022) for assessing DC was adopted, adding rigor and reliability to the study.

The reliability analysis for questions related to Variable 1 (Digital Competencies) showed a Cronbach's Alpha of 0.921, indicating high internal consistency of the instrument. Similarly, questions related to Variable 2 (Productivity) exhibited a Cronbach's Alpha of 0.861, denoting strong reliability of the instrument.

Established scales for 'Digital Competencies' and 'Productivity' allowed classification of responses into five distinct levels: 'Very Low,' 'Low,' 'Medium,' 'High,' and 'Very High.' This classification scheme enabled a more detailed and nuanced interpretation of the responses obtained.

SPSS v. 25.0 was used for the collected data which were consolidated and organized for an initial analysis through descriptive statistics, followed by regression analysis to examine how DC predict productivity. Ethical aspects were respected, protecting participant privacy and acknowledging the intellectual property of cited authors. This methodology validated the reliability of the measurement instrument, underpinning the conclusions about the influence of DC on the productivity of SPs.

4. Analysis and Results

4.1. General Overview of Digital Competencies and Productivity

The study conducted in a high-performing public entity in Peru, as identified by the **Cámara de Comercio de Lima** (2022), revealed that the predominant level of DC among the servants was 'High' (59.0%). In the analysis of specific skills, as shown in Figure 4, there was a prevalence of the 'Very High' level in communication (74.6%), and the 'High' level in information (55.2%), digital security (49.3%), and digital empathy (49.3%). Although the creation skill is rated 'Very High' (37.3%), it also shows significant percentages at lower levels, with 12.7% at 'Low' and 1.5% at 'Very Low'.

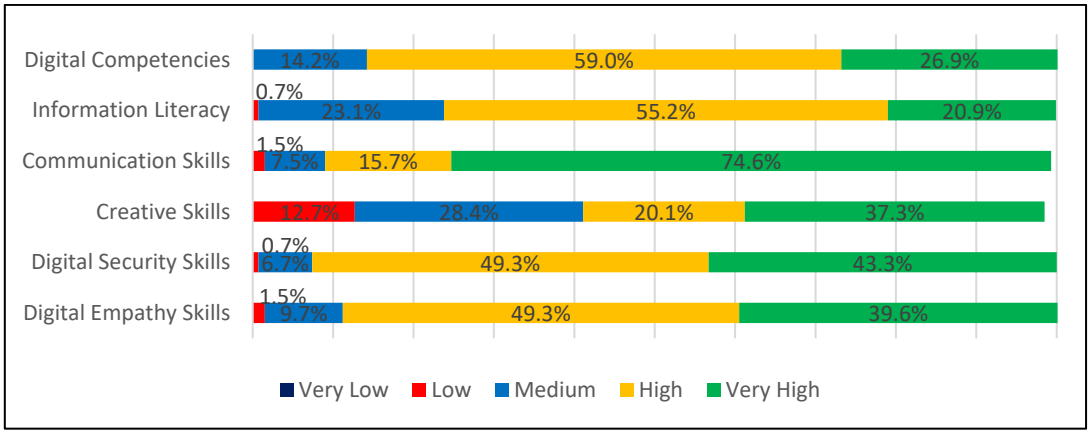

Figure 4: Level of Digital Competence and Dimensions.
Source: 134 public servants from a public entity in Peru.

The study population, comprising 134 individuals, was distributed into age groups according to the ranges proposed by **SERVIR** (2022), with the most represented being 45 to 64 years (75%). Upon analyzing the DC within these groups, it was observed that while the 'High' level is predominant in all groups, the 'Very High' level has a considerable presence in the 30 to 44 age group (37.5%).

When breaking down the skills of information, communication, creation, digital security, and digital empathy by age groups, interesting patterns were identified. The communication skill stood out with a predominantly 'Very High' level across all ages. In information and digital security skills, the 'High' level was dominant, but in creation skills, although the 'Very High' level was predominant in the 30 to 44 age group, in the 45 to 64 age group this level decreased (33.0%)

and the 'Medium' level increased (30.0%). Digital empathy showed a fairly balanced distribution between 'High' and 'Very High' levels across all age groups.

Furthermore, all participants were classified as digital immigrants based on the theory of digital natives and immigrants. These results require deeper analysis to understand their implications on the productivity of the public entity.

The survey results revealed that among the SPs of this high-performing Peruvian entity, levels of productivity, effectiveness, and efficiency were generally high, with predominant percentages of 65.7%, 56.7%, and 59.7% respectively. This distribution was consistent across all age groups. However, when examining the relationship between DC and productivity, it was noted that those with high DC tended to have high levels of productivity, though not necessarily very high.

Figure 5 shows that servers with very high DC exhibited high and very high levels of productivity, suggesting that advanced DC could favor productivity. In terms of information skills and communication skills, the highest levels of these skills were associated with high levels of productivity, underscoring the importance of fostering these skills.

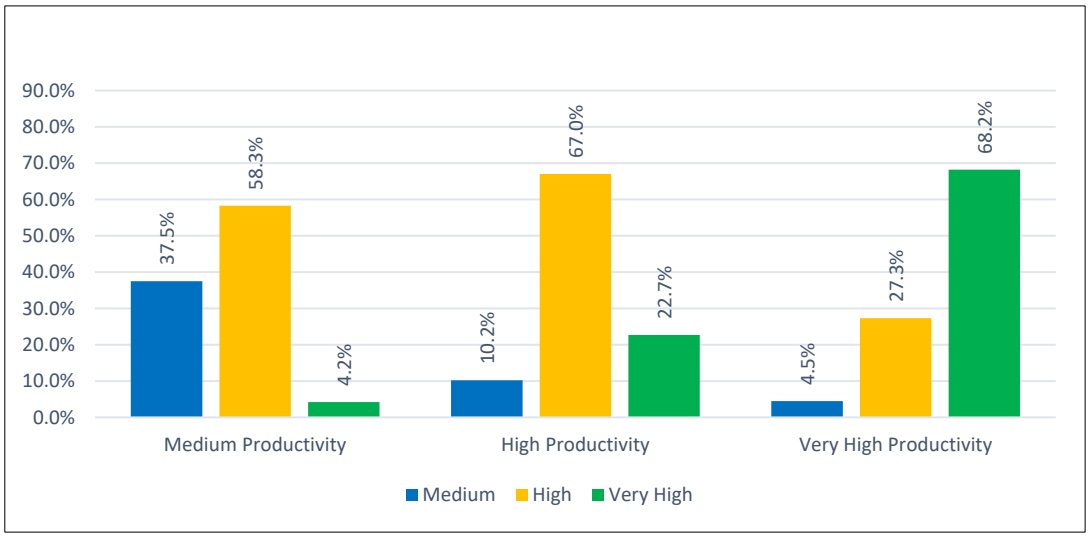

Figure 5: Digital Competency Levels and Productivity.
Source: 134 public servants from a public entity in Peru.

In the case of creation skills, insufficient information was provided to deduce a conclusive relationship with productivity. Overall, these findings suggest the importance of DC and certain skills, such as information and communication skills, in enhancing productivity among public servants (SP).

The statistical analysis of the 'Digital Competencies' and 'Productivity' variables shows integrity in the collected data, with no missing values. The average of the DC was established at 4.13, and productivity had an average of 3.99, suggesting a high presence of DC and a high performance of productivity among the servers of the studied public entity. The median and mode for both variables were 4, implying a symmetrical distribution of the data and a predominant frequency of the value 4.

Regarding statistical tests, the normality of the data is considered irrelevant due to the categorical nature of the variables. Therefore, an appropriate analysis for discrete variables was used, such as the chi-square test for independence.

4.2. Hypothesis Analysis: Digital Competencies and Productivity

The primary objective of the research was to determine the influence of DC on the productivity of public servants in the public entity. The statistical hypotheses proposed were: H0 (DC do not significantly influence productivity) and H1 (DC significantly influence productivity).

The results of the logistic regression test showed a chi-square (χ^2) value of 30.884 with a significance level of $p < 0.001$. This result, well below the 5% significance threshold, indicated that DC have a significant impact on productivity. Therefore, the null hypothesis (H0) is rejected.

Furthermore, the Nagelkerke coefficient was 0.249, suggesting that DC explain approximately 24.9% of the variability in productivity.

Hence, the results strongly support the alternative hypothesis (H1), that is, DC significantly influence the productivity of public servants in the public entity in Peru during 2022. This conclusion is supported by the statistical evidence obtained through the logistic regression model.

4.3. Impact of Digital Skills on Productivity

The present research evaluated the influence of various skills on the productivity of public servants in a public entity in Peru during 2022.

The results revealed that information skills have a significant influence on the productivity of public servants, explaining 19.3% of its variability (χ^2=23.319, p<0.001). Similarly, communication skills also showed a significant impact, although their magnitude was relatively low, explaining only a small fraction of the variability in productivity (χ^2=3.837, p=0.050).

On the other hand, creation skills also played a significant role, significantly influencing productivity and explaining 12.9% of its variability (χ^2=15.162, p<0.000). Digital security skills showed a significant, albeit moderate, effect on productivity, explaining about 11.9% of its variability (χ^2=13.936, p<0.000).

Finally, digital empathy skills demonstrated a substantial influence on productivity, explaining approximately 10.0% of its variability (χ^2=11.632, p<0.001).

4.4. Digital Competencies: Roles, Professions, and Gender

This study details the distribution of DC and creation skills in a public entity in Peru during 2022, breaking down the results by job roles, professions, and gender.

In terms of job roles, the 'High' level of DC was more common in the 'Professional' group, while in management roles, parity was observed between the 'High' and 'Very High' levels. For Supervisors or Coordinators, the 'Very High' level predominated. Regarding creation skills, a predominance of the 'Very High' level was detected in the 'Professional' and Management groups, while the Supervisors or Coordinators group presented a higher percentage at the 'Very High' level, followed by the 'Medium' level.

According to professions, in engineering, the 'Very High' level of DC and creation skills predominated notably. In economics, law, and political science, the 'High' level was the most common for DC, while the 'Very High' level stood out in creation skills. Business administration and accounting and financial sciences showed a higher presence of the 'High' level in DC, but in creation skills, a greater predominance of the 'Very High' level was evident. In communication sciences and industrial relations, a predominance of the 'High' level in DC and a 'Medium' level in creation skills were observed.

Lastly, from a gender perspective, among females, the 'High' level in DC and the 'Medium' level in creation skills were most recurrent. Conversely, in the male collective, a supremacy of the 'Very High' level in both competencies was observed.

These findings provide a detailed panorama and starting points for the development of training strategies, promotion of equity, and inclusive development of these competencies.

5. Discussion and Conclusions

This study analyzes the influence of DC on the productivity of public servants in a Peruvian entity during 2022. Despite Peru's digital lag, recent improvements remain limited (**James**, 2021). By corroborating hypotheses H0 and H1 through logistic regression testing, our results refute the non-influence of DC on productivity (H0), supporting the existence of such influence (H1). This influence explains 24.9% of the variation in productivity, underscoring the relevance of DC (**Van Laar *et al.***, 2018; **Youssef *et al.***, 2022).

The majority of public servants possess a high level of Digital Competencies (DC) (59.0%), yet productivity still displays a significant gap. Demographic analysis shows a correlation between age and DC, with the latter decreasing with age. A slight superiority in DC level among men (28.2%) compared to women (25.8%) is also observed.

Regarding specific hypotheses, analyses reveal that information and creation skills significantly influence productivity, accounting for 19.3% and 12.9% of its variability, respectively (**Fernández Márquez *et al.***, 2019; **Cabero Almenara *et al.***, 2013). However, communication skills present a moderate influence (3.4%) on productivity (**Drotner**, 2020; **Johnston**, 2020).

The results demonstrate a need to foster the development of DC throughout the working life and in academic curricula, enhancing the acquisition, evaluation, production, presentation, and exchange of information. Despite the high prevalence of communication skills, there is a deficit in creation skills.

The majority of public servants act as consumers of technology, rather than leveraging it for content creation, emphasizing the need to train servers in digital creation skills (**Galindo-Domínguez; Bezanilla**, 2021; **Katz**, 2018; **Sánchez-Cruzado *et al.***, 2021; **Nova Pinzón *et al.***, 2017). Finally, the strategy of facilitating access to technology, including the use of computers at home for those with limited resources, is supported (**Jara *et al.***, 2015).

In evaluating the influence of digital security and empathy skills on the productivity of public servants in a public entity in Peru during 2022, the results support the relevance of these competencies. In the sample analyzed, digital security

and empathy explained 11.9% and 10% of the variability in productivity, respectively. However, it was identified that there are other factors not contemplated in the study that may influence productivity.

According to **Fan and Wang** (2022), strengthening digital trust and protecting personal privacy and digital content are essential. This regulatory framework is relevant to ensure the veracity, ethics, transparency, security, and inclusion of digital interactions.

The study also found a correlation between high productivity and DC, with a notable influence of communication skills (74.6%). However, an area for improvement in creation skills was identified, reaffirming the importance of digital skills in public administration (**Youssef *et al.***, 2022; **Huamán Coronel; Medina Sotelo**, 2022; **OECD**, 2020c).

Peru has made efforts to boost legal and technological infrastructure, promoting the optimal use of technology. However, **SERVIR**'s study (2020) and the modest Internet penetration rate (61.4%) highlight the need to establish a baseline for measuring DC and reducing the digital divide.

With the implementation of the National Policy for the Modernization of Public Management and the Bicentennial Digital Agenda, goals have been set for process optimization and the professionalization of public service. Nevertheless, a higher priority on DC is suggested before undertaking digital transformation tasks.

Finally, there is a confirmed need to enhance the Digital Competencies (DC) of public servants (SP) and to find more appropriate indicators for their assessment (**Allmann; Blank**, 2021). In line with **OECD** (2020b), enhancing internet connectivity is essential, as shown by **INEI**'s (2023) study on internet usage in the Peruvian population. However, a comparison of age groups could not be conducted due to differences in data grouping in the reports of **INEI** (2023) and **SERVIR** (2022).

This study reveals discrepancies in digital creation skills (DC) depending on occupation, profession, and gender. Supervisors and executives stand out with high levels of DC, which may be a factor in their rise to leadership roles (**Sepúlveda López; Ramírez Castañeda**, 2018). Engineers lead in creation skills, followed by economists, business administrators, lawyers, and accountants. Men surpass women, with 45.1% achieving a 'Very High' level, compared to 27.4% of women.

Given the significant role of DC in work performance, proper training in DC is essential, particularly in the public sector, and should be an aim of educators (**Arias**, 2019). Despite the efforts of Digital Agenda 2.0 (**Flores Cabello**, 2020), the challenge lies in continuously updating DC, considering the rapid evolution of ICT (**Cabero Almenara *et al.***, 2013). Additionally, differences between digital natives and immigrants must be taken into account (**Bennett *et al.***, 2008; **Prensky**, 2001; **Van Laar *et al.***, 2017).

By the end of 2020, the majority of SP in Peru were digital immigrants (82.6%), presenting challenges in knowledge acquisition and transmission (**Prensky**, 2001). This underscores the need to motivate this group to adopt technology and promote innovation in education (**Bradonjic *et al.***, 2019).

Although this study highlights the importance of DC for productivity, other factors such as work environment and motivation are also crucial. The methodology of this study can be replicated in other public entities in Peru to examine these findings. However, the limitations of the research include the rapid evolution of technologies, the diversity of participants, self-assessment, and the geographical location of the study, which may influence the relevance and applicability of the results (**SERVIR**, 2022). It is vital to keep these limitations in mind when planning future research in this field.

This study concludes that DC play a crucial role in the productivity of SPs in a highly recognized entity in Peru in 2022. Specifically, it is observed that various dimensions of DC, including information, communication, creation, digital security, and digital empathy skills, significantly influence productivity.

A digital skills gap is detected between 'digital immigrants' over 45 years and the 30 to 44-year-old group, highlighting the need for improved training for older servers. Additionally, although the communication skills of most servers are at a 'Very High' level, creation skills are identified as the weakest area. This observation emphasizes the importance of fostering digital content creation skills to stimulate productivity and innovation.

Regarding occupational and gender differences, the results show that executives and supervisors have a 'Very High' level of DC compared to professionals, and engineers possess higher DC compared to economists, lawyers, business administrators, and accountants. Men display slightly better digital skills than women. These findings represent opportunities to strengthen digital skills among professionals and women, which may open more opportunities for assuming leadership roles and closing the gender gap.

6. Proposal

This study uncovers a significant digital gap in the Digital Competencies (DC) of public servants (SP) in Peru, more pronounced between generations, with the younger generation demonstrating superior mastery of these skills.

Although the data collected comes from an entity recognized for its excellence, it is suggested that the findings may be even more pronounced in lower-performing entities. Specific areas of weakness, particularly creation skills, are identified that require specialized attention and enhancement.

The fundamental proposal of this work advocates for the implementation of a training plan aimed at enhancing DC among SP in Peru, with the goal of improving their productivity in service delivery. Consequently, a new conceptual framework for DC is introduced, defined as follows: "Integration and interrelation in individuals of the five key skills in the digital environment: information, communication, creation, digital security, and digital empathy; enhancing productivity through effectiveness and efficiency."

This concept is supported by Figure 6, which presents a Directed Acyclic Graph (DAG), depicting the causal relationships between digital skills and productivity. This visual model illustrates how different digital skills and dimensions of productivity interrelate and influence each other, providing a valuable guide for the development and improvement of DC and, consequently, productivity.

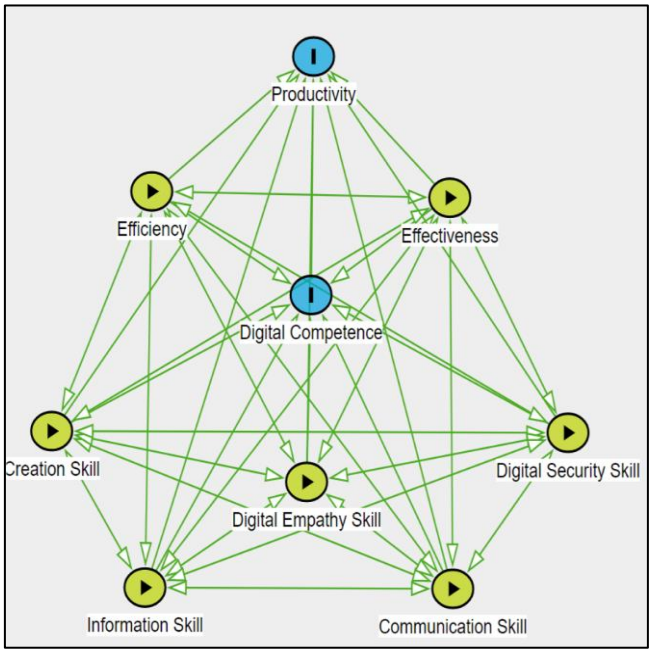

Figure 6: Directed Acyclic Graph (DAG) of Digital Competencies. Dagitty v.3.0 was used.

7. Funding

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