Perception and use of digital tax services: A case study

PERCEPCIÓN Y USO DE SERVICIOS TRIBUTARIOS DIGITALES: UN ESTUDIO DE CASO

Jairo Dote-Pardo[1,2,*] ✉ ⓘ
Universidad Católica de Temuco

Yenifer Marín Chavez[1] ✉ ⓘ
Universidad Católica de Temuco

Patricio Saavedra-Espinosa[1,2] ✉ ⓘ
Universidad del Bío-Bío

* Autor corresponsal

1 Departamento de Ciencias Económicas y Administrativas, Facultad de Ciencias Jurídicas, Económicas y Administrativas, Universidad Católica de Temuco, Manuel Montt 056, 4780000, Temuco, CHILE.

2 Centro de Gestión y Economía Aplicada (CGEA), Universidad Católica de Temuco, Manuel Montt 056, 4780000, Temuco, CHILE.

Abstract

Purpose: The purpose of this study is to analyze the factors that influence the adoption and use of the Chilean Internal Revenue Service's (IRS) online platform, a critical tool to improving accessibility and optimizing tax compliance.

Methodology: Data was collected through a questionnaire applied to a sample of 386 IRS users in one of Chile's administrative regions. Contingency tables were constructed, and chi-square tests were applied to evaluate user perceptions and statistical significance.

Results: Significant differences in platform participation are observed. Higher education levels and urban residence are associated with higher participation, while older adults and rural residents face barriers. Key impediments include the complexity of procedures and difficulties in navigation, particularly for lower tax brackets.

Implications: Improving the interface, simplifying procedures and expanding training are essential to increasing the adoption and usability of the IRS platform, as they facilitate user interaction and reduce technical barriers.

Originality: This study provides empirical evidence on digital adoption in southern Chile, highlighting the barriers of marginalized communities and providing recommendations for digital inclusion in emerging economies.

Resumen

Propósito: Responder a la pregunta ¿Qué factores influyen en la adopción y uso de la plataforma en línea del Servicio de Impuestos Internos (SII) de Chile? Comprender estos factores es clave para mejorar su accesibilidad y optimizar el cumplimiento tributario.

Metodología: Se diseñó y validó un cuestionario, que posteriormente fue aplicado a una muestra de 386 usuarios del SII en una región de Chile. Se construyeron tablas de contingencia con pruebas chi-cuadrado para evaluar las percepciones de los usuarios y la significancia estadística.

Resultados: Se observan diferencias significativas en la participación en la plataforma. Mayor nivel de educación y residencia en sectores urbanos se vinculan con una mayor participación, mientras que los adultos mayores y los residentes rurales enfrentan barreras. Los impedimentos clave incluyen la complejidad de los procedimientos y las dificultades de navegación, en particular para los tramos impositivos más bajos.

Implicancias: Mejorar la interfaz, simplificar procedimientos y ampliar la capacitación son esenciales para incrementar la adopción y usabilidad de la plataforma del SII, ya que facilitan la interacción del usuario y reducen barreras técnicas.

Originalidad: Este estudio aporta evidencia empírica sobre la adopción digital en el sur de Chile, destacando las barreras de comunidades marginadas y proporcionando recomendaciones para la inclusión digital en economías emergentes.

INTRODUCTION

In recent years, the adoption of digital technologies in public services has expanded considerably, offering greater efficiency, accessibility and convenience (Kulal et al., 2024). The use of online platforms in managing administrative processes, such as tax compliance, is already very important in many countries (Mbise & Baseka, 2023). Success in the adoption of these platforms depends on several factors that include demographics, digital literacy, and system design (Ly et al., 2024). Although online public service platforms have the capability to make the most complicated procedures easy, they usually present some challenges when it comes to making their websites inclusive and usable by a diverse population (Droutsas et al., 2025).

In Latin America, the adoption of e-government services is not homogeneous due to the diversity of digital infrastructure, socioeconomic status, and the levels of trust within government institutions (Mergel et al., 2019). In the region, the impediments to adoption are digital illiteracy, inability to access the service of the internet, and change resistance fueled by technologies among the aging and rural communities (Costa Junior et al., 2018). Fear of having their information compromised by cybersecurity threats also discourages usage of digital interfaces (Biehl et al., 2019).

In Chile, the Internal Revenue Service (IRS) has developed a comprehensive online platform to facilitate tax-related procedures. This initiative aims to improve efficiency and reduce bureaucratic burdens (Mbise & Baseka, 2023). Unlike other Latin American countries, where digital tax systems are often underdeveloped or lack integration, Chile's platform provides a wide range of services, allowing taxpayers to file returns, request tax certificates, and conduct other transactions entirely online (Berasaluce et al., 2021). According to recent reports, a significant proportion of tax procedures in Chile must be conducted online, reflecting a strong drive towards digitalization in the public sector (Córdova, 2024).

This research focuses on the Araucanía Region, a territory with unique challenges and opportunities for digital public service adoption. Araucanía is characterized by its rural landscape, large indigenous population, and significant digital infrastructure gaps (Bañales-Seguel et al., 2020). These factors create barriers to accessing online public services, making it a critical case for analyzing how socio-demographic and regional differences impact digital engagement with the IRS platform. The inclusion of this re-

gion provides a greater understanding of the barriers and enablers from the perspective of the underserved populations. This understanding offers important lessons for promoting digital inclusion and adapting e-government initiatives to the needs of marginalized communities.

The purpose of this research is to analyze the factors that influence the adoption and use of the Chilean Internal Revenue Service's (IRS) online platform, specifically in the Araucanía Region. Understanding these factors has implications for improving accessibility and increasing user satisfaction with online public services.

LITERATURE REVIEW

The role of online public services is increasingly essential in enhancing transparency, efficiency, and accessibility to government services (Yang et al., 2024). Concepts such as digital inequality remain a challenge, as disparities in access and digital skills significantly impact the adoption of e-government services (van Deursen & van Dijk, 2014). Helsper (2021) highlights the multidimensional nature of a phenomenon called "digital exclusion," emphasizing that socioeconomic status, education, and geography play a crucial role in determining citizens' digital participation.

In Latin America, studies by Dodel & Acosta (2024) and Correa & Pavez (2016) offer a nuanced understanding of digital inequalities, demonstrating that access alone is not sufficient to ensure meaningful interaction with online public services. Correa & Pavez (2016) argue that "digital capital," including cognitive and emotional skills, influences the extent to which people benefit from digital services. Similarly, Dodel & Acosta (2024) point out that digital inequalities in the region are exacerbated by infrastructure limitations and sociocultural factors, requiring more inclusive policy interventions.

Comparisons with other countries show that while Chile has made significant progress in implementing digital tax services, countries such as Estonia and South Korea have implemented more advanced digital government strategies. Estonia's e-residency program and blockchain-based public services offer a secure and efficient model for digital governance (Sullivan & Burger, 2017). South Korea's digital government policies emphasize seamless integration between different platforms and AI-based assistance to improve the user experience (Yang et al., 2024). These cases offer valuable lessons for Chile's digital inclusion initiatives.

Another crucial factor influencing access to digital platforms is user education. Research by Moravec et al. (2024) suggests that public awareness campaigns and structured programs to foster digital literacy can significantly improve user adoption rates. Programs that offer hands-on training, workshops, and multilingual support cater to the demographic diversity of users and encourage successful onboarding. In Germany, for example, structured digital literacy programs targeting older adults have been shown to be effective in reducing resistance to technology adoption (Oh et al., 2021).

METHODOLOGY

This research used a cross-sectional design to investigate users' participation and experiences with the online platform of the IRS. The data was obtained from a structured survey given to a representative sample of individuals who has interacted with the IRS system.

Instrument

The survey was conducted from June 1 to July 15, 2024 and was administered online via Google Forms®. It was a one-time application designed to capture current user experiences rather than longitudinal trends. The questionnaire included sections on demographic, educational, and geographic characteristics, as well as users' perceptions of platform usability, clarity of language, and procedural complexity.

Data

The population for this study consisted of the 869,535 inhabitants of the Araucanía Region, the most populous region in southern Chile. Probability sampling was used, employing the finite population formula (1). A confidence level of 95% was considered, which is usually the most popular in social sciences. The sample was drawn to ensure the representation of key demographic groups, including urban and rural

residents, different age groups, and various educational levels. To ensure representativeness, inclusion criteria required that participants: (1) Had interacted with the IRS online platform within the past 12 months; (2) Were 18 years or older, and; (3) Had sufficient digital literacy to complete an online.

Using formula (1) with a population (*N*) of 869,535, a confidence level (*Z*) of 1.96, a proportion (*p*) of 0.5, and a margin of error (*e*) of 0.05, the calculated sample size (n) was 384. A total of 386 responses were collected.

$$n = \frac{N \cdot Z^2 \cdot p \cdot q}{e^2 \cdot (N-1) + Z^2 \cdot p \cdot q} = 384 \quad (1)$$

Where *N* is representing the total population of the study (inhabitants of Araucanía), *Z* which corresponds to the Z-score for a 95% confidence level, *p* is the estimated proportion of the population with the characteristic of interest, chosen to maximize sample variability, $q = 1 - p$ representing the proportion of the population without the characteristic, and is the margin of error allowed in the estimation.

Data analysis

Descriptive statistics were used to summarize demographic characteristics and user perceptions of the IRS platform. Contingency tables were used to examine the frequencies of combinations of relevant discrete variables. Chi-square tests was used, to provide a sense of statistical significance to the analyses carried out in the contingency tables. The data were analyzed using SPSS v.29 software.

RESULTS

Table 1 presents some demographic and behavioral data related to a population that interacts with IRS online procedures. Gender is slightly skewed toward women (54.9%), compared to men, who make up 45.1% of the sample. The age distribution is concentrated in individuals between 36-45 years old (22.5%) and 56-65 years old (21.2%); older adults represent 6.7% of the population, and younger individuals between 18 and 25 years old make up 11.9%. Residency is almost equally divided, although a slight majority lives in rural areas (51.8%) compared to urban residents (48.2%). Regarding educational level, the largest proportion has basic education (31.3%), followed closely by secondary education (29.8%); Technical-vocational education accounts for 15.5% and higher education 23.3%, which together represented less than half of the population.

The proportion of those who have completed some online procedure amounts to 66.8%, which represents a high level of adoption of the IRS's online platform. However, the frequency is uneven: 46.4% report using the platform occasionally; 21.0% do so infrequently; and 18.7% have never used it. This latter percentage could indicate factors that hinder platform use. When initiating activities with the IRS, 40.4% did so in the first category and 34.2% in the second, leaving 25.4% without completing this procedure. This suggests that the majority of the population maintains some type of formal interaction with the IRS, whether digital or administrative. However, a significant proportion shows lower levels of use, which could be addressed by the competent authority to improve participation.

Table 1. Sample characterization.

Variable	Categories	Frequencies	Percentage
Gender	Male	174	45.1%
	Female	212	54.9%
Age	18-25 years	46	11.9%
	26-35 years	64	16.6%
	36-45 years	87	22.5%
	46-55 years	81	21.0%
	56-65 years	82	21.2%
	More than 65 years	26	6.7%
Residency	Rural	200	51.8%
	Urban	186	48.2%
Level of education	Basic education	121	31.3%
	Secondary education	115	29.8%
	Technical-professional education	60	15.5%
	Higher education	90	23.3%
Has carried out procedures online in IRS?	Yes	258	66.8%
	No	128	33.2%
Frequency of online procedures in IRS	Regularly	54	14.0%
	Occasionally	179	46.4%
	Rarely	81	21.0%
	Never	72	18.7%
Has started activities in IRS?	Yes, in second category	132	34.2%
	Yes, in first category	156	40.4%
	I don´t have	98	25.4%

Source: self-made.

The relationships between various demographic and behavioral variables and the completion of online IRS procedures are shown in Table 2, where numerous statistically significant differences are observed. 39.6% of men have completed some procedure online, while only 27.2% of women have done so; conversely, a higher proportion of women (17.9%) have never used this type of service, compared to 15.3% of men. Age appears to be critical, as all young people (18-35 years old) complete procedures online, and a minimal percentage falls into the "No" category. Conversely, older adults are less likely to complete procedures online. Area of residence shows a disparity, as urban residents are much more likely to complete procedures online (43.3%) compared to rural residents (23.6%). Educational level is also a differentiating factor in the use of online procedures. Those with higher education account for 14.5%, followed by those with secondary education at 22.0%; while those with basic and technical-vocational education account for 10.9% and 5.7% of the "No" category, respectively. This explains why a person with a higher level of education understands or feels quite comfortable with online applications.

The frequency of online procedures shows significant differences: the "Yes" category is dominated by regular and occasional users, while infrequent and never-registered users are more represented in the "No" category. This reflects a different level of interaction with the platform among the population. Regarding the initiation of activities with the IRS, the vast majority of those who have conducted procedures online fall into the first and second categories combined (65.0%), while a significant proportion of those who have not conducted procedures online are inactive with the IRS (23.6%). Awareness of online procedures is highly skewed. Among those who state that most procedures can be

conducted online, a higher proportion use the platform (61.9%), while the "No" level predominates among those who are unfamiliar with them (22.0%).

Table 2. Online Procedures Conducted in the IRS by Demographic and Socioeconomic Characteristics.

Variables	Categories	Has carried out procedures online in IRS?	
		Yes	No
Gender***	Male	39.6%	15.3%
	Female	27.2%	17.9%
Age***	18-25 years	11.9%	-
	26-35 years	16.6%	-
	36-45 years	18.7%	3.9%
	46-55 years	13.5%	7.5%
	56-65 years	6.0%	15.3%
	Older than 65 years	0.3%	6.5%
Residency***	Rural	23.6%	28.2%
	Urban	43.3%	4.9%
Level of education	Basic education	20.5%	10.9%
	Secondary education	22.0%	7.8%
	Technical-professional education	9.8%	5.7%
	Higher education	14.5%	8.8%
Frequency of online procedures in IRS***	Regularly	8.3%	5.7%
	Occasionally	46.1%	0.3%
	Rarely	11.9%	9.1%
	Never	0.5%	18.1%
Have you registered with the IRS to start economic activity?***	Yes, in second category	34.2%	0.0%
	Yes, in first category	30.8%	9.6%
	I don't have	1.8%	23.6%
Did you know that the vast majority of procedures are carried out online?***	Yes	61.9%	11.1%
	No	0.8%	20.7%
	Not sure	4.1%	1.3%

Note: *** indicates statistical significance at the 99% confidence level, ** at 95%, and * at 90%. These probabilities indicate the level of confidence that the observed differences are not due to random variation. *Source: self-made.*

Table 3 shows the differences in user experiences using the IRS platform, segmented by their interaction with the system. 12.4% of users in the second category report that "Mi SII" (personal website for taxpayers where they will find personalized information about their tax situation and tools to facilitate tax compliance in one place) is easy to navigate, while very few in the "I don't have" group share this perception. Subjects in the first category also have more difficulty with navigation, with 30.6% reporting difficulties; this suggests that the complexity of the procedures is an influential factor. The clarity of the language on the IRS website is generally quite good: while the clarity rate for the first category reached 37.2%, for the second category, 19.8% still find the language incomprehensible, and some aspects are, in fact, inaccessible.

Preferences for in-person procedures are diverse, reflecting diverse motivations: the most frequent explanations given by first-category users refer to difficulties completing a task online or a preference for in-person interactions, whi-

le the main reasons given by second-category users were difficulties completing something online. Therefore, these trends seem to suggest that users in higher complexity categories face more obstacles online and therefore need better support in completing procedures online. The main reasons for not starting activities were a lack of knowledge about the procedures that must be completed online (60.9%), while 10.2% were due to technical issues, underscoring the importance of awareness campaigns and basic guidance for this group to become familiar with the system digitally.

Interest in training to facilitate online procedures varies widely across groups. The "I don't have" category shows the highest percentage (43.8%) of interest in receiving assistance. Taxpayers in the first category also show a need for training (30.3%). On the other hand, the "I don't have" category showed no interest in receiving assistance (21.8%), indicating potential resistance to the system. In this sense, users who have initiated activities in the first category have great difficulty using the platform, especially with navigation and complex procedures, and require robust training and support. Those who have not initiated activities require awareness campaigns and basic training to remove barriers and use online services. Addressing these different needs can increase user satisfaction and encourage broader use of the IRS platform.

Table 3. Navigation and Preferences in Using 'Mi SII' Online Services.

Variables	Categories	Has started activities in IRS?		
		Yes, in second category	Yes, in first category	I don´t have
How do you view navigation through "MI SII"? ***	Easy	12.4%	1.6%	0.4%
	Regular	25.2%	14.0%	0.0%
	Difficult	13.6%	30.6%	2.3%
The language used on the page is clear and understandable***	Yes	31.4%	37.2%	1.6%
	No	19.8%	8.9%	1.2%
What is the main reason why you prefer to go to the IRS office to carry out the procedure? ***	I consider that my procedure is complex and requires an officer	5.6%	-	-
	I do not have a tax code	7.7%	2.1%	0.4%
	I prefer the attention of an officer	3.4%	17.1%	0.4%
	I had problems completing the procedure online	19.7%	18.8%	0.4%
	Other	12.0%	12.4%	-
What is the main reason why you have NOT completed the procedure online? ***	My accountant does all the paperwork	-	19.5%	-
	I didn't know that the process was done online	-	-	60.9%
	I had technical problems	-	9.4%	10.2%
Would you like to receive training or help to complete your procedures online?***	Yes	-	28.1%	43.8%
	No	-	0.8%	27.3%
What type of help or training would you like to receive to carry out online procedures in the IRS?***	I do not want help/training	-	0.8%	21.8%
	Courses or workshops on online procedures	-	30.3%	16.8%
	Courses or workshops on the use of the Web Page	-	-	21.0%
	Personalized telephone attention	-	-	9.2%

Note: *** indicates statistical significance at the 99% confidence level, ** at 95%, and * at 90%. These probabilities indicate the level of confidence that the observed differences are not due to random variation. *Source: self-made.*

DISCUSSION

The results show a significant gap between users of the online services implemented by the IRS, as the identified elements require specific and customized strategies for addressing them. Indeed, digital platforms have become central to the modernization of public services, providing convenience, efficiency, and even citizen participation (Latupeirissa et al., 2024). However, what this article establishes is that demographic, educational, and technical exclusion factors will determine users' levels of participation in such innovation, as also documented in a vast literature on digital inclusion. The works by authors such as Lythreatis et al. (2022) attest to this.

This is supported by the work of Curum & Khedo (2021), who posit that intuitive design and clear communication are critical to reducing cognitive load and thus increasing user satisfaction. The relatively high percentage of users who reported difficulty navigating in the first category suggests that procedural complexity exacerbates their use of the IRS platform (Abidi et al., 2024). Therefore, difficulties could be alleviated by improving the user interface by adding step-by-step guides or simplifying procedures. One of the vital conclusive determinants includes engagement in platform use, where the higher the educational level, the higher the likelihood of having completed procedures online; while for basic educational levels, the proportion of non-engagement is higher (Hollister et al., 2022). These findings reflect broader trends in the need for specific training, especially for users with low educational levels, to provide them with the skills necessary to operate online systems efficiently (van Deursen & van Dijk, 2014).

However, it is crucial to consider that this study represents a practical case applied to a specific context: the Araucanía Region, in southern Chile. The characteristics of this region, such as its demographic composition, socioeconomic indicators, and digital infrastructure, significantly influence the observed results. Compared to national averages, Araucanía has lower levels of educational attainment and digital access, especially in rural areas (Pareja-Arellano et al., 2024). The region is also distinguished by a high percentage of rural population and a significant presence of the *Mapuche* indigenous people, whose cultural perspectives on digital services and trust in government institutions may influence their willingness to adopt digital platforms (Bañales-Seguel et al., 2020).

For example, descriptive statistics (Table 2) show that access to digital infrastructure and educational attainment levels are unevenly distributed across the sample. Including ethnicity as a variable in this table would allow for a clearer assessment of differences in usage patterns between *Mapuche* and non-*Mapuche* participants, which could enrich the discussion of contextual barriers and help justify the selection of the region.

One of the main barriers to using IRS online services is lack of awareness of their existence. In similar socio-digital environments, awareness has been shown to significantly increase the adoption of e-government platforms (Alomari et al., 2012). Therefore, targeted outreach strategies should be considered to close information gaps, especially in those age groups and geographic areas where usage remains low (Morrison-Smith & Ruiz, 2020). This is especially relevant in the Araucanía, where internet penetration is uneven and rural communities are often less exposed to public digital services (Wu & Peng, 2024).

Beyond general findings from literature, such as the need for intuitive interfaces or the correlation between higher education levels and digital adoption, this study underscores the importance of region-specific interventions. In this case, vulnerability is not defined solely by income but also by a combination of limited educational opportunities, lack of digital infrastructure, geographic isolation, and cultural distance from the dominant digital discourse. Recognizing these multidimensional aspects of vulnerability is essential for designing inclusive digital financial services and effectively increasing participation rates in regions like Araucanía.

Research by Venkatesh et al. (2003) describes the main barriers to using digital services, including a general distrust of the technology itself or insecurity in knowing how to perform online procedures. Considering the large proportion of people who prefer human service due to previous difficulties or the perceived complexity of performing such tasks online, it is necessary to

create hybrid models that combine digital and human support. Live chat or telephone support options, as preferred by participants, can facilitate the transition to more digital methods without affecting accessibility for any user group. The findings also highlight how targeted training programs can address digital interaction gaps (Hafferty et al., 2024).

The interest in courses or workshops, expressed by the first category of users and those without prior experience with the IRS, reflects a willingness to learn when opportunities arise. Contextualized training, relevant to users' digital needs, can enable them to feel more confident accessing online services (Reddy et al., 2023). These challenges should be addressed through user-oriented design solutions and targeted training within comprehensive awareness campaigns. In the deployment of the IRS in the Araucanía Region, the introduction of strategies—which will include greater accessibility and overall user satisfaction—can translate into greater effectiveness and greater user satisfaction with public services.

CONCLUSIONS

This study identified important implications for improving the use of digital services and modernizing public services, using the IRS online platform as a case study. The main enabling factor underscores the need to clearly overcome demographic, educational, and technical barriers to increasing participation and satisfaction with online tax procedures.

The main implication of this is that procedural complexity and user interface design are important aspects of user engagement, as high-end users report higher levels of difficulty using the platform. Simplifying processes and improving platform clarity could lead to greater user satisfaction and ease of use. Educational inequalities also impact the configuration of online engagement, as the higher a user's educational level, the more readily and willingly they seem to engage with online services. Given this gap, tailored training programs are needed to empower users with more limited education or technical skills.

Despite the interesting findings, this study is not without limitations, including: (1) this study is

contextual in scope and may not detail the full dynamics in other regions or service platforms, both in Chile and international contexts; (2) additional studies with longitudinal data are required to contrast user behavior and the effect of specific interventions over time; (3) qualitative research can also provide additional insights into user preferences and barriers to gain deeper insight into digital interaction; and; (4) future research should also analyze the effect of regional influences and culture, particularly among indigenous communities, to gain a comprehensive digital approach.

REFERENCES

Abidi, M. H., Noor Siddiquee, A., Alkhalefah, H., & Srivastava, V. (2024). A comprehensive review of navigation systems for visually impaired individuals. *Heliyon, 10*(11), e31825. https://doi.org/10.1016/j.heliyon.2024.e31825

Alomari, M., Woods, P., & Sandhu, K. (2012). Predictors for e-government adoption in Jordan. *Information Technology & People, 25*(2), 207–234. https://doi.org/10.1108/09593841211232712

Bañales-Seguel, C., Riquelme Maulén, W., Álvez, A., & Habit, E. (2020). Scientific Landscape Related to Mapuche Indigenous Peoples and Wallmapu Territory. *Sustainability, 12*(19), 7895. https://doi.org/10.3390/su12197895

Berasaluce, M., Díaz-Siefer, P., Rodríguez-Díaz, P., Mena-Carrasco, M., Ibarra, J. T., Celis-Diez, J. L., & Mondaca, P. (2021). Social-Environmental Conflicts in Chile: Is There Any Potential for an Ecological Constitution? *Sustainability, 13*(22), 12701. https://doi.org/10.3390/su132212701

Biehl, A., Labarca, J. T., & Vela, J. (2019). Taxes without Taxpayers: The Invisibility of Taxes in Chile. *Revista Mexicana de Ciencias Políticas y Sociales, 64*(236), 49-82. https://doi.org/10.22201/fcpys.2448492xe.2019.236.62883

Córdova, C. B. (2024). The Making of an Indigenous Community and the Limits of Community: Class Differentiation and Social Ties in Southern Chile. *Rural Sociology, 89*(S1), 786–810. https://doi.org/10.1111/ruso.12518

Correa, T., & Pavez, I. (2016). Digital Inclusion in Rural Areas: A Qualitative Exploration of Challenges Faced by People From Isolated Communities. *Journal of Computer-Mediated Communication, 21*(3), 247–263. https://doi.org/10.1111/jcc4.12154

Costa Junior, J. da, Diehl, J. C., & Secomandi, F. (2018). Educating for a systems design approach to complex societal problems. *Journal of Engineering Design, 29*(3), 65–86. https://doi.org/10.1080/09544828.2018.1436162

Curum, B., & Khedo, K. K. (2021). Cognitive load management in mobile learning systems: principles and theories. *Journal of Computers in Education, 8*(1), 109–136. https://doi.org/10.1007/s40692-020-00173-6

Dodel, M., & Acosta, M. J. (2024). When Lockdowns Force "Everyone" to Work From Home: Inequalities in Telework During COVID-19 in Uruguay. *American Behavioral Scientist, 68*(8), 1007–1031. https://doi.org/10.1177/00027642231155370

Droutsas, N., Spyridonis, F., Daylamani-Zad, D., & Ghinea, G. (2025). Web accessibility barriers and their cross-disability impact in eSystems: A scoping review. *Computer Standards & Interfaces, 92*, 103923. https://doi.org/10.1016/j.csi.2024.103923

Hafferty, C., Reed, M. S., Brockett, B. F. T., Orford, S., Berry, R., Short, C., & Davis, J. (2024). Engagement in the digital age: Understanding "what works" for participatory technologies in environmental decision-making. *Journal of Environmental Management, 365*, 121365. https://doi.org/10.1016/j.jenvman.2024.121365

Helsper, E. (2021). *The Digital Disconnect: The Social Causes and Consequences of Digital Inequalities*. SAGE Publications Ltd. https://doi.org/10.4135/9781526492982

Hollister, B., Nair, P., Hill-Lindsay, S., & Chukoskie, L. (2022). Engagement in Online Learning: Student Attitudes and Behavior During COVID-19. *Frontiers in Education, 7*, 851019. https://doi.org/10.3389/feduc.2022.851019

Kulal, A., Rahiman, H. U., Suvarna, H., Abhishek, N., & Dinesh, S. (2024). Enhancing public service delivery efficiency: Exploring the impact of AI. *Journal of Open Innovation: Technology, Market, and Complexity, 10*(3), 100329. https://doi.org/10.1016/j.joitmc.2024.100329

Latupeirissa, J. J. P., Dewi, N. L. Y., Prayana, I. K. R., Srikandi, M. B., Ramadiansyah, S. A., & Pramana, I. B. G. A. Y. (2024). Transforming Public Service Delivery: A Comprehensive Review of Digitization Initiatives. *Sustainability, 16*(7), 2818. https://doi.org/10.3390/su16072818

Ly, B., Doeur, B., & nat, S. (2024). Key factors influencing digital learning adoption among cambodian university students: An integrated theoretical approach. *Computers in Human Behavior Reports, 15*, 100460. https://doi.org/10.1016/j.chbr.2024.100460

Lythreatis, S., Singh, S. K., & El-Kassar, A.-N. (2022). The digital divide: A review and future research agenda. *Technological Forecasting and Social Change, 175*, 121359. https://doi.org/10.1016/j.techfore.2021.121359

Mbise, K. S., & Baseka, L. (2023).The Impact of the Digital Tax Administration System on Compliance Among SMEs. *The Journal of Informatics, 2*(1), 69-82. https://doi.org/10.59645/tji.v2i1.94

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government Information Quarterly, 36*(4), 101385. https://doi.org/10.1016/j.giq.2019.06.002

Moravec, V., Hynek, N., Gavurova, B., & Rigelsky, M. (2024). Who uses it and for what purpose? The role of digital literacy in ChatGPT adoption and utilisation. *Journal of Innovation & Knowledge, 9*(4), 100602. https://doi.org/10.1016/j.jik.2024.100602

Morrison-Smith, S., & Ruiz, J. (2020). Challenges and barriers in virtual teams: a literature review. *SN Applied Sciences, 2*, 1096. https://doi.org/10.1007/s42452-020-2801-5

Oh, S. S., Kim, K.-A., Kim, M., Oh, J., Chu, S. H., & Choi, J. (2021). Measurement of Digital Literacy Among Older Adults: Systematic Review. *Journal of Medical Internet Research, 23*(2), e26145. https://doi.org/10.2196/26145

Pareja-Arellano, N. A., Sandoval-Obando, E., & Riquelme-Brevis, H. (2024). Etnia y ruralidad como ejes de la desigualdad social en la Araucanía (Chile) actual. *Papeles de Población, 29*(118), 177-207. https://doi.org/10.22185/24487147.2023.118.32

Reddy, P., Chaudhary, K., & Hussein, S. (2023). A digital literacy model to narrow the digital literacy skills gap. *Heliyon, 9*(4), e14878. https://doi.org/10.1016/j.heliyon.2023.e14878

Sullivan, C., & Burger, E. (2017). E-residency and blockchain. *Computer Law & Security Review, 33*(4), 470–481. https://doi.org/10.1016/j.clsr.2017.03.016

van Deursen, A. J., & van Dijk, J. A. (2014). The digital divide shifts to differences in usage. *New Media & Society, 16*(3), 507–526. https://doi.org/10.1177/1461444813487959

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly, 27*(3), 425-478. https://doi.org/10.2307/30036540

Wu, G., & Peng, Q. (2024). Bridging the Digital Divide: Unraveling the Determinants of FinTech Adoption in Rural Communities. *Sage Open, 14*(1). https://doi.org/10.1177/21582440241227770

Yang, C., Gu, M., & Albitar, K. (2024). Government in the digital age: Exploring the impact of digital transformation on governmental efficiency. *Technological Forecasting and Social Change, 208*, 123722. https://doi.org/10.1016/j.techfore.2024.123722