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Digital futures, unequal presents: Socioeconomic perceptions of digitalization in the European Union

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Abstract

Public perception of digital technologies is crucial for the success of EU digital strategies, yet the socioeconomic determinants of citizens' perceptions have received limited systematic attention. Using data from Special Eurobarometer SP551 ($n \geq 26,000$, 2024), this study analyses how EU citizens perceive the role of digital technologies in healthcare, public services, online commerce, and communication. Three grouping variables are examined – GDP per capita, EU accession date, and individual socio-demographic background – using Kruskal–Wallis tests with Dunn post hoc comparisons and multivariate linear regression. Results confirm all three research hypotheses: perceptions differ significantly across all dimensions. Citizens from lower-income countries and post-2004 member states assign greater future importance to digital technologies, pointing to a catching-up dynamic. Manual workers, homemakers, the unemployed, retirees, and students assign comparatively lower importance to future digital development, while higher-educated respondents and those currently in full-time education express the strongest expectations. The findings carry direct policy relevance for targeted implementation of the EU Digital Decade Policy Programme 2030, and contribute a perception-based, socioeconomic perspective to the EU digitalization literature.

Keywords: digitalization; Eurobarometer; EU Digital Decade; technology perception; digital inclusion; Kruskal–Wallis

Introduction

EU competitiveness policy has long linked economic performance to digital infrastructure and human capital (Bassanini et al., 2000). The Lisbon Strategy (European Parliament, 2000) first formalized this connection; the EU 2020 Strategy (European Commission, 2010) expanded it through broadband deployment, digital skills, and e-government investments. Since 2014, the Digital Economy and Society Index (DESI) tracks Member State progress (European Commission, 2022). Unmet targets from the EU 2020 nonetheless laid the foundation for the Digital Decade 2030 Policy Programme (DDPP 2030) (European Parliament and the Council, 2022).

The DDPP 2030 aims to help the Union adapt to technological developments that will significantly shape social, business, and inter-state relations in the coming decades (Boikova et al., 2021; Troitino, 2021). It establishes a monitoring system built on four pillars: connectivity, digital skills, digital enterprises, and digital public services (European Parliament and the Council, 2022).

Linked to DDPP 2030 implementation, the European Commission conducts an annual survey of citizens' digital perceptions through the SP551 Eurobarometer questionnaire. This study focuses on digitalization – the integration of digital technologies into existing processes, as distinct from the more profound structural change described by digital transformation (Kraus et al., 2021; Mergel et al., 2019) – and examines social perceptions across four domains: healthcare, e-commerce, communication, and public services (European Commission, 2024a, 2024b).

This study analyses seven items from the SP551 (European Commission, 2024a) questionnaire covering two key areas – the perceived future importance of digital technologies and current access to digital infrastructure – using Kruskal–Wallis tests, Dunn post hoc comparisons, and multivariate linear regression. Three grouping variables are examined: GDP per capita, EU accession date, and individual socio-demographic background, in order to determine whether these factors significantly influence perceptions of digital technologies. Since GDP per capita may affect attitudes toward digital technologies, given that digital tool use is closely linked to economic development, this leads to our first research hypothesis:

H1. GDP per capita is positively associated with the perceived importance of digital technologies across all domains.

EU accession represented more than economic and political integration for the countries involved; it also introduced new social and technological challenges. Digitalization, as a broad social transformation, has developed differently and at different speeds across Member States, depending on when they joined the Union. Given the variation in historical, economic, and institutional backgrounds, it is reasonable to assume that the date of EU accession may affect how populations perceive digital technologies, with post-2004 member states expressing stronger future expectations as part of a catching-up dynamic. This assumption underpins our second research hypothesis:

H2. The EU accession date is associated with differences in digital perceptions, with post-2004 member states expressing stronger future expectations.

Attitudes toward digital technologies depend not only on technical capabilities but also on individual social and personal background. Age, place of residence, occupation, economic situation, and education level can all influence how people assess the social impact of digitalization. Importantly, while higher education is often assumed to predict greater technology enthusiasm, recent evidence suggests the opposite pattern. The third hypothesis examines the extent to which these background variables shape digital perceptions:

H3. Socioeconomic background significantly shapes perceptions of digitalization, with different occupational and educational groups showing systematically different levels of perceived importance.

The findings carry direct implications for the targeted implementation of the EU Digital Decade Policy Programme 2030.

Literature Review

A bibliometric analysis was conducted using VOSviewer 1.6.20 (Van Eck & Waltman, 2023) and the Web of Science database to examine articles on EU digital transformation from 2010 to 2025; the search returned 867 relevant records. Cluster analysis identified five thematic areas: digital transformation and policy ecosystems, technological infrastructure, social impacts of digitalization, innovation-driven sustainability, and implementation strategies.

Economic development is a well-established driver of digitalization outcomes. Investment in digital infrastructure and skills strengthens economic growth, social cohesion, and business competitiveness (Kraus et al., 2021; Mazza & Frantzi, 2025). However, the relationship is not linear: although basic digital skills reach 82.7% in the Netherlands, they stand at only 27.7% in Romania, with comparable gaps in connectivity coverage (Obelovska et al., 2025). Digitalization efforts often follow national development logics rather than shared strategic goals, and benefits vary across industries and organizations (Abels et al., 2024). The digital divide has educational and social roots, and targeted catch-up programs focused on skills can narrow it (Budai et al., 2024; Ogrea & Herciu, 2022). Digitalization is reshaping operating models across e-health (Dobrovolska & Kolomiets, 2024), e-commerce (Sharma et al., 2023), and public services (Latupeirissa et al., 2024). E-health technologies hold particular promise for elderly and rural populations, though effective deployment requires active user engagement and adequate digital competence (Currie et al., 2015; World Health Organization, 2024). E-government is associated with gains in service quality and citizen trust (MacLean & Titah, 2022), while perceived security and user experience are primary determinants of e-commerce adoption (Gefen et al., 2003; Pavlou, 2003).

EU accession introduced not only economic and political integration but also new social and technological challenges (Troitino, 2021). Digitalization has developed differently across Member States depending on when they joined the Union. Post-2004 member states face persistent gaps in digital infrastructure and competence, yet research suggests they express stronger expectations for the future, treating digitalization as a catch-up mechanism (Garashchuk et al., 2025). Digital inequalities manifest not only in access but also in attitudes and usage patterns, particularly in peripheral states (Radovanovic, 2013). Institutional trust and regulatory stability remain critical mediating factors between accession history and digital perceptions (Gil-Garcia et al., 2018).

Individual-level determinants of digital perceptions are theorized through several complementary frameworks. The Technology Acceptance Model (TAM) identifies perceived usefulness and ease of use as primary drivers of technology adoption, with socioeconomic background shaping both (Venkatesh et al., 2003). Rogers' (2003) diffusion of innovations theory predicts that early adopters – typically higher-educated and higher-income individuals – drive technology uptake, while later adopters require stronger incentives. These frameworks, however, assume that higher education consistently predicts greater technology enthusiasm. Recent evidence challenges this assumption. Wyatt's (2008) typology of technology indifference identifies groups for whom digital tools are already so embedded in daily routines that further digitalization no longer registers as meaningful progress. For higher-educated respondents, digital tools are part of everyday life; they are therefore – according to this framework – less likely to perceive further digitalization as an important development (Janssen & Estevez, 2013; OECD, 2016), though this assumption is not uniformly supported by empirical evidence. Conversely, groups with limited access to traditional services – manual workers, retirees, homemakers, the unemployed, and those without formal qualifications – are more likely to view digitalization as a genuine opportunity (Petretto et al., 2024).

Materials and Methods

Data

Our analysis is based on the SP551 questionnaire, which examines the European Union population's relationship with digital technologies (European Commission, 2024a). The survey covers four main dimensions: individual perceptions and future expectations; assessment of government involvement; technological literacy and sense of security; and access opportunities and social participation. Due to space constraints, we focused on two areas: digital skills and digital infrastructure. The seven items were selected based on the number of processable responses and their social relevance.

Questions coded QC1 relate to digital skills and examine the importance respondents attribute to digital technologies across various areas of everyday life by 2030, covering four domains: healthcare, online commerce, communication, and public services. The QC8 questions measure individuals' digital access, social embeddedness, and opportunities to participate in development – in short, the realization of digital rights and principles – across three areas: affordable high-speed internet access, digital education and skills development, and online access to key public services.

Respondents rated the statements on a four-point Likert scale (1 – very important; 2 – fairly important; 3 – not very important; 4 – not at all important). Cases marked as refusals to answer were excluded from the analysis; statistical tests are therefore based exclusively on substantive responses.

Methods

The Likert-scale items in the questionnaire are ordinal, requiring a non-parametric procedure that assumes neither normality nor interval-scale measurement. The Kruskal–Wallis H-test is a non-parametric alternative to one-way ANOVA that compares the rank distributions of multiple independent groups (Field, 2015; Kruskal & Wallis, 1952), and can be reliably applied to Likert-type data with skewed distributions (Eiselen & van Huyssteen, 2023; Frost, n.d.; Lantz, 2013; Moll et al., 2018). Where the Kruskal–Wallis test indicated significant group differences, Dunn's post hoc test was applied to identify pairwise differences (Dunn, 1964). The Dunn test uses z-statistics, handles unequal group sizes, and provides a consistent framework for multiple comparisons (Dinno, 2015). Results were evaluated at significance levels of $p < 0.05$, $p < 0.01$, and $p < 0.001$.

Scale reliability was verified using Cronbach's alpha (Cronbach, 1951), a standard measure of multi-item instrument reliability based on inter-item correlations. Although the QC1 and QC8 items tap distinct domains rather than a single latent construct, Cronbach's alpha is used here as a measure of inter-item coherence to verify that the items within each block share sufficient common variance to justify joint analysis. The reliability classification is as follows: very low ($\alpha \leq 0.30$), low ($0.30 < \alpha \leq 0.60$), moderate ($0.60 < \alpha \leq 0.75$), high ($0.75 < \alpha \leq 0.90$), and very high ($\alpha > 0.90$) (Collins, 2007). Both scales demonstrated adequate internal consistency: the QC1 scale yielded $\alpha = 0.843$, and the QC8 scale yielded $\alpha = 0.754$, both falling within the high-reliability range.

The third hypothesis was tested using multivariate linear regression, which models the relationship between a numeric dependent variable and one or more independent variables (Kılıç, 2013). The general form of the regression equation is:

$$Y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \varepsilon_i$$

where Y_i is the dependent variable, a β_0 is the constat (intercept), $\beta_1, \beta_2, \dots, \beta_n$ are the explanatory variables, the $x_1, x_2, \dots, x_n$ are the values of the independent variables for the i -th observation, and ε is the

error term. Since social, educational, and economic background variables are measured at the nominal level, they were included as dummy variables. Reference categories are: self-employed (occupation), basic education (educational attainment), and low-income countries (GDP group). The regression coefficients (β) indicate how much a given category differs from the reference group in terms of the dependent variable. Attitudes toward digital rights and infrastructure were summarized into a single composite indicator using principal component analysis (PCA) of variables QC8_1, QC8_2, and QC8_4, which captured respondents' satisfaction with the digital environment (variable PC1) and avoided multicollinearity. All analyses were conducted using Stata 18.5.

Results

Patterns of Digital Perceptions

The analysis opens with descriptive statistics for seven items from two selected blocks of the SP551 questionnaire (Table 1).

Table 1. Summary Statistics of the Analyzed Questions (excluding “don't know” answers)

	QC1_6	QC1_8	QC1_9	QC1_10	QC8_1	QC8_2	QC8_4
Obs.	25 758	25 877	26 001	25 915	23 860	23 481	23 070
Mean	1.842	1.964	1.727	1.76	2.282	2.227	2.246
Std. dev	0.903	0.943	0.872	0.865	0.819	0.7506	0.762
Variance	0.816	0.889	0.76	0.748	0.671	0.563	0.58
Skewness	0.933	0.75	1.106	1.066	0.268	0.33	0.347
Kurtosis	3.098	2.67	3.492	3.502	2.596	2.921	2.898

Respondents assign significant importance to digital technologies across all domains by 2030: healthcare (QC1_6, mean = 1.84), online commerce (QC1_8, mean = 1.96), communication (QC1_9, mean = 1.73), and public services (QC1_10, mean = 1.76). Low standard deviations, positive skewness, and moderate kurtosis (3.1–3.5) point to a broad social consensus ($n = 25,758$ – $26,001$).

The QC8 items present a more cautious picture: internet access (QC8_1, mean = 2.28), digital education (QC8_2, mean = 2.23), and online public services (QC8_4, mean = 2.25). Higher means indicate more cautious assessments of current digital access and services ($n = 23,070$ – $23,860$).

The comparison reveals a clear pattern: QC1 means cluster between 1.73 and 1.96 with low standard deviations (0.87–0.94), indicating strong consensus around high future importance, while QC8 means range from 2.23 to 2.28 with somewhat higher dispersion, reflecting more cautious and varied assessments of current digital access – suggesting an implementation gap between expected and realized digitalization.

Digital Perceptions and Economic Development: Kruskal–Wallis and Dunn Tests

The future role of digital technologies was examined by GDP category: countries were grouped into three categories based on real GDP per capita (Table 2), and group responses were compared using the Kruskal–Wallis test, followed by Dunn post hoc comparisons, which were significant.

Table 2. Grouping of EU Member States based on real GDP per capita

GDP category	Threshold limit (€)	Countries
Low income	< 20 000	BG, HR, GR, HU, LV, LT, PL, RO, SK
Medium income	20 001 – 39 000	CY, CZ, EE, FR, IT, LT, MT, PT, ES
High income	> 39 001	AT, BE, DK, FI, DE, IE, LU, NL, SE

For healthcare access, the Kruskal–Wallis test ($\chi^2(2) = 52.89$; $p < 0.001$) indicated significant differences along the economic development continuum. The Dunn analysis showed significant differences across all pairwise comparisons: respondents from middle-income countries attributed less importance to digital technologies in healthcare than respondents from low-income countries, while respondents from high-income countries expressed the strongest expectations in this domain.

The perceived future role of digital commerce also differed significantly across the three groups ($\chi^2(2) = 40.45$; $p < 0.001$), though no statistically significant difference was found between low- and middle-income countries ($p = 0.083$). High-income countries attributed greater importance to digital commerce than both other groups, reflecting stronger e-commerce expectations in more developed economies.

For communication, the Kruskal–Wallis test ($\chi^2(2) = 24.93$; $p < 0.001$) again revealed a pattern linked to economic development. Middle-income respondents rated the future importance of digital communication lower than low-income respondents ($p = 0.026$), while high-income countries attributed greater importance to digital communication than both other groups, suggesting the influence of more advanced technological infrastructure and user habits.

For public services, the Kruskal–Wallis test ($\chi^2(2) = 317.28$; $p < 0.001$) yielded the strongest GDP-related result. Middle-income respondents attributed less importance to public services digitization than low-income respondents, while high-income respondents expressed the strongest expectations in this domain.

Digital Perceptions and EU Accession Date: Kruskal–Wallis and Dunn Tests

The analysis of economic development was followed by an examination by EU accession date, using the same methodological framework (Kruskal–Wallis test, followed by Dunn post hoc analysis where significant). Member States were grouped into three categories (Table 3).

Table 3. Grouping of EU Member States based on time of accession to the EU

Time accessing	Accession period	Countries
Early adopters	1957 - 1980	BE, DE, FR, IT, LU, NL, DK, IE
Post-Cold War	1981 - 2000	GR, ES, PT, AT, FI, SE
Eastern European enlargement	2001 - 2013	CY, CZ, EE, HU, LT, LV, MT, PL, SL, SK, BG, RO, HR

For healthcare access, the Kruskal–Wallis test ($\chi^2(2) = 19.26$; $p < 0.001$) indicated significant differences across accession periods, suggesting that the timing of membership is related to the importance attached to the future role of digital technologies in this domain. The Dunn analysis showed that the Post-Cold War group gave significantly lower values than both the Founding and Early Members ($p < 0.001$) and the Eastern European Enlargement states ($p < 0.001$). A smaller but significant difference also appeared between the latter two groups ($p = 0.034$), with Eastern European Enlargement states attaching greater importance to digital technologies in healthcare.

For online commerce, the perceived future role showed significant dependence on the accession period ($\chi^2(2) = 40.35$; $p < 0.001$). The Post-Cold War group attributed less importance to digital commerce than both the Founding and Early Members ($p < 0.001$) and the Eastern European Enlargement states ($p < 0.001$), with the latter group expressing the strongest expectations in this domain.

For online communication, the Kruskal–Wallis test did not indicate significant differences across accession groups ($\chi^2(2) = 2.63$; $p = 0.268$). The Dunn analysis revealed no consistent differences: although the Post-Cold War group gave slightly higher values than the Founding and Early Members ($p = 0.044$), the effect was small, and no significant differences were found in the remaining pairwise comparisons ($p > 0.05$).

For digital access to public services, the Kruskal–Wallis test indicated highly significant differences ($\chi^2(2) = 129.16$; $p < 0.001$). Post-Cold War respondents attributed less importance to this domain than citizens of Founding and Early Member States ($p < 0.001$). The largest difference, however, appeared among the Eastern European Enlargement countries: they attributed less importance to the digitization of public services than both the Founding and Early Members and the Post-Cold War group.

Individual Socioeconomic Background and Digital Perceptions: Linear Regression Analysis

Following the macro-level analyses, the effects of micro-level characteristics were modeled using linear regression. The dependent variables are the four QC1 items measuring the perceived future importance of digital technologies in healthcare, online commerce, digital communication, and public services. Independent variables include: the first principal component summarizing attitudes toward digital rights and principles (PC1); occupational status; educational attainment; country group based on real GDP per capita; age; gender; and type of residence. PC1 was constructed via PCA of the QC8 items (internet access, digital education and skills development, online public services availability), treating digital rights realization as a unidimensional indicator to avoid multicollinearity. Four independent regression models were estimated; results are summarized in Table 4.

Across all four models, the PC1 index showed a positive and significant coefficient ($\beta \approx 0.10$; $p < 0.001$). Given the reverse-coded dependent variables, this indicates that respondents with more favorable attitudes toward current digital infrastructure tend to assign slightly lower importance to future digital development – suggesting that current digital satisfaction and perceived future priorities are related but distinct constructs.

Table 4. Regression model results by socio-demographic and economic groups

Variables	QC1 6		QC1 8		QC1 9		QC1 10	
	Coefficient (β)	p-value	Coefficient (β)	p-value	Coefficient (β)	p-value	Coefficient (β)	p-value
PCA1	0.104	0.000 ***	0.103	0.000 ***	0.092	0.000 ***	0.102	0.000 ***
C14	Which of the following socio-professional categories do you currently belong to?							
Managers	0.009	0.712	0.017	0.494	-0.007	0.772	-0.009	0.676
Other white collars	0.052	0.039 *	0.088	0.000 ***	0.035	0.130	0.043	0.055 *
Manual workers	0.132	0.000 ***	0.152	0.000 ***	0.082	0.000 ***	0.116	0.000 ***
House persons	0.112	0.002 ***	0.233	0.000 ***	0.024	0.000 ***	0.165	0.000 ***
Unemployed	0.120	0.001 ***	0.158	0.000 ***	0.014	0.000 ***	0.068	0.032 *
Retired	0.126	0.000 ***	0.259	0.000 ***	0.128	0.000 ***	0.164	0.000 ***

Students	0.128	0.005 ***	0.145	0.001 ***	0.077	0.063 *	0.160	0.000 ***
D8	How old were you when you stopped full-time education?							
Secondary Education	-0.156	0.000 ***	-0.177	0.000 ***	-0.170	0.000 ***	-0.189	0.000 ***
Higher Education	-0.261	0.000 ***	-0.284	0.000 ***	-0.263	0.000 ***	-0.035	0.000 ***
Still Studying	-0.250	0.000 ***	-0.225	0.000 ***	-0.266	0.000 ***	-0.324	0.000 ***
No Full-Time Education	0.217	0.025 *	0.396	0.000 ***	0.494	0.000 ***	0.024	0.005 ***
Refusal	-0.115	0.254	-0.216	0.029 *	-0.142	0.131	-0.164	0.070 *
Don't know	-0.061	0.332	-0.124	0.044 *	0.037	0.501	0.000	0.874
GDP Group	Grouping of EU Member States based on real GDP per capita							
Medium Income	0.046	0.001 ***	0.021	0.116	0.107	0.404	-0.042	0.001 ***
High Income	0.012	0.397	-0.033	0.016 *	0.000	0.667	-0.143	0.000 ***
Control variables								
Age	0.003	0.000	0.009	0.000 ***	0.004	0.000 ***	0.004	0.000 ***
Gender	0.024	0.029 *	0.030	0.007 ***	-0.029	0.005 ***	0.019	0.055 *
Rural	0.072	0.000 ***	0.042	0.000 ***	0.057	0.000 ***	0.074	0.000 ***
R ² = 6.56		R ² = 13.11		R ² = 7.93		R ² = 11.09		

Bold coefficients indicate statistical significance at $p < 0.05$.

In all regression models, the dependent variables were reverse coded (1 = very important; 4 = not at all important). Therefore, negative regression coefficients indicate greater perceived importance, whereas positive coefficients indicate lower perceived importance.

In the healthcare model ($R^2 = 6.56\%$), respondents with secondary education ($\beta = -0.16$) and, especially, higher education ($\beta = -0.26$), as well as those currently in full-time education ($\beta = -0.25$), attributed significantly greater importance to healthcare digitalization ($p < 0.001$). Manual workers ($\beta = 0.13$), house persons ($\beta = 0.11$), unemployed respondents ($\beta = 0.12$), and retirees and students ($\beta = 0.11$) were assigned relatively lower importance than the reference occupational group ($p < 0.001$). Age ($\beta = 0.003$) and residence in a middle-income country ($\beta = 0.05$) were associated with lower perceived importance ($p < 0.001$). Across all groups, a more positive digital attitude (PCA1; $\beta = 0.104$, $p < 0.001$) remained a significant predictor.

The online commerce model ($R^2 = 13.11\%$) exhibited the highest explanatory power among the four models. Higher educated respondents ($\beta = -0.28$), those with secondary education ($\beta = -0.18$), and individuals still in full-time education ($\beta = -0.23$) attributed significantly greater importance to digital commerce (all $p < 0.001$). In contrast, retirees ($\beta = 0.26$), homemakers ($\beta = 0.23$), unemployed ($\beta = 0.16$), and students ($\beta = 0.15$) assigned relatively lower importance than the reference group. Age ($\beta = 0.009$) and

rural residence ($\beta = 0.04$) were positively associated with the reverse-coded outcome, indicating lower perceived importance of digital commerce ($p < 0.001$).

In the communication model ($R^2 = 7.93\%$), respondents with higher education ($\beta = -0.26$) and those currently in full-time education ($\beta = -0.27$) attributed significantly greater importance to digital communication (all $p < 0.001$), as indicated by the negative coefficients on the reverse-coded scale. In contrast, retirees ($\beta = 0.13$) and manual workers ($\beta = 0.08$) assigned relatively lower importance than the reference group. Respondents who had never participated in full-time education ($\beta = 0.49$; $p < 0.001$) exhibited substantially higher values on the reverse-coded scale, indicating lower perceived importance of digital communication. Age ($\beta = 0.004$) and rural residence ($\beta = 0.06$) were also positively associated with the reverse-coded outcome, suggesting a lower perceived importance of digital communication ($p < 0.001$).

The public services model ($R^2 = 11.09\%$) shows the most pronounced differences by economic development: high-income countries ($\beta = -0.14$; $p < 0.001$) attributed greater importance to the digitalization of public services than respondents from low-income countries. Similarly, respondents with higher education ($\beta = -0.19$) and those currently in full-time education ($\beta = -0.32$) reported significantly greater perceived importance (all $p < 0.001$). Retirees ($\beta = 0.16$), homemakers ($\beta = 0.17$), manual workers ($\beta = 0.12$), and students ($\beta = 0.16$) assigned relatively lower importance than the reference occupational group. Age, rural residence, and the absence of formal full-time education were positively associated with the reverse-coded outcome, indicating lower perceived importance.

Discussion

Results across the Kruskal–Wallis, Dunn, and regression analyses converge: European citizens assign high importance to digital technologies in healthcare, e-commerce, communication, and public services. The low standard deviations and positive skewness of QC1 items reflect a broad social consensus, consistent with the technological optimism documented in the literature (Boikova et al., 2021; Kraus et al., 2021).

High QC1 scores align with documented patterns. Fifty-five percent of EU citizens have sought health information online, and e-health technologies – telemedicine, teleradiology, telepsychiatry – are expanding rapidly (Eurostat, 2022; World Health Organization, 2024), though effective use requires adequate digital competence (Black et al., 2011; Currie et al., 2015). In e-commerce, 72% of EU households shop online; perceived security and user experience are primary determinants of purchasing willingness (Eurostat, 2024; Gefen et al., 2003; Pavlou, 2003). For public services, e-government quality and institutional trust are key determinants of social acceptance (Capgemini et al., 2024).

The QC8 scores present a more cautious picture: higher means and flatter distributions indicate that digital infrastructure implementation remains incomplete. Access, particularly in Eastern European member states and rural areas, is uneven and often falls short of social expectations (European Commission et al., 2024; Ogorean & Herciu, 2022). Digital competence gaps among older and less educated populations further constrain the effective use of e-government and e-health systems (Petretto et al., 2024).

The comparison carries a clear message: while strong consensus prevails regarding future prospects, a more cautious and critical tone dominates the assessment of the current situation, pointing directly to where EU digital policy should focus.

Digital Perceptions and Economic Development

H1 is supported: GDP per capita is significantly associated with digital perceptions, though the relationship is non-linear across income groups. Middle-income respondents placed less importance on several domains

than low-income respondents. This may indicate that although infrastructure is already more developed than in low-income countries, social trust and user competencies have not yet caught up with the level of technological development.

In e-commerce, no significant difference emerged between low- and middle-income countries, suggesting that cultural factors – consumer habits, trust in online payment systems – matter at least as much as GDP in this domain. The strongest difference emerged in public services, where higher income directly correlates with higher expectations of digital government, underscoring the decisive role of institutional trust.

Overall, the relationship between GDP and digital perceptions is non-linear and mediated by cultural factors such as institutional trust, uncertainty avoidance, and attitudes toward change (Rogers, 2003; Venkatesh et al., 2003), which partly account for the limited explanatory power of the models.

Digital Perceptions and EU Accession Date

H2 is also supported: EU accession date is significantly associated with perceptions of digital healthcare, e-commerce, and public services; no significant difference was found for communication.

Eastern European Enlargement member states express stronger expectations for digitalization in healthcare and e-commerce – domains where technology offers a genuine catch-up opportunity – yet are more guarded about the digitization of public services, reflecting lower institutional trust (Garashchuk et al., 2025; Radovanovic, 2013; Troitino, 2021). Post-Cold War accession states show the most cautious overall stance.

Individual Socioeconomic Background and Digital Perceptions

H3 is supported. The PC1 index shows a positive and significant effect across all four models ($\beta \approx 0.09$ – 0.10 ; $p < 0.001$). On the reverse-coded scale, this indicates that respondents satisfied with current digital infrastructure assign slightly lower importance to future development – suggesting that current digital satisfaction and perceived future priorities are related but distinct constructs.

The occupational pattern confirms the hypothesis. Manual workers, homemakers, the unemployed, retirees, and students show positive coefficients ($\beta = 0.11$ – 0.26 ; $p < 0.001$), reflecting lower perceived importance of future digitalization – consistent with their more limited current access to digital services (Petretto et al., 2024). Managers do not differ significantly from the self-employed reference group, suggesting comparable levels of digital integration across these groups (Venkatesh et al., 2003).

The education results are more nuanced. Contrary to Wyatt's (2008) typology of technology indifference, higher-educated respondents do not show reduced interest in future digitalization. Negative coefficients for secondary education ($\beta \approx -0.16$ to -0.19), higher education ($\beta \approx -0.22$ to -0.28), and those still studying ($\beta \approx -0.25$ to -0.32) indicate greater perceived importance across all four domains (all $p < 0.001$), consistent with TAM and Rogers' (2003) diffusion theory. Respondents without formal qualifications show the largest positive coefficients ($\beta = 0.40$ – 0.49 ; $p < 0.001$), indicating the lowest perceived importance – reflecting limited capacity to articulate digital expectations (Janssen & Estevez, 2013; OECD, 2016).

High-income country respondents show negative coefficients in several models ($\beta = -0.03$ to -0.14 ; $p < 0.05$), indicating greater perceived importance of digital development. Age and rural residence are positively associated with the reverse-coded outcome ($\beta \approx 0.003$ – 0.009 and 0.04 – 0.07 ; $p < 0.001$), reflecting lower perceived importance among older and rural populations (Garashchuk et al., 2025).

Limitations

Several methodological limitations must be considered when interpreting these results. The analysis is based on cross-sectional data from the 2024 SP551 Eurobarometer: although significant associations were observed between socioeconomic background variables and digital perceptions, causal conclusions cannot be drawn. Longitudinal panel data would allow more precise examination of whether positive assessments of digital infrastructure led to a more optimistic view of the future, or vice versa.

The low R^2 values (6.56–13.11%) indicate that the models capture only a fraction of the variance in digital perceptions. Missing variables – digital trust, cultural orientations, and personal values, including Hofstede-type national culture dimensions – partly account for the models' limited explanatory power.

Despite these limitations, the study makes a valuable contribution to understanding the social perception of digital technologies. Future research directions include longitudinal data collection, multilevel modeling, mixed-methods approaches, and deeper integration of cultural context.

Conclusion

Analysis of the 'European Citizens and the Digital Decade' Eurobarometer survey (SP551, 2024) confirms all three research hypotheses. Across all four domains, EU citizens express strong consensus on the future importance of digital technologies, while assessments of current digital infrastructure remain noticeably more cautious. This implementation gap – between expected and realized digitalization – is consistent across income groups and accession periods, and points directly to where policy attention is needed.

For H1, results clearly confirm that economic development is associated with digital perceptions, but not in a linear manner. High-income country respondents consistently gave the highest values, particularly for public services digitization. Yet citizens of middle-income countries gave lower ratings than those of low-income countries across several domains.

H2 results also showed significant differences. Post-2004 Eastern European Enlargement states expressed stronger expectations for digitalization (particularly in healthcare and e-commerce), treating it as a catch-up mechanism rather than a convenience. Post-Cold War accession states, by contrast, take a more cautious stance, especially toward digital public services, reflecting a persistent deficit in institutional trust.

The regression models for H3 revealed a clear pattern. Higher-educated respondents and those currently in full-time education attributed the greatest importance to future digital development across all four domains – a finding consistent with TAM and Rogers' diffusion theory, and contrary to Wyatt's typology of technology indifference. Manual workers, homemakers, the unemployed, retirees, and students showed lower perceived importance, reflecting limited current access to digital services rather than indifference toward technology. Respondents without formal qualifications exhibited the lowest perceived importance of future digitalization, suggesting that limited digital competence constrains the ability to articulate digital expectations.

The policy implications extend beyond statistical significance. In implementing the DDPP 2030, it is essential to address not only technological infrastructure but also the digital dimensions of social inequality. For disadvantaged and rural groups, digital services should be made available with local organizational support; for middle-income countries, building digital trust and institutional capacity deserves particular attention. The challenge facing European societies is ultimately social rather than technological: ensuring that all citizens – regardless of income, place of residence, or social position – can benefit from the digital

opportunities available to them, and that technological progress translates into genuine, broadly shared social benefit.

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