THE IMPACT OF DIGITAL QUALITY OF LIFE ON ARTIFICIAL INTELLIGENCE DEVELOPMENT: A CASE STUDY USING THE DQL AND AIRI INDEXES

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Abstract:
Research background: This study examines the relationship between Digital Quality of Life (DQL) and Artificial Intelligence (AI) readiness across European countries, utilizing the Digital Quality of Life (DQL) and AI Readiness Index (AIRI) as assessment tools.
Purpose of the article: The aim is to identify correlations and potential causal relationships, assessing how indicators of digital well-being, such as internet quality and e-governance, align with a nation's preparedness for AI integration. The research focuses on 39 European countries, selected for geographic diversity, economic status, and digital infrastructure, allowing for a comprehensive comparison.
Methods: Through correlation analysis and regression models, the study investigates how dimensions of DQL influence AI readiness. Findings reveal a high correlation between DQL and AIRI (0.8796), particularly with electronic governance (0.9338) and electronic infrastructure (0.8819), underscoring the importance of robust digital systems for AI adoption. Lesser but significant correlations were observed in internet quality and affordability, suggesting they contribute to digital quality but are not as directly associated with AI readiness. The regression analysis identifies key DQL dimensions (Electronic Infrastructure, Electronic Security, and Electronic Government) as significant predictors of AIRI, with an R^2 value of 0.9210, indicating high explanatory power.
Findings & Value added: These results highlight the importance of investing in digital infrastructure and cybersecurity to create an environment supportive of AI integration. The study suggests that countries with advanced digital infrastructures are better positioned for AI adoption, while those with lower DQL levels may face challenges in technological readiness. Findings emphasize the need for targeted policies to enhance DQL components, especially in regions lagging in digital advancements, to facilitate comprehensive AI integration and drive technological growth across Europe.

Keywords: digital quality of life; artificial intelligence readiness; digital infrastructure; e-government

JEL Classification: O33; O38; L86

1. Introduction

Digital quality of life (DQL) is an increasingly significant focus in today's technology-driven world, playing a crucial role in influencing a country's socio-economic environment and its capacity for innovation. This emphasis on DQL reflects a broader trend within social sciences, especially in the field of technology and development studies, where scholars highlight its growing impact on technological adoption and innovation outcomes, such as artificial intelligence (AI) advancement. According to (Silva et al., 2022) digital quality of life encompasses not only access to digital technologies but also the effectiveness of digital governance, privacy protections, and digital inclusion, all of which are fundamental for fostering an environment that supports AI development.

In examining how digital quality influences AI readiness, a recent study by Li et al. (2023) emphasizes that resistance to change can significantly impact a sector's readiness for AI, particularly in environments like the hospitality industry. This research highlights how task-oriented leadership and high-performance work systems serve as mediating and moderating factors, helping to address resistance and enhance AI readiness. While focused on a specific industry, these findings underline the importance of managing change resistance, a challenge that might also impact DQL's role in AI development at broader, societal levels. By fostering leadership and supportive systems, industries may better leverage DQL for advancing AI integration.

The goal of this study is to examine the relationship between digital quality of life and AI readiness across European countries, utilizing the DQL and AIRI indexes to assess how digital well-being indicators may align with a nation's preparedness for AI integration. Specifically, the study aims to uncover correlations and identify potential causal relationships, exploring the extent to which factors like digital infrastructure, internet connectivity, and online services contribute to AI readiness in various nations.

A deeper understanding of the relationship between digital quality and productivity has been explored in studies examining sectors like agriculture, where Soldic-Aleksic et al. (2024) demonstrate that AI adoption improves labor productivity by optimizing resources and enhancing efficiency across EU countries. Their analysis shows a positive relationship between the AI Readiness Index score and labor productivity, adding an economic perspective to the discussion of DQL.

The Digital Quality of Life (DQL) index and the Artificial Intelligence Readiness Index (AIRI) are two prominent measures employed to assess the readiness and quality of a country's digital environment and its AI infrastructure, respectively. The DQL index assesses parameters like internet affordability, electronic security, and the availability of digital government services, which contribute to an individual's experience within the digital domain. AIRI, on the other hand, measures a country's readiness to integrate AI into its economy and society, considering factors such as digital skills, technology adoption, and innovation infrastructure (2023 Digital Quality of Life Index, 2023).

Recent findings by Nzobonimpa and Savard (2023) further illustrate the complexities involved in AI adoption. They analyze how high readiness scores in AI often fail to align with responsible governance, raising critical concerns about equity, transparency, and accountability as essential components in the transition toward an AI-driven society. Their study emphasizes that true AI readiness should encompass ethical considerations, underscoring the nuanced relationship between DQL and AI development.

Recent research by Litvintseva and Karelin (2022) supports this by analyzing the impact of DQL on economic growth in Russian regions, showing that a higher digital quality of life positively influences socio-economic growth but also notes potential economic and institutional risks arising from digital transformations. Their study also emphasizes the importance of project management quality in regional digital projects, which is crucial for realizing the full benefits of DQL in economic outcomes.

Involvement of elderly populations in digital transformations has also become a pertinent focus in enhancing DQL. Barysheva et al. (2022), in a study conducted in Tomsk, highlight that while many elderly individuals show limited psychological readiness and motivation to adapt to digital technologies, their active involvement could foster inclusivity and improve digital experiences for all demographics. This is particularly important in ensuring that DQL benefits are shared across age groups, thus creating a robust digital society that supports AI advancements and broader socio-economic goals.

Moreover, Holden and Harsh (2024) analyze the socio-political impacts of data infrastructures in Africa, examining the complexities surrounding AI readiness, particularly within the labor sectors involved in AI data annotation. Their work underscores the historical and political contingencies that influence the DQL and AI infrastructure, contributing valuable insights into regional disparities in digital transformations.

Studies suggest that countries with high DQL scores typically provide fertile ground for AI development, as their environments support secure, accessible, and inclusive digital experiences. Kosasi et al. (2023) reinforce this by analyzing the relationship between digital AI technology and quality of life, using the UTAUT model to study Performance Expectancy, Effort Expectancy, and Use Behavior. Their findings indicate that digital AI has a strong influence on quality of life and underscores the need for policies enhancing both digital literacy and technological inclusivity, which may stimulate AI innovation.

In recent research, Mohamed et al. (2024) examine the role of social media in enhancing adolescents' digital life quality in the UAE, revealing significant positive impacts of social media on adolescents' DQL. Variations in social media preferences might correlate with different levels of digital experience quality, aligning with findings on DQL's influence on AI development. This suggests that digital inclusivity and accessible, engaging platforms foster higher adoption and innovation rates.

Addressing the interplay between DQL and digital security, Lebea and Leung (2024) explore risks associated with smart home devices and IoT, noting privacy concerns that may hinder broader adoption. They suggest a Smart Contracts framework for bolstering personal data protection, which may serve as a valuable model for DQL initiatives aimed at ensuring privacy and ethical data management in AI innovation.

Further research is warranted to examine how variations in digital quality impact long-term AI growth trajectories and to assess the broader socio-economic outcomes of these investments. As digital quality of life increasingly influences AI capabilities, understanding the nuances of these indices can be invaluable for policymakers aiming to enhance national competitiveness and innovation in the digital age.

2. Methodology

The presented contribution focuses on identifying the relationship between artificial intelligence readiness and digital quality of life in European countries. The AI Readiness Index and the Digital Quality of Life Index are used to examine these connections, aiming to assess

how the preparedness for AI integration aligns with indicators of digital well-being. Considering the aim of the paper, the following hypothesis was stated:

Hypothesis H1: *There is a statistically significant correlation between the rankings of European countries on the AI Readiness Index and the Digital Quality of Life Index, suggesting that higher levels of AI readiness are associated with improved digital quality of life*.

The research sample consists of 39 European countries, selected based on the availability of current data on the Artificial Intelligence Readiness Index (AIRI) and the Digital Quality of Life Index (DQL) for the year 2023. The criteria for selecting the countries include geographic diversity, economic status (developed and developing countries), and the robustness of digital infrastructure. This selection allows for a comprehensive comparison and analysis of technological readiness.

Countries such as France and Germany represent developed economies with a high level of digital infrastructure and innovative approaches in the field of AI, achieving high scores in both indices. Northern European countries, like Finland and Sweden, are characterized by innovative digital governance and internet access, contributing to their favorable evaluations. Central Europe, represented by countries such as Austria and Poland, shows varying readiness for AI and digital quality of life, with some countries striving to overcome regional disparities. Eastern European nations, including Ukraine and Bulgaria, face infrastructure challenges, but many are working to improve their digital environments. The inclusion of Balkan countries, such as North Macedonia and Albania, provides insight into the unique challenges faced by smaller nations in the realm of AI and digital skills.

To achieve the study's research goal, a correlation analysis will be conducted between various components of DQL and AIRI. This methodological approach was chosen to allow quantitative analysis of the relationship between AI readiness and digital quality of life and to identify the DQL factors most significantly influencing AIRI. By using correlation analysis, this study aims to quantify the strength and direction of associations between AI readiness and digital well-being indicators across countries.

Overall, this study seeks to gain a deeper understanding of the relationship between AI readiness and digital quality of life in Europe, focusing on identifying the key factors that influence technological development in individual countries.

Two key indices were selected to explore the relationships between AI preparedness and digital well-being: the AI Readiness Index and the Digital Quality of Life Index. Each index was chosen for its recognized reliability and comprehensive methodology, providing robust insights into the technological landscape of European countries. Each index is defined by distinct methodologies and structures, providing unique insights into the technological landscape of the selected European countries.

The AI Readiness Index examines the preparedness of governments to implement artificial intelligence (AI) in the delivery of public services to citizens. The index includes 39 indicators organized into 10 dimensions, which are structured into three main pillars: Government, Technology Sector, and Data & Infrastructure (Figure 1). In 2023, the analysis was expanded to rank 193 countries, an increase from the previous 181 countries. The aim of the AI Readiness Index is to provide valuable insights for the effective and responsible integration of AI into public services. **Government Pillar** assesses the diversity and effectiveness of AI strategies across nations. Despite a decline in the overall number of AI strategies released, a significant portion of new strategies is now originating from low- and lower-middle-income countries, underscoring the growing recognition of AI's potential. **Technology Sector Pillar** highlights disparities in AI capabilities between high-income and middle-income countries. High-income nations consistently outperform their lower-income counterparts, although several middle-

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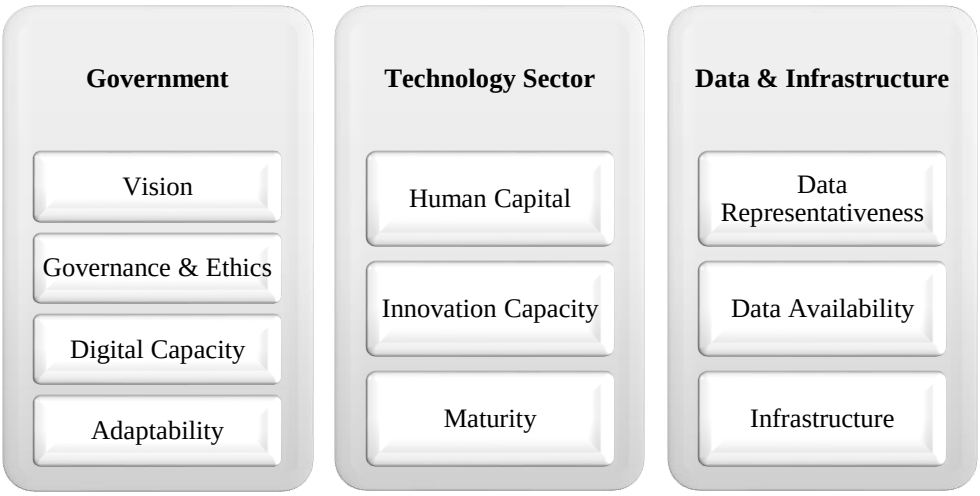
income economies, such as Malaysia, demonstrate exceptional performance, placing them among the top 50 countries globally. **Data & Infrastructure Pillar** reveals ongoing challenges related to the digital divide. While generative AI presents opportunities for lower-income nations, inadequate data and infrastructure can lead to reliance on foreign technologies, complicating efforts to address local needs. Strengthening these areas is crucial for ensuring equitable access to the benefits of AI (AI Readiness Index – Oxford Insights, 2024)

Figure 1: Pillars and dimensions of Government AI Readiness Index



Source: own processing

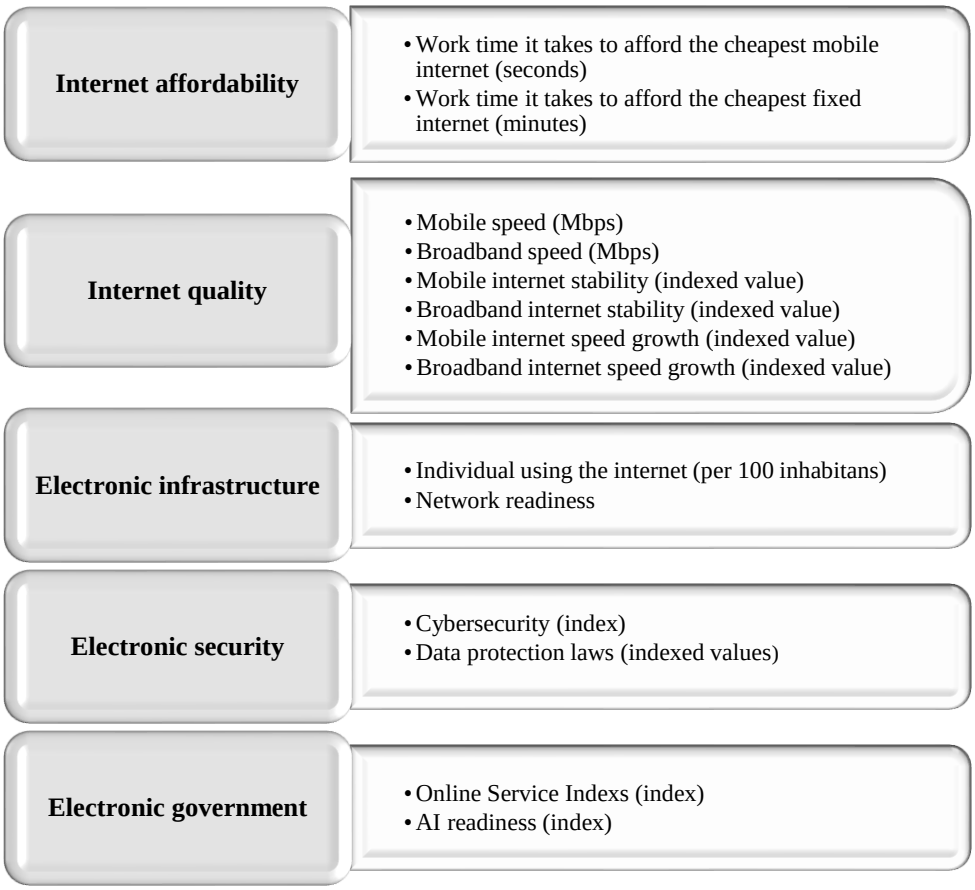
The Digital Quality of Life (DQL) Index offers insightful analysis of the factors affecting digital well-being across 121 countries. This index uniquely assesses a nation's digital quality of life through five fundamental pillars: internet affordability, internet quality, electronic infrastructure, electronic security, and electronic government (2023 Digital Quality of Life Index, 2023).

Internet affordability is a critical determinant, reflecting the amount of labor time individuals must invest to obtain reliable internet access. A lower affordability index correlates with improved digital well-being, whereas elevated costs can impede access to necessary digital resources. Internet quality, characterized by connectivity speed and stability, profoundly influences daily activities and work productivity. A higher quality of internet connectivity facilitates better communication and enhances the overall user experience. Electronic infrastructure plays an essential role in enabling daily internet usage across various domains, including education, e-commerce, and banking. A well-developed electronic infrastructure ensures that individuals can effectively engage in these activities. Electronic security evaluates the safety of online interactions and a country's readiness to counter cyber threats, thereby safeguarding user privacy and data integrity. E-government effectiveness is critical in minimizing bureaucratic hurdles and promoting transparency within public services, which ultimately enhances service efficiency and improves the overall quality of life for citizens. Collectively, these five pillars encompass 14 specific indicators (Figure 2), providing a comprehensive assessment of the overall digital quality of life in each country (2023 Digital Quality of Life Index, 2023).

The statistical programs Statistica and Gretl were used to process the research results, with methodology focusing on Pearson's correlation test and multiple regression analysis (OLS). This approach was designed to identify the relationship between artificial intelligence readiness and digital quality of life in European countries. To examine these connections, the AI

Readiness Index and the Digital Quality of Life Index were utilized, with the goal of assessing how preparedness for AI integration aligns with indicators of digital well-being.

Figure 2: Pillars and indicators of DQL Index



Source: own processing

3. Results

Figure 3 presents the Government AI Readiness Index values for all countries included in the analysis. The darker the color on the map, the higher the index score, indicating better preparedness for implementing and utilizing artificial intelligence. The highest-rated countries globally include the USA, Singapore, the United Kingdom, Finland, Canada, and France, while countries with the lowest scores include North Korea and Syria. For detailed information on individual rankings of European countries, refer to the notes provided below the figure.

The highest ratings among European countries were achieved by the United Kingdom (78.57), Finland (77.37), and France (76.07), indicating advanced readiness for AI integration within governmental structures and placing them as leaders in AI preparedness. Conversely, lower-rated countries include Albania (43.26), Moldova (42.97), Belarus (39.20), and Bosnia and Herzegovina (36.49), highlighting potential challenges related to technological development and the availability of skilled workers.

According to Lavrinenko et al. (2023), weaker rankings for certain countries may result from insufficient technological infrastructure and low levels of digitalization. The authors also highlight obstacles related to a lack of qualified personnel and regulatory environments, which often hinder AI development.

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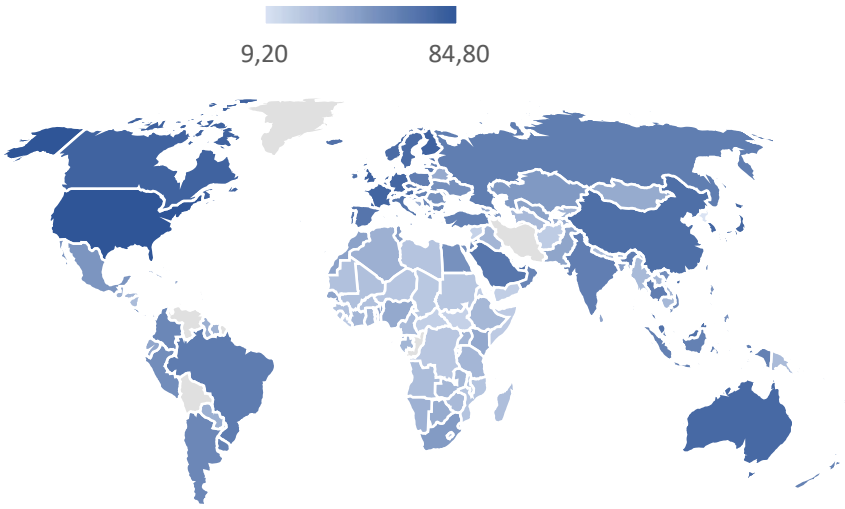
In the following Figure 4, the values of the Digital Quality of Life Index (DQL) are illustrated for all monitored countries around the world. The DQL indicator reflects the quality of life in terms of the availability and quality of internet services, electronic infrastructure,

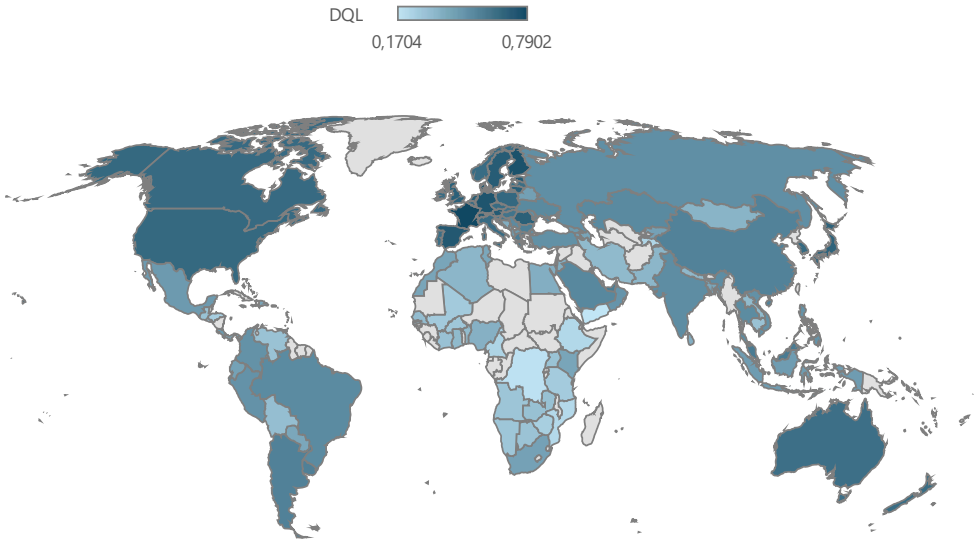
Figure 3: Government AI Readiness Index – World map



Note: Country rankings: 3rd United Kingdom, 4th Finland, 6th France, 8th Germany, 10th Netherlands, 11th Denmark, 13th Norway, 14th Sweden, 15th Austria, 17th Estonia, 20th Ireland, 22nd Luxembourg, 24th Switzerland, 25th Portugal, 26th Italy, 27th Spain, 28th Belgium, 31st Czech Republic, 33rd Malta, 35th Lithuania, 36th Poland, 39th Slovenia, 43rd Cyprus, 44th Slovakia, 45th Hungary, 48th Latvia, 51st Bulgaria, 52nd Greece, 57th Serbia, 60th Ukraine, 64th Romania, 70th Croatia, 78th Montenegro, 83rd North Macedonia, 89th Albania, 90th Moldova, 99th Georgia, 107th Belarus, 117th Bosnia and Herzegovina
Source: own processing according to AI Readiness Index – Oxford Insights (2024)

security, and e-government. The higher the DQL, the better the conditions for digital life in that country.

Figure 4: Digital Quality of Life Index – World map



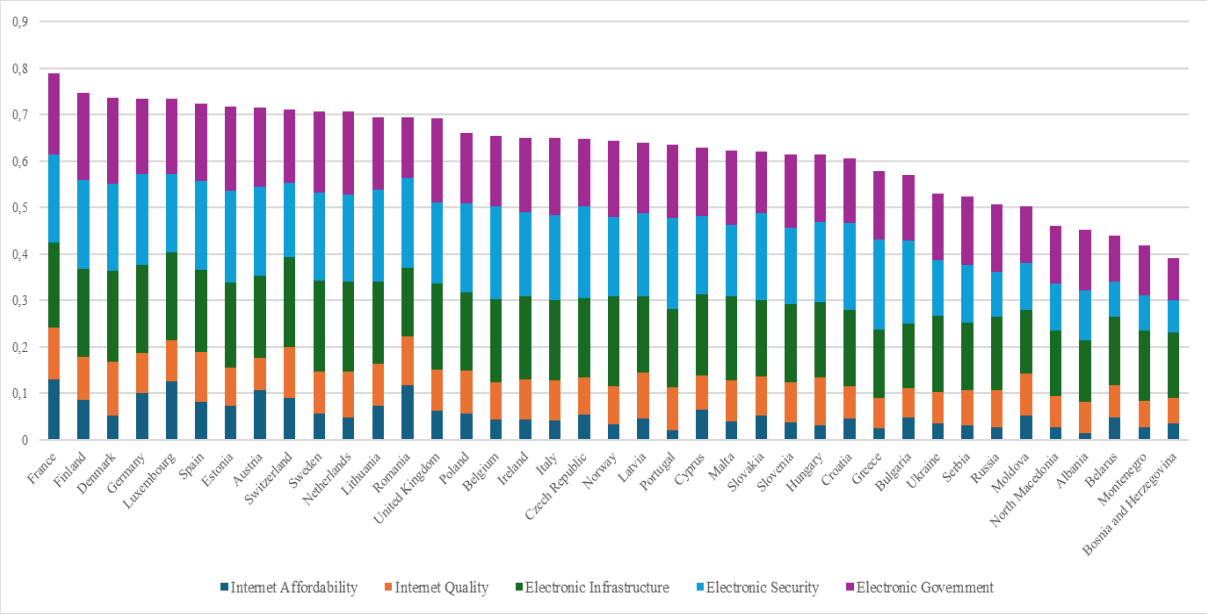
Source: own processing according to 2023 Digital Quality of Life Index (2023)

Among the countries with the highest DQL values is France, which achieved a score of 0.7902, ranking first in both Europe and all monitored countries worldwide. Following closely

are Finland (0.7482) and Denmark (0.7377), which demonstrate a high level of internet availability and quality, as well as developed electronic services and security systems. The top of the ranking is predominantly occupied by European countries, which exhibit a high quality of digital services, infrastructure, and accessibility. Among all monitored countries, European nations occupy the top 10 positions, with non-European countries appearing only at 11th place (Singapore), 16th and 17th places (Japan and Israel), and 20th (USA). At the lower end of the list, where values drop below 0.5, countries such as India and Russia are found, whose scores indicate challenges in digital accessibility and infrastructure. Among European countries with the lowest values are Bosnia and Herzegovina (0.3906), Montenegro (0.4199), Belarus (0.4407), Albania (0.4524), and North Macedonia (0.4614). These countries exhibit inadequate quality of electronic infrastructure and security. At the very bottom of the global ranking are countries like the Democratic Republic of Congo (DQL: 0.1825) and Yemen (DQL: 0.1704), where digital infrastructure and quality of life in the digital space face significant limitations.

Figure 5 present a comparison of the observed European countries in the Digital Quality of Life Index and its pillars.

Figure 5: DQL index and pillars - ranking



Source: own processing

In Western Europe, besides France, countries such as Germany (0.7357), the Netherlands (0.7064), and Sweden (0.7079) achieve the best values. These countries benefit from a high level of internet quality, electronic security, and the availability of public electronic services, thereby strengthening their digital competitiveness.

Conversely, Central and Eastern European countries, such as Hungary (0.6148), Slovakia (0.6217), and Poland (0.6614), achieve lower values compared to Western European countries, indicating the need for further development of digital infrastructure and security measures.

The graphical representation of the ratings of individual DQL pillars (Internet accessibility, internet quality, electronic infrastructure, security, and e-government) provides a more detailed view of the digital challenges and successes. For instance, the United Kingdom and Finland achieve above-average values in electronic infrastructure and internet quality, while countries such as Moldova and Serbia exhibit noticeable gaps in electronic security.

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This analysis highlights significant disparities among various European regions, with Western European countries showing markedly higher DQL values than those in Eastern Europe and the Balkans.

Based on the evaluation of the graphical results, it is evident that there are significant differences in the readiness of countries for the integration of artificial intelligence and the quality of digital life in Europe. For instance, countries like France and Germany, characterized by developed economies and a high level of digital infrastructure, achieve high ratings in both indices. Conversely, countries such as Ukraine and Bulgaria face challenges related to infrastructure, but many of them are working to improve their digital environments. This raises the question of the extent to which readiness for artificial intelligence is connected to the quality of digital life.

The aim of this analysis is to investigate the relationship between the AI Readiness Index and the Digital Quality of Life Index in European countries. Based on the information presented, we have established the hypothesis H1: There is a statistically significant correlation between the rankings of European countries on the AI Readiness Index and the Digital Quality of Life Index, suggesting that higher levels of AI readiness are associated with improved digital quality of life.

To verify the existence of a statistically significant relationship between the values of the AI Readiness Index (AIRI) and the Digital Quality of Life Index (DQL) of the surveyed European countries, we employ the Pearson correlation coefficient and linear regression analysis. The resulting correlation coefficients, presented in the correlation matrix (Table 1) and in Figure 6, illustrate the strength and direction of the relationship between these two indices.

Table 1: Correlation matrix

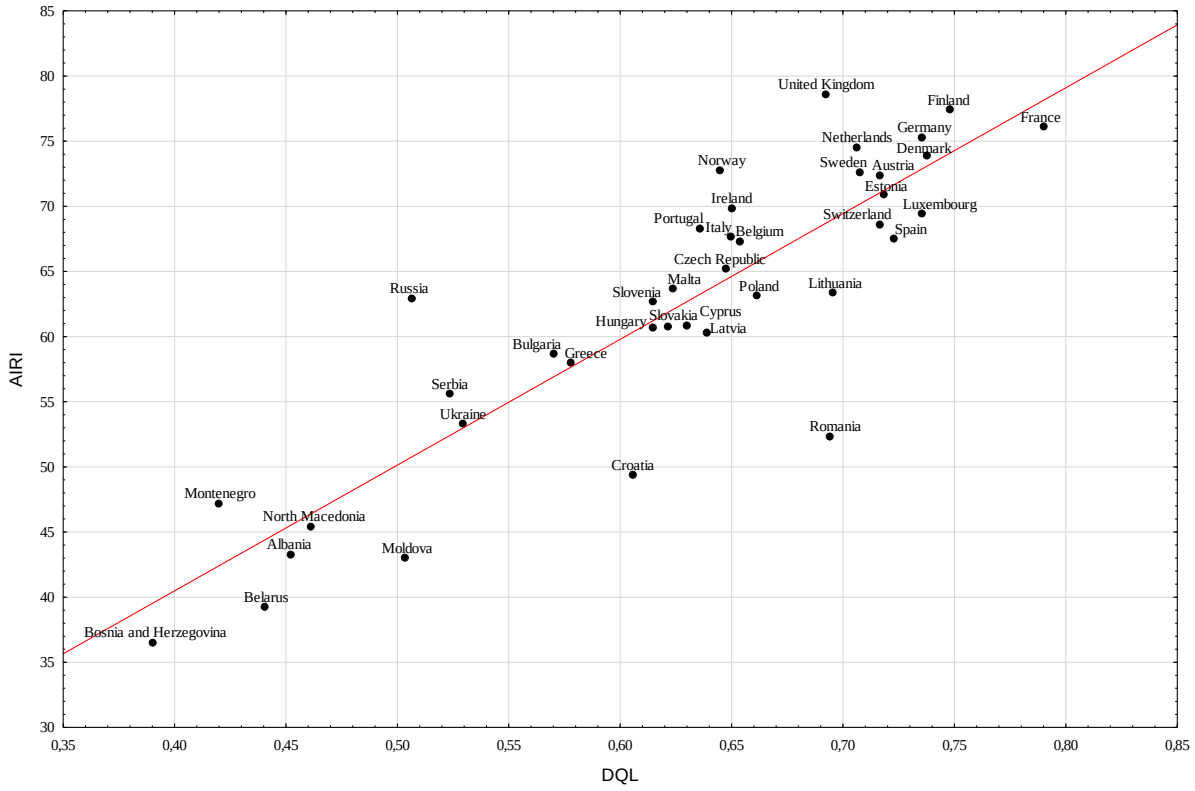
	DQL	Internet Affordability	Internet Quality	Electronic Infrastructure	Electronic Security	Electronic Government
AIRI	**0.8796**	**0.4388**	**0.5861**	**0.8819**	**0.7487**	**0.9338**
Government	**0.7798**	**0.3268**	**0.5250**	**0.7582**	**0.6839**	**0.8967**
Technology Sector	**0.7989**	**0.4209**	**0.5274**	**0.8570**	**0.6499**	**0.8226**
Data and Infrastructure	**0.8580**	**0.5078**	**0.5681**	**0.8369**	**0.7302**	**0.8230**
Vision	**0.6335**	0.2054	**0.3822**	**0.5737**	**0.6470**	**0.7190**
Governance and Ethics	**0.6994**	0.3066	**0.5661**	**0.7398**	**0.5349**	**0.7985**
Digital Capacity	**0.7563**	**0.4429**	**0.5353**	**0.7218**	**0.5542**	**0.8877**
Adaptability	**0.6352**	**0.3621**	**0.4487**	**0.7271**	**0.4029**	**0.7593**
Maturity	**0.7723**	**0.4418**	**0.4921**	**0.8206**	**0.6413**	**0.7473**
Innovation Capacity	**0.8034**	**0.4540**	**0.4968**	**0.8862**	**0.6247**	**0.8379**
Human Capital	**0.6624**	0.2690	**0.5025**	**0.6860**	**0.5639**	**0.7201**
Infrastructure	**0.8506**	**0.5088**	**0.5944**	**0.8298**	**0.7387**	**0.7638**
Data Availability	**0.6802**	**0.3620**	**0.4555**	**0.6496**	**0.5774**	**0.7139**
Data Representativeness	**0.6842**	**0.4421**	**0.3889**	**0.6830**	**0.5564**	**0.6816**

Source: own processing in Statistica

The correlation coefficient between AIRI and DQL is notably high at 0.8796, indicating a strong positive relationship. It is important to note that all highlighted values in bold are statistically significant at the alpha level of 0.05. This suggests that countries with greater readiness for artificial intelligence tend to exhibit better digital quality of life. Specifically, the highest correlations within the DQL dimensions are seen in Electronic Government (0.9338) and Electronic Infrastructure (0.8819), demonstrating that robust digital governance and infrastructure are closely linked with AI readiness. Additionally, dimensions such as Internet Quality (0.5861) and Internet Affordability (0.4388) also show positive correlations, although they are comparatively weaker, indicating that while these factors contribute to digital quality, they are not as directly associated with AI readiness.

The color scale of the correlation coefficients indicates that the darker the green, the stronger the correlation, while lighter colors approach a correlation coefficient of 0. A medium level of correlation, approximately 0.5, is represented in yellow. Conversely, the lower correlations between certain dimensions—such as Vision (0.6335) and Governance and Ethics (0.6994)—

Figure 6: Correlation between the AI Readiness Index and the Digital Quality of Life Index



Source: own processing in Statistica

imply that while they still relate to AI readiness, they may not play as crucial a role in influencing digital living conditions. This analysis aims to assess the extent to which improvements in AI readiness align with enhancements in digital quality of life. Thus, if a country exhibits a high AIRI, it is likely to also possess a high DQL, indicating a comprehensive digital environment that supports technological integration. In contrast, if a country shows low values in both indices, it suggests that challenges in technological readiness may be coupled with poor digital living conditions, limiting overall progress.

To verify the significance of each correlation coefficient, we decided to use a linear regression model. Table 2 presents the resulting characteristics. The results in Table 2 confirm the hypothesis H1 of the existence of statistically significant relationships between the AI Readiness Index (AIRI) and the Digital Quality of Life Index (DQL) and its dimensions for the surveyed European countries.

In this analysis, DQL is treated as the independent variable, while AIRI serves as the dependent variable. The objective of the regression analysis is to determine which factors within the DQL framework most significantly influence AI readiness. Key factors to be examined include Internet Affordability, Internet Quality, Electronic Infrastructure, Electronic Security, and Electronic Government, as these elements are likely to be critical in shaping a country's ability to integrate and benefit from artificial intelligence.

The findings presented in Table 2 indicate that the dimensions of the Digital Quality of Life Index (DQL) significantly influence the AI Readiness Index (AIRI). Each regression model

assesses the impact of DQL and its five pillars—Internet Affordability (IA), Internet Quality (IQ), Electronic Infrastructure (EI), Electronic Security (ES), and Electronic Government (EG)—on AI readiness.

Table 2: Estimation of regression models

Dependent variable	Independent variable	Const. α	Coefficient	p-value	R^2	White´s test for heteroscedasticity
AIRI	DQL	1.8723	96.5345	0.0000	0.7738	0.8252
AIRI	Internet Affordability (IA)	52.8857	166.0680	0.0052	0.1926	0.8465
AIRI	Internet Quality (IQ)	25.5046	433.8860	0.0000	0.3435	0.8596
AIRI	Electronic Infrastructure (EI)	−27.3102	530.1680	0.0000	0.7778	0.0543
AIRI	Electronic Security (ES)	28.0480	208.6050	0.0000	0.56054	0.8635
AIRI	Electronic Government (EG)	−7.1506	458.4820	0.0000	0.8719	0.1866

Note: In the last column, we present the p-values of the performed White´s test for heteroscedasticity with null hypothesis: heteroscedasticity not present.

Source: own processing

The analysis reveals a positive relationship between AIRI and each independent variable, suggesting that improvements in these dimensions enhance a country's readiness for artificial intelligence. Notably, the coefficient values for Internet Quality and Electronic Infrastructure highlight their critical roles in promoting greater digital engagement and facilitating AI adoption. As internet quality improves, it enables better access to information and services, which are essential for leveraging AI technologies. Moreover, the positive coefficients for Electronic Security and Electronic Government indicate that a robust digital environment characterized by effective and secure online services instills confidence in AI implementation. The statistical significance of these variables reinforces the notion that countries with stronger DQL dimensions are more likely to exhibit higher AI readiness.

Overall, these results underscore the importance of investing in digital infrastructure, security, and governance to foster an environment conducive to AI integration, ultimately supporting the development of more advanced digital economies.

The resulting regression model, which includes all dimensions of DQL, is represented as follows:

$$AIRI = -18{,}9056 + 13{,}4698IA - 24{,}3329IQ + 203{,}911EI + 35{,}7062ES + 278{,}503EG \quad (1)$$

Here, Internet Affordability (IA) and Internet Quality (IQ) do not exhibit statistical significance in influencing AIRI, as indicated by their respective p-values. Conversely, Electronic Infrastructure (EI), Electronic Security (ES), and Electronic Government (EG) show significant relationships with AIRI, supporting their importance in shaping a country's readiness for AI. The model has an R^2 value of 0.9210, indicating a strong explanatory power.

Moreover, the results from White's test for heteroscedasticity suggest that heteroscedasticity is not present, reinforcing the reliability of the regression analysis. These findings highlight that while the dimensions of Electronic Infrastructure, Electronic Security, and Electronic Government are crucial for enhancing AI readiness, Internet Affordability and Internet Quality may require further investigation to understand their roles better within the context of digital quality and AI integration.

4. Discussion

The findings of this study underscore the critical relationship between Digital Quality of Life (DQL) and the readiness of countries to embrace artificial intelligence (AI), as measured by the AI Readiness Index (AIRI). The strong positive correlations identified between various

dimensions of DQL, such as internet quality, electronic safety, e-governance, and electronic infrastructure, and AIRI highlight the fundamental role that digital living conditions play in determining a country's preparedness for AI adoption. This insight aligns with existing literature that posits a robust digital ecosystem as a prerequisite for technological advancement (Sui et al., 2024). According to Bruneckiene et al. (2021), competitiveness is one of the essential factors influencing the level of economic development. Moreover, recent research indicates that the integration of financial technologies, or FinTech, enhances access to digital services, further contributing to the improvement of DQL and fostering an environment ripe for AI development (Kwilinski, 2023).

Furthermore, the regression analysis further elucidates how specific elements of DQL directly influence AI readiness. For instance, the results indicate that improvements in internet quality and electronic safety are particularly significant predictors of a country's capacity to integrate AI technologies. These findings suggest that policymakers should prioritize investments in digital infrastructure and cybersecurity measures as a means to foster an environment conducive to AI development. This perspective is reinforced by studies (Aduba et al., 2023; Emuron et al., 2024) showing that FinTech advancements not only increase financial accessibility but also improve the overall digital infrastructure, which is crucial for AI integration. The notable disparity between countries with high DQL and those with lower values points to an urgent need for targeted interventions in regions lagging in digital advancements (Martincevic, 2022).

Additionally, the study reveals that enhancing e-governance and electronic infrastructure not only boosts the DQL but also creates a fertile ground for innovation and technological growth. This is significant as it implies that efforts to improve digital quality can have a multiplicative effect on a country's overall development trajectory. Investments in FinTech, particularly in emerging markets, are vital for bridging these gaps and facilitating comprehensive digital transformation (Hewage et al., 2024). Countries that invest in these areas are likely to see accelerated advancements in AI capabilities, ultimately leading to enhanced competitiveness on a global scale (Jencova et al., 2023).

In light of these findings, it becomes clear that a multifaceted approach is required to tackle the challenges faced by nations with lower DQL. Collaborative efforts among governments, private sectors, and international organizations are essential to share best practices and resources. This collaboration could help bridge the digital divide, enabling more countries to engage in AI development effectively.

5. Conclusions

This study highlights the crucial interplay between Digital Quality of Life (DQL) and artificial intelligence readiness (AIRI), revealing that higher DQL scores correspond to increased readiness for AI integration. The strong correlations and significant regression outcomes emphasize that investments in digital infrastructure, internet quality, and electronic safety are vital for countries aiming to enhance their AI capabilities.

However, this research is not without limitations. The study's reliance on existing indices may overlook localized factors that influence DQL and AIRI, such as cultural, economic, and regulatory environments. Furthermore, the dynamic nature of technology means that these findings may evolve as new developments in AI and digital technology emerge.

Future research should seek to explore the nuances of this relationship further, perhaps by conducting case studies on specific countries or regions to understand better how localized

efforts can impact DQL and AIRI. Additionally, longitudinal studies could provide insights into how changes in digital quality over time influence AI readiness.

In summary, while this study sheds light on significant trends and correlations, it also emphasizes the need for continued investigation into the barriers hindering digital advancement, particularly in developing countries. By addressing these challenges, nations can position themselves better to leverage the transformative potential of AI. These findings are consistent with previous research indicating that digital transformation plays a key role in enhancing the competitiveness of countries.

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