DIGITALIZATION OF THE TAX SYSTEM IN EUROPE

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Abstract

In the context of the highly increasing dispersion of technology in the European economic environment, the interaction of citizens with the public sector is changing rapidly. European countries have significant differences on the tax collection, generating economic effects under a complex fiscal system. The purpose of this study is to analyse the effects of digitalization on the VAT compliance gap in the European Union countries.

The analysis considers the VAT compliance gap as the dependent variable and examines the influence of E-government activities of individuals via websites as an independent variable, as a relevant indicator of digitalization. The research approach methodology consisted in EViews Granger causality tests for the collected data from the EU sources, for a period of ten years (2012-2021).

The study results revealed relevant insights and latest information about the connection between e-government users and the VAT compliance gap. This relationship is particularly notable as it emphasizes the potential of digitalization in uplifting tax compliance and improving VAT collection.

Studying the impact of digitalization on VAT compliance, the research is intent to provide to the economist, policymakers, and students a deeper understanding of the technology's impact on tax policies and economic outcome.

Keywords

Digitalization, Tax System, Tax Collection, VAT Compliance Gap, e-Government users, State Revenue, Taxation

JEL Classification

H710

Introduction

The increasing ubiquity of digitalization in contemporary economies has turned into a disruptive force that significantly affects the financial system components. According to the European Commission's dataset, the Digital Economy, and Society Index (DESI) 2022 offers an in-depth indication of the digital revolution taking place in EU's member states. The DESI composite index illustrates the differences and advancements in e-government adoption across EU nations by combining data on multiple digital

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performance aspects. Although is reflecting significant information about the degree of digitalisation in the EU countries, this index could not be considered in this present study, because the information is only accessible as of 2017.
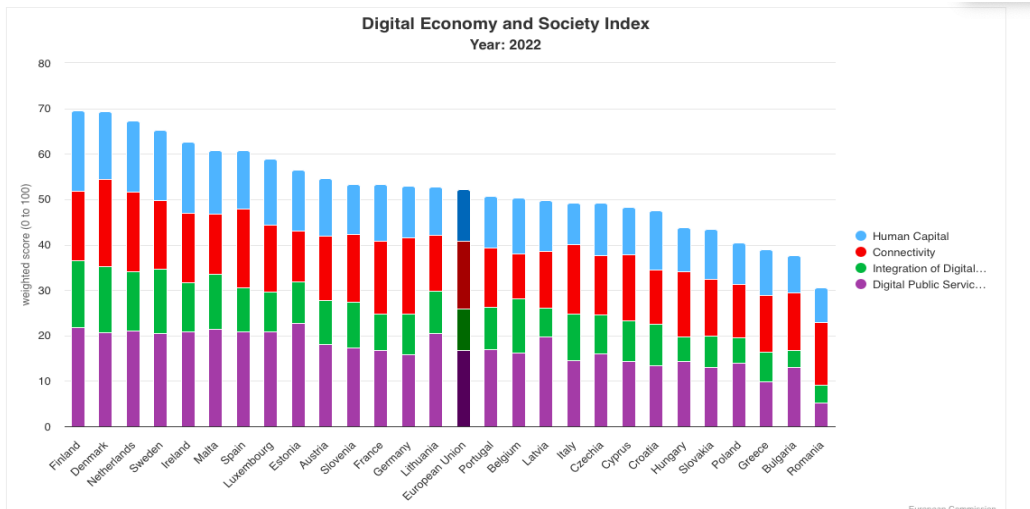

Figure no. 1: Digital Economy and Society Index
Source: European Commission site, DESI 2022 Composite Index

From the macroeconomic perspective, tax collection has a key role in economic policy and funding the public services. On average, in the European Union, tax revenues are present 40% of GDP, with significant variation between member states. For example, Denmark, Sweden, and France following their social comprehensive welfare systems and important levels of public spending, have the highest tax-to-GDP ratios. On the other side, Ireland, Romania, and Bulgaria are reporting the lowest tax-to-GDP ratios, around 25-30%. The budget deficit is also varying between EU member states, while there are countries managed to maintain the recommended rate of 3% of GDP, other countries, like Italy and Spain, confront with higher deficits mostly due to economic stagnation but also to high debts levels.

When a government collects sufficient taxes in relation with to its expenditures, has the capacity to fund public services, social programs, infrastructure, and other investments without borrowing. If tax revenues are low due to tax, rates, tax evasion or a narrow tax base, the government will not cover their spending leading to budged deficits. Therefore, the collection of taxes through a digital, facile, and transparent channel is playing a crucial role in the overall process of taxation impacting tax-to-GDP and budget deficit. A high VAT compliance gap, percentage of the GDP, indicates a shortfall in collecting revenues from taxes, which could otherwise use to support the public services or to reduce the budget deficit.

1. Review of the scientific literature

The rising importance of digital public administration, effects on governance and the effectiveness derives from an extensive analysis of the existing literature. There are studies that analysis the relation between digitalisation and tax evasions, nevertheless, there is an absence of quantitative studies, across all EU nations that address a direct discussion of digitalization and VAT gap fluctuations.

McGee and Achim (2024) paper, which analysis at Polish public perceptions of tax evasion offers background information on VAT gap differences. Their study has a limited relevance proving the relationship between digitalization and tax compliance across EU countries, because it does not explicitly examine the influence of digitalization or compare VAT disparities across EU nations limiting applicability to this study hypothesis. Even though, the paper is offering insights about compliance behavior in a European context, it has a single-country approach and there is an absence of a direct discussion of digitalization.

The European Commission, for example, highlighted in its 2022 proposals under the "VAT in the Digital Age" project that e-invoicing and digital reporting might help reduce the VAT fraud, particularly intra-EU "carousel fraud." By reforming VAT regulations, the new measures are expected to reduce fraud-related revenue losses by up to €11 billion annually and make compliance easier for cross-border companies. From this perspective, the research on the connection between digitalization and VAT compliance is necessary, especially since digital initiatives like e-invoicing and real-time reporting impact VAT disparities within European nations. The idea that digitalization may lower VAT non-compliance and close revenue gaps is supported by the body of current research. The EU's continuous efforts to digitalize VAT regulations, especially through the ViDA plans, have generated discussion over the measures' proportionality and possible unforeseen repercussions. Papis and Sroka (2024) express concerns in "Questioning the Proportionality of the ViDA Rules on the Platform Economy" that although these regulations are intended to simplify VAT collection and lower fraud, they might place unnecessary tension on digital platforms and force compliance costs on smaller companies. This is consistent with Matesanz's (2023) analysis, which contends that smaller operators who lack the means to manage complicated tax responsibilities may be disproportionately impacted by the growing responsibility placed on digital platforms to collect VAT.

In contrast, Lasiński-Sulecki's (2023) study on Poland's digitalization of VAT reporting identifies both advantages and disadvantages. Although digital reporting increases compliance and transparency, it also presents substantial implementation difficulties that may put a strain on smaller businesses, casting doubt on the viability of widespread EU-wide adoption in the absence of sufficient support measures. The wider ramifications of the ViDA initiative are also covered by Wille (2023), who contends that although digital reforms are essential for updating VAT compliance, the scope and speed of implementation may exceed the capacity of certain companies to adjust, which could result in discrepancies in compliance throughout the EU. Therefore, these analyses point to the necessary for more complex rules that take into consideration the differing capacities of various stakeholders to comply, even while the drive for digitalization is well-intentioned.

According to Citigroup (2024) report, digital projects can promote transparency and streamline government activities (Citigroup, 2024). Moreover, Citi's interpretations regarding the digitalization of governments point to major gains in service delivery and operational effectiveness, underlining the broader implications for both domestic and global governance practices (Citigroup, 2024).

The existing literature continuously emphasizes how digitalization is reforming tax administration, especially regarding VAT compliance. According to the OECD (2023), an advanced data management is crucial to the efficiency, transparency, and taxpayer usability that are increased when digital tools are integrated into tax systems.

Similarly, by decreasing tax evasion and improving reporting accuracy, automation and real-time data reporting enhance compliance and close the VAT gap, according to the European Central Bank (2011). These conclusions are supported by the IMF (2023), which points out that advancements in digital technology improve reporting and monitoring.

Moreover, to assure full benefit of the rewards of digital tax administration, the OECD (2021) emphasizes the significance of addressing cybersecurity threats. In addition to the existing above-mentioned studies, this present research helps in this regard by quantitatively examining the relationship between differences in VAT compliance and e-government usage across European nations, proving empirical evidence to support ongoing digitalization in tax system.

According to Valenduc and Vendramin (2017), digitalization increases the efficiency and transparency of tax systems by fusing innovative ideas with well-known patterns. According to Queiroz et al. (2021), this change is essential since it allows for better data management and analytics by adapting traditional business models with digital tools. In the public sector, digitization may result in enriched datasets and improved citizen contact by supporting efficient decision-making in the face of massive data sets (Carlsson, 2018). Additionally, research by Teera and Hudson (2004) and Pessino and Fenochietto (2010) indicate that tax revenue and efficient use of tax bases are positively correlated, indicating that the use of digital tools can maximize tax collection efforts.

All these above-mentioned sources indicate that although digitisation improves tax administration and compliance, the infrastructure and implementation quality are play also a significant role in its effectiveness. Moreover, by quantitatively analyzing how differences in e-government usage affect VAT compliance across European nations, this research adds new empirical insights to this existing literature and demonstrates a connection between tax performance and digitalization.

2. Research methodology

The objective of this study is to determine if digitalisation represents a significant independent factor that influence VAT compliance gap in the EU member states. Revealing new findings on how digitalisation could positively impact the economy, this study advances the discussion regarding how taxes are evolving in the digital age. The expectation is that a country's VAT compliance gap to be significantly influenced by the degree of digitalisation of that country. The integration of digital technologies may bring about notable transformations in a nation's tax collecting, compliance, and overall economic transactions. This research intends to explain how digital interaction with the

public institution in regards with tax collection, influences VAT compliance gap in European Union countries. The study analysed data about e-government users and VAT compliance gap, extracted from Eurostat data base, for a 10-year period 2012-2021, for all the European Union countries.

The research question addressed by this study is *"How does the adoption of digitalisation, e-government users, impact the VAT compliance gap in the European Countries?"*

- **Rationale for the study**

The necessity to comprehend how digitalization could improve the interaction with the public sector and to understand the variable influencing the VAT compliance gap in European countries is what encouraged this research. There is still absence of reach on the impact of digitalization in a time of immediate technological developments and financial volatility.

The purpose of this study is to fill in this knowledge gap and give policymakers, academics, and interested parties a solid foundation upon which to develop effective fiscal policies, both theoretical and practical. The insights gained from this study should bring impact the discussion around taxation and sustainable economic growth, facilitating informed decision-making within the framework of the European Union economy.

The rapid growth in the worldwide usage of the internet has significantly changed our everyday reality and business transactions Around two-thirds of the world's population, or 5.4 billion people, used the internet in 2023. This impacted how people travel, work, shop, and media consumption behaviours (Citi Research, 2024). The ICT sector is rising at a rate that is around three times higher than the OECD countries' overall economic growth, which is revealing the rise of the digital economy.

- **Problem statement**

Despite major efforts in recent years to improve tax administration and close the VAT gap in the European Union countries there are still substantial differences across states. The analysed data from 2012 to 2021 shows that there are significant regional variations in the VAT compliance gap, which is the percentage difference between predicted and actual VAT receipts, throughout the EU. For instance, VAT differences are continuously large in countries like Malta and Romania, while they have been remarkably smaller in Sweden and Finland. The purpose of this study is to examine the relationship between these discrepancies in VAT compliance and the improvement made in e-government services, as demonstrated also by the DESI 2022 data. Its specific goal is to establish whether the VAT compliance gap could diminish by improving administrative effectiveness and implementation of digital public services.

Understanding the precise effects of the independent variable— the degree of digitization, becomes essential considering the changing economic landscape and insufficient analysis makes it more difficult for policymakers to create successful fiscal plans. This problem statement establishes the framework for the investigation into the

possible effects of digital services on tax effectiveness by tying differences in VAT compliance to developments in e-government.

- **Research approach**

The research approach is based on a quantitative analysis to methodically observe the causality of digitalisation on VAT compliance gap in European Union countries. The study uses EViews Granger causality tests to find out the impact of digitalization on VAT gap. Through analysing the mentioned quantitative variables, the study aims to identify the interactions that lead to the observed effect of digitalization on VAT compliance throughout the geopolitical landscape of Europe.

Figure no. 2: Research framework
Source: author computation

The study analyses annual evolution of VAT compliance gap and E-government users from 20212 to 2021. E-government users is representing the independent variable and VAT compliance gap represents the depended variable.

For visualisation of the evolution of the variables in scope, the collected and analysed data were visually represented in graphics using data as percentages.

In order to assess rigorously the casual relationship of the two variables, for testing in EViews, the variables were transformed in stationary series.

In scope of the study were the European Union countries and among these, e-government users caused a change in VAT compliance gap that proved to be significant in Bulgaria, Czechia, Estonia, Germany, Hungary, Italy, and Slovenia.

- **Hypotheses formulation**

The hypotheses are defined in order do offer a structured framework of the study:

- Null Hypothesis (H0): The digitalization (e-government users) does not contribute significantly to disparities in VAT compliance gap among European countries.
- Alternative Hypothesis (H1): Differences in the digitalization (e-government users) in European countries are associated with significant variations in VAT compliance gap.

The hypothesis formulation was defined to deliver a structured framework for evaluating the causality between digitalization, the independent variable allowing for

validation and leading to an understanding of the VAT Gap dynamics in European countries.

- **Data processing and analysis**

Granger causality test in EViews was used as part of the analysis to analyze at the causality between the VAT gap and the number of e-government users in each of the European nations covered by the study. The purpose of this test was to ascertain if, in varying national settings, changes in e-government adoption might predict variations in the VAT gap. The outcomes of the analysis offer significant viewpoints on the possible direction of effect that these elements may have within the digital and economic contexts of the European nations in scope

- **Validity and reliability**

The data regarding the variables obtained from Eurostat for the VAT compliance gap and e-government users assure the analysis's reliability. The e-government users' data, as defined in Eurostat's metadata, were extracted from standardized surveys accepted in all EU member states, ensuring that the metrics on the adoption of digital government are consistent and comparable.

More concisely, as mentioned in the Eurostat metadata, the VAT gap data is gathered through exacting actions that take into consideration a range of variables influencing tax compliance. The data is part of the transparent documentation and methodology that Eurostat provides, available for in-depth analysis and understanding in a diversity of European contexts.

3. Results and discussion

The study analysed the influence of digitalization on VAT compliance gap for all the European Union countries and for the countries detailed below and, the results of the calculation discovered a significant causality for the following countries:

- **BULGARIA**

The analysis results indicate that E-Government users Granger cause VAT compliance gap, with an F-statistic of 10.6018 and a probability of 0.0436, demonstrating a significant causal effect. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 0.32235 and a probability of 0.7468, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0436 in the Granger causality test.

Table no. 1: Granger Causality Test results – Bulgaria

Null Hypothesis:	Observations	F-Statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	10.6018	0.0436
VAT Compliance Gap does nor Granger Cause E-Government Users		0.32235	0.7468

Source: Eurostat database, author calculation

- **CZECHIA**

The analysis results indicate that E-Government users Granger cause VAT compliance gap, with an F-statistic of 7.33007 and a probability of 0.0700, demonstrating a significant causal effect. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 0.42214 and a probability of 0.6894, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0700 in the Granger causality test.

Table no. 2: Granger Causality Test results – Czechia

Null Hypothesis:	Observations	F-Statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	7.33007	0.0700
VAT Compliance Gap does nor Granger Cause E-Government Users		0.42214	0.6894

Source: Eurostat database, author calculation

- **ESTONIA**

The analysis results indicate that E-Government users Granger cause VAT compliance gap, with an F-statistic of 8.55254 and a probability of 0.0576, demonstrating a significant causal effect. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 0.28043 and a probability of 0.7733, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0576 in the Granger causality test.

Table no. 3: Granger Causality Test results – Estonia

Null Hypothesis:	Observations	F-Statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	8.55254	0.0576
VAT Compliance Gap does nor Granger Cause E-Government Users		0.28043	0.7733

Source: Eurostat database, author calculation

- **GERMANY**

The analysis results indicate that E-Government users Granger cause VAT compliance gap, with an F-statistic of 21.6797 and a probability of 0.0165, demonstrating a significant causal effect. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 3.78646 and a probability of 0.1511, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0165 in the Granger causality test.

Table no. 4: Granger Causality Test results – Germany

Null Hypothesis:	Observations	F-Statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	21.6797	0.0165
VAT Compliance Gap does nor Granger Cause E-Government Users		3.78646	0.1511

Source: Eurostat database, author calculation

- **HUNGARY**

The analysis results indicate that E-Government users Granger cause VAT compliance gap, with an F-statistic of 7.53499 and a probability of 0.0676, demonstrating a significant causal effect. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 0.07563 and a probability of 0.9289, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0676 in the Granger causality test.

Table no. 5: Granger Causality Test results – Hungary

Null Hypothesis:	Observations	F-Statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	7.53499	0.0676
VAT Compliance Gap does nor Granger Cause E-Government Users		0.07563	0.9289

Source: Eurostat database, author calculation

- **ITALY**

The analysis results indicate that E-Government users Granger cause VAT compliance gap, with an F-statistic of 8.59186 and a probability of 0.0573, demonstrating a significant causal effect. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 0.05081and a probability of 0.9513, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0573 in the Granger causality test.

Table no. 6: Granger Causality Test results – Italy

Null Hypothesis:	Observations	F-statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	8.59186	0.0573
VAT Compliance Gap does nor Granger Cause E-Government Users		0.05081	0.9513

Source: Eurostat database, author calculation

- **SLOVENIA**

The analysis results indicate that E-Government users Granger show a marginal causal effect on VAT compliance gap, with an F-statistic of 6.19990 and a probability of 0.0860, which is near significance but does not meet standard limits. Nevertheless, VAT compliance gap does not Granger cause E-Government users, as evinced by an F-statistic of 0.29561 and a probability of 0.7635, which implies no significant causal association in this trend.

An increase in digitalisation, e-government users is likely to determine a decrease in the VAT compliance GAP, as proven by a p-value of 0.0860 in the Granger causality test.

Table no. 7: Granger Causality Test results – Slovenia

Null Hypothesis:	Observations	F-Statistic	Probability
E-Government Users does not Granger Cause VAT Compliance Gap	8	6.19990	0.0860
VAT Compliance Gap does nor Granger Cause E-Government Users		0.29561	0.7635

Source: Eurostat database, author calculation

The Granger Causality Test analysis presented in the EU countries delivers important latest information about the relationship between e-government users and the VAT compliance gap. Particularly, there is confirmation to imply that the adoption of e-government services has a causal effect on closing the VAT compliance gap in the examples of Czechia, Bulgaria, Estonia, Germany, Hungary, Italy, and Slovenia. This association is especially important since it shows how digitization can improve tax compliance and reduce revenue losses related to VAT.

The F-statistics and associated probability indicate that the null hypothesis—that is, the suggestion that e-government users are not the reason for the VAT compliance gap—can be rejected at various levels of significance in these countries. For example, in Czechia, the adoption of e-government is a significant driver of decreasing the VAT gap, as suggested by the F-statistic of 21.6797 with a probability of 0.0165. Like Germany and Bulgaria, other nations reveal significant causality as well, although at marginally higher probability levels.

Nerveless, none of the countries under research demonstrated a substantial opposite causal relationship between the VAT compliance gap and the number of e-government users. The absence of reverse causality implies that although e-government services can be successful in closing the VAT gap, shifts in the VAT compliance gap do not always translate into more people using e-government services.

The idea that digitalization improves tax performance is supported by the Granger causality study results, which show a consistent pattern across EU nations: a decrease in the VAT compliance gap is associated with an increase in e-government users. With an F-statistic of 10.6018 and a probability of 0.0436, for example, Bulgaria showed a substantial causal effect, which is consistent with earlier study by Teera and Hudson (2004), who found that higher compliance rates are correlated with more efficient tax administration. These results are also consistent with previous research that highlights the beneficial effects of digital tools on tax compliance (OECD, 2023; ECB, 2011). With differing levels of statistical significance, such patterns are seen in Czechia, Estonia, Germany, Hungary, Italy, and Slovenia. In the public sector, digitalization may

result in enriched datasets and improved citizen contact by allowing efficient decision-making against of substantial data sets (Carlsson, 2018).

Furthermore, research by Teera and Hudson (2004) and Pessino and Fenochietto (2010) point to that tax revenue and efficient usage of tax bases are positively correlated, indicating that the use of digital tools can maximize tax collection efforts. By quantitatively analyzing how differences in e-government usage affect VAT compliance across European nations, the current research offers empirical insights into the connection between tax performance and digitalization. According to Matesanz (2023), who addresses the roles of digital platforms in VAT collection, these findings are consistent with the larger body of research on the effects of digitalization on tax compliance, supporting the idea that better digital frameworks can lead to better tax compliance outcomes.

Overall, the study's findings highlight how important e-Government is to improving VAT compliance throughout the EU and demonstrate a model change in tax administration towards the use of digital technologies. Public attitudes regarding tax evasion in Poland are highlighted in the McGee and Achim (2024) study, which also underlines how compliance is influenced by social norms and the objectivity of the tax system. This supports the research findings that in EU nations, like Germany and Bulgaria, a greater use of e-Government results in a smaller VAT compliance gap.

In conclusion, these results emphasize how important e-government programs are to improving VAT compliance in the EU. Czechia, Bulgaria, Estonia, Germany, Hungary, Italy, and Slovenia are good instances for nations that have not embraced digitalization completely. They could be able to reduce their VAT gaps correspondingly by supporting and investing in e-government services, which would increase overall tax compliance and strengthen their financial position.

4. Limitation of the study

- The analysis depends on the comprehensiveness and quality of e-government adoption measures and VAT gap data. The dependability of the findings could be impacted by differences in data collection techniques or reporting requirements throughout EU nations.
- Granger causality tests can indicate directional associations, but they cannot prove correlation. This is the difference between causation and correlation. The analysis may not take into consideration other unknown factors that could be influencing both digitalization and VAT compliance.
- Due to the restricted timeframe of the data, the study may not fully represent the long-term impact of e-government projects and the impacts of digitalization on VAT gap reduction may not be immediate.

- The administrative capabilities, digital infrastructure, and economic development of EU member states vary significantly from one another. These variations could result in different effects of digitalization on the VAT gap, which would make it challenging to extrapolate results to other nations.
- Economic recessions, adjustments to VAT rates, or policy changes may have a dispersed impact on VAT compliance and may interact in an unexpected manner with digitalization initiatives. These external influences are not taken into consideration in this study.

Conclusions

This study concludes by emphasizing the important theoretical ramifications of digitalization on VAT compliance and proving a direct relationship between increasing e-Government use and closing VAT compliance gaps in EU nations. These results add to the body of research by supporting the allegations made by academics like Teera and Hudson (2004) on tax performance and by providing further information about how digitalization can improve compliance.

Practically, these findings demonstrate that to increase tax compliance, policymakers must fund digital infrastructure and support e-Government programs. Nevertheless, the study contains limitations, such as the short time span of available data on digitalization and variations in data quality among nations. Furthermore, the analysis mostly ignores the larger socioeconomic issues that can affect tax compliance conduct in favor of focusing on the causal relationship. To improve information in this developing field, future research should focus on examining these socioeconomic factors and evaluating the long-term effects of digitalization on VAT compliance in various contexts, building on the seminal work of academics like Pessino and Fenochietto (2010) and McGee and Achim (2024).

Several recommendations should be considered to improving tax collection in EU countries through digitalization:

- EU members should make investments to upgrade their e-government services and digital infrastructure, especially those with larger VAT gaps. Enhanced digitalization can lower administrative costs, increase compliance, and streamline tax collecting procedures.

- The European Union should think about offering resources and tailored assistance to nations that have greater VAT disparities and lower adoption rates for e-government. This could entail exchanging best practices from nations with more developed digital economies, providing financial support for digital enterprises, or offering technical assistance.

- Digitalization projects ought to be combined with more comprehensive tax reform programs. This involves making certain that digital tools are easy to use, available to all taxpayers, and backed by solid legal foundations that encourage adherence to the law.

Encourage digital literacy among enterprises and the public in addition to infrastructural improvements. Making sure that e-government services are usable by all parties involved is crucial to optimizing the effect of digitalization on VAT.

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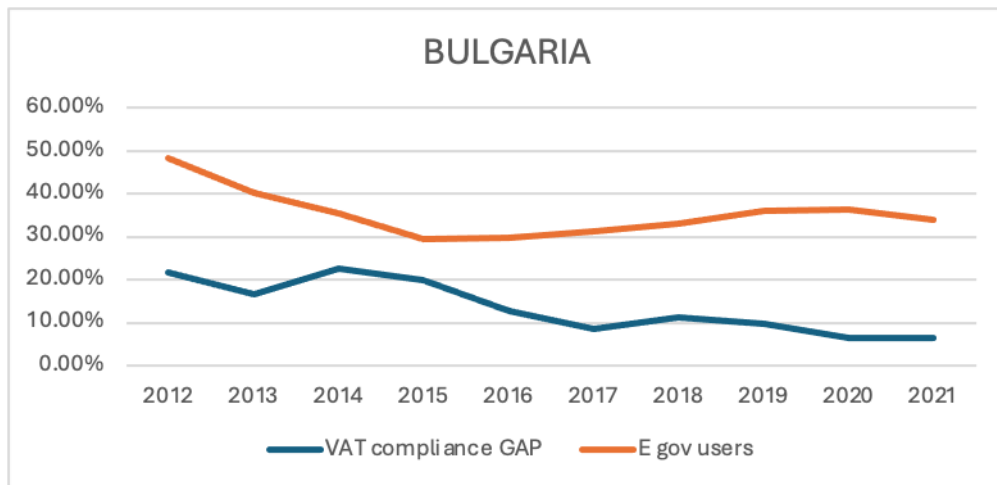*The influence digitalization VAT compliance gap*

- **BULGARIA**

Figure no. 3: Percentage of VAT Compliance Gap and E-Government users in Bulgaria, 2012-2021
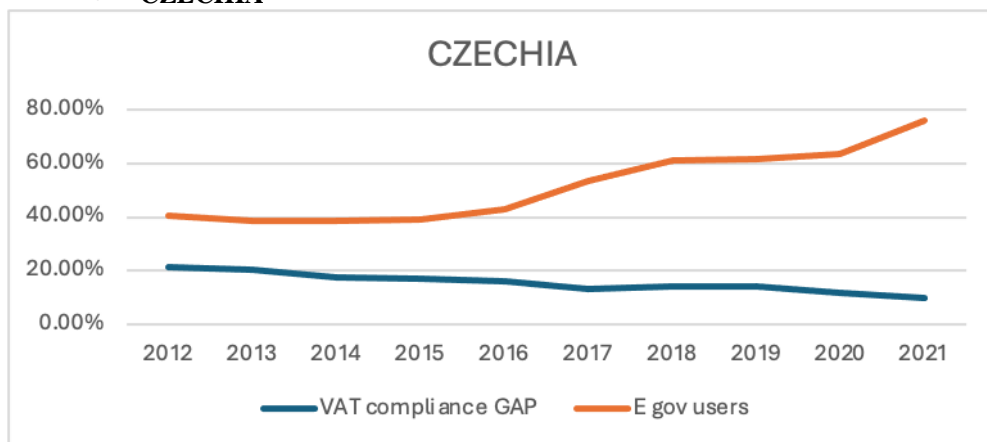*Source: author computation*

- **CZECHIA**

Figure no. 4: Percentage of VAT Compliance Gap and E-Government users in Czechia, 2012-2021
Source: author computation
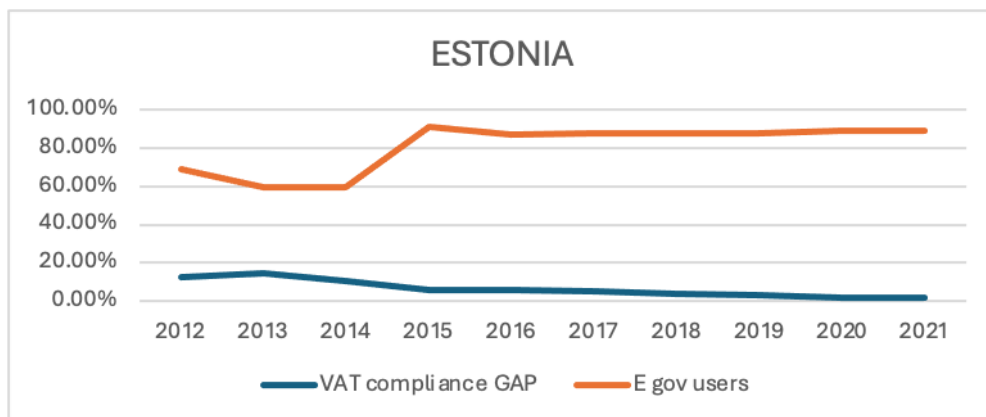
- **ESTONIA**

Figure no. 5: Percentage of VAT Compliance Gap and E-Government users in Estonia, 2012-2021
Source: author computation

- **GERMANY**

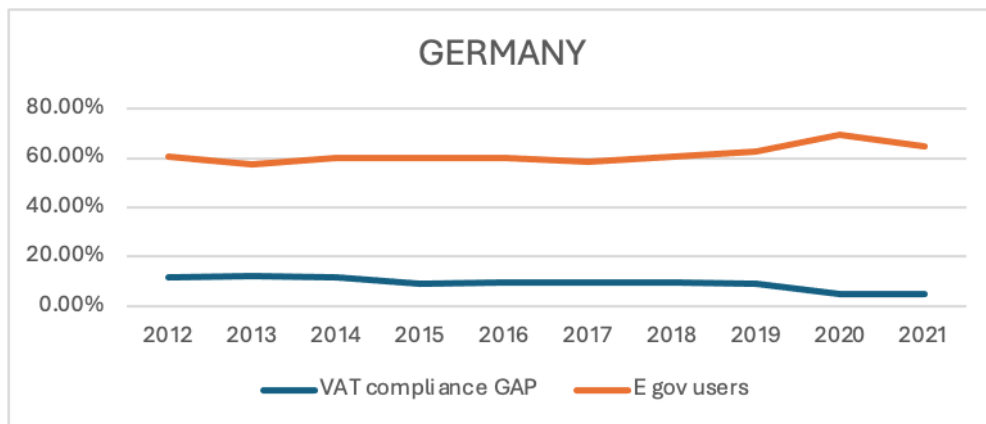**Figure no. 6: Percentage of VAT Compliance Gap and E-Government users in Germany, 2012-2021**
Source: author computation

- **HUNGARY**

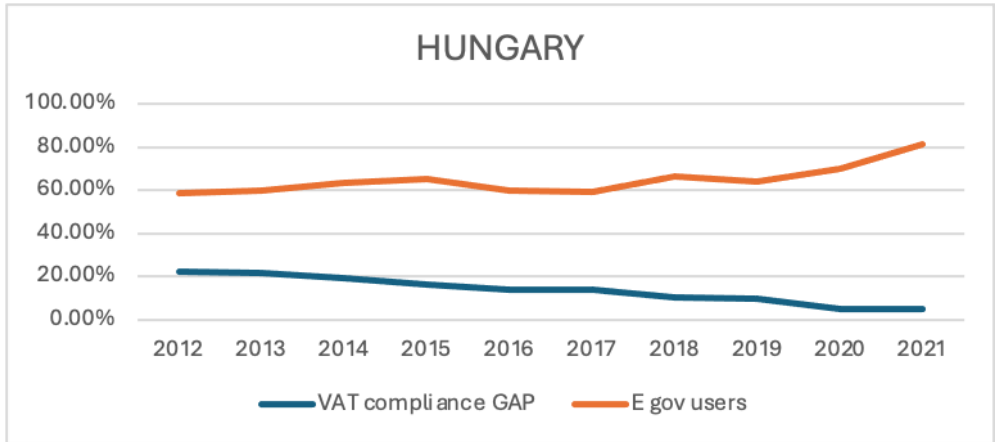**Figure no. 7: Percentage of VAT Compliance Gap and E-Government users in Hungary, 2012-2021,** *Source: author computation*
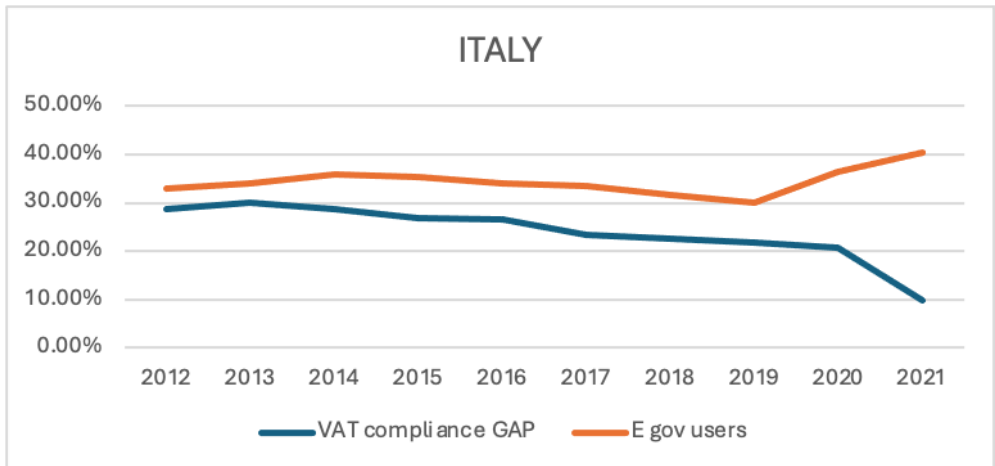
- **ITALY**

Figure no. 8: Percentage of VAT Compliance Gap and E-Government users in Italy, 2012-2021
Source: author computation
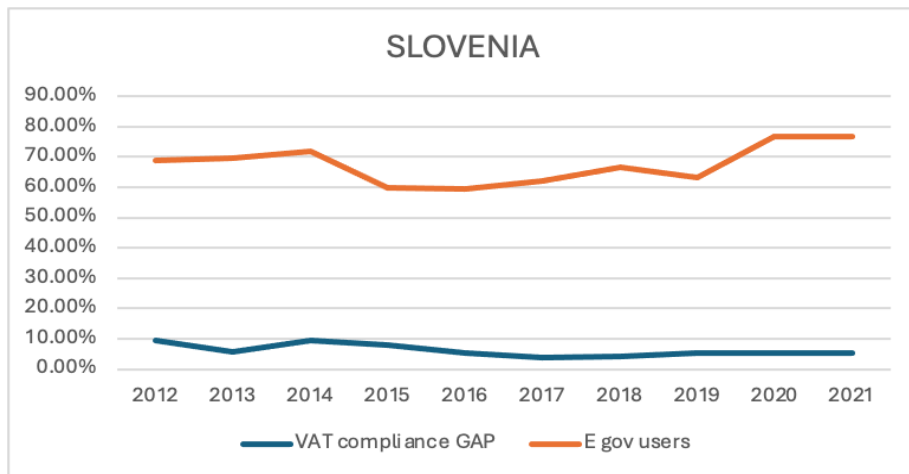
- **SLOVENIA**

Figure no. 9: Percentage of VAT Compliance Gap and E-Government users in Slovenia, 2012-2021
Source: author computation

Eurostat database extract – VAT Compliance Gap and E-Government users, 2012-2021

Country	Year	VAT compliance GAP	E gov users	Delta VAT compliance	Delta E gov users
Bulgaria	2012	21.80%	48%	-4.30%	-1.37%
Bulgaria	2013	16.70%	40%	-5.10%	-8.20%
Bulgaria	2014	22.50%	35%	5.80%	-4.70%
Bulgaria	2015	19.90%	30%	-2.60%	-6%
Bulgaria	2016	12.68%	30%	-7.22%	0%
Bulgaria	2017	8.47%	31%	-4.20%	1%
Bulgaria	2018	11.32%	33%	2.84%	2%
Bulgaria	2019	9.68%	36%	-1.64%	3%
Bulgaria	2020	6.31%	36%	-3.37%	0%
Bulgaria	2021	6.31%	34%	0.00%	-2%
Czechia	2012	21.30%	41%	3.10%	3.64%
Czechia	2013	20.20%	39%	-1.10%	-1.98%
Czechia	2014	17.70%	39%	-2.50%	0.29%
Czechia	2015	16.86%	39%	-0.84%	0%
Czechia	2016	16.02%	43%	-0.84%	4%
Czechia	2017	13.13%	53%	-2.89%	10%
Czechia	2018	14.05%	61%	0.92%	8%
Czechia	2019	14.23%	61%	0.18%	0%
Czechia	2020	11.90%	64%	-2.33%	2%
Czechia	2021	10.00%	76%	-1.90%	12%
Estonia	2012	12.60%	69%	0.10%	0.09%
Estonia	2013	14.20%	60%	1.60%	-9.52%
Estonia	2014	10.50%	59%	-3.70%	-0.34%
Estonia	2015	5.80%	91%	-4.70%	32%
Estonia	2016	5.59%	87%	-0.21%	-4%
Estonia	2017	5.19%	88%	-0.41%	0%

Estonia	2018	4.00%	88%	-1.18%	0%
Estonia	2019	3.27%	88%	-0.74%	0%
Estonia	2020	1.80%	89%	-1.47%	1%
Estonia	2021	1.80%	89%	0.00%	0%
Germany	2012	11.70%	61%	9.90%	-28.55%
Germany	2013	11.90%	57%	0.20%	-3.55%
Germany	2014	11.80%	60%	-0.10%	2.78%
Germany	2015	9.20%	60%	-2.60%	0%
Germany	2016	9.37%	60%	0.17%	0%
Germany	2017	9.26%	59%	-0.12%	-2%
Germany	2018	9.42%	61%	0.17%	2%
Germany	2019	8.97%	63%	-0.45%	2%
Germany	2020	4.76%	69%	-4.21%	6%
Germany	2021	4.76%	65%	0.00%	-4%
Hungary	2012	22.20%	59%	17.44%	-6.36%
Hungary	2013	21.60%	60%	-0.60%	1.36%
Hungary	2014	19.10%	63%	-2.50%	3.33%
Hungary	2015	16.50%	65%	-2.60%	2%
Hungary	2016	14.16%	60%	-2.34%	-5%
Hungary	2017	14.27%	59%	0.11%	0%
Hungary	2018	10.18%	67%	-4.09%	7%
Hungary	2019	9.82%	64%	-0.37%	-3%
Hungary	2020	5.09%	70%	-4.73%	6%
Hungary	2021	5.09%	81%	0.00%	11%
Italy	2012	28.70%	33%	23.61%	-48.52%
Italy	2013	30.00%	34%	1.30%	1.04%
Italy	2014	28.60%	36%	-1.40%	1.98%
Italy	2015	26.90%	35%	-1.70%	-1%
Italy	2016	26.52%	34%	-0.38%	-1%
Italy	2017	23.33%	33%	-3.19%	0%
Italy	2018	22.58%	32%	-0.75%	-2%

Italy	2019	21.81%	30%	-0.77%	-2%
Italy	2020	20.83%	36%	-0.98%	6%
Italy	2021	9.70%	40%	-11.13%	4%
Slovenia	2012	9.30%	69%	-0.40%	28.47%
Slovenia	2013	5.70%	70%	-3.60%	0.89%
Slovenia	2014	9.60%	72%	3.90%	2.10%
Slovenia	2015	7.80%	60%	-1.80%	-12%
Slovenia	2016	5.35%	59%	-2.45%	-1%
Slovenia	2017	3.82%	62%	-1.53%	3%
Slovenia	2018	4.29%	67%	0.47%	4%
Slovenia	2019	5.51%	63%	1.22%	-3%
Slovenia	2020	5.48%	77%	-0.03%	13%
Slovenia	2021	5.48%	77%	0.00%	0%

Table no 7: VAT Compliance Gap and E-Government, 2012-2021

Source: Eurostat, Main tax aggregate VAT GAP database:

https://ec.europa.eu/eurostat/cache/metadata/en/gov_10a_taxag_esms.htm; Eurostat,

E-government users database:

https://ec.europa.eu/eurostat/cache/metadata/en/isoc_i_esms.htm