

European Commission Digitalisation: Strategy Meets Policy

RINSE DIJKSTRA, University of Twente, The Netherlands

ABSTRACT - The European Commission is increasingly introducing digitalisation policies in the European Union according to its digital strategy. This research aims to provide a critical analysis of these digitalisation policies' alignment with their respective digital strategy objectives. It is crucial to analyse the alignment of these digitalisation policies because of the high level of societal impact and the position of the European Union in the global digital landscape. First, some past and future policies are analysed for their alignment with strategy. Secondly, the efficiency of implementing selected policies in low-DESI (Digital Economy and Society Index) member states compared to high-DESI member states is analysed using case studies. Findings show that alignment between policies and their respective strategic objectives is high, because of the use of multiple policies to satisfy the overall objective. There seems to be no evidence of a difference in implementation efficiency between low- and high-DESI member states. Finally, the paper provides a conclusion and recommendations for further work.

Additional Key Words and Phrases: European Commission, Digitalisation, Strategy, Policy, DESI, European Union

1 INTRODUCTION

In a recent news article on the website of the European Commission (EC), a proposal was introduced for, amongst other things, updated drivers licence requirements [14]. One of the items included in the proposal is a digital driving licence which supposedly makes it easier to replace, renew or exchange a European Union (EU) driving licence, as well as for non-EU drivers to exchange their licence for an EU instance. This is an example of a digitalisation effort made by the EC, of which there are plenty of other examples such as the abolition of mobile phone roaming charges within the EU and some other states [57]. The EC itself is also 'going with the times', as its own digital strategy [13] focuses strongly on digitalising its own internal processes, such as administration affairs, and subsequently allows for digital-ready policy making.

As an example of the current digital agenda active in the EU, the EC introduced a general digital strategy for digital policy-making within the EU [6] back in 2020. The main purpose of the strategy is that proposed digital transformations should work for the benefit of European residents, while also allowing the EU to take their own route to a digital transformation. Its main pillars are the following:

- Technology that works for people
- A fair and competitive economy
- An open, democratic and sustainable society

This strategy is in line with that of the Digital Single Market which puts the focus on growing the digital economy within the EU and harmonising laws and regulations across EU member states [20].

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The purpose of this paper is to critically analyse digitalisation policies introduced by the EC to assess whether these policies align well with the general digital strategy of the EU. This is extremely relevant to assess given that policies introduced by the EC are to be introduced in the entire EU. Thus, they have a rather high societal impact. Also, for digitalisation in the EU, it is important to keep up with other global powers such as the United States and China. For example, the largest successful startup companies such as Google and Alibaba are from other parts of the world [17], while the EU does not host many successful global startups. Also, indices such as I-DESI point out that digitalisation overall is significantly more advanced in the United States [18].

2 PROBLEM STATEMENT

The main goal of this research is to assess the alignment of digitalisation policies with the EU digital strategy. In this part of the paper, goals are defined and subsequently, research questions are posed to reach these goals.

2.1 Goals

Within EU digital agendas, different pillars have their own sets of strategic objectives which, in theory, satisfy the upholding of the main pillars. The level of alignment of digitalisation policies with their respective strategic objectives is to be assessed based on these different pillars. If the policies indeed align well with the strategy (digital agenda), digitalisation policies would match these strategic objectives.

Additionally, the implementation of some past digital policies is analysed to assess whether proposed digital policies can actually be implemented effectively in EU member states. The focus is on member states with a low Digital Economy and Society Index (DESI), which is an index introduced by the EC to rank member states based on their overall digitalisation level [17]. The ranking factors used in this index are:

- Human capital, which measures the digital skills and -development of inhabitants of the country.
- Connectivity, which measures the availability to the public of both mobile and fixed broadband connections.
- Integration of digital technology, which measures the integration in business and e-commerce.
- Digital public services, which measures the use of digital solutions in the public sector.

2.2 Research Questions

The research questions which answer the goals of this research are as follows:

- RQ1 To what extent do digitalisation policies proposed by the European Commission align with the overall European Union digital strategy?

RQ2 How large is the difference in the efficiency of implementation of European Commission digitalisation policies between high-DESI and low-DESI member states?

2.3 Hypothesis

The hypotheses (expected results) of the research questions in Section 2.2 are as follows:

- (1) It is expected that the proposed digitalisation policies by the EC align well (see Section 4.1 for an explanation of the level of alignment in the context of this research question) with the EU's digital strategy. After all, the EC itself plays a large role in defining the strategy. The strategy should subsequently be a guideline for introduced digitalisation policies.
- (2) While alignment with the overall digital strategy might be high, it is expected that there will occur difficulties with implementing digitalisation policies in low-DESI member states compared to high-DESI member states. This is hypothesised for the reason that the level of digital advancement in these member states is lower, for example in terms of digital infrastructure and human capital according to the DESI.

3 RELATED WORK

To provide context and showcase the foundation on which this research was built, this chapter goes over the most relevant research streams with regard to the two research questions posed. Papers were found via several search engines such as Semantic Scholar and Web of Science. The keywords used developed over the course of the literature search, given that new insights also led to new inquiries. The most important searches contained the following keywords/search queries: European Union Digitalisation/Digitalization, European Union Strategy, EU Digital Strategy, European Union Digital Transformation, Digital Strategy Alignment.

Three research streams, namely EU strategy, digitalisation and the digital divide, are covered in this chapter. A short summary of these topics is given to provide an appropriate amount of knowledge about the context of this research.

3.1 EU (Digital) Strategy

The EU remains an interesting international actor from the global perspective [54]. There exist many fields in which the EC pursues strategies to create policies. For example, the EU is an effective player in the field of climate strategising and policy-making [4, 33]. Given that the EU is a large global player, and is thus involved in a significant amount of policy-making and strategising, there exists a large amount of literature assessing practically any strategy which the EU implements. The focus is on the digital strategy given that that is relevant to this research.

The largest focus of the digital agenda is on the Digital Single Market Strategy (DSMS) and the policies which result from it. Interesting to note is that the EC started to introduce regulations rather than directives to create European unity in the digital landscape [3], examples of which are the General Data Protection Regulation (GDPR) and the Digital Services Act (DSA). Member states are mandated

to introduce regulations as they are explained in their respective legal documents, while directives are less binding. In the past few years, the DSA and the Digital Markets Act (DMA) are the largest efforts in digital policy-making. The DSA mainly protects citizens by preventing exposure to illegal content and harmonising the digital ruleset across the EU [43], while the DMA mainly serves to regulate the powerful position which Big Tech companies such as Facebook currently possess [44]. Both of these acts clearly play well into the DSMS by harmonising the digital laws across the EU.

In order to evaluate the level of alignment between digital strategy and policies coming forth as a result, the definition of strategic alignment is given. Strategic alignment of the IT strategy with the organisational strategy is a well-developed field of research going back to 1993 when Henderson et al. made a model defining different strategies for digitalising an organisation [22]. The idea was that one could define IT strategies based on existing business strategies, or do so vice versa. An interesting parallel between the EU digital strategy and IT strategy in the business sphere can be drawn here, given that the digital agendas largely revolve around reacting to changes in the global digital landscape.

3.2 Digitalisation

Digitalisation (or digital transformation) can be summarised as “the changes associated with the application of digital technology in all aspects of human society” [50], in contrast with ‘digitisation’, which is the transformation of existing non-digital data to digital data. Most papers on digitalisation seem to deal with technological innovations (i.e. new technologies) while there is not much research on the broader impact of it on organisations and/or society [23].

Digitalisation is a phenomenon impacting every aspect of society and business [2]. Among other things, it offers many possibilities for innovation, among which business model innovation [47], and the achievement of the Sustainable Development Goals of the United Nations [56]. Also, productivity should grow as a result of digitalisation, although it might harm the employment rate [1].

3.3 The Digital Divide within the EU

The term ‘digital divide’ is used to describe the gap between people who can leverage the power of digitalisation and/or the internet and those who can not, for example for social or financial benefit. This gap is influenced by a set of nine identified factors, of which education is the strongest [28]. Within the EU, this digital divide also exists, which is one of the problems which the EU digital agendas try to solve [11, 24, 51]. For a good reason, as Eurostat data indicates that there exists a clear difference in, among other things, the amount of internet usage and e-commerce between Western- and Eastern-Europe [19]. Szeles and Simionescu found that in order to stimulate the digital economy, which in turn closes the gap formed by the digital divide, tertiary education and the number of issued patents are the most important factors [52].

The digital economy is usually assessed based on three indicators: electronic commerce, internet usage and human resources in ICT

[52]. The DESI includes these indicators as well and is the main tool used to assess the digital economy and the digital divide within the EU since its inception in 2015. The different pillars in the DESI impact each other: the level of infrastructure, for example, influences the individual digital skills which EU citizens might have [27]. While the index is relatively young, a sizeable amount of earlier research assessing the DESI and its relationships with other important indices exists. The link between DESI and economic growth is evaluated, although there is controversy about the claim that there indeed is a link given that there exist sources that say there is a significant positive relationship [31, 34] and some that say there is no significant relationship [55]. There exists a positive relationship between Sustainable Development Goal Index and the DESI [26], implying that a high DESI helps comply with the United Nations' goals. Also, there is a supposed positive relationship between DESI and the World Happiness Index [25].

4 METHODOLOGY AND APPROACH

For this paper, a qualitative research approach has been taken for both research questions. The main reason for a qualitative approach is that it is hard to approach the alignment between strategy and policy in a quantitative manner, given that the pillars of the EU digital strategies themselves are often not concretely converted into numerical targets, just like the main objectives of introduced policies. Similarly, one might be able to approach the difference between the efficiency of implementation of these policies between high- and low-DESI member states in a quantitative manner, although some policies are concerned with topics that can not easily be put into numbers. It would then be difficult to provide a proper analysis. Thus, a qualitative approach is the 'safer' approach.

4.1 Qualitative Assessment and -Evaluation

To find whether there is an acceptable level of alignment between the EU's digital strategy and the EC's (proposed) policies, a set of different proposed and implemented digitalisation policies are analysed and assessed based on the extent to which they match their respective strategic objectives in the EU digital strategy. If the policies reflect many elements of the digital strategy, the level of alignment is high. This approach was chosen because the EU digital strategy *should* be a guideline for the EC's policies and thus, comparing the strategy and policies is the most effective way to assess alignment.

4.2 Case Studies

Whether there exists a large difference in the efficiency of policy implementation between high-DESI and low-DESI countries is assessed by performing a number of case studies of policy implementation in different member states for which there exists sufficient available data. The approach to answering this question was chosen because if there are significant differences to be found in existing research, these can be clearly and structurally found through careful analysis. Furthermore, if there are recurring issues with the implementation within low-DESI member states, these can be used to make recommendations in the final conclusion of the proposed paper. The following keywords were used on search engines such as Web of

Science, Scopus and Google Scholar to find case study literature: GDPR Implementation, GDPR differences EU member states, GDPR different countries, Digital Services Act different countries, European Roaming Different countries, European Roaming, EU Roaming, Cybersecurity Act European Union, Cybersecurity Act EU.

5 CONTEXT OF EU DIGITAL STRATEGY AND -POLICIES

In this section, the history of the EU digital strategy is summarised and the key points of the digital agendas are pointed out. Also, some past and present digital policies introduced by the EC are mentioned.

5.1 History of EU Digital Strategy

In the political guidelines for policy-making (2019) set out by Ursula von der Leyen (the current president of the EC), creating 'a Europe fit for the digital age' is one of the six points mentioned [10]. The guideline mentions 'hot topics' like 5G, Internet of Things and Artificial Intelligence. To understand what foundation currently proposed policies are being built on, the history of the EU digital strategy is examined. Thus, the purpose of this section is to chronologically assess the past milestones in the digital history of the EU.

In 2010, the first digital agenda for Europe was released by the EC as one of seven flagship initiatives of their overall 'Europe 2020' strategy [15]. It featured a list of critical areas on which the EC wished to focus in the upcoming ten years, with a prominent focus on the Digital Single Market (DSM). This DSM was further worked out in 2015 with its own separate strategy [16].

In 2020, the Commission introduced a general digital strategy for digital policy-making within the EU [6] which is discussed in the introductory Section 1. Additionally, in 2021, the EC communicated a 2030 digital compass with a set of metrics showcasing their ambitions for the next ten years to come [7].

5.2 Pillars and objectives of EU Digital Strategy

In order to assess whether implemented and/or proposed policies align well with the discussed digital agendas of the EC, a proper analysis of the key areas mentioned in these agendas is necessary. The following section aims to set out the most important topics providing the foundation for digital policy-making in their respective time frames. The digitalisation strategies all share a similar structure: they contain a set of main objectives or areas, which all contain their own respective set of planned legislative actions.

2010-2019: The Digital Agenda for Europe

The Digital Agenda for Europe, or 2010 Digital Agenda as it will be referred to from now on, was supposed to aid in making a post-crisis Europe ready for the digital future [15]. It considered six categories of 'legislative actions' that the EC wanted to take in the running time of the agenda:

- (1) Creating a vibrant digital single market
- (2) Increase interoperability and promote standards
- (3) Improve trust and security in the digital sphere
- (4) Provide fast and ultra-fast internet access
- (5) Enhance digital literacy, skills and inclusion

- (6) Provide ICT-enabled benefits for EU society

2015: A Digital Single Market Strategy for Europe

As discussed in the history of digital agenda, a separate digital agenda for the Digital Single Market was published under the guidance of then-EC-president Jean-Claude Juncker [16]. It featured its own set of key areas on which to focus:

- (1) Providing better access for consumers and businesses to digital goods and services across Europe
- (2) Creating the right conditions for digital networks and services to flourish
- (3) Maximising the growth potential of the digital economy

2020-2030: Shaping Europe's digital future and the 2030 Digital Compass

The currently active (at the time of writing this paper) digital agenda [6] ('2020 Digital Agenda') of the EC features a set of key pillars on which the EC wishes to focus in the five years after the communication of the agenda, namely:

- (1) Technology that works for people
- (2) A fair and competitive economy
- (3) An open, democratic and sustainable society

These three pillars all have a set of key actions attached with which the EC wishes to satisfy them. These include topics like Artificial Intelligence, digital education, data strategy and making the use of digital services more sustainable. About a year after the communication of this strategy, the '2030 Digital Compass: the European way for the Digital Decade' was communicated [7] which supplied rather concrete 'cardinal points' which laid out the ambitions for 2030:

- (1) A digitally skilled population and highly skilled digital professionals
- (2) Secure and performant sustainable digital infrastructures
- (3) Digital transformation of businesses
- (4) Digitalisation of public services

Interesting to notice here is the overlap between these four cardinal points and the four pillars of the DESI: The first cardinal point relates to human capital, the second to connectivity, the third to integration of digital technology and the fourth to digital public services.

5.3 Past Implemented Policies

During the periods in which the previously mentioned digital strategies were or are currently active, a set of policies have been introduced and implemented. During the first period from 2010 until 2019, these policies include the following:

- (1) Roaming charges within the European Union were altered due to regulations from 2012 and 2015, thus allowing EU citizens to use mobile phone service for the same fee anywhere within the EU [35, 36]. Due to the 2015 regulation, data roaming charges were fully abolished in 2017.
- (2) GDPR (General Data Protection Regulation) was introduced in 2016, which set drastic boundaries on the collection, storage and alteration of private data [38].
- (3) In 2017, a regulation on the portability of digital services across the EU was introduced, allowing EU citizens to make use of their digital services anywhere in the EU [39]. This

regulation worked in conjunction with a 2018 regulation addressing unjustified geo-blocking [40].

- (4) The 2019 Cybersecurity Act was introduced, giving more strength to ENISA (European Union Agency for Cybersecurity) [41].

5.4 Current and Future Policies

After the introduction of the 2020 digital agenda and the 2030 digital compass, multiple proposals for regulations were made by the EC to reach the goals set. The most important proposals include the following:

- (1) The earlier described DSA and;
- (2) DMA acts, which were introduced in 2020 and have been in force since 2022.
- (3) The 'Artificial Intelligence Act' from 2021 harmonising the definition and ruleset of AI across member states [8]. This is in line with the overall DSMS given that it harmonises the law in the form of a regulation, thus enforcing it across the EU.
- (4) The 'Data Governance Act' from 2022 (which is already active at the time of writing) creating more options for data sharing [45], with the 'Data Act' proposal (2022) further harmonising the rules for data sharing across member states [9], which again is in line with the DSMS.

6 FINDINGS ON THE FIRST RESEARCH QUESTION

The first research question is answered by providing a more detailed explanation of how the research was carried out and finally providing a conclusion about the findings.

6.1 Defining Alignment with Digital Strategy

Previously in Sections 5.2, 5.3 and 5.4, the different digital agendas of the EU were summarised, along with a set of policies (or policy proposals) which the EC constructed as a result. Alignment between this set of policies and their respective digital agenda, with the DSMS as an over-arching strategy (given that that is a longer-term agenda), is assessed in detail by extracting different criteria from the strategic pillars and 'grading' the policies for their relevance in terms of strategy.

Most of the acts introduced by the EC focus on specific strategic objectives. Thus, it would not be fair to assess policies on their strategic fit with the entire digital agenda, given that it most likely covers only one strategic objective. To counteract this lack of universality, policies will be assessed within their key area of digitalisation. For example, policies regarding privacy laws should only be assessed in terms of strategic objectives which relate to privacy.

What policy belongs to what original strategic objective is derived from both the digital agenda and the documentation of the policy at hand. This is viable because the EU digital agendas contain rather specific action areas, while the policy documents contain specific objectives as well, thus making it relatively easy to observe the

relationship between the strategic objective and the policy. The relationships between the eight assessed policies and their respective relevant strategic objectives can be seen in Table 1.

Table 1. Relating digitalisation policies to their respective strategic objectives

Digital agenda	Strategic objective	Policy
2010 Digital Agenda	2.1.4 Reinforcing the single market for telecommunications services	Regulations on roaming charges [35, 36]
	2.3 Trust and security	General Data Protection Regulation [38]
	2.1.1 Opening up access to content	Regulations on cross-border portability and unjustified geoblocking [39, 40]
2020 Digital Agenda	2.3 Trust and security	Cybersecurity Act [41]
	2.C An open, democratic and sustainable society	Digital Services Act [43]
	2.B A fair and competitive economy	Digital Markets Act [44]
	2.A Technology that works for people	Artificial Intelligence Act [8]
	2.B A fair and competitive economy	Data Governance Act and Data Act [9, 45]

6.2 Process of evaluating policies

Having found the strategic objectives belonging to the set of policies to be looked at in this research, the assessment process is done. First, the assessment criteria for each strategic objective have been defined, which can be found in Appendix A. Each strategic objective was analysed and criteria have been extracted from them. For example, the strategic objective 'Trust and security' from the 2010 Digital Agenda has the criteria of helping to ensure safety and security, protecting the right to privacy and supporting action to fight cybercrime. Secondly, individual digitalisation policies have been assessed on the criteria which belong to their respective strategic objective. Each criterium is assessed on a Likert scale of one to five, where one means that the criterium is not (or hardly) reflected in the policy, while five means that the policy reflects the criterium fully. In practice, a policy's purpose, methodology and implications are analysed after which the respective criteria are scored. Thirdly, the findings can be plotted on radar (or 'spider') charts to visualise them. A larger surface area on the radar charts implies a higher level of strategic fit. Lastly, conclusions are drawn about the findings.

Given that this is a qualitative assessment, the assessment criteria mentioned above are clarified. Thus, the most important keywords in the assessment criteria are featured here along with their respective definitions in the context of this research:

- To *help* means that some existing transformation in a subject or process is further supported. An example is the unification of the market in the content sector.
- To *improve* means that the efficiency or effectiveness (depending on the context) of an existing subject, process or behaviour is increased. An example is increasing transparency of collective rights management within the EU.
- To *promote* means that some process is given more resources such that it has a higher priority on the political agenda. An example is the promotion of digital transformation in public administrations.
- To *protect* means that an existing subject is protected such that it keeps its integrity. An example is the protection of citizens' digital privacy.
- To *support* means that an existing subject, process or behaviour is further endorsed such that it receives more resources. An example is the support of SMEs (Small and Medium-sized Enterprises) in the EU.

6.3 Results of the alignment assessment

The results of the alignment assessment have been visualised and can be found in Appendix B in the form of radar charts. The policies which belong to the same agenda point have been added to the same chart to showcase their possible interdependence. Two of these radar charts are now discussed to exemplify the general findings of this qualitative assessment.

Figure 1 shows how the roaming charges regulations scored on the four criteria defined for them. It is clear to see that they scored high on two criteria, while the other two have low grades. This comes back in other assessments as well, where new policies satisfy certain criteria very well and some not so much. This implies that new digital policies as proposed are specifically focused on sub-objectives, rather than trying to solve large overall objectives with single policies.

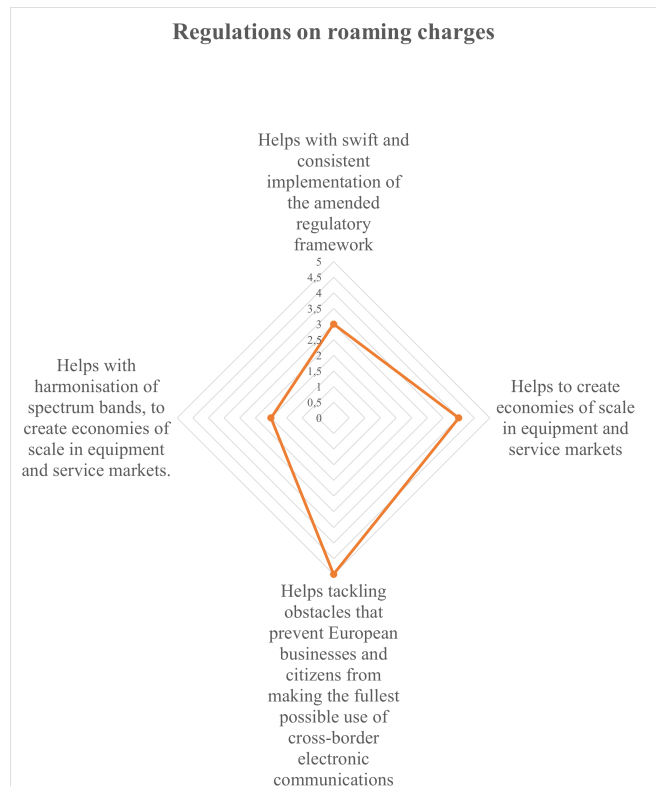


Fig. 1. Evaluation of regulations on roaming charges

Figure 2 shows a combination of the assessment of the GDPR and the Cybersecurity Act. As stated earlier in this section, they have been combined in a single radar chart given that they belong to the same strategic objective in the 2010 Digital Agenda. The individual policies do not satisfy all three criteria, while the combination of them offers a strong position for all of them. The approach taken here by the EC seems to support the earlier observation of having multiple policies to cover the larger strategic objective.

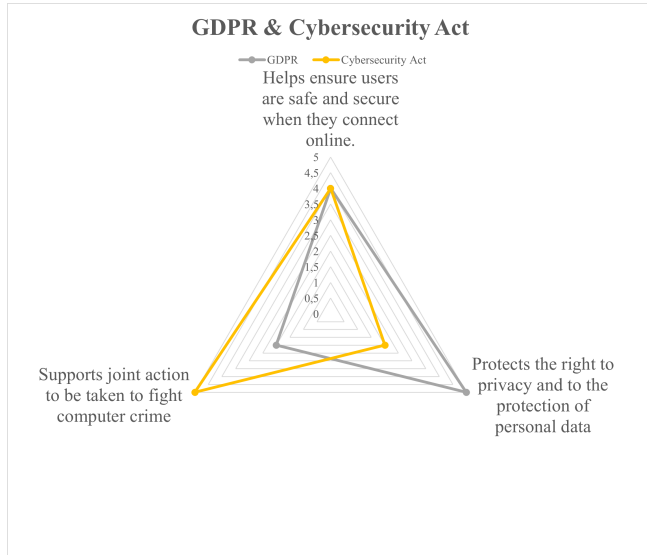


Fig. 2. Evaluation of the GDPR and the Cybersecurity Act

Given the results of the alignment assessment, it can be argued that there is a fit of the (proposed) policies with the respective digital agendas. In the selection of past and present policies which have been assessed, there are no policies which have low scores on all criteria, meaning there are no policies which completely missed their purpose. The general finding is that the EC seems to introduce multiple policies to supposedly cover the overall strategic objective. The only exception to this is the Data Act which can be seen in Figure 7 (Appendix B), which covers all criteria with a score of four or higher. The implication of these findings is mainly that the EC seems to be able to effectively introduce digital policies which satisfy their overall digital strategy. Thus, recommended would be not to stray off that path.

7 FINDINGS ON THE SECOND RESEARCH QUESTION

In this section, the DESI is further explained and low- and high-DESI countries are defined. Metrics for efficient implementation are defined, after which case studies are carried out on three policies. Finally, conclusions are drawn about the findings.

7.1 Regarding the DESI

As discussed in the problem statement (Section 2.1) and related work (Section 3.3) of this paper, the DESI is a powerful index used within the EU to measure digitalisation in EU member states. The purpose of the second research question in this paper is to assess whether there exist differences in the implementation of digitalisation policies in low- and high-DESI member states, and thus it is important to consider examples of member states that are generally considered as high- or low-scoring. The DESI results of 2022 show that overall, the Scandinavian member states (Finland, Denmark and Sweden), together with the Netherlands, have a leading position on the index

[17]. These countries also have relatively low yearly growth, indicating that they have had a leading position on the digitalisation front for years now. Thus, they are considered high-DESI member states.

In contrast to the leading countries, Bulgaria and Romania (of which the latter has a significantly lower score and scores lowest of all EU member states) are at the bottom of the list. They are especially lacking in terms of human capital, indicating that the amount of citizens that possess basic digital skills is rather low compared to other EU member states. These countries are considered low-DESI member states.

7.2 Metrics for efficient implementation of policies

What determines 'efficient implementation' in the context of EU digitalisation policies is rather hard to generalise, given that the nature of the policies differs significantly. For example, some policies might be concerned with digital infrastructure while others might set boundaries for tech companies. Thus, for the sake of this research, efficient implementation is to be defined as a successful implementation according to the goals which the EC set out in the policies in the first place. Many policies leave some room for the interpretation of policies, so the extent to which initiative has been taken to implement policies is a rather good metric as well.

7.3 Case studies considered

For the sake of answering this research question, three digital policies by the EC which are in force at the time of writing have been considered. The implementation of these policies is to be considered for some of the previously defined high- and low-DESI countries, after which potential differences are discussed between them. Ultimately, this case study comparison leads to a qualitative assessment of the practical differences between high- and low-DESI countries.

As clarified in Section 4.2, what policies are considered largely depends on the availability of data and the impact the policies have, which are two factors that seem to support each other. For this research, the following three policies have been chosen to be further considered:

- (1) General Data Protection Regulation from 2016
- (2) Regulations on roaming charges from 2012 and 2015
- (3) Cybersecurity Act from 2019

7.3.1 Evaluating the GDPR. First, the GDPR is considered. Because of the nature of the regulation, member states have a certain amount of freedom in how they implement the laws in their own jurisdiction. This is both because of the intended ambiguity in some aspects of the regulation and because of the possibility to add additional elements to the law, making it more detailed on a national level. However, comparing the implementation of GDPR in different countries shows that only a few countries add on to the original regulation [12].

Custers et al. show that in the selection of countries they reviewed (which were eight in total), Germany is the frontrunner while Italy and Romania lack behind [12]. While not many countries add on to the GDPR regulation, in more specific categories there do exist

differences, for example in the procedure for requests to the data authority [46]. Previously mentioned papers do indicate differences between countries, but this is not causally related to the DESI, as Germany and Italy, for example, have relatively average DESI scores [17]. While there might not exist a clear relationship between DESI and GDPR implementation on a national legal level, there is an arguable difference in the level of GDPR awareness among the public [48]. Given that public awareness plays a large role in the success of GDPR, the DESI position of a country might still impact the overall success of the GDPR implementation.

7.3.2 Evaluating Roaming Charges Regulation(s). Secondly, roaming charges regulations are considered. As discussed earlier in Section 5.3, roaming charges were abolished in 2017 throughout the European Union, meaning that citizens can now make use of mobile data abroad without any extra costs on top of what they already pay in their home country. Abolishing roaming charges can cause issues with mobile providers, however, as they lose a source of income. Back in 2017, Spruytte et al. argued that this could lead to higher domestic prices [49], which ultimately would have meant that wealthy citizens were better off with the regulations than those with intermediate wealth [29]. However, more current research indicates that these domestic prices did not significantly increase [32].

Within this research, it is important to focus on differences between countries, especially considering the DESI. Research on the roaming regulations focuses mainly on the financial implications, while there is no evidence to support that there were any significant differences in the implementation between different member states. Additionally, a report from 2019 shows a large increase in roaming data usage, while simultaneously indicating that there were no major issues with the implementation of the regulations [5]. In conclusion, there seems to be no evidence (in existing research) for any operational differences in the implementation of roaming charges regulations throughout high- and low-DESI member states.

7.3.3 Evaluating the Cybersecurity Act. Implementing a better defence against cybercrime is an ongoing process on the EU digital agenda, which started in 2013 with a cybersecurity strategy and resulted in the principal instruments being introduced in 2016 and 2019 [53]. In 2016, the NIS (Network and Information Systems) directive [37] set out guidelines for EU member states such that they could adopt their own national framework, which should subsequently allow them to comply with the directive provisions [30]. This NIS directive was since then followed up by the NIS2 directive, further enhancing the previous directive [42]. The Cybersecurity Act from 2019 [41] further aided the NIS directive by giving more power to ENISA, which is an agency which supports member states in the fight against cybercrime. Thus, it is valuable to assess whether there exist significant differences in the successful adoption of these national frameworks across different EU member states.

ENISA supplies a significant amount of best practices and advice for EU member states, although the organisation does not analyse the performance of member states. Examples are reports comparing the different approaches which some states take in their cybersecurity strategies [21]. These reports do not seem to indicate significant

differences between low-DESI and high-DESI member states though. Existing research takes a similar stance: the focus lies more on the contents of the cybersecurity agenda rather than performance. Thus, it can not be said for certain whether there exists a significant difference in the level of cybersecurity performance between EU member states.

7.4 Results of the case studies

To conclude this second research question, it seems there is no clear evidence for a relationship between ranking in the DESI and the efficiency of implementation of EU digitalisation policies. With regard to some policies, like the GDPR, certain measurement factors of the DESI may influence the extent to which a policy is effective in EU member states. On a policy-making level though, there is no evidence for low-DESI member states being less adept at implementing the provisions set out by the EC in their directives and regulations compared to high-DESI member states. The fact that EU digitalisation policies are written with one of the core principles being the harmonisation of laws around Europe helps to explain why this is the case, given that the whole of the EU should be able to implement the provisions. Thus, recommended would be to keep a difference in DESI in mind to safeguard that future policies can be implemented efficiently across the EU.

8 CONCLUSION

Because of the high societal impact within the European Union (EU) and the position of the EU within the global digital landscape (compared to large players like the United States and China), it is crucial to assess whether digitalisation policies proposed and implemented by the European Commission (EC) align well with the strategic objectives set out in the digital agendas of the EU. Additionally, it is important to assess whether member states with a lower overall level of digitalisation are capable of implementing these policies in an efficient manner, given that the proposed policies should work for the benefit of the whole EU rather than only digitally-adept member states.

A qualitative assessment and -evaluation was carried out to assess the alignment of a set of EC digitalisation policies with their respective strategic objectives in EU digital agendas. After the selection of this set of policies and the mapping of their respective strategic objectives, assessment criteria were developed and the policies were subsequently assessed based on these criteria. Results show that policies are very effective at satisfying specific strategic sub-objectives, while most of the assessed policies do not satisfy all the assessment criteria appointed to the broader strategic objective. The general finding is that the EC seems to introduce multiple policies to supposedly cover the overall strategic objective. The conclusion reached for this first research question confirms the first hypothesis of this research, which stated that the expected level of alignment was high. The main implication of these findings is that the EC seems to be able to effectively introduce digital policies which satisfy their overall digital strategy. Thus, recommended would be not to stray off that path

Three case studies were carried out to assess whether there exist differences between the implementations of EU digitalisation policies in low- and high-DESI member states. There seems to be no significant evidence for the disability of low-DESI member states to implement digitalisation policies efficiently, and thus the second hypothesis of this research is rejected, which was that low-DESI member states would have a more difficult time efficiently implementing digital policies. Important to note, however, is that because of the overall lower level of digitalisation in these countries, the effectiveness of the policies might be lower on an operational level, for example, because of a lower level of digital skills among the population. One of the main goals of the EC is the harmonisation of digital law across the EU, which helps to explain why there are no significant differences in the implementations. The main recommendation for digital policymakers would be to keep the DESI in mind when creating future policies to safeguard that all EU member states are able to implement policies, regardless of their DESI position.

9 DISCUSSION

In this section, limitations applicable to this research are discussed, after which potential future work is discussed based on these limitations.

9.1 Limitations

A set of limitations is applicable to this research. With regard to the first research question, the main limitation is the subjectivity which is applicable in the development of the assessment criteria. While they are solely based on the EU digital agendas and effort has been taken to make the criteria as objective as possible, the assessment remains subjective and is thus open to possible bias. For the second research question, a lack of existing research into the comparison of digitalisation policy implementations is the largest limitation. It remains difficult (not impossible) to assess the differences between low- and high-DESI member states without further research being conducted in this area.

9.2 Future Work

In terms of future work, the following topics could be of interest in order to extend the work done in this research:

- (1) Given that this research only covers the theoretical alignment between strategy and policy, it would be of value to research whether the proposed policies align well with strategy while also actually being effective at satisfying strategic objectives after implementation.
- (2) As the conclusion was reached that EU digitalisation policies largely focus on rather specific topics, it would be of value to assess a larger set of digitalisation policies to understand whether all strategic objectives are satisfied in the duration in which the EU digital agendas are active.
- (3) Specific studies should be carried out on a case-by-case basis assessing the differences in the implementation of policies in different EU member states. This would lead to more convincing research about there being significant differences between low- and high-DESI member states. An example would be the

assessment of cybersecurity performance across EU member states.

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A APPENDIX A: ALIGNMENT ASSESSMENT CRITERIA

- 2010 Digital Agenda
 - 2.1.1 Opening up access to content
 - Helps to close gap between accessing content in the online or offline world
 - Helps unify the market in the content sector
 - Improves the governance and transparency of collective rights management
 - Promotes distribution of digital content in Europe
 - 2.1.4 Reinforcing the single market for telecommunications services
 - Helps with swift and consistent implementation of the amended regulatory framework
 - Helps to create economies of scale in equipment and service markets
 - Helps tackling obstacles that prevent European businesses and citizens from making the fullest possible use of cross-border electronic communications services.
 - Helps with harmonisation of spectrum bands, to create economies of scale in equipment and service markets.
 - 2.3 Trust and security
 - Helps ensure users are safe and secure when they connect online.
 - Protects the right to privacy and to the protection of personal data
 - Supports joint action to be taken to fight computer crime
- 2020 Digital Agenda
 - 2.A Technology that works for people
 - Supports the joining of forces between the EU and Member States (high collaboration)
 - Promotes the digital transformation of public administrations throughout Europe
 - Supports investment in new technologies and innovations

- Helps achieve a more secure digital space
- 2.B A fair and competitive economy
 - Supports European technological independence
 - Supports a European single market for data
 - Supports SMEs in the single market
 - Helps provide a level playing field in the digital space (for consumers and businesses)
- 2.C An open, democratic and sustainable society
 - Supports European values, rules and norms in the digital space
 - Supports a trustworthy digital society (inclusive, fair and accessible)
 - Helps consumers take control of their own data and identity
 - Supports transparency in the digital space
 - Helps reach sustainability (SDG and European Green Deal) goals

B APPENDIX B: EVALUATION RESULTS IN RADAR CHARTS

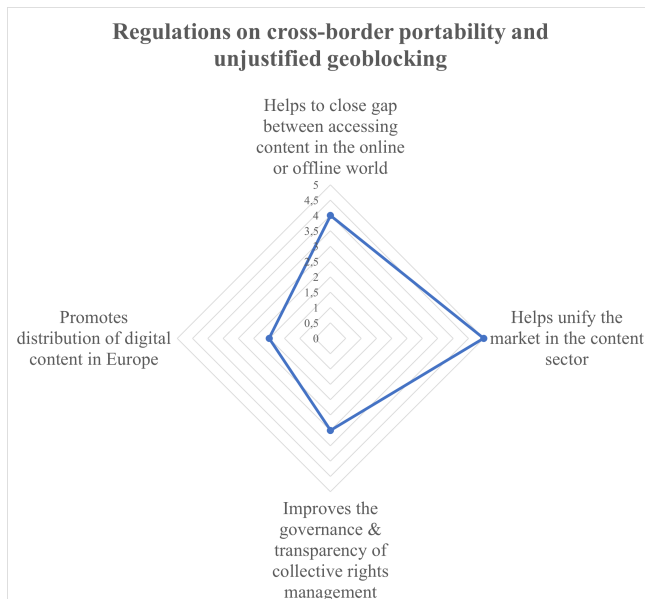


Fig. 3. Evaluation of regulations on cross-border portability and geoblocking

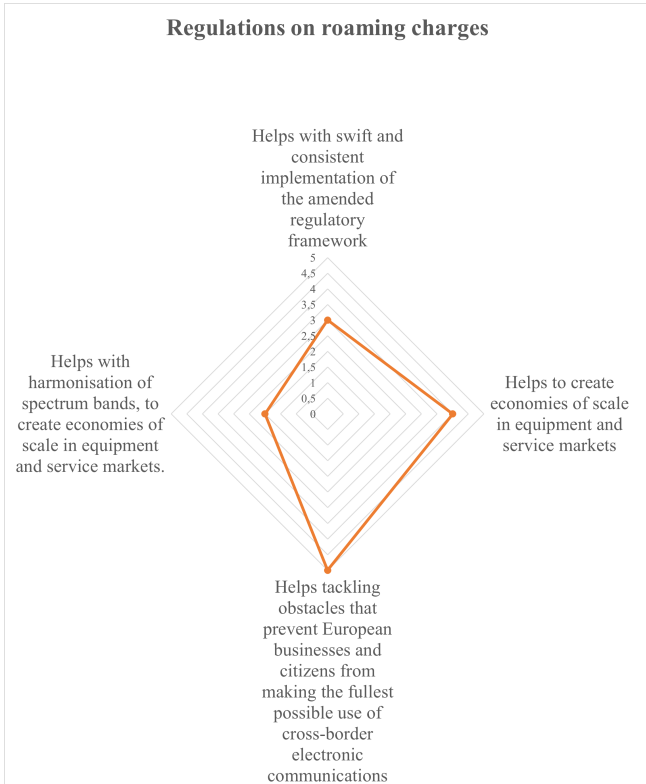


Fig. 4. Evaluation of regulations on roaming charges

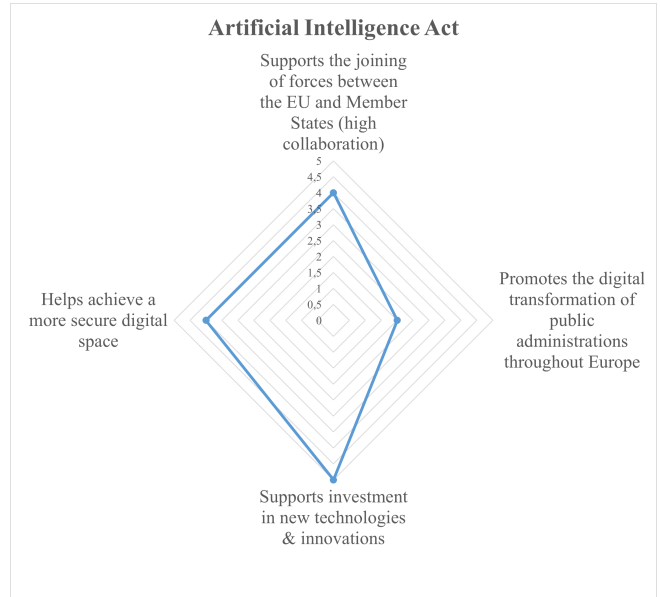


Fig. 6. Evaluation of the Artificial Intelligence Act

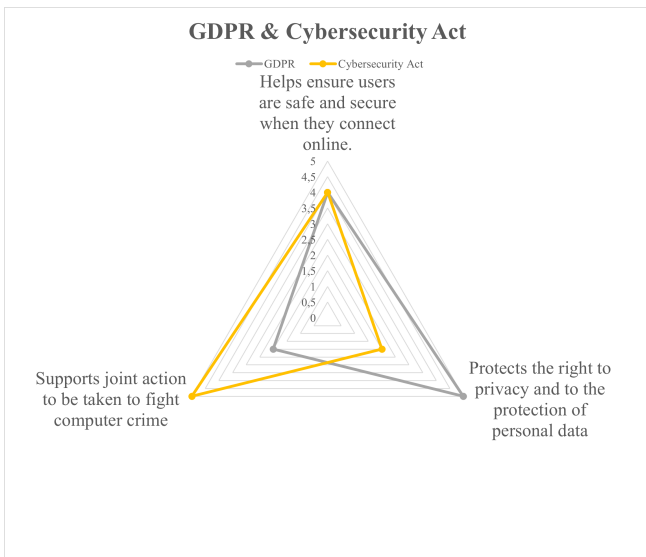


Fig. 5. Evaluation of the GDPR and the Cybersecurity Act

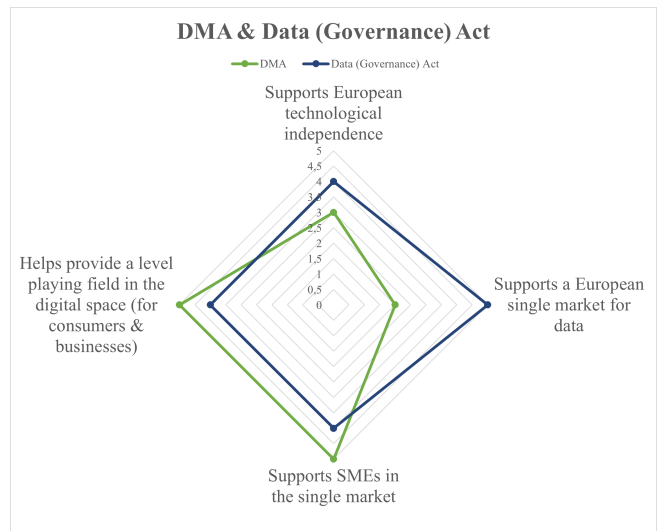


Fig. 7. Evaluation of the DMA and the Data (Governance) Act

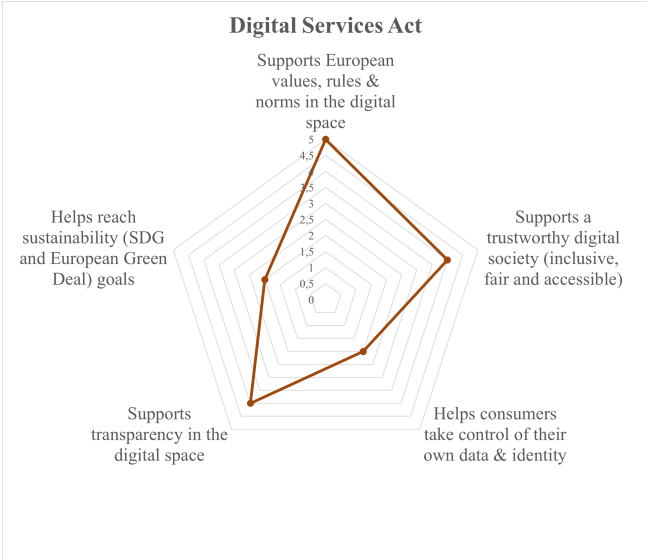


Fig. 8. Evaluation of the DSA