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Survey of e-Gov Benchmarks

Master's Thesis

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Author’s declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

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Abstract

In most economically well-developed countries of the world, the progress of e-government is relatively slow. It often turns out that development is far behind the officially defined and announced strategies and deadlines. In this regard, the evaluation of the development of e-government initiatives is of particular relevance. As a result, several e-government benchmarking reports are published each year. Such reports usually find a great response among the public and, in particular, among journalists. It also puts much pressure on politicians and public administration in every country and state. However, benchmarks are usually developed not by states but by third parties or higher organizations such as the EU.

However, unfortunately, such reports are often misinterpreted. For a detailed understanding of benchmarking reports, it is necessary to delve into the analysis. This thesis will look at how people set up benchmarks and what they are used for. With the help of the SLR, the author will try to answer three questions related to benchmarking: Which e-government benchmarks exist on the international and national levels? How do stakeholders measure the success of e-government initiatives? How are e-government benchmarks used/exploited by different organizations?

This thesis is written in English and is 52 pages long, including 6 chapters and 9 tables.

List of abbreviations and terms

e-government	Electronic government
e-service	Electronic service
EC	European Commission
EIU	Economist Intelligence Unit
ENB	European Benchmarking Network
Et al.	Et alii – "and others"
EU	European Union
GDP	Gross Domestic Product
GSM	Global System for Mobile Communication
ICT	Information and Communication Technology
NGO	Non-governmental Organization
OECD	Organisation for Economic Co-operation and Development
OECD	Organisation for Economic Co-operation and Development's
PC	Personal computer
SLR	Systematic Literature Review
U.S.A.	United States of America
UK	United Kingdom
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNDPEPA	United Nations Division for Public Economics and Public Administration
UNPAN	United Nations Network in On-Line Administration and Finance

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1 Introduction

The ability and credibility of countries depend mainly on their ability to use the technological opportunities provided by Information and Communications Technology (ICT) for economic and social development. At the same time, the expert assessment reflecting the country's respective capabilities significantly affects the country's attractiveness in foreign markets both as an exporter and as a destination country for investments. Since the development of information technology is one of the development priorities worldwide, countries must stand out in terms of the use of ICT in the organization of work in the public sector.

To implement e-government projects/initiatives that lead to effective and efficient e-government, mature management and monitoring of e-government projects/initiatives is necessary. Therefore, for decades, various benchmarks have been used to evaluate the performance of e-government and compare the performance of countries around the world to stimulate further development of these indicators. According to the Cambridge dictionary, a benchmark is a criterion used for the comparison (Cambridge University, 2021). It was benchmarking as a tool that companies began operating in the second half of the 20th century. A company Rank Xerox was one of the first to use this method in practice during the crisis in the late 1970s. Rank Xerox compared its performance to competitors to reclaim its competitive edge on manufacturing costs, copier assembly, and customer satisfaction. It helped the company streamline business processes, including reducing distribution costs and becoming a leader in its segment of the copier market (Watson, 1993) (Camp, 1989). The benchmarking methods and frameworks are not limited to business processes or products. Over time, benchmarking has been applied to assess the public sector to improve the quality and efficiency of public services. In particular, benchmarking was used to assess e-government at the end of the 1990s. This made it possible to assess the progress of the e-government at the local, national, and global levels (UNCTAD, 2009) (United Nations, 2001) (United Nations, 2014) (United Nations, 2003) (United Nations, 2018) (United Nations, 2008) (United Nations, 2010) (United Nations, 2004).

Since then, the need for benchmarking has been recognized by many scientists worldwide. A scientist Frank Bannister emphasizes in his thesis that benchmarks "can have a significant practical impact, both political and potentially economic" (Bannister, 2007). Also, benchmarks can influence the development of the e-government services (Kunstelj & Vintar, 2004). Several countries have used comparative ratings to justify their spending on e-government initiatives (Janssen, Rotthier, & Snijkers, 2004). In addition, many large organizations have created benchmarks for evaluating the results of e-government at both national and international levels. A few examples of these are the European Union's (EU) eGovernment Benchmark, Organisation for Economic Co-operation and Development's (OECD) Digital Government Index, and the UN E-Government Survey.

At the same time, an expert assessment, reflecting the corresponding capabilities of the country, significantly affects the country's attractiveness in foreign markets, both as an exporter and as a destination country for investment. Furthermore, since the development of information technology is one of the development priorities around the world, it is essential to stand out in terms of the use of ICT, both when organizing work in the public sector and in dealing with business and free sectors (Bannister, 2007).

This study aims to obtain a comprehensive understanding of the existing benchmarks, their use, and their role in building effective and efficient e-government. To achieve the set goals, it is necessary to study the published academic literature on this issue comprehensively. To this end, a Systematic Literature Review (SLR) will be conducted, and the research questions are as follows:

RQ1: Which e-government benchmarks exist on the international and national levels?

To reach a certain standard of quality, benchmark surveys are essential. The author will determine the different kinds of e-government benchmarks in this question. They could vary on different levels. For this research, the author will only consider international and national levels. In this survey, benchmarks will be separated, studied, and then finalized in the actual list to distinguish.

RQ2: How do stakeholders measure the success of e-government initiatives?

E-government initiatives are goals set by governments to be achieved through ICT, such as e-commerce, e-health, e-sciences, and e-education. A stakeholder in this matter is a person, group, or organization interested in government affairs. It could be either society, NGOs, legislatures, regulators, or other government bodies. The authors of benchmarks, in this case, will not be considered. In this question, the author will try to find an answer to what methods exist for assessing the success of e-government initiatives.

RQ3: How are e-government benchmarks used/exploited by different organizations?

Organizations have different benchmarks to assess the e-government level in countries where they have a strategic impact. This question will outline the various use-cases for e-government benchmarks.

The article is structured as follows. Section 2 gives an overview of the background of e-government benchmarking. Section 3 describes the research methodology used to conduct this SLR. Section 4 provides results, and Section 5 provides a discussion part where research questions will be answered. Finally, section 6 provides a summary.

2 Background

This section will discuss the term e-government, the purpose of e-government, and benchmarking e-government from a historical perspective.

2.1 Benchmarking e-government

An essential aspect of any informatization program, especially when it comes to developing information systems that ensure the interaction of government, business, and the population, that is, e-government, is the ability to monitor the effectiveness of projects and programs. This predetermines the interest of international organizations in measuring and evaluating the digitalization of public administration, developing new statistical indicators that characterize this process and indices that allow cross-country comparisons.

First of all, it is essential to understand the meaning of the term e-government. Today the term “e-Government” is internationally accepted and widely used in all countries where e-government programs are implemented. However, there is no unambiguous definition of e-government in the literature despite the well-established terminology. How e-government is measured depends mainly on how we define e-government itself. All the interpretations can be reduced to two groups: first, researchers give the concept of government in a narrow sense, and second, in a broad sense.

1. E-government in the narrow sense means the use of communication technologies and information in the activities of public administration, such as public and business-oriented service provisioning, public procurements for organizations, the execution of financial transactions, and information receipt and provisioning (Fang, 2002).

2. E-government, in a broad sense, is understood as a process of transformation of internal and external interactions in government or institutions as a result of the introduction of telecommunication methods to optimize management, improve population-oriented service quality, and ensure the constitutional rights of citizens (United Nations, 2004).

The main goal of such a government is to provide citizens with the entire range of public services with the help of the internet while minimizing their interaction with public authorities and the time for it. This means that thanks to the creation of electronic government, contact with the state can become much easier, faster, and more efficient, and the authorities' responsibility to their people will increase, which, in turn, will lead to the improvement of democracy. However, it is worth noting that e-government is not an add-on or an identical semblance of government in its traditional sense. Instead, it defines a new interconnection between society and power structures based on the active use and use of the ICT (Curthoys & Crabtree, 2003).

Since the late 1990s, e-government has become a preferred target for benchmarking. The development of e-government assessment has been significantly influenced by various international organizations conducting a comparative analysis of e-government. Starting in 2003, researchers began to study this phenomenon more closely. These studies have looked at multiple e-government benchmarks over the years, examined the usefulness of benchmarking for e-government progress, and examined their impact on government and government.

3 Research Methodology

As a rule, the necessary information about scientific results and practical experience gained in various fields of science and practice is scattered over a significant number of sources. Therefore, the Systematic Literature Review (SLR) will be used in this paper to condense and systematically present scientific results.

This survey is based on Kitchenham's "Guidelines for performing Systematic Literature Reviews in Software Engineering" and answers the research questions mentioned in Section 1. A systematic review is a form of scientific research with pre-planned methods, where the object of study is the results of the series of original research. Unlike conventional literature reviews, systematic reviews follow a rigorous methodology to reduce the likelihood of bias. Systematic reviews formulate specific questions, search, and select literary sources according to precise criteria. The result of a systematic review is evidence-based conclusions (Kitchenham & Charters, 2007).

Based on Kitchenham's guidelines, an SLR must be performed in five stages:

1) Search Strategy
2) Study Selection
3) Study Quality Assessment
4) Data Extraction
5) Data Synthesis (Kitchenham & Charters, 2007).

3.1 Search Strategy

Search terms are formed at the first stage of the strategy based on the research questions. Next, a search string with "AND" and "OR" combinations is formed to search for relevant scientific articles in the database. Further, inclusion criteria for the identified articles are formed, and the most relevant articles are selected. Then criteria for assessing quality are formed and applied to the primary selected studies. Finally, after all these steps, conclusive studies are selected for subsequent steps in extracting and synthesizing data.

3.1.1 Search Terms

Once the research questions have been identified, the search strings and databases for selection follow. **E-government** and **benchmark** were chosen as the primary search terms. Synonyms were found: digital government and digital transformation for e-government and index and measurement for the benchmark. Combining search terms with "AND" and "OR" operators resulted in the following search string:

("e-government" OR "digital government" OR "digital transformation") AND ("benchmark" OR "index" OR "measurement")

3.1.2 Search Process

Work began on sample searches of articles in the Scopus database. *Scopus* is a database that combines summaries and citations of articles and other scientific content (Scopus et al., 2021). According to the initial selection criteria, 1469 articles were found between 1979 and 2022. The documents were sorted by cited.

3.2 Study Selection

The next stage is the selection of articles. In this research, a two-stage selection of articles for research was applied. The first stage of article selection involves an article search, where one researcher reviews article titles and abstracts based on pre-formed inclusion criteria. Further, pre-formed quality criteria are applied to the selected articles by titles and abstract, and final articles are selected.

3.2.1 Selection Phase 1

During this stage, one researcher reviewed the titles of articles and, based on the inclusion criteria set out in Table 1, either included them in the collection or not. In case of doubt, the researcher also got acquainted with the abstract. After completion of this stage, 36 articles were chosen.

3.2.2 Selection Phase 2

Further, after selecting primary articles by titles and abstracts, it was necessary to form quality assessment criteria and then apply them to the articles selected from Phase 1. After

completing Selection Phase 2, 10 to 15 main articles should have remained. At this stage, 11 articles were selected. From the remaining articles, data will then be extracted and synthesized.

Table 1. Inclusion Criteria for Selection Phase 1

Criteria ID	Inclusion Criteria
IC1	The article focuses on e-government benchmarking.
IC2	The article explains the importance of e-government benchmarks.
IC3	The article describes different use cases of e-government benchmarks.
IC4	The article states about different stakeholders using e-government benchmarks.
IC5	The article includes the organizations that include e-government benchmarks.
IC6	The article explains or includes the different e-government benchmarks on the international level.
IC7	The article explains or includes the different e-government benchmarks that exist on the national level.

Table 2. Quality Criteria Checklist for Selection Phase 2

Criteria ID	Quality Criteria Check-List
QC1	Are the research objectives clearly defined in the study?
QC2	Are the e-government initiatives clearly defined in the study?
QC3	Are e-government benchmarks elaborated or explained in the study?
QC4	Are different benchmarks listed in the paper?
QC5	Are different use-cases listed on how e-government benchmarks can be used?
QC6	Are different organizations listed down that use e-government benchmarks?

3.3 Study Quality Assessment

At this stage, three independent researchers from Tallinn University of Technology, Estonia (Mr. Draheim, Ms. Butt, and Ms. Kalašnikova) evaluated the articles selected from the previous stage based on the Quality Criteria Checklist in Table 2. Each article was rated on a 5-point Likert scale, where the answers were coded as follows: 1 – entirely disagree, 2 – disagree, 3 – neutral, 4 – agree, 5 – entirely agree. In order to evaluate each

article, it was necessary to meet all the pre-established Quality Criteria and, depending on the answer to the question, assign points to each article according to the evaluation system. All articles scoring three or higher were included in the further review. Below are tables from all three independent researchers and a table with the average of all ratings (Kitchenham & Charters, 2007).

Table 3. Quality Score of Selected Studies by Mr.Draheim

Study ID	**QC1**	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**Total Score**
S1	5	4	5	5	4	3	4.33
S2	4	4	5	4	4	5	4.33
S3	4	4	5	5	4	4	4.33
S4	5	4	4	4	5	4	4.33
S5	5	5	5	5	5	5	5.00
S6	5	4	5	3	4	4	4.17
S7	5	4	5	5	4	3	4.33
S8	5	4	4	4	4	4	4.17
S9	4	4	4	4	4	3	3.83
S10	5	4	4	4	4	4	4.17
S11	5	4	5	5	4	4	4.50

Table 4. Quality Score of Selected Studies by Ms. Butt

Study ID	QC1	QC2	QC3	QC4	QC5	QC6	Total Score
S1	4	4	5	5	5	3	4.33
S2	5	4	5	4	4	5	4.50
S3	4	4	4	4	4	3	3.83
S4	5	4	4	4	5	4	4.33
S5	4	4	4	4	4	3	3.83
S6	5	4	5	3	3	3	3.83
S7	5	5	5	5	4	4	4.67
S8	5	5	5	4	4	4	4.50
S9	4	3	4	4	5	3	3.83
S10	5	5	4	5	5	4	4.67
S11	5	3	4	3	4	4	3.83

Table 5. Quality Score of Selected Studies by Ms.Kalašnikova

Study ID	QC1	QC2	QC3	QC4	QC5	QC6	Total Score
S1	5	4	5	5	5	3	4.50
S2	5	4	5	5	4	5	4.67
S3	4	4	5	5	4	4	4.33
S4	5	4	4	5	5	4	4.50
S5	5	5	5	4	5	5	4.83
S6	5	4	5	3	4	4	4.17
S7	5	4	5	5	4	3	4.33
S8	5	4	4	4	4	4	4.17
S9	4	4	4	4	4	3	3.83
S10	5	4	4	4	4	4	4.17
S11	5	4	5	4	4	4	4.33

Table 6. Quality Score of Selected Studies Total Average

Study ID	QC1	QC2	QC3	QC4	QC5	QC6	Total Score
S1	5	4	5	5	5	3	4.39
S2	5	4	5	4	4	5	4.50
S3	4	4	5	5	4	4	4.17
S4	5	4	4	4	5	4	4.39
S5	5	5	5	4	5	4	4.56
S6	5	4	5	3	4	4	4.06
S7	5	4	5	5	4	3	4.44
S8	5	4	4	4	4	4	4.28
S9	4	4	4	4	4	3	3.83
S10	5	4	4	4	4	4	4.33
S11	5	4	5	4	4	4	4.22

3.4 Data Extraction and Synthesis

Data extraction represents the process by which the researcher obtains the necessary information about the characteristics of the study and the results included in the study. Data extraction requirements will vary from survey to survey and should be adapted to the research question. Standardized data extraction forms ensure consistency in a systematic review, thereby potentially reducing errors and increasing validity and reliability. In this study, the extracted data are presented in two tables. Table 7 presents a list of final selected studies with study titles and publication types. Table 8 presents the authors, years, and source/publishers of the final selected studies. Also, for each article, an individual ID was selected.

At the stage of data synthesis, summation and comparison of data obtained from selected studies are performed. Further, based on the findings, research questions are answered.

Table 7. List of Final Selected Studies

Study ID	Study Title	Publication Type
S1	The curse of the benchmark: An assessment of the validity and value of e-government comparisons	Article
S2	Evaluating the progress of e-government development: A critical analysis	Article
S3	Benchmarking e-Government: A comparison of frameworks for computing e-Government index and ranking	Article
S4	If you measure it they will score: An assessment of international eGovernment benchmarking	Article
S5	Measuring e-government impact: Existing practices and shortcomings	Conference Paper
S6	A statistical analysis of the construction of the United Nations E-Government Development Index	Article
S7	Benchmarking e-Government: Improving the national and international measurement, evaluation and comparison of e-Government	Book Chapter
S8	Benchmarking the e-government bulldozer: Beyond measuring the tread marks	Article
S9	Institutional isomorphism, policy networks, and the analytical depreciation of measurement indicators: The case of the EU e-government benchmarking	Article
S10	What is the point of benchmarking e-government? An integrative and critical literature review on the phenomenon of benchmarking e-government	Article
S11	Demarcation of the field of e-government assessment	Article

Table 8. List of Authors, Years, and Source/Publisher

Study ID	Authors	Years	Source/Publisher
S1	Bannister, F.	2007	International Review of Administrative Sciences 73(2), pp. 171-188
S2	Kunstelj, M., Vintar, M.	2004	Information Polity 9(3-4), pp. 131-148
S3	Rorissa, A., Demissie, D., Pardo, T.	2011	Government Information Quarterly 28(3), pp. 354-362
S4	Janssen, D., Rotthier, S., Snijkers, K.	2004	Information Polity 9(3-4), pp. 121-130
S5	Peters, R.M., Janssen, M., Van Engers, T.M.	2004	ACM International Conference Proceeding Series 60, pp. 480-489
S6	Whitmore, A.	2012	Government Information Quarterly 29(1), pp. 68-75
S7	Heeks, R.	2008	Evaluating Information Systems: Public and Private Sector pp. 257-301
S8	Salem, F.	2007	Measuring Business Excellence 11(4), pp. 9-22
S9	Codagnone, C., Misuraca, G., Savoldelli, A., Lupiañez-Villanueva, F.	2015	Telecommunications Policy 39(3-4),1478, pp. 305-319
S10	Skargren, F.	2020	Information Polity 25(1), pp. 67-89
S11	Bogdanoska Jovanovska, M.	2016	Transylvanian Review of Administrative Sciences 2016(48), pp. 19-36

Table 9. Data Extracted from Selected Studies

Extracted Data Item	Description
Study Title	See Table 7
Authors	See Table 8
Year	See Table 8
Publication Title	See Table 7
Publication Type	See Table 7
Source/Publisher	See Table 8

3.5 Thematic Analysis

For further work with the selected literature found from SLR, the method of thematic analysis from Braun and Clarke was used (Braun & Clarke, 2006). The thematic analysis makes it possible to identify and highlight repetitive patterns, themes, and meanings in the data. It is a relatively flexible and universal "tool" applied to various qualitative research methods. The critical concept of thematic analysis is the concept of the "theme." Braun and Clarke describe a theme as an essential idea in the data directly related to the research question (Braun & Clarke, 2006). This method makes it possible to operate with heterogeneous data sources, which is a significant advantage in terms of the focus of this study on the analysis of publications with different research designs. The disadvantage of thematic analysis may be the researcher's subjectivity in creating topics (Guest, MacQueen, & Namey, 2012). The thematic analysis is based on Braun and Clarke's identified and described six stages of analysis:

1) Familiarisation with the data;
2) Data coding;
3) Searching for themes;
4) Reviewing themes;
5) Defining and naming themes;
6) Writing up.

In the first stage, the text is read, and an overview of the material is obtained. Once the texts have been examined, coding can begin. Coding begins with multiple thorough

readings of texts, in which essential passages of text, sentences, or words are marked and assigned a code. Coding is the main operation of qualitative analysis. In the next or third stage, initial codes are created, and meaningful information is extracted from the text and grouped under different themes (systematization of the information contained in the text). In the fourth stage, the themes are thematically structured and correlated. In the fifth stage, the themes are named, and in the last or sixth stage, the results are reported.

Based on the objectives of the present study, inductive or "bottom-up" coding techniques have been used in the data analysis. This means that no attempt is made to fit the text under analysis into pre-established frameworks or analytical categories; the resulting system of categories is based directly on the data. The information obtained in the selected articles was processed and categorized according to the research questions. In the second step, the codes were divided into categories and grouped based on similarity. Finally, the results were described based on the research questions. Thematic analysis was done using NVIVO.

4 Results

This section will look at different categories of benchmarks, different approaches to evaluating the success of e-government initiatives, and how different organizations use benchmarks and will answer research questions: Which e-government benchmarks exist on the international and national levels? How do stakeholders measure the success of e-government initiatives? How are e-government benchmarks used/exploited by different organizations?

4.1 Approaches to Benchmarking

As the SLR has been shown, there are many benchmarks. Many of the articles selected for this review distinguish different categories of benchmarks, but the authors' approach differs.

The article S1 aims to find out if the benchmarking results are helpful and, if so, who the beneficiaries are. The author of S1 proposed his classification of benchmarks. (Bannister, 2007) implies the division of e-government benchmarks into four categories:

- Frequency: this term refers to the frequency of publication, i.e., how often is a given benchmarking report released?
- Source: this term refers to authorship and commission, i.e., who makes this benchmarking report?
- Scope: this term refers to the reports' different geographic diversity and scope, i.e., where is this benchmarking report conducted?
- Scale: this term refers to measuring the benchmarking scale, i.e., how many countries are included in comparison?

The author further elaborates on these concepts. For example, this term refers to the frequency of publication of e-government benchmarks. As an example, the author cited four benchmarks that were regularly published. These include the e-Europe benchmarks (Capgemini) commissioned by the EU Directorate-General for the Information Society

and Media, Accenture's e-government leadership reports, The Brown University Global e-Government survey, and The UNPAN (United Nations Network in On-Line Administration and Finance) report (European Commission, Directorate-General for Communications Networks, Content and Technology, 2021) (Accenture, 2022) (Brown University, 2022) (UNPAN, 2022). Further, under the source term, the author distinguishes different categories of sources. The author divides benchmarks into four subtypes: **state-paid independent benchmarks** for a specific research purpose, **commercial benchmarks** to boost research sales, **benchmarks for** selling **marketing results,** and **academic benchmarks**. Next comes the division of benchmarks according to the scope of the study. There are both international benchmarks and benchmarks limited to a particular region. So, for example, only European benchmarks. By the latter, the author means the benchmarking scale, whether it is just a comparison of several countries or the whole world at once (Bannister, 2007).

The author of article S11 similarly divides the benchmark categories based on a review of thirty-seven studies and articles in the "e-government benchmarking field." (Bogdanoska Jovanovska, 2016) endowed the benchmarks studies with four unique attributes:

- Authorship and commissioning: the author mentions stakeholders as authors, clients, and funders to measure e-government. These include *international* and *global independent organizations*, *academic institutions* and *national institutions*, and *groups of independent researchers.*
- Geographic coverage and diversity: under this term, the author divided the research into international, regional, and national. The author divided international studies into *truly global* and only *partly global*.
- The frequency of publications: here, the author divides benchmarking studies into those that are carried out every year, that is, *annual*, as well as *biannual.*
- The focus or subject of research: the author identifies three focus categories: ICT intensity, digital divide, and e-readiness. E-readiness measures the willingness of governments to adopt new technologies. The digital divide defines the gap between people that can access the internet and those who cannot. ICT intensity has internal and external intensity. External intensity is divided to supply and demand parts.

Due to complexity, few benchmarking studies exist that focus on back office or internal intensity of ICT, which is not a very well-taken subject either. Most of thee-government benchmarking is focused only on front office and, more specifically, on e-readiness. The author describes it as a factor that measures (business, government, or person) ability to adopt some technology. ICT intensity has two aspects: internal and external, measured through distinct indicators and methods. Typical measurement of ICT is concerned mainly with external intensity; online services supplied to the end-users, which is better know as the e-government front office, supply, and demand (Bogdanoska Jovanovska, 2016).

The categories of benchmarks also differ depending on their approach to assessing the e-government. Article S2, written by Slovenian researchers Kunstelj and Vintar (Kunstelj & Vintar, 2004), summarizes years of comparative research and evaluates existing e-government benchmarking developments and monitoring methods by focusing on EU indicators.

They grouped benchmarks into five categories:

- E-readiness: country or government preparedness and capability to take part in the “electronic world” (deliver online services)
- Back office: all aspects of e-government that are not precisely “seen” benchmarking can involve issues such as resources, policies, logistics, labor, administration, and all the front office supporting processes.
- Front office: supply: benchmarking of e-government services through online supply, which can also include other ways of communication.
- Front office: demand: benchmarking e-government online services from the user's standpoint.
- Effects and impacts: various aspects of impact to e-government, including social, economic, and financial benchmarking.

Article S4, written by (Janssen, Rotthier, & Snijkers, 2004), classified 18 benchmarks, including some local Belgian benchmarks, into four categories:

- Supply studies: concentrating only on online e-government service delivery,
- Demand studies: examine e-government more extensive manner, also covering aspects of e-participation,

- Information society studies: more extensive e-government research, also focusing on the environment of ICT enablement and policies,
- E-government indicator studies: more extensive observation of ICT development factors.

The author of article S1, (Bannister, 2007), offers, on the contrary, a fuller list of benchmarks:

- Inputs,
- Process,
- Outputs,
- Gain (outputs relative to inputs),
- Demand,
- Usage,
- Effectiveness,
- Impact,
- Value for money.

Article S11 compares different e-government benchmarking studies/methods and concludes that most benchmarking studies concentrate only on the front office and very few on the back office. They also find out the inappropriate use of benchmarking terminology between the studies (Bogdanoska Jovanovska, 2016).

In contrast, the use of ICT can be pointed out by the internal intensity factor, which shows results of improvement in management workflows of the government or its institutions. It includes human resources, IT infrastructure, environment (economic, political, cultural), policies, and regulations. Internal intensity measurement includes measurements of ICT areas such as project delivery, people, investments, budgets, organizational capability, arrangements in ministerial offices, outsourcing, and procurement. The digital divide concentrates mainly on front office services of the e-government. It defines the gap between government e-readiness and non-e-readiness, which can be shown as a gap between people that can access the internet and those who cannot. It exposes the issue that a group of people cannot enjoy the benefits of the e-government, therefore cannot acquire essential online information or required computer

skills, and have limited or no access to e-government services (Bogdanoska Jovanovska, 2016).

Article S10 does a literature review on e-government benchmarking studies published from 2003 – to 2016. The author categorizes those benchmarking studies into three periods and found similar patterns and criticism, including lack of innovation and stagnation in e-government benchmarking. E-government benchmarks usually consist of extensive e-service and web-page quality, internet infrastructure, and population education levels, sometimes called maturity index, e-readiness index, or surveys. In the early days, three major measurement areas existed: performance indicators, stage-model studies, and service literature concentrating only on the supply side (front office) rather than other aspects of the e-government. At the time, it was enough to encourage e-government development in countries. From 2004, work towards improving benchmarking, especially in the back office area, began. Also same time, there were the first phenomena of flaws in current practices and methodology. So, scholars started looking for ways to keep up with technological advancements by improving current methodology and introducing key terminology. However, their efforts were not so compelling that later years raised more criticism towards existing methods and urgency for new benchmarking. It can be said that e-government benchmarking was in some stagnation. The author also points out the lack of cooperation between stakeholders and no actual resolution to the complaint. He concludes by stating that there is a need for entirely new frameworks, measuring methodologies, and new ways of thinking in the e-government benchmarking (Skargren, 2020).

Article S9 raises concerns about the validity of benchmark results. As research material, they take an example of e-government benchmarking made by the EU. They claim that most e-government benchmarks are concentrated on the supply side and are not accurate, applying gaming with the results. In conclusion, providing better methods to enhance the overall e-government benchmarking process (Codagnone, Misuraca, Savoldelli, & Lupiañez-Villanueva, 2015).

The article S9 also mentions that e-government benchmarking is complex and entails a technical, analytical, and socio-political agenda. Applied measures help decrease systematic errors by exploiting indicators' validity to reduce complexity and keep measured objects intact. Measurements' socio-political side touches on definitions for

categories and classifications, what to measure, why to measure, indicators interpretation, political reaction, social reaction, and standardized measures through social mechanisms (Codagnone, Misuraca, Savoldelli, & Lupiañez-Villanueva, 2015).

In the beginning benchmarking was consolidated because of mimetic behavior across populations of organizations. It was appropriate for e-government development. After that, it lost validity but retained policy prominence due to resistance to change within a self-referential policy network. The enduring prominence of supply side benchmarking has to some extent, sidetracked more relevant and valid measurement and evaluation activities at all levels (EU, national, and local). The role of international benchmarking is to provide more composite and high-level monitoring indicators (Codagnone, Misuraca, Savoldelli, & Lupiañez-Villanueva, 2015).

In 2001, the EU Commission launched its first benchmarking of e-government using a four stages model, which was later replaced with five stages. Benchmarking indicators were measured by scanning and scoring a sample of websites in the relevant EU countries, resulting in high scores in many countries due to liner stage models. It is worth noting that scoring high in EU benchmarking can facilitate increased "virtual" quality, which may not reflect the actual quality of e-government services. It led many countries to deploy services and climb from a 50 percent level to saturation in supply side benchmarking in only a couple of years. In 2010, EU benchmarking concentrated on the online complexity indicator by dividing participating people into four groups by specifying the percentage of citizens who used online surveys. International organizations and national and local governments converged in developing their own supply side benchmarking and in giving relevance and attention to those produced by others. In 2012, the new EU benchmarking version marked its release, substantially changed, and updated. It made critical changes to the existing methodology. One of them introduced the life events concept (i.e., marriage, birth, voting, housing, health issues, schooling, employment), which was more comprehensive and uniform than the essential services concept. In addition, it embraced new indicators such as transparency, citizen mobility, business mobility, different vital enablers, and user-centric e-government. The scanning and scoring of websites now used the mystery shopper methodology and an online survey amongst EU citizens. As a result, it faced much opposition among member countries that

had already made investments to adjust to existing benchmarks (Codagnone, Misuraca, Savoldelli, & Lupiañez-Villanueva, 2015).

The author of article S8, (Salem, 2007), presents three primary purposes of benchmarking:

1. To give an idea to policymakers about their country's performance in e-government rankings,
2. To provide decision-making assistance for policymakers (sometimes best practices and lessons learned),
3. To justify government and agencies' investments in e-government.

The author also defines the importance of e-government benchmarking scope in different areas. For example, in e-government services, (Salem, 2007) relies on four key areas:

1. Citizen-related e-services – services that citizens use.
2. G2P – business services.
3. E-citizens applications – services to talk with citizens and listen to them. It covers areas such as e-participation, e-democracy, and e-accountability.
4. E-society applications – services for better cooperation with businesses, building relationships, and developing communities.

All those scopes are necessary, and concentrating only on one (most benchmarking studies concentrate only on citizen-related services) is not how a successful government should work. Most benchmarking is done on a national governmental level on national and international relevance. While this is understandable, and in developing countries, most e-governmental services are concentrated only locally, lower-tier governments are more innovative and focus on more extensive services. Also, a considerable number of studies concentrate on web-based communication. While today's standards, this is probably the most preferred way, in 2006, Heeks argued that citizens prefer other communication channels. In developing countries, where the internet is less available, there are other communication channels such as telephones and personal visits (offline) (Heeks, 2006).

According to S8, most of the benchmarking studies concentrate only on e-government core values and use composite indicators criticized due to their inaccuracy and lack of transparency. In addition, the lack of calculated indicators (i.e., benefit & cost ratio, supply & demand, maturity, and use of stage models) in benchmarking is also worrisome. While new stage models are offered in some studies, they are not widely used due to the high measurement costs and low comparison value (Salem, 2007).

4.2 Overview of Existing Approaches to Measuring the Success of e-Government Initiatives

In this section, the author will look at who the stakeholders are, what benchmarking methods exist, and finally look, at specific examples of initiatives taken.

4.2.1 Approaches to the Measurement of Benchmarks

In world practice, there is no universal methodology for measuring the success of e-government initiatives. However, SLR showed that some approaches are most preferred over other methods. Below they will be considered.

Article S11 describes six different stakeholder groups that have a strong interest in the subject of benchmarking. (Bogdanoska Jovanovska, 2016) divided stakeholders into the six groups as follows:

- supranational organizations involved in the global dimension of e-government, such as the UN and OECD,
- global independent organizations such as World Economic Forum and Economist Intelligence Unit,
- multinational consulting companies such as Accenture and Capgemini,
- academic institutions such as Brown University in the U.S.A. and Waseda University in Japan,
- national institutions or national associations of ICT in the public sector in one country, such as the National Audit Office in the UK, European Commission in Europe, Australian National Audit Office in Australia, and US momentum,
- groups of independent researchers.

According to article S3, the use of e-Government benchmarks manifested by two aspects: 1) evaluate individual country progress over some time, 2) compare the growth of individual country against other countries. Benchmarking studies that focus on online service delivery rely on indicators such as the number of online services available to citizens and businesses and the percentages of government departments with websites and websites that offer electronic services. Generally, indicators and indices for benchmarking are quantitative and form a ranking and assessment framework. The framework's core characteristics can be based on entity measurement characteristics or subjective measures. In general, e-Government studies focus on the supply side, not back office, due to expensive data collection and complex processing. For that reason, EU benchmarks are transparent, broadly accepted, simple, inexpensive, and used by many countries (Rorissa, Demissie, & Pardo, 2011).

The authors of article S2, (Kunstelj & Vintar, 2004), mentioned above divide benchmarks into different categories depending on what they evaluate:

- **e-readiness** – IT enablement measures factors that demonstrate individual stakeholders' readiness, such as business, citizens, and government.
- **back office** – every aspect related to the government side, i.e., policies for both IT and non-IT, strategies, action plans, information infrastructure use and adaptation, awareness of e-government issues and advantages, and IT training. Other external aspects managed by the back office cover information infrastructure ownership, usage level, and interests.
- **front office (supply)** – supply side approaches entail evaluating online supply. In individual cases, it also involves other communication channels such as call centers, digital television, dedicated kiosks, and different mobile technologies. These techniques explore quality, availability, development level, and other supply-related characteristics for e-services, individual websites, information content, and portals.
- **front office (demand)** – demand approaches study the field from the user's standpoint. It gathers information for e-services, portals, individual websites, and information in areas like actual service use, level of interest, reasons for services not being used, and quality evaluation of services.

- **effects and impacts** – evaluation of e-government impact on social, democratic, and economic processes also topics such as work methods, cost analyses, benefit analyses, and organizational impact. However, this approach is limited due to its concentration only on the technological process of e-government (Kunstelj & Vintar, 2004).

In article S4, (Janssen, Rotthier, & Snijkers, 2004), the authors classified 18 benchmarks into four categories:

- Input indicators;
- Output indicators;
- Usage/Intensity indicators;
- Impact/Effect indicators;
- Environmental/Readiness indicators.

Input indicators, in this case, measure the resources that countries have invested in e-government. (Janssen, Rotthier, & Snijkers, 2004) present examples of input indicators:

- the number of financial resources allocated to e-government,
- spending on IT/e-government as a percent of GDP,
- resources allocated to research and development,
- government resources allocated to the internet infrastructure.

Output indicators measure the number of applications implemented inside of e-government, instead of measuring financial resources. (Janssen, Rotthier, & Snijkers, 2004) present examples of output indicators:

- the number of online services for businesses and citizens,
- the percentage of government agencies with websites,
- the number of e-services offered by government websites.

Usage indicators measure the actual use of services by citizens or businesses. (Janssen, Rotthier, & Snijkers, 2004) present examples of usage indicators:

- the number of businesses or individuals using the e-services offered,

- the percentage of citizens who are looking to find some information from government websites,
- the number of businesses dealing with online payments,
- internet traffic percentage related to the provision of e-services.

Impact indicators measure in a much more immediate sense than usage indicators. They measure the actual satisfaction of the end-users or, more generally, how things have improved with e-government. (Janssen, Rotthier, & Snijkers, 2004) present examples of impact indicators including:

- reduction in waiting time at the government counter x by y percentage,
- reduction in processing time in government x by y percentage,
- levels of citizen/business satisfaction with e-government,
- survey-type questions such as: “Do you feel more positive about your government now that you can contact them by e-mail?”, “Is your government more efficient now that you can service online?”.

Finally, environmental indicators attempt to measure a country’s readiness for the information society and its implications. (Janssen, Rotthier, & Snijkers, 2004) present examples of environmental indicators that include:

- a level of penetration of ICT (PC, internet, mobile phone) in private households, at work, and in schools,
- an indicator that measures “fear of an invasion of privacy,”
- assessments of online purchases as an indicator of trust in the online environment,
- an indicator that measures “the quality of legislation relating to the information society,” tariffs for telephone, GSM, and internet access.

Article S8 researches different international e-government reports and methodologies used to compare them and discusses whether those are accurate or the limitations of current methods. ENB (European Benchmarking Network) defines seven distinct categories of benchmarking. From the perspective of e-government, we can divide those benchmarking methodologies into three main groups as presented by (Salem, 2007):

- Strategic – means to enable high performance in long-term strategies,
- Competitive – to improve specific operations and processes,
- Process.

A standard methodology used throughout the reports concerning e-government benchmarking is strategic benchmarking. Recent e-government studies have introduced two new major measuring tracks: 1) to raise the importance of the complexity of online e-government services, and 2) to evaluate e-government key factors, such as e-readiness and societal utilization. Term e-readiness is also widely used in the overall e-government benchmarking. It defines the readiness/preparedness of the government to be able to deliver e-government successfully (Salem, 2007).

According to S5, one of the methods is e-government performance evaluation. This methodology concentrates mainly on the review of websites. These measures focus primarily on components visible to users and do not consider back office components like integration. Five main measurement criteria are **attracting** (design, graphic, services), **informing** (links, content, contacts, projects), **community** (forum, ads, news, community services, networking), **delivering** (framework, search engine, mailing list, multimedia) and **innovation** (transformation level of existing services and frequency of new innovative services) (Peters, Janssen, & Engers, 2004).

The article also mentions a statistical method for assessing e-government. A statical technique called factor analysis has been widely used to benchmark across various disciplines. It is used to examine patterns of correlation between observable indicator variables and latent variables (factors) that are unknown and not directly measurable. It provides an analytical means to evaluate different variables under consideration for inclusion in e-government indices. The UN E-government Development Index, compiled using factor analysis, supports three distinct factors: the Human Capital Index, the Telecommunication Infrastructure Index, and the Online Service Index. First, it is compiled into 11 core measures that reflect the execution of government functions. Then, to put all those measures on the same scale, min-max normalization and normalized indices are grouped under three aggregate components. Finally, the overall e-government Development Index is compiled based on those indexes (Peters, Janssen, & Engers, 2004).

The author of article S7 states that e-government benchmarking is driven by demand (in policy lifecycle), and benchmarking key areas (readiness, availability, uptake, and impact) will change over time. He compared 64 benchmarking reports and found that demand for different key issues (areas) shifts over time. For example, recent reports do not cover benchmarking for readiness. He argues that only well-developed countries seek to use another type of benchmarking (Heeks, 2006).

4.2.2 Benchmarking in Practice

The author of article S7 notes that the main e-government benchmarking initiatives come from politicians, whose involvement in benchmarking can be varied and sometimes indirect. Public officials, government consultants, academics, and private IT companies are other parties involved. Citizens are also one group involved, but most of the time, they are hardly mentioned (Heeks, 2006).

According to S4, the EU uses benchmarking approaches from CapGemini Ernst & Young (now Capgemini) and EuroBarometer. Their approach was to measure the development and availability levels of 20 essential online public services. It covers governmental websites for citizens and businesses to find information and obtain and send completed forms. In addition, multiple studies and projects were implemented to supplement existing methods, including Eworx and PLS Ramboll, SIBIS, BISER, and REGIONAL-IST (Rorissa, Demissie, & Pardo, 2011).

Article S2 compares popular e-government benchmarking frameworks and criticizes, especially (West, 2007) that they do not provide accurate results because they do not distinguish between static (simple) and interactive (dynamic) government portals. Their case study shows six frameworks that will compute e-government indices by taking (West, 2007) framework as a base and building other frameworks based on it. As a result, they found out that when websites have weights assigned based on their level of e-government service development status present more precise results than those without (Kunstelj & Vintar, 2004).

According to S5, in the Netherlands, multiple e-government monitoring initiatives have been used.

OVERHEID.NL

The project is a large-scale periodical survey of government websites commissioned by Duch Kingdom Relations and the Ministry of the Interior. Assessments in this survey used five-point criteria that included government information, user-friendliness, government services, the scope of participation, and general information on government websites. Furthermore, 3000 users were surveyed by scholars to measure the time that websites took to respond to e-mails (Peters, Janssen, & Engers, 2004).

WEBDAM.NL

This initiative focuses exclusively on the front office aspect of the e-government. It started a Top 50 for municipalities' websites, using design, content, service level, and communication criteria. Representatives from three groups perform each municipality's assessment and ranking: civil servants, citizens, and experts. Each group has a minimum and maximum score. Finally, the total is aggregated to determine a ranking (Peters, Janssen, & Engers, 2004).

Accenture e-gov monitor

Accenture researchers accessed and assessed the websites of national government agencies to determine the quality and maturity of services and the level at which business can be conducted electronically with the government. The primary "indicator" of the eGovernment level chosen by Accenture is what they call: service maturity. Service maturity indicates how a government has developed an online presence. It is decomposed into three following aspects: publish relationship: active/passive interaction, and transaction (Peters, Janssen, & Engers, 2004).

European Regional innovation scorecard

This initiative is used for monitoring and comparing the innovation in regions to their ability to foster economic growth. It is generally accepted as a leading European benchmark for innovation dynamics. The following indicators are evaluated: population with tertiary education, lifelong learning, employment in medium/high-tech

manufacturing, employment in high-tech services, public and business R&D, EPO high-tech patent applications, manufacturing, and services (Peters, Janssen, & Engers, 2004).

Article S8 also discusses various benchmarking methodologies used in widespread international-level reports. The author brings some examples:

Global E-government Readiness Report

The report was conducted by UNDESA from July to August 2005 and covered 191 countries, which made it truly global. The project used a strategic type of benchmarking. UN created a new e-government e-readiness measuring framework, which helped governments develop ICT action plans. This new people-centric methodology for benchmarking combines a pack of indexes qualitatively and quantitatively. This report represents indicators such as readiness to provide information to citizens as well as the capacity of the public sector to establish e-government components (Salem, 2007).

Online Availability of Public Services

The report was compiled by EC/Capgemini in April 2006 and covered 28 countries, including ten new members of the European Union additionally, Switzerland, Norway, and Iceland. The report used a strategic type of benchmarking. It consists of four modules presented by Capgemini that embraced web-based survey, sampling, analysis, and screening. In addition, this report examined 20 necessary government online public services available for businesses and citizens per the Action Plan framework for e-Europe (Salem, 2007).

Benchmarking E-government in Europe and the US

The report was compiled by RAND Europe from April to May 2002 and covered 17 countries. It was based on methodology presented by EC/Capgemini and was part of the SIBIS (Statistical Indicators Benchmarking the Information Society) program. This report focused purely on Europe's e-government improvements. In contrast to existing e-government studies at the time, which mainly measured the supply side of e-government, they concentrated on to demand side. Two competitive nature benchmarking surveys were held in the major EU countries, the U.S.A., and Switzerland (Salem, 2007).

E-government in Central Europe: Rethinking Public Administration

The report was compiled by EIU (Economist Intelligence Unit) from July to August 2004 and covered 11 countries. It combined 35 earlier published studies with benchmarking qualitative and quantitative methodologies. Their idea was to study complex subjects in benchmarking, such as shared vision or e-democracy. Weights were added to examined methodologies, and the overall ranking was revealed after summing up all of the measured indicators (Salem, 2007).

Benchmarking the Information Society: eEurope Indicators for European Regions (BISER)

BISER carried out this project in 2004. It lasted 24 months and covered 28 European regions. This project developed a benchmarking methodology that concentrates on encountering difficulties in adopting online services and satisfactorily with the e-government. For each EU member country defined, 20 benchmarking statistical indicators allowed to compare their e-government, including establishment and population (Salem, 2007).

Global E-government

In 2006, Brown University published its following annual report. It covered 198 countries, and its objective was to measure the use of e-government services by including the online availability and accessibility of different materials. Benchmarking conducted was strategic (Salem, 2007).

Reorganisation of Government Back-offices for Better Electronic Public Services – European Good Practices

The report was conducted by the University of Bremen and the Danish Technological Institute in 2003. It covered 17 EU countries additionally Norway and Iceland. The main focus was benchmarking the integration of e-government public online services from the back office side. Their research methodology was based on three communication phases: face-to-face interviews, web, and telephone. In addition, the report included an exercise in the process benchmarking (Salem, 2007).

International E-economy: Benchmarking the World's Most Effective Policies for the E-economy

In 2003, the UK Department of Trade and Industry commissioned a report that Booz-Allen-Hamilton implemented. The report aimed to assess the level of progress the UK is making towards becoming the "world's best environment for e-commerce," identify best practices and share them with cooperating countries, and explain why some countries have excelled in some regions of their wider e-economy. Interviews were conducted in nine countries with high-ranking policymakers to conduct a competitive benchmarking analysis of the e-economy. This report uses ten previously conducted and published private and official institution benchmarking studies by applying part of the methodology for subjective assessment and ranking. Benchmarking conducted was competitive (Salem, 2007).

Leadership in Customer Service: New Expectations, New Experiences (Global e-Government Survey 2005)

In 2005, Accenture published its sixth annual report, the methodology of which has undergone significant changes compared to the previous five reports. The report used a hybrid methodology. For the first part, e-government service levels and availability were quantified and qualitatively assessed maturity for services. Next, perceptions of business and citizens in 22 countries were assessed in methods and levels of integration with the e-government in 4 focus areas. Finally, the final ranking was produced by combining two previously conducted parts (Salem, 2007).

User Satisfaction and Usage Survey of E-government Services

The report was conducted in 2004 by Taylor Nelson Sofres. It covered 32 countries and used a strategic benchmarking methodology. It measured the usage and introduction of online e-government services and the quantitative benchmarking (Salem, 2007).

4.3 Purposes for Benchmarks by Organizations

In this section, the author will consider which organizations are stakeholders in e-government benchmarking, as well as what their purposes are.

According to article S1, organizations that are interested in and involved in measuring e-government fall into four broad categories: supranational organizations such as the EU and the UN, individual governments, academic institutions, and private firms. Some of them, in turn, are also sponsors of this event, but at the same time, all categories have entirely different reasons for benchmarking on their behalf (Bannister, 2007).

In article S7, the author asks a fundamental question: why benchmark? Benchmarking studies of e-government have external and internal purposes. The external goal is helpful to scientists and users of this work. Benchmarking studies say almost nothing about the internal goal. An internal goal is responsible for the benefit to the individuals or organizations conducting the benchmarking study. The benefit pursued by private firms is the desire to raise the organization's profile in e-government. So, this may be due to the desire to raise funds. According to the author, if benchmarking is marketing or selling reports, this is contrary to the development goals (Heeks, 2006).

The same is stated by the author of the S1 article on the example of private firms. The author cites private firms as an example, the purpose of which, according to him, is to increase the firm's authority in the e-government market. According to the author, this is the most prominent justification for investing considerable financial resources (Bannister, 2007).

According to S1, Accenture, a private firm whose reports are available free of charge on the internet or on-demand, belongs to this category. The author argues that this firm is unlikely to criticize a potential or existing client because it is well aware of the marketing consequences of any of its comments. Accordingly, this affects how they communicate their findings. The same goes for their reports that are being prepared for sale. They may also be influenced by expectations of customer response, although they may be more impartial (Bannister, 2007).

According to the S3 article, the United Nations, specifically UNDPEPA, was one of the pioneers to purpose web measuring index for e-government to rank countries based on their provision of the e-government services. Policy planners used it as an annual benchmark, and some countries used rankings resulting from benchmarking to justify spending on e-government initiatives. Internationally, ICT indicators had an essential role in establishing policy-relevant e-government benchmarks and monitoring the digital

divide on a global level. Public policymakers can use benchmarking indicators to design ICT policies. Researchers can use them to assess the impact ICT use has on productivity (Rorissa, Demissie, & Pardo, 2011).

Finally, benchmarking can assist governments and administrations responsible for implementing e-Government services to monitor public spending effectiveness and efficiency indicators. As we can see, benchmarking e-government serves both internal and external purposes, and (Rorissa, Demissie, & Pardo, 2011) divide its benefits into three categories:

- retrospective achievement measuring (helping policymakers track their country's position in the e-governmental ranking)
- direction and priorities for prospective charting
- measuring progress & development for e-government (forcing governments and their agencies accountable for the investments in the e-government).

Article S10 notes that benchmarking can monitor the efficiency and effectiveness of public spending (Skargren, 2020). Notably, under article S5, some countries use benchmark scores to justify expenditures on e-government initiatives (Peters, Janssen, & Engers, 2004).

5 Data Synthesis

This section will summarize the results of SLR, followed by a discussion of the study results.

5.1 Research Question (RQ1)

Which e-government benchmarks exist on the international and national levels?

According to SLR, benchmarks can be classified into five different categories:

- The frequency of publications: Benchmarks are mainly divided into those released *annually* or less often, twice a year (*biannually*).
- Authorship and commission or source: In this category, three possible combinations of sources have been identified. National or international organizations conduct *government* benchmarks, researchers and universities conduct *academic* benchmarks, and private companies and organizations conduct *independent* benchmarks.
- Geographic diversity and coverage or scope: benchmarks can be divided into international and national under this category. International studies are divided in turn into *truly global* and only *partly global.* The main scope of the benchmarks is the European Union.
- Scale: under this category, there are many different combinations. For example, some benchmarks compare only a few countries, while others reach the whole world.
- The focus or subject of research: benchmark studies focus on two broad categories: a *front office* and a *back office*. The front office has three focus categories *ICT intensity*, *digital divide*, and *e-readiness*.

5.2 Research Question (RQ2)

How do stakeholders measure the success of e-government initiatives?

Despite the support for e-government benchmarking value and ranking countries by delivery of digital services, there remains disagreement among experts on the choice of priority methodologies and practices. SLR has shown that benchmarking is a rather eclectic mix of exercises undertaken by different institutions for different purposes.

Although there are many different e-government benchmarks, benchmarking studies fall into two main categories – front office and back office. The front and back office, in turn, includes three components: e-readiness, ICT intensity, and the digital divide. There are also two components for front office services: supply and demand. Most indicators on the supply side measure quantity, not quality. For example, the number of implemented online services and the percentage of government departments with a website are measured as the number of individuals who have used the offered electronic services. Measurements are also made on the number of financial resources allocated to research and development in e-government and internet infrastructure. On the demand side, the focus is on measuring usage and quality. For example, websites' quality, use, content, and other electronic services are measured. The back office evaluates cooperation methods between and inside single government administrations and the usage level of databases and information systems. More precisely, process integration and standardization levels and several institutions and employees involved in life event process execution.

It can be noted that benchmarking focuses mainly on the supply side, measuring only the availability of online services. Countries, in turn, pay too much attention to ranking when they could learn from the experience of other countries. However, this phenomenon is easily explained by the high cost of data collection and their complex processing. For this reason, more sophisticated deep analysis tools are used less frequently.

One of the challenges countries should work on is developing communication between the public and private sectors. In many countries, the public sector works only with the public sector and never with the private sector. The private sector often goes further in its development, but it could go even further if the public sector were ready for it. For

example, the private sector would like to use public services with identity cards in their services, but the basis of the system does not exist. In Germany, for example, only a tiny part of the German population uses digital online services and digital IDs. The private sector in Germany would also love to use public services with ID cards in their services, but the system's backbone is not existing.

Another problem is the involvement of universities in working with the public sector (science and public administration), which will be discussed below.

5.3 Research Question (RQ3)

How are e-government benchmarks used/exploited by different organizations?

SLR has shown that organizations interested in and involved in benchmarking e-government fall into four broad categories: supranational organizations such as the EU and the UN, governments, academic institutions, and private firms. Some of them, in turn, are also sponsors of this event. Moreover, each of the categories has different reasons for e-government benchmarking.

The articles selected for this SLR most often critically refer to private firms due to their commercial purposes in benchmarking. The authors criticize private firms for seeking to raise the firm's profile in the e-government market and seeking commercial justification for funding e-government benchmarking.

The primary purpose of supranational organizations is to monitor the progress of e-government. Their main interest lies in seeing how public administration is accessible to the people. Supranational organizations such as the EU put pressure on the public administration in every country, acting as a kind of voice of society, stating that governments need to change something. However, it is also essential for the EU to maintain a certain standard. One of the EU's priorities is to remove the obstacles facing the Single Digital Market in Europe. To this end, the EU is pushing for the development of an interoperability framework, as this is a crucial factor in enabling digital transformation. Its existence would allow administrations to exchange meaningful electronic information with each other and with citizens and businesses in a way that is comprehensible to all parties involved. It requires a coordinated approach at all levels.

Otherwise, the current digital fragmentation would increase, jeopardizing the provision of connected public services across the EU.

There are also non-governmental organizations (NGOs) trying to support and involve other communities and services. NGOs are trying to pressure the government to change it and make public services available to people worldwide. NGOs can influence the development of e-government more than the country itself. It happened, for example, in Ukraine, where NGOs are more motivated to ensure that the state successfully implements the e-government (Lemke, Ehrhardt, & Popelyshyn, 2021).

As for the governments of individual countries, benchmarking helps them track the efficiency and effectiveness of public spending (for example, it allows politicians to track their country's position in the e-government ranking). In addition, some countries use benchmark scores to justify expenditures on e-government initiatives.

Academic institutions generally do not have commercial or private purposes but pursue a specific research purpose. Sometimes the government sponsors their research, but this is more common in countries where the universities are much closer to the government and work together.

6 Summary

Since the early 2000s, e-government benchmarking has proliferated and gained immense popularity. As a result, many different benchmarks were published every year. This is confirmed by the many benchmarks that come out every year from commercial and international organizations, governments, and universities. However, although e-government benchmarks are so widely accepted worldwide, they are not always a reliable tool, as they do not always give an accurate picture of the state of e-government in different countries. In particular, this is due to the political pressure exerted on them.

Many of the 11 articles reviewed in this research work contained much criticism on benchmarking. However, it turned out that e-government benchmarking is much more closely related to policy-making (as in the case of supranational organizations) and commercial goals (as in the case of commercial companies) than simply assessing the implementation of e-government in different countries.

On the one hand, of course, benchmarking reports play an essential role in drawing the public's attention and policymakers, particularly regarding the need for e-government development. It also helps choose the right e-government development strategy for individual countries and regions and provides decision-making assistance for

On the opposite, it can also be noted that the benchmarking methodology may contain inaccuracies and ambiguity. As a result, benchmarks cause much controversy regarding the methodology they use. Moreover, there is also a danger that countries will be too fixated on exactly those indicators evaluated by the benchmark. Most often, this is usually the implementation of the front office. So, researchers again have the same challenges with an obsession with quantity, not quality, and citizens' actual use of these services.

A possible interesting topic for further study would be to find compromises between what supranational organizations or any other stakeholders consider necessary in the implementation of e-government and what citizens of different countries need from e-government. Also, one of the interesting topics is the involvement of the public sector in

collaboration with the private sector and the involvement of universities in working with the public sector.

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