





The Quality of E-Government Management, Information Security and Quality

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Abstract

The purpose of the presented paper was to present the state of e-government services in the Republic of Kosovo within the management of electronic services and the role of ICT in data security and quality. E-government is an important sphere in Kosovo, which has been shown to have positively influenced the provision of services to all stakeholders, taking care of the security and quality of these services. This paper belongs to the qualitative and quantitative types, where a total of 115 subjects, experts, and users of e-government services participated and gave their opinions against these services. A literature review was used to process qualitative data, while a questionnaire was used to process quantitative data with experts and users of e-government services. From the results of the research, we understood that the level of use of e-government services in the Republic of Kosovo is high and that there is a high level of data security and quality of services, where the role of ICT in the management of e-data-government is essential and very important. It is recommended that, according to the results of this study, direct access to the management of these services should be considered and offered to ensure the sustainability of e-government services in the Republic of Kosovo.

Keywords:

E-Government;
ICT Role;
Security;
Quality of Information.

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1- Introduction

E-government aims to realize a transparent government with a greater responsibility towards its citizens and other parties, such as businesses and non-governmental organizations, and to have a wider reflection of its work at the international level. Based on the European Commission, which since 2006 has been working on the digitization of states and currently implements the 2016-2020 EU e-Government Action Plan, where based on this action plan are presented on annual basis the achievements of EU member states concerning e-government [1]. In recent times, digitalization has produced changes in all aspects, including social, cultural, economic, and political ones, which consequently create new opportunities, challenges, and concerns for all of humanity [2]. It is considered that the reliable and efficient infrastructure in organizations has a very important role in the preservation and stability in general, as well as the use of various tools of information and communication technology offers us more risks, which belong to the cyber world [3].

Research shows that typically, receiving systemic risk status is the result of a cyber-security breach [4]. For many decades, the management of the cyber security risk has been presented as an essential problem, which generally damages the reputation of the organization, can be very costly, and presents long-term problems [5]. So, nowadays, it is considered that cyber security within e-government is presented as a differentiating element and plays a very essential role in the

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sustainable development of the organization and the government in general [6]. It should be an important government program to develop the cyber security culture of ICT systems for users who give and receive information are protected and have the opportunity to solve security problems [7]. In general, public service includes activities that can be within the framework of the service manager from the government, in various lower units, or in other legal institutions that are based on the given authority [8].

Grout & Stevens [9] managed to define public e-government service as any service that can be offered to a large number of citizens. However, in practice, there are legislative and executive regulations that often define the functions of the public service [10, 11]. Now public services are everywhere and can be reformed, recreated, and modernized. In this context, the state of public services and their future can be at the center of various public debates around the world [12]. Around the world, public services are attempting to bring about fundamental changes in the governance and design of public service delivery. E-government in many aspects refers to the use of information through the use of information technology tools, which aim to provide various comprehensive services at the state level. In this context, e-government has created real opportunities to improve governance conditions, and in this way, high-quality, strategic, and secure services have been provided to stakeholders [13]. For this reason, all governments of the modern world, which are under development, must examine in detail all the elements or nuances that make up a successful, high-quality, and secure e-government [14].

Research shows that several aspects should be taken into account when providing public services through e-government, such as accountability between the provider and the user, representation and participation, availability, good functioning, adaptability, and the possibility of use by all parties, as well as the possibility of correction [6]. The government needs to provide public services with a variety of innovations that should pay attention to the general needs and demands of the public [15]. It should also encourage an effective role for the users of these services to ensure safe and quality service [16]. To achieve reliability in the use of electronic services, it is certainly necessary to take into account the provision of realistic promises to citizens and service users and to contribute to building trust in the use of these inter-institutional services [15]. So, this should go beyond the simple automation of public services, and a culture of application and widespread use of government services should be created [7]. Since 1990, various governments have started the first presentations of digitized information and communication technology services, which gradually managed to take their place in the daily use of citizens and are still used today for various information purposes [17].

Nowadays, public services such as e-government require more than just ICT, which is related to the complex practices of information systems and cyber security. Electronic governance, or e-government, can be used to improve the efficiency of the provision of government services to all stakeholders within the state or even to external users [18]. Services offered through e-government have the potential to improve communication between different government agencies and other constituents, thus providing access to various information and services at a relatively low cost [7]. It is considered that through the participation of citizens in e-government services, the possibility of new security and quality of service is created [17]. It does not mean that only the presentation of data and services in e-government offers the possibility of using these services; it depends on the orientation of the public service and the recognition of the factors that would enable government agencies to develop online services to fulfill the needs of their citizens [19]. The development of an e-government system is usually influenced by internal and external environments, which depend not only on the available resources but also related to the political will of the government to develop it as a project [20]. Among the most important issues are the technical issues, which contribute to the quality of e-government services. Research shows that ease of use, data compatibility, reliability, and quality are the main features of a successful or well-managed government platform. All this implies the role of ICT in the successful management of e-government, which is considered in this research, through which the role of ICT in e-government management is addressed, addressing the level of security of public services and their quality in general.

2- Literature Review

2-1- E-Government

Digitalization can be seen as a form of systematic application of information and communication technologies, including all areas of life and the potential of society. It is understood that social potential lies in education, and a school is the basis of education. In general, the main goal of the digitalization of society is to ensure universal access to information. As indicators that represent the level of digitization, there are the availability, usefulness, and quality of the information and services offered [21]. Research shows that the process of informatization in society offers us the digitization of services, and as a result of this is e-government, which provides us with the qualitative development of digital content and enables the distribution of the broadband network and wide area network. The use of services offered by various information and communication technology platforms has undergone various changes in all business sectors, and this has automatically affected the public sector. It has been concluded that the public sector must adapt to the changes that come in the field of ICT, which are now easily applicable and therefore affect that we have easy access to data and communication becomes easier with citizens, businesses, and all public administration institutions [22]. There

are different definitions of e-government that can be seen in the literature, but according to the United Nations Organization, e-government represents a continuous task of public administration to improve the relationship between citizens and the public sector through services [4].

In general, we can say that e-Government should be smooth, with a terminological and conceptual multiplicity, therefore the basic concepts that contain it as a platform should be clarified and unified. To Glyptis et al. [14], e-government includes a comprehensive perspective; that is, it also includes the adoption of new forms of ICT, which are more favorable, thus providing easy access to use. Santos et al. presents e-Government as a form of online supply of government information and services which can be provided through the Internet and other digital media [23]. present e-Government as a form of restructuring of public services, which adopts mechanisms that promote communication between different subjects, thus offering simple processes. E-Government services can also be perceived as a form of extension of central government services, which also offer different specifications. In this context, different governments offer electronic services that affect their competencies, typology, different territorial and local distribution at different levels [2]. Nabafu & Maiga [24] describe E-Government as a form that enables citizens of all levels to interact with all the public services offered, which are easily applicable.

Other authors such as Shackleton & Dawson [25] present e-Government as a service more than an electronic platform, as through e-Government new and improved services are offered to the public in general, to increase the involvement of all communities. According to the Dias & Gomes [26] study present e-Government as a method of government support, where the involvement of citizens with public services is achieved. In the field of electronic government, [27] mention several types of activities that can be offered through e-Government, such as Government-to-Citizens or Government-to-Clients, Government-to-Businesses/Companies, Government-to-Employees, Government-to-Government and Citizen-to-Citizen which are possible and applicable. Zaidi & Qteishat [28] have defined several forms of e-Government, such as Government-Citizen, Government-Business-Citizen, and Government-Government, for which services are said to be at the service of users. We say that the assessment of electronic services should be based on academic level dimensions, which provide a clear perception of the quality and security of services, and which consequently promote sustainable development, suitable for the real needs of all citizens.

2-2- Information Quality Management

It is considered that systems and public administration are presented as essential elements for a successful and reliable E-Government [29]. With a good design of E-government, it is possible to manifest a good governance model, which makes E-Government very important as a form of electronic governance, with inclusiveness, transparency and open access for all parties. E-Government serves as a basic tool for public administration and in this form, its implementation depends on the policy, rules and laws in force, which then dictate the form of operation of E-Government [30].

The management of information quality is one of the main and essential issues of e-Government, precisely the quality of information is considered very important to guarantee its approach to management, compared to the approaches available for managing the quality of information and communication in general. Research shows that most of the frameworks and approaches proposed for information quality management come from some form of analogy between the physical level of the product and information production [31]. According to the authors it is considered very reasonable to prove why existing approaches to the management of the quality of physical products are offered, which are consequently considered inappropriate or are not sufficient for quality management of information products. Da Veiga & Eloff [32] stated that changes in the field of information and communication technology arise like the raw material, which in general makes the nature of the information itself, thus producing differences in the quality of the information compared to the quality of the physical product, with the difficulty of measuring the information and the contexts in which the information is used.

It is considered that a major difference between information and physical products usually occurs due to consumption repeatedly, indeed indefinitely without exhaustion [25]. In this context information is more than a space. Also, this analogy is too short, considering that the tools are not included in the final products. In this form, we note that a single piece of raw data can be obtained once and then used in multiple information products from different platforms say that a good representation should be very imperative and accurate in all the details provided. We consider that data can be collected continuously and have the possibility of storage for an indefinite time, without the need to be included in any information product. Compared to physical products, collecting and storing an additional piece of raw information material has the potential to be used in the future and results in relatively small additional costs for organizations [33]. These changes come as a result of specific information security dimensions. Wimmer & Von Bredow [34] points out that even though an article of raw material has arrived on time, it does not mean that the intrinsic property of duration is attributed to the raw material. In this form, it is said that such dimensions of data reliability have no counterpart in product production. Research suggests that these differences may also manifest in the end, in that it is said that information products, such as the quality of the individual data that make up an information product, are as important to the consumer as the quality of the overall product.

In the context of information quality management, we also find other differences between information quality and product quality, which relate to the difficulties associated with measuring information [35]. Regarding the dimension of accuracy, Ullah et al. [36] identified one of the internal dimensions, where it is said that accuracy cannot be measured internally, but it always refers to something else, such as a real-world situation, represented by the data [37]. In the context of the use of data had pointed out a difference, which is between the quality of information and the physical quality of the product, where he points out that the most useful data are new and unique. To successfully manage data, data quality control must be maintained [38].

2-3- Security and Quality Service

E-Government has offered new forms of communication and interaction between different institutions and organizations, citizens, and businesses in the provision of public services. These interactions have managed to make it vulnerable to discuss the maximum protection of information. In general, some broad requirements are presented which are introduced in the level of e-Government information security, such as the aspect of confidentiality, data integrity, data availability, authenticity, and protection as well as accountability [39]. Research shows that confidentiality represents a form of information protection from unauthorized disclosure trends, by ensuring information is shared only with authorized users. By data integrity, we mean the accuracy of the information, to preserve the origin of the information, its completeness, and correctness [40]. Whereas the availability of data represents the form of the permissibility of using this information, by the right people at the right time. On the other hand, data authenticity refers to different forms of legitimacy, which are related to different forms of transactions, communication, and different documents. By accountability, we mean all actions that can affect the risk of e-government security, which can be traced back to the person responsible. Through the development of information and communication security practices, we reach the point where we require an adequate awareness of the technological perspective as well as the social and economic level of the organization [21].

McLaughlin & Gogan [5] presented three different aspects of effective information security in organizations. At the first level, he presented the reliability of the technical infrastructure which, according to him, affects the security of transactions, the protection of access, and prevents hacker attacks. In the second level, it represents the creation of the process of creating a reliable and efficient way of controlling information security, while in the third level, the aspect of developing a good corporate security culture that can promote positive individual attitudes and behavior toward information security controls in general. Many authors present considerable efforts designed to ensure information security in different institutions [32] as is the case when an information security culture framework is proposed, to increase awareness of information security in organizations. Posthumus & Von Solms [41] had developed an information security governance framework. Martin [42] had recommended a grounded form of total quality management to manage information security across organizations.

We also have different levels of information security compliance, which refer to the effective implementation of information security standards and policies, to achieve information protection in public organizations [43]. It is considered that great speed is being achieved at the institutional level, to signal the appropriate steps of organizational information protection [44]. Other authors have also written about information security compliance, which means those different aspects of information security work together effectively [43] and different mechanisms of information security function [44]. Through information security compliance, we present a form of meeting security and privacy requirements in institutions, as well as various forms of non-compliance with information security standards and policies, which have been the main reason for security breaches [15]. Lee & Kim [45] investigated the use of sanctions to increase information security compliance. Siponen & Vance [44] identified various factors such as normative beliefs, threat assessment, self-efficacy, and visibility, which influence employees' intention to achieve information security policies. Ifinedo (2018) [46] proposed a framework to comply with information security policies in institutions and organizations, presenting different perspectives of socialization, social influence, and recognition. These are mainly related to the attitudes and behaviors of users in information security compliance. They have also explored other factors that influence and contribute to the promotion of information security compliance in public institutions, which are related to the sustainable development of electronic government [34].

In this context of data security, the organizational aspect also presents characteristics such as the process of communication and top management of the promotion of organizational security culture, which direct the intentions and behaviors of employees towards a form of security compliance information. So, an organizational culture that contributes to the good development of information security directly in the behavior of employees, following the standards and policies of information security in institutions [47]. Also in the environmental context, there is an institutional need that is applicable to study the forms of environmental pressures and to adopt innovations in the field of the electronic market [48]. With this form, institutional theory should provide legitimacy from all parties while also providing external expectations. External views can be classified at the level of expectations, normative forms, and the level of expectation of cognition [49]. In the context of the quality of services since the beginning of humanity, human beings have had needs

for the provision of services, which services differ from their traditional format until today at the level of electronic services. According to the Parasuraman et al. [38] they emphasize that when consumers receive good things in a traditional form, their style, textures, colors, labels, and packaging are usually highlighted, while in other forms the purchase of services is most of the time untouchable, Parasuraman et al. [38] point out that the term service quality provides the quality of any interaction experienced by customers, of the Internet as well as their personal experiences. Usually, when a citizen needs the provision of services, regardless of the interruption, he manages to follow the traditional or electronic format, there is a constant need for quality assessment Hien (2014) [50] where the quality of the service can be emphasized as a measure in which the service provided corresponds to customer expectations. The quality of services is also a perceived element that is a success factor in each field of activity of organizations or institutions [51].

Similarly, Lee & Kim [45] present the ability to measure the quality of service as a prerequisite to achieving a high level of quality, while Khawaja et al. [48] emphasize that organizations usually encounter difficulties when evaluating the quality of services provided to their customers, which usually results when they assess the existence of a defect in service or whether delivery is achieved within the defined time frame. It is considered that the customer's perspective regarding the quality of services provided is essential to achieving the appropriate level of user satisfaction [52]. Many authors have researched the quality of services, precisely they suggest that a realistic perception of service quality has its source in the relationship between the level of user expectations and the level of performance provided. Some of the main issues that determine the quality of service are related to the level of the tangibility of products, aspects of reliability, level of responsibility, forms of communication, courtesy, aspects of knowing customers, and forms of access. Considering the development and evolution of ICT, governments around the world face various challenges of technological transformation, and in this context, they face the efficiency of these services.

In this context, it is required to analyze available models that evaluate the quality of services in this area. An e-Government can be defined as high service quality when all stakeholders express a high level of satisfaction with the use of these services [28]. Al-Jaghoub et al. [27] also define an e-Government as the use of any type of information and communication technology, to achieve the improvement of the operations offered to the user and many, namely the citizens, companies, and institutions. In this form, Alshehri et al. [22] emphasize that an e-Government is understood as a form of provided information and services related to the government. Similarly, Frisbie et al. [53] referred that the use of an e-Government, especially in its WEB-based dimension, serves to improve access to government information and services by citizens, businesses, and other government bodies. Klischewski & Scholl [54] claim that one of the main factors affecting the successful development of e-Government is the development of websites that better serve the needs of citizens. According to Amaldas et al. [55] the existence of online services at the government level could significantly increase access, as well as the achievement of time and money savings for citizens. We also present a general conclusion which comes from the general report of the United Nations of 2012, which in the framework of the survey of the governments of the United Nations is that despite the current climate of global recession and taking into account the continuing need for provided electronic services, all governments must begin to reformulate e-government strategies, to create new synergies and increase sustainable development.

3- Research Methodology and Hypothesis

The research belongs to the quantitative and qualitative types, where through the interpretation of the literature were presented the opinions and discoveries of other authors from around the world, while through the questionnaire was presented the opinion of experts and high-level users of institutional platforms in the Republic of Kosovo (see Appendix I). Through this questionnaire, three key elements of e-government development were addressed, such as leadership, data security, and the quality of these services that are offered. The research was carried out with 115 experts and high-level users of e-government services, who filled out the questionnaire in electronic form, which was sent directly to their email addresses or through social platforms. Completing this questionnaire represents their professional opinion on the level of application of these services, how appropriate they are, their content, and the general quality of these services. For data processing, the statistical program SPSS v.25 was applied, while the data is presented in tabular and graphic form. First, the descriptive data of the participation is presented, then we did the descriptive analysis presented in the form of percentage and frequency, to validate the data, Alpha Cronbach's reliability analysis was performed and the normality analysis, while for the verification of the hypotheses, we applied the non-parametric tests such as factor analysis, linear regression analysis, and Spearman correlation.

3-1- Research Concept

Quality management is presented as the basic concept of the research on which the role of ICT is presented in the framework of leadership, the creation of data security, and the quality of services (Figure 1).

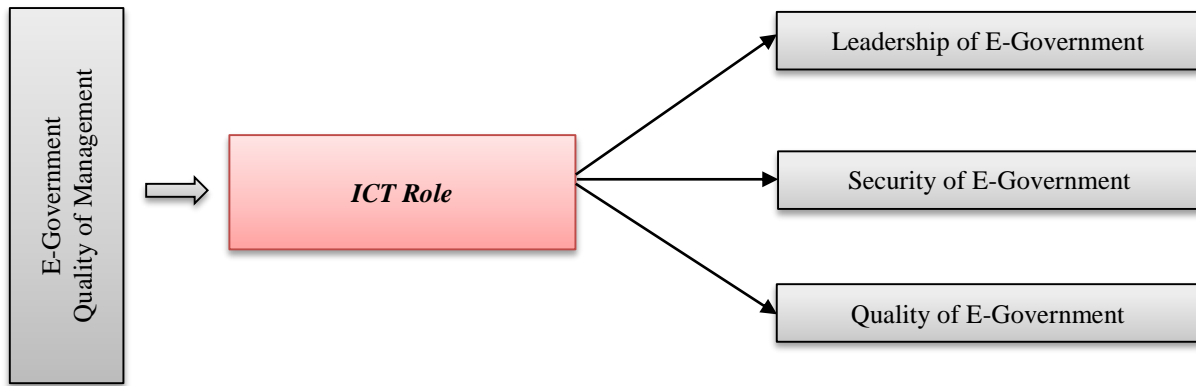


Figure 1. Research concept – steps of the research

E-Government Quality Management presents the expected research concept, where based on the quality of E-Government management, we have presented the role of ICT as a key role in E-Government management, which includes three basic elements of E-Government Leadership, Security and Quality. Based on this concept, the research literature has been examined, where scientific works have been researched in prestigious databases such as Elsevier, Scopus, IEEE, Springer, ACM and Web of Science, where in total 55 different scientific papers were analyzed which are presented during the examination of my paper.

3-1-1- Statistical Analysis Model

The testing of the research model is carried out based on the following formula/regression, $Y_{i,t} = \beta_0 + \beta_1 LEA_{i,t} + \beta_2 SEC_{i,t} + \beta_3 QUA_{i,t} + e_i$, where Y stands for the total number of employees, LEA- Leadership, SEC-Security and QUA-Quality. The research is also tested through factor analysis (λ_i, e_i) , $i = 1, \dots, p$ and $\lambda_1 \leq \lambda_2 \leq \dots \leq \lambda_p$, Factor analysis is a method for investigating whether several variables of interest Y_1, Y_2, \dots, Y_p , are linearly related to a smaller number of unobservable factors F_1, F_2, \dots, F_k , and correlation Spearman $r_R = 1 - \frac{6 \sum d_i^2}{n(n^2-1)}$.

3-2- Research Questions and Hypothesis

The research questions and hypotheses have been presented as below, through which we analyze this gap in the sustainable development of E-Government services in the Republic of Kosovo. Through these questions, we touched on the essential problem of the research, trying to present the role of ICT, the level of leadership, security, and quality of services.

Research Questions:

1. What is the general role of ICT in e-Government management?
2. What are the security factors of e-Government?
3. What are the quality factors of e-Government services?
4. What impact do security and quality of services have on the leadership level of e-Government?
5. What is the connection between the quality of services, security, and leadership in e-Government?

Hypothesis:

H1. The electronic governance offered in the institutions of the Republic of Kosovo presents a high level of data security.

H2. The electronic governance offered in the institutions of the Republic of Kosovo presents a high level of quality of services.

H3. Leadership developed within e-Government depends on the level of data security and quality of services.

H4. The role of ICT is presented through the positive correlation of leadership, security, and quality of e-Government services.

4- Data analysis and Result

4-1- Descriptive results

A total of 115 respondents participated in the research, of which 58 were male or 50.4% and 57 were female or 49.6%. Within the age group, we see that 18 of them belong to the 18-25 age group or 15.7%, another 19 from the 26-35 age

group or 16.5%, another 28 from the 36-45 age group or 24.3%, then 30 of others in the age group of 46-55 years or 26.1% and 20 others in the age group over 55 years or 17.4%. There were 13 respondents or 11.3% with a secondary qualification, 33 with a bachelor's qualification or 28.7%, then 51 with a master's qualification or 44.3%, and another 18 with a Ph.D. or 15.7% (Table 1).

Table 1. Demographic results of research

Gender	N	%
Male	58	50.4
Female	57	49.6
Age	N	%
18-25	18	15.7
26-35	19	16.5
36-45	28	24.3
46-55	30	26.1
Over 55	20	17.4
Qualification	N	%
High school	13	11.3
Bachelor	33	28.7
Master	51	44.3
PhD	18	15.7

We understand that the majority of respondents agree that E-government contains high-quality information, and also offers good communication opportunities through which values and expectations are presented. We see that through E-governance services in the Republic of Kosovo, institutional strategies have been presented, and it also provides an environment for economic-social and innovative empowerment. They affirm that the E-government in the Republic of Kosovo has a well-defined plan or strategy to achieve the raising of the level of institutional services of the government, businesses, and citizens, as well as having formal methods for determining the current requirements of products/services and user expectations and citizens. They agree that it is also possible to review the complaints of users/citizens, improve electronic services, achieve a high level of efficiency, as well as to measure and analyze the current levels of benefit from quality services of users/citizens (see Table 2).

Table 2. Questions – Leadership and security of data

	I do not agree at all		I do not agree		Neutral		I agree		I completely agree	
	N	%	N	%	N	%	N	%	N	%
E-Government contains high-quality information.	2	1.7%	4	3.5%	36	31.3%	45	39.1%	28	24.3%
E-Governance offers good communication opportunities through which values and expectations are presented.	1	0.9%	6	5.2%	33	28.7%	41	35.7%	34	29.6%
In E-Governance, the strategies of the institutions of the Republic of Kosovo are clearly defined.	3	2.6%	10	8.7%	30	26.1%	41	35.7%	31	27.0%
In E-Governance, the aims and objectives of the institutions of the Republic of Kosovo are clearly defined.	3	2.6%	9	7.8%	35	30.4%	43	37.4%	25	21.7%
E-Governance offers an environment for economic-social empowerment and innovation.	2	1.7%	12	10.4%	30	26.1%	39	33.9%	32	27.8%
E-Government has a well-defined strategy/plan to raise the institutional services of the Government, businesses, and citizens.	5	4.3%	7	6.1%	35	30.4%	37	32.2%	31	27.0%
E-Governance has a formal method for determining current product/service requirements and user/citizen expectations.	4	3.5%	8	7.0%	39	33.9%	39	33.9%	25	21.7%
E-Governance examines user/citizen complaints to improve electronic services and improve governance efficiency.	5	4.3%	14	12.2%	34	29.6%	39	33.9%	23	20.0%
E-Governance measures and analyses the current levels of benefits of quality services to users/citizens.	3	2.6%	10	8.7%	44	38.3%	31	27.0%	27	23.5%

Even within the security and quality of information, we are dealing with a professional approach to the services provided by the institutions of the Republic of Kosovo, which is confirmed by the responses of the respondents (Table 3). As we can see in the first statement, most respondents agree that we have accurate and fast information, as well as reliable information for most of them. On the other hand, they claim that this information is updated and relevant. They claim that the government provides clear and meaningful information, and of course, this information is provided in appropriate formats and at a high level.

Table 3. Questions – Quality of services

	I do not agree at all		I do not agree		Neutral		I agree		I completely agree	
	N	%	N	%	N	%	N	%	N	%
E-Government provides accurate and fast information	4	3.5%	3	2.6%	31	27.0%	50	43.5%	27	23.5%
E-Government provides reliable information	3	2.6%	6	5.2%	22	19.1%	46	40.0%	38	33.0%
E-Governance provides up-to-date information	5	4.3%	4	3.5%	31	27.0%	43	37.4%	32	27.8%
E-Government provides relevant information	2	1.7%	5	4.3%	35	30.4%	48	41.7%	25	21.7%
E-Governance provides easy-to-understand information	3	2.6%	2	1.7%	28	24.3%	48	41.7%	34	29.6%
E-Government provides clear and meaningful information	3	2.6%	4	3.5%	31	27.0%	55	47.8%	22	19.1%
E-Government offers information in a suitable format for links to web pages of public and international institutions	6	5.2%	7	6.1%	31	27.0%	40	34.8%	31	27.0%
I believe that I will be able to perform online services and transactions that are useful to me	3	2.6%	8	7.0%	21	18.3%	42	36.5%	41	35.7%
In the e-Government portal, my data is safe	5	4.3%	9	7.8%	27	23.5%	46	40.0%	28	24.3%
E-Governance enables advanced search and easy-to-use access	3	2.6%	10	8.7%	27	23.5%	41	35.7%	34	29.6%
Access to the E-Governance portal is clear and easy for all other applications of RK institutions	4	3.5%	2	1.7%	34	29.6%	46	40.0%	29	25.2%
The design of the E-Government portal is suitable for the service provided	3	2.6%	8	7.0%	25	21.7%	41	35.7%	38	33.0%

4-2- Reliability Test

Based on Table 4, the questionnaire through Alpha Cronbach's reliability test was validated, where it is proven that the groups of questions are reliable at a high level of over 85%, precisely leadership has a reliability level of 93.9%, security at 88.1%, and quality with a level of 92.8%.

Table 4. Reliability test

Groups	Number of variables	Cronbach's Alpha
Leadership	9	0.939 (93.9%)
Security	5	0.881 (88.1%)
Quality	7	0.928 (92.8%)

4-3- Normality Test of Group-Variable

The normality of the data was carried out to prove whether the data has a normal or non-normal distribution, which turned out to have a non-parametric distribution, and the non-parametric tests were applied to prove the research hypotheses (Table 5).

Table 5. Normality test

	Kolmogorov-Smirnov ^a		
	Statistic	df	Sig.
Leadership	0.070	115	0.200 [*]
Security	0.094	115	0.114
Quality	0.089	115	0.205

4-4- Factor Analysis

The purpose of the factorial analysis is to first present the factors that are important in the management of the quality of e-Government, within the role of ICT, data security, quality of services, and the level of leadership. According to the following results of KMO and Bartlett's test, we see that we have the Kaiser-Meyer level of 0.951, then with Chi-square 2.073, df 210, and p-value=0.000 which shows that the data can be interpreted and presented at the level of henceforth (Table 6).

Table 6. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.951
Bartlett's Test of Sphericity		Approx. Chi-Square 2,073.772
		df 210
		Sig. 0.000

As we can see (Table 7), the data are classified into two main factors, so the first factor has an Eigenvalue of 12.910, while the second has 1.076.

Table 7. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.910	61.477	61.477	12.910	61.477	61.477	7.027	33.461	33.461
2	1.076	5.125	66.602	1.076	5.125	66.602	6.960	33.141	66.602
3	0.923	4.394	70.995						
4	0.715	3.406	74.401						
5	0.671	3.195	77.597						
6	0.583	2.775	80.372						
7	0.511	2.434	82.806						
8	0.468	2.230	85.036						
9	0.445	2.118	87.154						
10	0.381	1.813	88.967						
11	0.329	1.565	90.533						
12	0.272	1.294	91.827						
13	0.260	1.239	93.065						
14	0.244	1.164	94.229						
15	0.228	1.085	95.314						
16	0.219	1.041	96.355						
17	0.190	0.906	97.261						
18	0.163	0.775	98.036						
19	0.149	0.709	98.745						
20	0.136	0.650	99.395						
21	0.127	0.605	100.000						

Extraction Method: Principal Component Analysis.

Based on Figure 2, even though the following figure, we see that the decline has started from the second factor, which proves our division of variables into two main factors.

The first factor presents 9 variables that have passed the coefficient above 60%, which can be classified as leadership and data security. Variables such as In E-Governance, the strategies of the institutions of the Republic of Kosovo are clearly defined (0.72), In E-Governance, the aims and objectives of the institutions of the Republic of Kosovo are clearly defined (0.60), E-Governance provides an environment for economic-social empowerment and innovation (0.73), E-Government has a well-defined strategy/plan to improve the institutional services of the Government, businesses and citizens (0.76), E-Government has a formal method for determining current product/service requirements and user expectations /citizens (0.77), E-Governance examines the complaints of users/citizens to improve electronic services and improve governance efficiency are presented at the leadership level, while variables such as E-Governance contains high quality information (0.64) and E- The government measures and analyzes the current levels of benefits of quality services of users/citizens (0.72) are presented in k head of data security and quality in E-Government. So, the first factor includes the leadership and security, and the quality of e-Government services. Through this analysis, we manage to prove the first hypothesis that H1. The electronic governance offered in the institutions of the Republic of Kosovo presents a high level of data security (see Table 8).

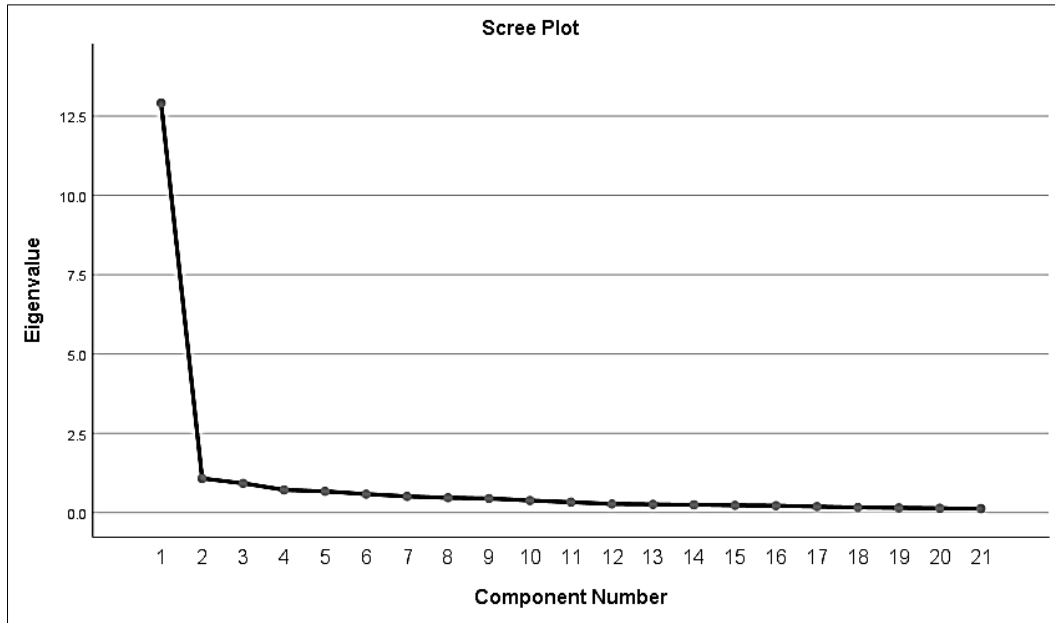


Figure 2. Factor analysis – scree plot

Table 8. Rotated Component Matrix

Rotated Component Matrix	Component	
	1	2
E-Government contains high-quality information.	0.648	*
E-Governance offers good communication opportunities through which values and expectations are presented.	0.723	*
In E-Governance, the strategies of the institutions of the Republic of Kosovo are clearly defined.	0.605	*
In E-Governance, the aims and objectives of the institutions of the Republic of Kosovo are clearly defined.	0.737	*
E-Governance offers an environment for economic-social empowerment and innovation.	0.767	*
E-Government has a well-defined strategy/plan to raise the institutional services of the Government, businesses, and citizens.	0.775	*
E-Governance has a formal method for determining current product/service requirements and user/citizen expectations.	0.713	*
E-Governance examines user/citizen complaints to improve electronic services and improve governance efficiency.	0.752	*
E-Governance measures and analyzes the current levels of benefits of quality services to users/citizens.	0.726	*
E-Government provides accurate and fast information	*	*
E-Government provides reliable information	*	*
E-Governance provides up-to-date information	*	*
E-Government provides relevant information	*	0.660
E-Governance provides easy-to-understand information	*	0.773
E-Government provides clear and meaningful information	*	0.705
E-Government offers information in a suitable format for links to web pages of public and international institutions	*	*
I believe that I will be able to perform online services and transactions that are useful to me	*	0.617
In the e-Government portal, my data is safe	*	0.730
E-Governance enables advanced search and easy-to-use access	*	0.765
Access to the E-Governance portal is clear and easy for all other applications of RK institutions	*	0.809
The design of the E-Government portal is suitable for the service provided	*	0.741

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; a. Rotation converged in 3 iterations.

In the second factor, 8 variables are presented which represent the quality of services provided by e-Government. The variables that belong to the aspect of data security are E-Government offers relevant information (0.66), E-Government offers information that is easy to understand (0.77), and E-Government offers clear and meaningful information (0.70), we believe that we will be able to perform online services and transactions that are useful for me (0.61), In the e-Government portal my data is safe (0.73), E-Government enables advanced search and access easy to use (0.76), access to the E-Government portal is clear and easy for all other applications of RK institutions (0.80) and the design of the E-Government portal is suitable for the service provided (0.74). Within this analysis, we prove the second hypothesis that H2. The electronic governance offered in the institutions of the Republic of Kosovo presents a high level of quality of services.

4-5- Regression Analysis

The regression analysis was carried out within the model $Y_{i,t} = \beta_0 + \beta_1 LEA_{i,t} + \beta_2 SEC_{i,t} + \beta_3 QUA_{i,t} + \epsilon_{i,t}$, where the dependent variable is Leadership (LEA), while the independent variables are Security (SEC) and Quality (QUA) (Table 9). As we can see below, the analysis is classified into two main models, wherein in the first model, there is the impact of data security, while in the second model we find the impact of data security and the quality of services.

Table 9. Regression analysis

Independent	Model -1-				Model -2-			
	B	S.H.	β	Sig.	B	S.H.	β	Sig.
Security	0.850	0.048	0.856	0.000	0.621	0.108	0.624	0.000
Quality	*	*	*	*	0.265	0.112	0.257	0.020
R	0.856				0.863			
R ²	0.732				0.745			
ΔR^2	0.730				0.740			
F	308.569				163.314			
ANOVA (Sig.)	0.000				0.000			
Dependent	Leadership							

Based on the above results, we see that in the first model data security has a coefficient of $B=0.850$, $S.H = 0.048$, $\beta = 0.856$, and $p\text{-value}=0.000$, while in the second model it is seen that $\beta=0.624$ with more effects low but significant, while the quality of services appears only in the second model with coefficient $B=0.265$, $S.H=0.112$, $\beta=0.257$ and $p\text{-value}=0.020$. based on these results accept hypothesis H3. Leadership developed within e-Government depends on the level of data security and quality of services, confirming that Leadership is a factor statistically dependent on data security and the level of quality of services provided (Figure 3). E-Government quality management is presented at a high level of leadership through data security and the quality of services provided.

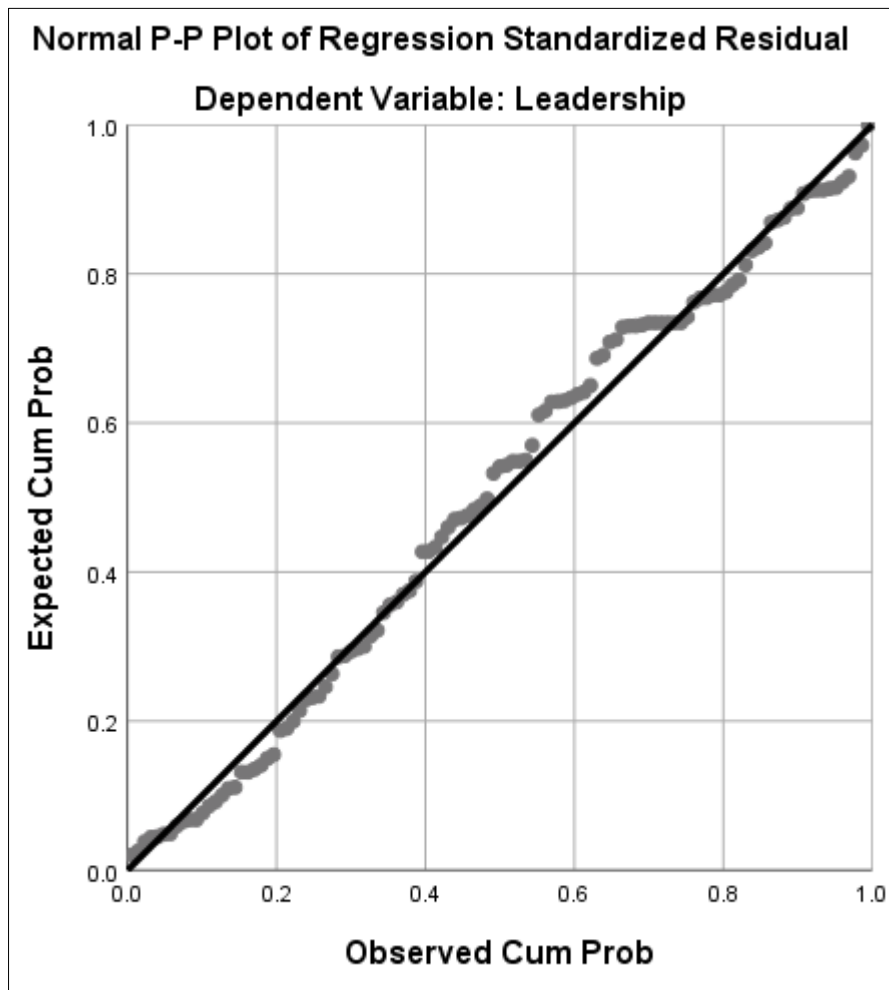


Figure 3. Regression Normal plot

4-6- Correlation Analysis

Through the correlation analysis, the links between leadership, security, and quality of services was presented (see Table 10). Through this analysis, we proved hypothesis H4. The role of ICT is presented through the positive correlation of leadership, security, and quality of e-Government services.

Table 10. Correlations analysis

		Security	Quality	Leadership
Security	Correlation Coefficient	1.000		
	Sig. (2-tailed)	.		
	N	115		
Quality	Correlation Coefficient	0.863**	1.000	
	Sig. (2-tailed)	0.000	.	
	N	115	115	
Leadership	Correlation Coefficient	0.801**	0.761**	1.000
	Sig. (2-tailed)	0.000	0.000	.
	N	115	115	115

** . Correlation is significant at the 0.01 level (2-tailed).

The results of the research show that there is a positive relationship between Security and Quality ($\rho=0.863^{**}$, $p\text{-value}=0.0000$), then there is also a correlative relationship with leadership ($\rho=0.801$, $p\text{-value}=0.000$), while quality has a relationship positively correlated with leadership ($\rho=0.761$, $p\text{-value}=0.000$) (see Figure 4). Through this result, we conclude that the connection of these factors represents the role of ICT in the successful management of e-Government.



Figure 4. Scatter plot – correlation

5- Research Analysis and Discussion

5-1- The Main Findings of the Research

Based on the results of the research, we conclude that the services offered by E-Government have a high level of security and adaptation to the data security levels of the governments of European countries and beyond, based on Table 2, the respondents confirm that they present strategies with clear and clear goals of the institutional objectives of the Republic of Kosovo. A powerful economic-social and innovative environment are also presented, and suitable methods

of use are also offered (Table 2). Even within the quality of services we see that we have a high level of these services (Table 3), where they claim that there is accurate and fast information, with a high level of updating and easily applicable. It is possible to carry out transactions and the data is considered to be safe, (Table 3). Through the factorial analysis, we managed to prove the first hypothesis H1. The electronic governance offered in the institutions of the Republic of Kosovo presents a high level of data security, (Table 8) and the second hypothesis H2. The electronic governance offered in the institutions of the Republic of Kosovo presents a high level of quality of services, (Table 8) as well. The ranking of the variables that represent leadership and data security at their highest level is shown, while the second factor presents the factors that represent the quality of services. Through the regression analysis, we proved the hypothesis that H3. Leadership developed within e-Government depends on the level of data security and quality of services, (Table 3), while the fourth hypothesis H4 is confirmed through the correlation analysis. The role of ICT is presented through the positive correlation of leadership, security, and quality of e-Government services.

5-2- Comparison with Other Studies

Compared to other research, my research presents a positive picture of the state of services provided by electronic government, showing precisely many advantages that are welcome at this level and are presented here. My research presents a positive view of the state of services provided by electronic government, precisely showing many advantages that are welcome at this level and which are presented here. Based on the reviewed literature [7, 9, 26], it is concluded that the successful management of e-government is dependent on the level of leadership that contains the strategy and the clear vision of the services [12], the security level [2], and the quality of the services [33]. The level of application of these services is increasing, which makes a clear strategy mandatory for the successful management of e-government [4], while it is seen that the role of ICT in data security and quality of services is essential for successful and sustainable management [6]. The results of the research show a high level of qualification among the users, with a young age of use and wide inclusion of the female gender, a very positive element for transition countries like Kosovo. Most of them are satisfied with the content of the information provided in e-government, which is considered to be of high quality, as well as the good communication opportunities offered through which the values and expectations are presented very clearly (Table 2).

5-3- Advantages and Limitations

It is seen that we have a significant impact on data security and quality of services at the leadership level, which is a very important factor in the sustainable management of e-government, while their connection shows that it is an inseparable chain that must be managed with a high commitment of all ICT resources. The services offered by E-Government in the Republic of Kosovo are presented at the appropriate level of application, which can be compared with high-quality and high-security services that can be applied for internal purposes, government-government, or government-institutions, government-citizens, or even government-businesses, so we have a wide composition of the application, which makes the possibility of use very complex and requires that the role of ICT is at a high level and very vigilant.

6- Conclusion

In general, it is concluded that the role of ICT in the management of e-government in the Republic of Kosovo is very important (Tables 2 and 3), and based on the opinions of the respondents, it is seen that the data security of these services provided represents the stability of e-government in the Republic of Kosovo. From the results, we find that data security factors are related to timely data management, a clear definition of e-government strategy and vision, communication with citizens and businesses, and providing them with usable data that can be classified as other safety products, while the quality factors of the services are related to the possibility of using them 24 hours a day, 7 days a week, with high quality, taking into account their content, the ease of usage, and suitable formats (Tables 2 and 3). In the end, it is concluded that the services offered have a high level of application, which is proven by the answers of the respondents, with satisfactory security and quality. This represents a high level of sustainability, but it does not mean that we should not have a long-term strategy for managing e-government services. What we can propose with this research is that the published data be standardized, that is, to create a form of data standardization, which would help in the more successful management of services and also affect their privacy and quality. The role of ICT should start with the planning of strategies, which makes their role inseparable in this process and perhaps the main role in electronic governance. E-government in the Republic of Kosovo should be offered in forms and models suitable for all parties, including all business communities, offering them quick access and ease of use of services, opportunities for transactions, and receiving data securely and reliably, as well as with high quality.

6-1- Future Direction

In the future, we recommend that larger-scale research be developed within the framework of E-Government, first analyzing the technical conditions that our institutions possess as well as the number of E-Government security experts that would enable better quality and more comprehensive service.

7- Declarations

7-1- Author Contributions

Conceptualization, A.Q.T., and L.T.; methodology, A.Q.T., and L.T.; investigation, A.Q.T., and L.T.; writing—original draft preparation, A.Q.T., and L.T.; writing—review and editing, A.Q.T., and L.T. All authors have read and agreed to the published version of the manuscript.

7-2- Data Availability Statement

The data presented in this study are available in the article.

7-3- Funding

The authors received no financial support for the research, authorship, and/or publication on this article.

7-4- Institutional Review Board Statement

Not applicable.

7-5- Informed Consent Statement

Not applicable.

7-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I

The questionnaire was applied to experts and users of E-Government platforms in the Republic of Kosovo. The questionnaire is classified into several categories, starting with demographic data, then the leadership part and finally the two parts of data quality and security. The quality of e-Government management, the role of ICT in information security and quality. Through this questionnaire, it will assess the quality of e-Government management, focusing on the role of ICT in the quality and security of information. Your answers will assess the role of ICT, so you will give a general assessment of the application of e-Government in the Republic of Kosovo. This questionnaire is designed for research purposes and fully preserves the confidentiality of the respondents.

Thank you for your cooperation!

Demographic data:

Gender: Male ____ Female ____

Age: ____

Cualification: High school ____ Bachelor ____ Master ____ PhD ____

Leadership

Questions	1	2	3	4	5
E-Government contains high-quality information.					
E-Governance offers good communication opportunities through which values and expectations are presented.					
In E-Governance, the strategies of the institutions of the Republic of Kosovo are clearly defined.					
In E-Governance, the aims and objectives of the institutions of the Republic of Kosovo are clearly defined.					
E-Governance provides an environment for economic-social empowerment and innovation.					
E-Government has a well-defined strategy/plan to raise the institutional services of the Government, businesses and citizens.					
E-Government has a formal method for determining current product/service requirements and user/citizen expectations.					
E-Governance examines user/citizen complaints to improve electronic services and improve governance efficiency.					
E-Governance measures and analyses the current levels of benefits of quality services to users/citizens.					

1: I do not agree at all, 2: I do not agree, 3: Neutral, 4: I Agree, 5: I completely agree.

Quality and Information Security

Questions	1	2	3	4	5
E-Governance measures and analyses the current levels of benefits of quality services to users/citizens.					
E-Government provides accurate and fast information					
E-Government provides reliable information					
E-Governance provides updated information					
E-Government provides relevant information					
E-Governance provides easy-to-understand information					
E-Government provides clear and meaningful information					
E-Government offers information in a suitable format for links to web pages of public and international institutions					
I believe that I will be able to perform online services and transactions that are useful to me					
In the e-Government portal, my personal data is safe					
E-Governance enables advanced search and easy-to-use access					
Access to the E-Governance portal is clear and easy for all other applications of RK institutions					
The design of the E-Government portal is suitable for the service provided					

1: I do not agree at all, 2: I do not agree, 3: Neutral, 4: I Agree, 5: I completely agree.