

# UNDERSTANDING PUBLIC E-SERVICES -

## Deconstructing e-Services to Identify Quality Aspects

Arild Jansen, Section for eGovernment, University of Oslo, Norway, [arildj@jus.uio.no](mailto:arildj@jus.uio.no)

Svein Ølnes, Vestlandsforskning (Western Norway Research Institute), [sol@vestforsk.no](mailto:sol@vestforsk.no)

### ABSTRACT

*eGovernment is about providing digital services to citizens and businesses. However, we question whether all types of digital interaction between citizens or businesses and government agencies really are services. We will argue that our understanding of this concept is inadequate, and that the inflationary use of “e-services”, or “digital services”, blurs important differences between categories of interactions which have distinct quality requirements. It creates problems when developing frameworks for assessing the quality of such online services. This paper explores a framework for categorizing different types of digital communication by identifying basic service elements as part of a service. In this way we can describe and model various types of interactions between citizens and public agencies based on a consistent set of these elements. As an illustration of the usefulness of this framework, we describe some of the life event services in the EU eGovernment benchmark measurement in terms of our vocabulary.*

**Keywords:** service, e-service, digital service, eGovernment, benchmarking

## 1 INTRODUCTION

### 1.1 Introduction and background

The service concept is widely used but entails much confusion. E-service, or digital service, is even worse; it is used for most all types of electronic communication between citizens and government (Lindgren and Jansson, 2013). Lee (2010), for instance, speaks of even information provision as services. However, is the government offering us a ‘service’ when we pay taxes or a business is reporting information decreed by law to public agencies, just because the Internet is used as a communication channel? There is, thus little consensus on the meaning of the concepts used to describe and discuss these e-services, and hence, the literature is full of synonymous terms and concepts (Lindgren and Jansson, 2013). Such confusion also creates difficulties when governments carry out benchmarkings to assess the quality of e-services, and also when trying to define ontologies to help achieve better interoperability between different systems. Goldkuhl (2007) questions the use of service in all governmental tasks, while Alter (2008) points to the different definitions of service across communities. Baida et al. (2004) propose an ontology for describing services and service bundling, while Lee (2010), on the other hand suggests a conceptual frame including metaphors and themes to be used when evaluating e-government development. These contributions have been the basis for Jansen and Ølnes (2014) in their development of a framework for describing and modelling the different types of interaction patterns (called “e-services”) that take place when a public agency provides “e-services” to its various users and stakeholders. This framework, consisting of six basic service elements, has several dimensions, including i) the type or category of the interaction seen from the provider, ii) the purpose of the interaction, iii) the content or structure of the interaction, iv) the result or effect of the interaction and v) the quality requirements to them.

The aim of this paper is to further develop this framework by including quality attributes and to explore its usefulness in order to improve the foundations for the e-government benchmarking measurements. The research issue that this paper will address is: *To provide a better understanding of the e-service concept by conceptualizing the different types of interaction between a government and its citizens and businesses and thus provide a better foundation for different quality measurements of e-services.*

## 1.2 Methodology

Our work is exploratory, aiming to develop a framework for describing and modelling public electronic services, and also to serve as a basis for assessing the quality of these services. The paper is rooted in the eGovernment research field, but borrows from more general computer science. Our discussions partly borrows from the business science and service management literature, but also computer science, because there are few references to this in eGovernment literature and not many papers rooted in the eGovernment field that discuss the ‘service’ or ‘e-service’ concepts.

This paper builds on and extends the literature review that previously has been undertaken, by using the extensive eGovernment Reference Library (EGRL 8.5)<sup>1</sup>. Our framework is based on the conceptualization of Goldkuhl and Røstlinger (2000), Goldkuhl and Person (2006) and furthermore Baida et al. (2004) and Lee (2010). In particular, we have benefitted from Lee’s eGovernment stage models (2010). We have also studied the European Commission’s work on defining a framework for evaluating digital services (European Commission, 2012) and the similar work done in Norway by the Agency for Public Administration and eGovernment (Difi)<sup>2</sup>.

## 1.3 Structure of the paper

In the next session we discuss the ‘service’ and ‘e-service’ concepts, followed by a discussion of quality indicators in the EU’s eGovernment benchmark measurement (European Commission, 2012) as well as the Norwegian quality metrics for public digital services. In section 3, we present our framework including a vocabulary of basic service elements that can describe all types of “e-services”. This vocabulary is tested on a subset of basic services from the EU eGovernment benchmark measurements (European Commission, 2012). Finally, we present our conclusions and suggest further research in this quite fundamental part of eGovernment.

We use the terms “e-service” and “digital service” interchangeably as they refer to the same concept. We also use single quotes when referring to the concept ‘e-service’ (Ogden and Richards, 1923).

# 2 DECONSTRUCTING THE E-SERVICE CONCEPT

## 2.1 Services and e-services

‘Service’ is a concept loaded with different meanings in different circumstances, mostly depending on who uses it. There exist a number of definitions of the concept ‘service’, both lexical and from other sources. Starting with encyclopaedia the word ‘service’ comes from the Latin word “servus” which means slave (Webster’s, 1979). A first definition of service is the occupation or condition of a servant, corresponding nicely to how service is understood in computer science: A program that offers a service to other programs through a well-defined user interface, such as in Service-oriented architecture (SOA).

Hill (1977) defines service this way: “A service is a change in the condition of a person, or a good belonging to some economic entity, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity”. Although not very precise, this definition has been adopted by the U. S. government. It puts weight on the action rather than the substance or the quality. Thus, ‘service’ is used to indicate an action and also the type of action (the act or method). The definition also covers the output of a service (the quality) and the organization acting to carry out the service.

Goldkuhl and Røstlinger (2000) discuss the determinant properties of services, often being contrasting to the properties of goods, and they reject the main characteristics of services that often are mentioned; being *intangible* (immaterial), *inseparable* (in production and consumption), *heterogeneous* (i.e. instancial variance) and *perishable*. They furthermore point to the fact that the criteria for service quality are dependent on how a service is apprehended, illustrating that a service can be defined differently as an activity, a benefit or a customer satisfaction. Following from that, they propose to distinguish between a ser-

---

<sup>1</sup> see: <http://faculty.washington.edu/jscholl/>

<sup>2</sup> see: <http://kvalitet.difi.no/kriteriesett/kvalitet-pa-digitale-tjenester> (in Norwegian)

vice *action* (what the service provider does), a service *result* (what is done to the customer) and a service *effect* (what a customer experiences from the service, e.g. a satisfaction).

Vargo and Lusch (2004) are in line with Goldkuhl & Röstlinger in that the traditional understanding of services as being intangible, inseparable etc. is misleading and that these characteristics (a) do not distinguish services from goods, (b) only have meaning from a manufacturing perspective, and (c) imply inappropriate normative strategies. However, they differ in their conclusion and argue for a Service-dominant Logic where the relationship between services and goods is emphasized rather than the difference. We believe that this view is fruitful in that it may help to describe (model) public service provision (benefits?) that include both typical e-service transactions and physical performance, as e.g. kindergarten, health and care services.

Grønroos (2006) points to the observation that customers are both co-producers and consumers of a service, and furthermore argue that a service-logic approach best fits the context of most goods-producing businesses today. This is similar to what is proposed by Vargo and Lusch (2004). They later formulate this as “the customer is always a co-creator of value” (ibid.). They define *Service* “as the application of competences (knowledge and skills) by one entity for the benefit of another” (ibid.). This definition provides a new perspective for understanding economic phenomena, by implying that value is created collaboratively in interactive configurations of mutual exchange. They call these value-creation configurations *service systems*, including the participants, processes, and resources that interact to create value in service systems. So *value* and *value creation* are at the heart of a service and are critical to understanding the dynamics of service systems and to furthering service science. But they also underline that value is an elusive term, hard to describe precisely.

We support the understanding that a ‘service’ represents a type of value creation, including one or more actions. Furthermore, it should have a substantial content that provides some outcome (value) that is attractive for the receiver and implies an effect on the receiver. Borrowing from Baida's definitions, we believe that his basic idea of elementary “service actions” (as functions or processes) is fruitful, implying that we should develop an ontology of elementary public “service processes”. These may include both online electronic and physical activities, and also make a distinction between the two, as discussed in the Core Public Service Vocabulary referenced in chapter 2.3. The distinction between *service action*, *service result*, and *service effect* that Goldkuhl and Röstlinger (2000) is also useful for our attempt to construct a framework for categorizing various types of ‘e-services’.

We argue that the term “e-services” are being applied uncritical to describe all types of interactions between citizens and public agencies through an ICT-based interface, most often based on web technology. For instance, Lee (2010), in his discussion of eGovernment stage models, takes the notion of e-services more or less for granted. Similarly, Tan et al. (2013) provide no definition, but equal web-mediated services with functions available at websites, and states two important aspects of web-enabled service quality: content functions and service delivery. Axelson and Ventura (2007) make a distinction between an e-form and e-service where they see the first as a part of the user interface of a web-based public e-service.

Rowley (2006) defines ‘e-services’ as “...*deeds, efforts or performances whose delivery is mediated by information technology. Such e-service includes the service element of e-tailing, customer support, and service delivery.* This definition reflects the three main components involved: service provider, service receiver, and the channels of service delivery.

Goldkuhl (2007) questions the use of the term ‘service’ in all governmental tasks and he asks whether the service perspective is compatible with all kinds of public authority. More precisely, he questions whether a public e-service is a real service to the citizen, in a strict sense: in what ways is a citizen served through an e-service? One of his next questions is what is meant by ‘e-services’. He links these questions to a study of a child care service and the work to develop a requirement specification for an electronic child care service. He shows how the lack of a proper understanding of ‘e-service’ led to problems with the requirement specifications and ultimately the e-service application itself. The citizen was mainly seen as an information provider and not as someone to whom a service was provided. Lindgren & Jansson, (2013) show that there is little consensus in the literature on the meaning of public ‘e-service’ concept and how it is used.

In concluding that, in spite of its extensive use, there is no common understanding of neither the 'service' nor the 'e-service' concept, we strongly argue that there is a need for more precise conceptualisations. We also think that in order to approach a meaningful understanding, we first have to look at the various types of interaction between the government and the citizens or businesses and categorize them accordingly.

## 2.2 e-Services and stage models

From the advent of the Nolan model in 1969, see King and Kraemer (1984), a number of stage or phase models have been developed to describe the evolution of computing in organisations. Similar models have been developed to predict the progress of public electronic "services", by dividing the development of eGovernment into several evolutionary stages; see for example Layne & Lee (2001), Hiller & Belanger (2001); United Nations (2003). However, they all bear a deterministic characteristic in describing a development from simple provision of information to a more refined one-stop government. Implicit in the stage models is "the more the better", the further "up" on the development ladder the better and more valuable it is.

Goldkuhl and Person (2006) have conducted a review of some of these models, which they criticize: "*The evolutionary assumption is that the stages occur in this prescribed order; first stage I occur and then stage II and so on. [...] in practice these stages will occur simultaneously. The criticism of the quality assumptions is directed towards the assumption that stage IV is better than stage III and so on[...]these stages represent different elements of eGovernment rather than a quality progression.*"

Similarly, Lee (2010) has analysed a number of these models and his instructive synthesis clearly shows their non-linear and multidimensional characters. We fully agree with both Goldkuhl & Person and Lee in that the deterministic character of stage models conveys a limited understanding of e-government development, but at the same time they very well illustrate the complexity and multidimensional character of various types of interaction between public agencies and citizens or businesses. Also the development of the EU's eGovernment benchmark framework reflects this understanding by describing the different roles of public sector's interaction with citizens as well as private sector, as for instance «Empowering Government» (assessing User-centric, Transparent and Collaborative Government), «Results-driven Government», (Effective and Efficient Government) and furthermore 'Smart Government', through assessing "key Enablers". We will discuss some of these dimensions in chapter 4.

## 2.3 e-Services and quality measurement

The present eGovernment policies in most countries have development of electronic services at its core, being rooted in one of the stage models discussed above. In order to monitor the progress of eGovernment, there is a need for measuring the quality of digital services. Several initiatives have been taken in order to develop frameworks for benchmarking, including constructing quality indicators. We have looked at the European Commission's initiative together with work done by the Norwegian Government.

A prerequisite for developing benchmarking indicators for a specific field or concept is that we have a clear understanding of what we aim at measuring. Thus, when trying to measure quality, we must specify whose quality we are measuring (Jansen and Ølnes, 2013). We have above shown that the concept 'e-service' is ambiguous and may imply to misleading results in the benchmarking processes currently being undertaken.

Much effort has been put into developing more systematic vocabularies (ontologies) for describing public services, which is necessary both to achieve better interoperability and to be able to specify reliable indicators for benchmarking; see Wimmer (2002), W3C (2004), and OASIS (2006). In such work there is thus a clear need for more precise definitions of the key concepts that can describe and model the different activities and processes involved.

The European Commission has been working on interoperability issues in the public sector for many years. At present the programme ISA (Interoperability Solutions for European Public Administrations programme) aims to establish a common and formal specification of public services across the member countries. This work in progress is called the *Core Public Service Vocabulary* (CPSV). The CPSV is a "simplified, reusable and extensible data model that captures the fundamental characteristics of a service

offered by public administration” (European Commission, 2013). The modelling of the CPSV is based on semantic web technology (W3C, 2009), (European Commission, 2013). However, the framework for evaluating quality of e-services in EU countries has not used this CSPV model. There seems to be a clear connection between the CPSV work and the work with benchmarking service quality, but unfortunately, so far the two have not been connected.

EU’s proposed new framework for eGovernment benchmarking (European Commission, 2012) focuses on the benchmarking methodology for evaluating public digital services. It aligns with the eGovernment Action Plan 2011 – 2015 (European Commission, 2010). The main methods described in the benchmark framework are User surveys and Mystery shopping. Mystery shopping is a method used mostly for evaluating the quality of services. It can also be used for evaluating the quality of public e-services. The services in the EU benchmarking framework are chosen according to prioritized life events like “Losing and finding a job”, “Business start up and early trading activities”. In the 2014 benchmarks the business life event “Regular business operation” and the citizen life events: 1) “Starting a small claims procedure”, 2) “Moving”, and 3) “Owning and driving a car” were chosen.

The main categories used in evaluating online services are:

- User Centricity
  - Online availability
  - Usability
  - Ease of use
  - Speed of use
- Transparency
  - Transparency of public organisations
  - Transparency of service delivery
  - Transparency of personal data
- Single market mobility
  - (same indicators as User Centricity, but used on cross-national services)
- Key Enablers
  - eID
  - eDocuments
  - Authentic Sources
  - eSafe
  - Single Sign On (SSO)

The Agency for Public Management and eGovernment (Difi) in Norway has also been working on developing a metric for quality evaluation of digital services. This metric “*Quality of Digital Service*” including a set of indicators were presented in the spring of 2014 for comments from the public<sup>3</sup>. An evaluation of about 60 public services, both from municipalities and government agencies, will be carried out during the autumn 2014. The quality metric groups all together 31 indicators in the following six categories:

- Findability
- Trust
- Security and privacy
- Technology (standards, best practices)
- Usability
- Support

However, a definition of ‘digital services’ is not provided in neither of these measurements and comments to the proposed indicators point out this obvious missing<sup>4</sup>. The lack of a proper definition of ‘e-service’ makes the benchmarking less valuable and could lead to meaningless results.

Although the two metrics differ, we clearly see a similarity in both categories and indicators. A noticeable difference between them is that the EU framework groups services by life events, something that is miss-

---

<sup>3</sup> see <http://kvalitet.difi.no/kriteriesett/kvalitet-pa-digitale-tjenester>

<sup>4</sup> Unfortunately the comments have been removed due to a system upgrade

ing in the Norwegian metrics. We have selected the following categories of quality measure that is appropriate for our work:

- Availability
- Usability (including functionality)
- Ease of use
- Quality of data
- Security and privacy
- Trust
- Transparency

In chapter 4 we show how some of the services in the EU benchmarking quality measurement can be described by our framework outlined below and how to include some of the quality categories and example of indicators.

### **3 A FRAMEWORK FOR CATEGORIZING E-SERVICES**

As shown above, and which is more thoroughly discussed in Jansen and Ølnes (2014), it is not feasible to provide a definition that unambiguously specifies what shall qualify as ‘e-service’, as the concept is associated with very different meanings across disciplines and application areas. Rather, we think it is more fruitful to investigate the characteristics of different types of interaction between the government and the citizens, and model these in a common framework. Our point of departure is that ‘e-service’ corresponds to the common conceptualization of ‘service’ as stated in section 2.1; it is a digital interaction between a user and a provider that offers a substantial content having value that is attractive for the receiver. The act of service provision will include some type of value creation. Following from that, an interaction sequence that shall qualify as ‘e-service’ must include activities that are favourable to the receiver. Therefore, the service description must include both the activity that is involved and the intended result. Furthermore, as ‘e-services’ often are parts of physical services, references to relevant activities must be included in the description.

Even if a major part of the interactions between public agencies and external actors will be digital, many of these interactions will be an (integral) part of a physical service provision, for example in sectors like education, health, care, welfare work etc. Thus, in striving for greater precision, it is necessary to examine the different parts of common public services and identify these parts according to their role or function, and in particular see what parts of the interactions are lawful (either permitted or sanctioned). If the interaction consists mainly of completing an electronic form, it should be denoted something other than an e-service, and then include a reference (link) from the relevant form to the corresponding (e-) service, also comprising a link to relevant regulations. This is in line with the proposed Core Public Sector Vocabulary although the CPSV only distinguishes between the physical and digital part of the service with its channel property (European Commission, 2013). It is necessary to define the different categories of digital interaction in order to be able to handle the parts of the service provision that is to be automated. It is also necessary to define the different categories in order to formulate indicators for assessing the quality of these parts.

As shown in section 2.2, the existing stages models also use this term in inconsistent ways. Lee (2010), in his paper: “10 year retrospect on stage models of eGovernment”, reports from a qualitative meta-synthesis of twelve eGovernment stage models. He argues that these models seem to be incongruent with each other because they are based on different perspectives and they use somewhat different metaphors, presenting a difficulty not only in understanding different research results, but also in planning future progresses for eGovernment.

Below, we present an extract of table 1 in Lee (op. cit. p 222) to illustrate the various types of interactions and transactions that is concealed in the notion of ‘e-services’.

Table 1: Comparison of stages in eGovernment development (derived from Lee 2010)

Authors Stage number	Gartner group (2000)	Layne and Lee (2001)	Hiller Belanger (2001)	United nation (2008)	Siau and Long (2005)	Lee (2010) Metaphors and themes	
2	Web presence	Catalogue	Info dissemination, etc.	Presence	Web	Presenting (information)	
3	Interaction		Two-way communication	Interactive presence	Interaction	Assimilating (interaction & integration)	
4	Transaction	Transaction	Service and financial transaction	Transactional presence	Transaction	Reforming (transaction & streamlining)	
5-6							
7		Vertical integration	Vertical and horizontal integration	Network presence/connected		Morphing	
8		Horizontal integration				Participation	transformation
9	Transformation				Transformation	e-Governance	
10			Political participation	e-participation	e-democracy	Involvement	Process management

Although some of differences, most models bear the same basic characteristics, including four “stages”: *presence/information provision, interaction, transaction and transformation*. In addition, some models also suggest an (e-)democracy stage, supporting participation function, which, however, represents another dimension. Furthermore, the transformation stage is in no way unambiguous, encompassing both vertical and horizontal integration.

Through his synthesis, Lee suggests five concepts to describe interactions with citizens (*information, interaction, transaction, participation and involvement*), and similarly four concepts for describing technical operation (*integration, streamlining, transformation and process management*). We find this distinction between two underlying perspectives (a citizen’s view and a technological perspective) fruitful and worth pursuing. However, to accept these different perspectives imply to define distinct quality criteria when assessing service categories that are appropriate for each of them.

Lee’s (2010) review also clearly illustrates the lack of a precise and unambiguous definitions, which causes various problems when developing eGovernment systems, not least when different systems have to exchange information. Thus, this absence of a common understanding is even worse when comparing e-service quality levels without agreeing upon what one is really measuring (Jansen and Ølnes, 2013).

Jansen and Ølnes (2014) developed a draft framework including some basic (electronic) service elements that can describe the various types of communication or interactions patterns that can take place between citizens and public agencies. This framework, builds on Baida’s (2006) and Lee’s (2010). In addition, it includes *support functions*, for example authentication, single-sign-on, e-Signature, e-Payment etc., which is similar to OASIS’ definition of methods (OASIS, 2006). The framework is outlined in the table below.

Furthermore, we follow Goldkuhl and Røstlinger (2000) in distinguishing between a *service action* (what the service provider does), a *service result* (what is intended by the provider, e.g. to offer a specific output) and a *service effect* (what a customer experiences from the service, e.g. a satisfaction, fulfilment of expectations). Our category *Purpose of an interaction, seen from the provider* corresponds to their “service action”, while we have integrated their two categories “service result” and “service effect” into one “effect” dimension which we have called *Result and effect for the receiver*, describing the outcome for the receiver. Our *content and structure* dimension aims at describing the characteristics of the interaction, indicating whether it is a one-way or two-way dialogue, whether the interaction is static or dynamic, and whether it is regulated by law etc.

Table 2: A framework for different categories of digital interactions between government and citizens (based on Jansen and Ølnes (2014))

Categories of digital interaction	Purpose of an interaction, seen from the provider	Content/structure of the interaction	Result and effect for the receiver
1. Simple <i>one-way information provision</i>	Provide documents to user for downloading	Static, structured information, e.g. brochures	No specific effect other than to get access to a standard (general) document etc.
2. <i>Two-way communication</i> and information provision	Provide specific information services on user request	Exchange of simple messages and specific information provision	No further effect other than the dialogue itself, e.g. to obtain a specified document or communicate with specific actor. No execution of authority, no specific regulation
3. Dynamic, <i>secure interaction</i> between user and system	Initiate a well-defined data handling process, complete an electronic form	Dynamic, involves various types of data/	The effect is a change of state, e.g. to update information in a (public) database.
4. <i>Secure transaction</i> and <i>contraction</i>	Carry out a specific task, regulated by law, which may be part of public service provision	Formalized exchange of structured information according to regulation.	The effect is to establish a contractual relation between parties, e.g. to accept and sign a debt certificate. Commits the user regarding later action
5. <i>Complete transaction process</i> , e.g. case handling	Initiate and execute a complete set of tasks (e.g. complete case handling)	Formalized sequence of interactions & processes, according to regulation.	The effect is (final) decisions that affect/deal with the user, e.g. in case handling,
6. <i>Support functions</i> , e.g. Login/Single Sign On, e-Signature, epayment, etc.	Execute a process that are necessary /required for executing a task	Formalized exchange of data, regulated by law : Part of infrastructure	No effect on its own, but mandatory functions when interacting with public agencies, e.g. authorize/ authenticate a secure transactions

In table 3, we compare Lee's "stages with our basic types of interaction.

Table 3: Mapping Lee's stages onto our elementary interaction processes

Lee (2010)		Categories of interaction
Citizen Service Stages	Information	Simple information provision
	Interaction	Communication /secure interaction
	Transaction	Secure transaction or complete interaction
	Participation	Communication, secure interaction (?)
	Involvement	Secure interaction or secure transaction

We can see from table 3 that Lee's citizens' service stages easily may be represented and modelled by our elementary process. His different categories of technical operations represent, another dimension that describes back-office processes and functions that are to be changed through (internal) transformations, e.g. in order to obtain vertical and horizontal integration. These can be described in other ways, e.g. directly by UML-diagrams. Lee (op. cit.) also points out that eGovernment development "stages" should not be mixed up with the different "service" types and complexity; for example, his "Involvement" metaphor for most mature stage(s) will include different service categories.

Our quality dimension, which is not included in table 2, is important when modelling and developing electronic services. Furthermore, we need to specify the type of actors involved, both on the provider side (public agencies, private service providers) and on the receiver side (citizens, private businesses etc.). In this way we will be able to specify and model the different types of interactions and transactions between public agencies and their users in a more precise way, including the legal requirements and prem-

ises as well as organisational conditions. In table 4 below, we provide some examples of how the quality categories and associated indicators (see section 2.3 above) can be applied to the categories of interaction.

Table 4: Examples of quality requirements and actors involved relevant for different types of interaction

Categories of basic interaction	Important quality categories	Example of indicators (from the Norwegian evaluation metrics)
1. Simple <i>one-way information provision</i>	<b>Availability</b> , Quality of data,	Is the service description updated and marked with date?
2. <i>Two-way communication and information provision</i>	<b>Usability</b> , Ease of use	Is the service available for mobile use (is responsive design used)?
3. Dynamic, <i>secure interaction between user and system</i>	<b>Security</b> , + categories above	Is sensitive information encrypted before transmission?
4. <i>Secure transaction and contraction</i>	<b>Privacy, security, trust</b>	Does the Government Agency clearly inform about the use of the information gathered?
5. <i>Complete transaction process, e.g. case handling</i>	<b>Transparency, privacy, Quality of data,</b>	Lawful. Degree of automation. Is the technology used in a “smart” way?
6. <i>Support functions, e.g. Login/SSO, e-Signature, e-payment...</i>	<b>Usability, Ease of use, security</b>	Does the service use the national SSO authentication service?

The quality indicators given in the table above correspond to the proposed categories of indicators in the benchmarking systems discussed in chapter 2.3 and are shown in bold text.

An example is The Norwegian State Educational Loan Fund that provides an online application service for students to apply for grants. But this ‘e-service’, actually includes several phases of interactions between the applicant and the Fund, and can be decomposed into several electronic processes, such as

- i) accessing and downloading general information and guidance material (*type 2 interaction*)
- ii) to log on to the application, using an authorized authentication service (*type 6 support function*)
- iii) to complete an online form and in most cases complete the case handling process (*type 5 complete transaction*)
- iv) to be informed whether financial support will be granted or not (*type 3 secure dynamic interaction*)
- v) to access the secure website and sign the debt certificate through a specific signature service (*type 4 secure transaction*).

These basic processes were broken down into a number of interaction sequences between the applicants and the agency, a refinement that was necessary when designing the IS system(s) that automated these different processes.

## 4 THE FRAMEWORK APPLIED TO THE EU’S E-SERVICE BENCHMARKING

As an illustration of the usefulness of our framework, we describe some of the basic services in the EU’s eGovernment benchmark measurement in terms of our vocabulary. This benchmarking scheme was agreed upon in November 2000 and was a part of the eEurope initiative, later followed by the i2010 initiative, see (Cap Gemini et al. (2010) and the European Commission (2012). The main goal of this benchmarking was to monitor “the percentage of basic public services available online”. These 20 “benchmark services” are divided into 12 services for citizens and 8 services for businesses. However, it is necessary to describe their characteristics more precisely in order to specify the quality requirements to a (e-) service. For example, the quality requirements for an online transaction are different from those needed for downloading a book.

In analysing these different types of ‘services’, we must identify in detail the individual actions and functions that finally add up to a requested output for the user. Consequently, we must carefully examine if the ‘service’ in question includes a set of (sub-)functions or activities and whether these should be explicitly stated. As an illustration, the services linked to obtaining a driver’s license involves many steps and

corresponding sub-services, carried out by both private and public agencies, where we include our basic digital interaction categories, as described in table 3 above

- you have to undertake driving lessons (a **physical** service provided by a business, and is not part of the e-service, this difference is also captured in the CPSV service model (European Commission, 2013))
- there is a need to check your certificate of good conduct at the police (which may be requested online from a public agency). *Type 3: Secure interaction,*
- you need to present a health certificate, which may be requested online from another public agency. *Type 3: Secure interaction*
- you have to study and learn traffic rules and pass a theoretical exam (which may also be completed online) *type 5: complete transaction process*
- you have to undertake a practical driving test (only a **physical** service)
- finally, a driver's license is issued if all the above requirements are met (at present issuing the license is a physical service, but in the future it could be an e-service). *Type 4: Secure Transaction.*

In most European countries you can carry out many of these steps online, but to characterize “obtaining a driver's license” as an ‘e-service’ is far from the truth, which we have shown by looking closer at the different elements of this ‘e-service’. We thus illustrate how one can describe and model this process in detail. In this way a service provider may offer citizens a smoother and more effective way of obtaining a driver licence by visualizing the connections between the electronic functions and the physical actions. We believe it will also make the administrative task more efficient for the relevant public agencies. Below we will apply our framework to a selected number of the selected services found in the EU's eGovernment benchmarking, as they are found in many countries. We have simplified some of them for illustration purpose and we have chosen services that are common in many countries.

*Table 5: The framework applied to selected services from the European eGovernment benchmark framework*

Services for citizens	Type of digital interactions	Content/structure of Interaction	Result and effect for the receiver	Important quality categories
Declaring income taxes	Dynamic, secure interaction	Authentication (6) Secure transactions (4/5) Signature (6)	Approve tax filing data , include updated data in public registers	Ease of use, Quality of information Security Trust /Transparency
Applying for a study grant	Complete case handling process, Signing debt certificate process	Authenticate (6) Secure transaction (4) Complete transaction process (5) Sign debt. certificate (6)	Accepted (or) refused application Enter into a contract Receive grant	Usability, Quality of information, Security
Applying for a driver's license	Compound service involving several agencies, both public and private	Authenticate (6) Complete transaction process (5) Pass exam (partly physical test) Secure transactions (4)	Update public registers Receive driver license	Usability, Ease of use, Security Trust /transparency
Registering a car	Secure transaction and contraction	Authenticate (6) Secure transactions (4) Signature (6)	Update car register Receive international car license	Ease of use Quality of information
Buying, building or renovating a house	Compound service with complete case handling	Authenticate (6) Secure interactions (3) Secure transaction (4) Complete transaction process(5) Signature (6)	Accepted (or) refused permission Receive completed documents	Usability, Ease of use, Quality of information

By breaking the different (e-) service elements into basic (unitary) functional processes, as shown in table 5 above, we add more information about the digital interactions that are included in these different categories of ‘services’. This will help us understand them in more detail. For instance, when a ‘service’ involves exchange of information between different public agencies, we can use these basic functions to describe the various service elements in significant detail. It will then be easier to model them, also because

these different service elements can be given distinct names. This modelling is essential in order to measure the quality of services and e-services.

## 5 CONCLUSIONS AND FURTHER RESEARCH

This paper has demonstrated that the various and inconsistent definitions of ‘e-service’ are confusing and troublesome, and most often ‘service’ or ‘e-service’ are used without any further description. We will strongly argue that the uncritical use of the ‘(e-)service’ concepts for all types of interactions blurs important differences between them in that these are ‘services’ of quite different categories with distinct quality requirements. This is not least the case in public documents and in benchmarking activities, where precise understanding of concepts is crucial.

We have demonstrated that our framework, including six generic categories of interaction is useful in describing and modelling eGovernment services. This categorization and breakdown of services is also essential for benchmarking purposes and the ability to evaluate service quality. Different categories of services have different expectations from the users and must thus be evaluated based on different criteria.

We therefore argue that there is a need to conduct a more systematic analysis of the different tasks and duties of the Government which may help us to acquire a better understanding and definition of different services and how they can be modelled and assessed when building online eGovernment applications. The work with modelling public services and developing indicators for benchmarking the quality of these services should be brought together in order to form a better foundation for the benchmarking frameworks.

We are thus in line with Goldkuhl (2007), who argues for more reflective studies on the service dimension in e-services, and we claim that substantial parts of what are now called e-services are rather service descriptions, service interfaces, or service representations. There is an urgent need to properly model and define the key concepts in the eGovernment field, and ‘e-service’ is one of these, in order to make progress in the work with quality measurement and benchmarking. The ‘e-service’ concept must be broken down into basic elements which must be named accordingly, partly following Baida’s (2006) definitions. Thus, we argue that there is a need more research that can provide more precise conceptualisations of ‘digital services’.

## References

- Alter, S., 2008. Service system fundamentals: Work system, value chain, and life cycle. *IBM Systems Journal* 47, 71–85.
- Axelsson, K., Ventura, S., 2007. Reaching Communication Quality in Public E-Forms—A Communicative Perspective on E-Form Design, in: *Electronic Government*. Springer, pp. 342–353.
- Baida, Z., Gordijn, J., Omelayenko, B., 2004. A Shared Service Terminology for Online Service Provisioning. Presented at the ICEC’04, Sixth International Conference on Electronic Commerce, ACM.
- Baida, Z.S., 2006. Software-aided Service Bundling: Intelligent Methods and Tools for Graphical Service Modeling, in: *Doctoral Theses - Sciences*. Amsterdam: Vrije Universiteit.
- Cap Gemini, Rand Europe, Sogeti, DTi, 2010. Digitizing Public Services in Europe: Putting ambition into action. European Commission, Directorate General Information Society and Media.
- European Commission, 2010. The European eGovernment Action Plan 2011-2015 (No. COM-2010-0743-FIN). European Commission, Brussels.
- European Commission, 2012. eGovernment Benchmark Framework 2012 - 2015 (Method paper No. SMART 2012/0034-1). European Commission DG Communications Networks, Content and Technology, Brussels.
- European Commission, 2013. Core Public Service Vocabulary Specification v. 1.01.
- Goldkuhl, G., 2007. What Does it Mean to Serve the Citizen in e-Services? *International Journal of Public Information Systems* 2007:3.

- Goldkuhl, G., Persson, A., 2006. From e-ladder to e-diamond—re—conceptualising models for public e-services. Proceedings of the 14 th European Conference on Information Systems (ECIS 2006) Göteborg.
- Goldkuhl, G., Röstlinger, A., 2000. Beyond goods and services: an elaborate product classification on pragmatic grounds. Univ., Centrum för studier av människa, teknik och organisation.
- Grönroos, C., 2006. Adopting a service logic for marketing. *Marketing theory* 6, 317–333.
- Hiller, J.S., Belanger, F., 2001. Privacy strategies for electronic government. *E-government* 200, 162–198.
- Hill, T.P., 1977. On goods and services. *The Review of Income and Wealth* 23, 314–319.
- Jansen, A., Ølnes, S., 2013. Benchmarking E-Government Quality-Whose Quality Are We Measuring., in: *EGOV/ePart Ongoing Research*. pp. 43–53.
- Jansen, A., Ølnes, S., 2014. The Muddy Waters of Public e-Services - The Use and Misuse of the Concept and How to Get Out of the Maze. *Systems, Signs & Actions Vol. 8 (1)*, 2014.
- King, J.L., Kraemer, K.L., 1984. Evolution and organizational information systems: an assessment of Nolan's stage model. *Communications of the ACM* 27, 466–475.
- Layne, K., Lee, J., 2001. Developing fully functional E-government: A four stage model. *Government Information Quarterly* 18, 122–136.
- Lee, J., 2010. 10 year retrospect on stage models of e-Government: A qualitative meta-synthesis. *Government Information Quarterly* 27, 220–230.
- Lindgren, I., Jansson, G., 2013. Electronic services in the public sector: A conceptual framework. *Government Information Quarterly* 30, 163–172.
- Lusch, R.F., Vargo, S.L., 2006. Service-dominant logic: reactions, reflections and refinements. *Marketing Theory* 6, 281–288. doi:10.1177/1470593106066781
- OASIS, 2006. Reference Model for Service Oriented Architecture 1.0.
- Ogden, R.G., Richards, I.A., 1923. *The Meaning of Meaning*. Routledge and Kenan Paul, London.
- Rowley, J., 2006. An analysis of the e-service literature: Towards a research agenda. *Internet Research* 16, 339–359.
- Tan, C.-W., Benbasat, I., Cenfetelli, R.T., 2013. IT-Mediated Customer Service Content and Delivery in Electronic Governments: An Empirical Investigation of the Antecedents of Service Quality. *MIS Quarterly* 37, 77–109.
- United Nations, 2003. UN global e-Government survey 2003, United Nations Department of Economic and Social Affairs. New York.
- Vargo, S.L., Lusch, R.F., 2004. The Four Service Marketing Myths. *Journal of Service Research* 6, 324–335.
- W3C, 2004. Web Services Glossary (W3C Working Group Note). W3C.
- W3C, 2009. W3C Semantic Web Frequently Asked Questions.
- Webster's, 1979. Webster's New Twentieth Century Dictionary Unabridged, 2nd ed. Simon and Schuster.
- Wimmer, M.A., 2002. Integrated service modelling for online one-stop government. *Electronic Markets* 12, 149–56.