Accepted to e-Challenges, Stockholm, October 2008

Categories of Public e-Services - an Inquiry Based on the e-Diamond Model

Mikael LIND[1, 2, 3], Göran GOLDKUHL[2,3]
[1]*University College of Borås, School of Business and Informatics, S-501 90 Borås, Sweden*
[2]*Jönköping International Business School, P.O Box 1026, S-551 11 Jönköping, Sweden*
[3]*Linköping University, Department of Management and Engineering, S-581 83 Linköping, Sweden*
Tel: +46 705 66 40 97, Fax: +46 33 435 40 07, Email: Mikael.Lind@hb.se
Tel: +46 705 52 98 15, Fax: +46 13 14 94 03, E-mail: Goran.Goldkuhl@liu.se

Abstract: Today there exist a lot of public e-services. An unsolved quest still however is how to categorize such e-services. Stage-models are today dominating for pinpointing high-range characteristics of e-services. There relies however confusion in whether these stage models are prescriptions of desired e-services. A need for classifying middle-range categories of e-services as a support for guiding development and refinement of e-services as well as a support for citizens to select and find e-services. In this paper such classification of middle-range categories of e-services, based on foundational action-theoretic categories founded in the e-diamond model, is made. Based on a categorization of 335 public e-services in Sweden four classes of middle-range categories are identified; Government informative, Government performative, Citizen informative, and Citizen performative. Within each of these categories sub categories such as separate vs. compound, and individual vs. general is used for the purpose of make an even more fine-grained classification

Keywords: middle-range categories, informative, performative

1. Introduction

The amount of e-services provided by the public sector for citizen is continuously increasing. Public e-services can be conceived as “electronic services which can be accessed, for example, via the Internet, TV or mobile devices, and which are offered to citizens, companies, professional organizations, interest groups and other official bodies by organizations in the public sector” [17, pp. 11]. This definition indicates a broad spectrum of technologies in use but also several target groups for the e-services. The continual dissemination and development of e-services is claimed to rather be driven by a need to increase efficiency and decrease costs than driven by the needs of the e-citizen (c.f. e.g. [5]). There are several initiatives and programs driving this development; both on national, European and UN level.

Existing e-services are of diverse types, but there do not exist any appropriate models for categorizing such e-services. It exist however a number of models, especially stage models used to characterize the maturity of a certain e-service, but these models rather pinpoints **high-range characteristics** of e-services. Examples of such state-of-the-art models are the stage model from Australian National Auditing Office [3] and the stage model from the Swedish Agency for Administrative Development [14]. E-services are here ordered in four stages: 1) information, 2) interaction, 3) transaction and 4) integration. These models comply with the well-known stage model of Layne & Lee [13]. There is however some problems related with the use of stage models. There is confusion whether

they describe a prescribed trajectory of e-service development or a categorization of varying advanced degrees of e-services. How are stage models intended to be used?

Contemporary initiatives of proposing models have been taken for putting the desires and the needs of the client into focus, such as the e-co model [11]. Another example of a model for categorizing e-services is the e-diamond model [8, 9]. This model is a reaction against stage models. Instead of categories ordered in a stage model, three orthogonal dimensions are described. Each dimension consists of polar categories; general vs. individualized e-services, informative vs. performative e-services, and separate vs. coordinated e-services.

These different e-service models contribute with important high-level categorizations of e-services. However, the problem of how to make middle-range categorizations of, and consequently label, e-services is still to be managed. The e-diamond model seems to establish a solid base for identifying characteristics of e-services on such level.

2. Objectives

The aim of this paper is to develop a number of middle-range categories of e-services based on the constituents put forward in the e-diamond model. The knowledge contribution reported in this paper is two-folded; the categories as such and the process of doing the categorization. The research reported in this paper is driven from the question of finding relevant models for categorizing e-services.

3. Research Approach

The research conducted in developing middle-range categories of e-services has been based on the multi-grounded theory approach (MGT) [7, 12]. This development has gone through the steps MGT in terms of empirically based theory generation and explicit grounding (test and evaluation). Theory generation includes activities such as inductive coding (open coding), conceptual refinement, development of structures and categories (axial coding) and theory condensing (selective coding) based on empirical data consisting of characteristics of existing public e-services in Sweden. The empirical data is constituted by descriptions of 335 e-services [1] offered to citizens in Sweden. The empirical investigation was made by taking the three polarities (separate vs. co-ordinated, general vs. individual, informative vs. performative) of the e-diamond model [8, 9] and categorizing each of the 335 e-service in relation to each polarity.

The results from this analysis revealed that 27 % out of the 335 e-services (see figure 1) could be characterized as informative and aimed towards a general public distributed by a single organization. 24 % out of the 335 e-services makes it possible for the citizen to perform communicative acts, requires identification and are distributed by a single organization. The last type of e-services (13 %) shown in figure 1 are distributed jointly by several organizations in which identification is required and that the citizen can perform communicative acts.

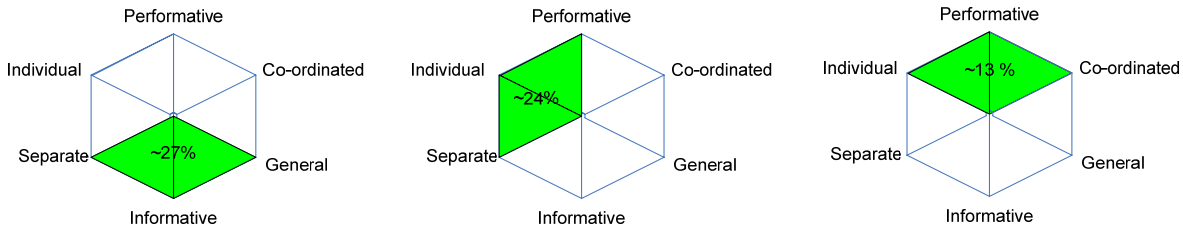

Figure 1: Different combinations of characteristics of 335 studied e-services according to the e-diamond mode l[1]

This identification of different characteristics of e-services could be seen as one first step towards a classification performed by the support of the e-diamond model. A middle-range categorization was however still missing. In order to make such categorization additional theoretical support has been identified as necessary. Theoretical sources used, informing this next step of the analysis processes, was thus contemporary stage models (c.f. e.g. [3, 14]) and especially the constituents of the e-diamond model [8, 9]. As described above this analysis used the e-diamond model as classification scheme. In the confrontation of the empirical data, the evolving theory and the informing theory (the e-diamond model), a need to refine the e-diamond model was identified. The e-diamond model and its refinement will be described in the next section. Figure 1 above used the original three polarity e-diamond model. The revised model (with four polarities; see figure 2 below) was used in the further analysis leading to the middle-range categories (section 4 below).

The explicit grounding includes activities such as theoretical matching (the growing multi-layered framework is tested against existing theory), explicit empirical evaluation, and evaluation of theoretical unity. The multi-grounded framework has thereby been an important source for developing a contribution to the scientific body of knowledge about characterising e-services in middle-range categories.

4. The e-Diamond Model

As stated in section 1 above, the e-diamond model is a reaction against stage models of e-services (e.g. [3, 13, 14]). This reaction was based on several identified obscurities in the stage models [8, 9]. Do e-services evolve through such a series of stages? Is there a real advancement between the different stages? Should one always strive for higher stages? Are higher stages inherently better than lower stages? Is a stage model a proper yardstick for evaluation and benchmarking? Goldkuhl & Persson [8, 9] made a critical analysis and conceptual deconstruction of the stage models. This deconstruction led to formulation of three polarities instead of the four staged categories. In Goldkuhl & Persson [9] these polarities have been labeled:

- Type of communicative action (informative vs performative)
- Degree of individualization in proposition (general vs individualised)
- Amount of involved agencies (separate vs coordinated)

One main idea behind the e-diamond model is that these polarities, in principal, are orthogonal. This means that they can vary independently of each other and that they do not follow a staged trajectory (as indicated in stage models).

The development of the e-diamond model can be seen to also follow a Multi-Grounded Theory approach [7]. There has been alternating empirical and theoretical analyses. Theoretically, the e-diamond model is mainly based on socio-instrumental pragmatism [10] and information systems actability [16]. The empirical investigations earlier performed have been minor case studies. There has not been any such broad empirical investigation as reported in Albinsson et al [1], which are the empirical basis for this paper.

Goldkuhl & Persson [9] indicated a need for further development of the e-diamond model. There might be differences who is the actual communicator in the e-service interaction; if it is the citizen or the government agency. This need to explicitly state the communication direction has been further strengthened through the study made by Goldkuhl [6]. Based on the e-diamond model and an in-depth empirical case study of an e-service application a distinction between government-to-citizen (G2C) and citizen-to-government (C2G) e-services was presented [6].

In our study, through the elaborated empirical analysis and categorisation of our empirical material, there emerged a clear need to distinguish between who the communicator was; i.e. if it was the citizen or the government agency. Based on this need, accentuated through the empirical study and earlier identified (see above), the e-diamond

model was complemented with another polarity. It is now expressed in the model who is the principal communicator (citizen vs. government). The revised e-diamond model is found in figure 2. The original e-diamond was a hexagon. The revised model is an octagon.

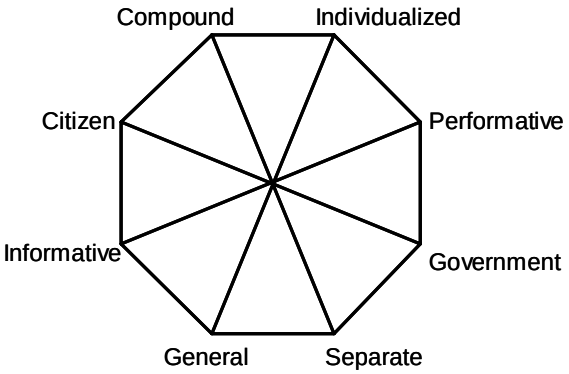

Figure 2 The e-diamond model for public e-services (based on [8, 9])

In this revision of the model we have also changed the concept 'coordinated' to 'compound'. Compound expresses better that is a bundle of services conducted by different agencies.

5. Towards Middle-range Categories of e-Services

Public e-services are parts of the relationship between citizens and one or several government agencies. The point of departure for identifying middle-range categories is the action performed through the e-service by the government agency and/or the citizen. Naturally a lot of the e-services studied were aimed towards informing citizens. These e-services, which could be characterised as ***government informative***, are however of different type dependent on whether:

1. the propositional content of the e-service is directed to one *particular individual (I)* or to the *general (G)* public
2. the performing (government) actor is one *single (S)* government agency or a *compound (C)* actor representing several government actors. In this latter case the communicating agency is taking information supplied by several government actors into account.

The label of this middle-range category indicates that all e-services bound to this category are e-services that are informative and where one government agency is the communicator or sometimes several agencies. The most common e-services are those where the government informs the general public. Two different types could however be identified *separate – general* and *compound – general*. The latter one takes information supplied by several government agencies into account in order to manage the realisation of the e-service.

Basically this combination would give raise to four different types of government informative e-services, but a fifth one could also be identified. Most individual e-services demand an identified individual, in which the organisational memory of the government plays an essential role, but there exist however e-services where there it is enough that the citizen occasionally identify himself/herself (*occasional individual*). Examples of such e-services are loan simulation, and individual study guides. This occasional identification does not affect the working memory of the government agency.

E-services directed to a particular individual when the individual needs to identify himself/herself have also been identified as being of different types; *separate – individual* or *compound - individual*. An example of the first one is a patient journal (from one clinic) while a compilation of journals from several clinics is an example of the latter one.

From our empirical basis other middle range categories of e-services could however be identified. Staying with the government as the communicator there are of course also e-services in which the government performs something in relation to the citizen. Example of this could be communicating a decision, or supplying a certificate of decision. These e-services are categorised as ***government performative***. Such e-services are dependent on that the citizen is identified and that the performing government agency is a single actor. This is one main task that different government agencies have; i.e. to exercise authority in certain areas and to make decisions that affect citizens. Such authority power is normally allocated to particular single agencies. Within this middle-range category it does consequently not seem to exist any compound e-services (where there are several governmental agencies involved).

So far we have treated e-services that have the government as the communicator. Our model for characterising public e-services covers of course the opposite communication direction as well;, i.e. the citizen (the client) as the communicator. When the citizen is the communicator we take for granted that the identity of the citizen needs to be to authenticated. One type of e-service when the citizen is the communicator is the ***citizen informative***. One example of such e-service is when the citizen has the possibility to provide profile information to a government agency through "My pages" (individual characteristics).

There does also exist public e-services where the citizens' perform actions, i.e. ***citizen performative*** e-services. Examples of such e-services are different kinds of applications directed towards government agencies. Such e-services could be *separate* as well as *compound*. An example of the last category would be applications that are dependent on information (about the citizen) from several government agencies, such as application for provisional driver's license where there is a requirement to check the status of criminal registers. In such cases there are sometimes necessary for the citizen to give consent (permission) that a government agency retrieves information from other government agencies (on behalf of the citizen).

A summary of the properties of these four distinct categories of e-services could be found in table 1. The properties used in this are fetched from the revised e-diamond model, i.e. propositional content (general/individual), type of communicative action (informative/performative), government actors (separate/compound), and communicator (government/citizen). The table also includes exemplars.

As could be derived from table 1 there are a number of combinations of the used properties that distinguish the different public e-services. One could question whether there are more combinations that would be applicable for deriving the middle-range categories. Our empirical basis has been the properties of the 335 e-services. Stage models used for characterising e-services has a built in value-basis of a desire to design highly integrated e-services. In our characterisation such value basis relies on whether the government actor is compound or not. Even though we have not yet found any such e-services, logically there would potentially exist at least two other characteristics of e-services. These are:

- ***Government informative***, *compound - occasional - identified*, which would allow the citizen by occasional identification derive potential information adopted to his/her preferences based on multiple information sources provided by several governmental agencies.
- ***Citizen informative***, *compound*, which would allow the citizen to supply information that would affect multiple governmental agencies.

In our framework there does however not exist any citizens performative where there is not necessary for the citizen to identify himself/herself.

Table 1: Middle-range categories of public e-services

Middle-range category	Sub category	Propositional content (General / individualized)	Type of communicative action (Performative / Informative)	Government actors (Separate / Compound)	Communicator (Government / Citizen)	Exemplar
Government informative	Separate general	G	I	S	G	Regulations
	Compound General	G	I	C	G	Drivers license portal Map info Company guide
	Occasional Individual	$I_{Occasional}$	I	S	G	Loan simulation Individualised educational guide
	Separate (Identified) Individual	$I_{Identified}$	I	S	G	Clinic journal (from one clinic)
	Compound (Identified) Individual	$I_{Identified}$	I	C	G	Several clinic journals
Government performative		$I_{Identified}$	P	S	G	Certificate of registration Government decision
Citizen informative		$I_{Identified}$	I	S	C	Individual characteristics
Citizen performative	Separate	$I_{Identified}$	P	S	C	Application building permit
	Compound	$I_{Identified}$	P	C	C+(G)	Application provisional drivers license

6. Conclusions and Recommendations: Putting the Categories into Use

There is need for better models for categorizing public e-services. Such models are intended to improve the design and evaluation of e-services. It is important that citizens and other clients more easily find, access and utilize appropriate e-services. Albinsson et al [2] identify that there exist an electronic service paradox in the sense that there are simply too many sites, services, and communication, but still there are things people cannot do electronically. Besides that, the point of departure for development and dissemination of the majority of e-services has been identified as organization-centric rather than as citizen-centric (cf also [6]). An unsolved quest is a standardized way to categorize and label e-services.

This paper reports results from an empirical study classifying public e-services. This e-classification was made by the use of the e-diamond model. The process in applying the e-diamond model in this classification has been articulated. Due to the use of the e-diamond model have made us to propose an expansion and refinement of the model. The four polarities constituting the revised e-diamond model has been the foundation for deriving the middle-range categories.

The e-diamond model can be considered to be a practical theory in the sense that Cronen [4] uses this concept. Cronen [4] writes about practical theories: “Its use should, to offer a few examples, make one a more sensitive observer of details of action, better at asking useful questions, more capable of seeing the ways actions are patterned, and more

adept at forming systemic hypotheses and entertaining alternatives". Confer also Goldkuhl [6] for earlier development of practical theories on public e-services. In this paper we have identified four middle-range categories of public e-services; ***Government informative***, ***Government performative***, ***Citizen informative***, and ***Citizen performative***. These categories are to be considered as a part of a practical theory.

The definition of these four middle-range categories has been performed by taking the action characteristics of the e-service into account by considering propositional content, type of communicative action, government actions, and the communicator (c.f. table 1). Theoretically, this follows partially speech act theory [15] and the language-action perspective [18]. Important to note is that irrespective of identified communicator, the client's utilisation of the e-service is the dominating perspective. In this way we have taken one step forward towards a client and utilization oriented categorization of e-services. The goal is that such categorization would be a support for letting citizens and other clients to select and find e-services based on their needs of value creation. This categorization does thus meet the demands of finding an adequate level of complexity and ambition in e-service design and evaluation dependent on the client's need and purpose with the utilization of the e-service. As identified in the introduction existing stage models pinpoints high-range characteristics of e-services. These models describe a prescribed trajectory of e-service development towards the most mature e-service as an integrated e-service. An unsolved quest is whether such orientation towards this value-basis of mature e-services is desired. In this paper we have instead used a socio-pragmatic framework for deriving the middle-range categories of e-services as a reaction against existing stage models where the emphasis can be interpreted to strive for as complex and ambitious e-services as possible. This means a focus on possible actions to perform and consequently the basis for judging different e-services is desired actions to be performed for and/or by the citizen. The proposed e-service categorization is thus intended to contribute to establishing more purposeful and suitable e-services. The different e-service categories in the e-diamond model and proposed middle range categories (table 1 above) give much more conceptual nuances than the stage categories of the stage models.

Some e-services offered by the governments of Sweden today build upon combining several middle-range categories of public e-services. Such ones could be seen as compound e-services. One example could be where the citizen has the possibility to first get informed by the government (***government informative***), secondly make an application for something (***citizen performative***) and thirdly get informed by the government of a decision (***government performative***). We claim that the classification of such compound e-services, as combinations of different middle-range categories of public e-services, is a better way than to just propose e-service integration. In this way different related actions performed by different communicators are used as the point of departure. An important challenge for the future is to develop knowledge about how to construct and evaluate compound e-services, building on the middle-range categories developed in this paper, based on patterns of desired actions performed by governments and citizens.

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