Stage-models for public e-services
- investigating conceptual foundations

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Abstract

Information technology has since the turn of the millennia been one of the core issues in the reform of public administration in government agencies. Aiding this development has in some countries and in the research community been discussed through the development of stage models describing the evolution of services in stages. This is the case in Sweden where the Swedish agency for administrative development has been using a model to describe, evaluate and promote the emerging services. This paper pivots on the discussion about the conceptual foundation for models such as the Swedish model and other models. The discussion is conceptually founded in information systems actability theory and IS usage situations. This paper addresses the issue of stage models and the concept of stages itself. The models discussed lack in the categorization of the described stages; borders between stages are undistinguishable and unclear. A refined model that addresses the discovered issues is presented in the paper.

1 Introduction

We have for almost a decade seen the emergence and rapid growth of government services available on the Internet. In the latest part of the previous century government initiatives and visions started to occur. Although work on the strategies for eGovernment started in last century the implementation of strategies where launched as programs in the early years of the new century. Among the early adopters were Canada, Australia and Sweden in early year 2000 (Booz, Allen, Hamilton, 2002).

Layne and Lee (2001) refer to the experiences of eGovernment as chaotic and unmanageable and in this sense claim the importance of dividing the development into distinguishable stages. In Sweden where SAFAD (Swedish agency for administrative development) is responsible for guiding and supporting the government agencies in the realization of the eGovernment vision a stage model is used for guiding and evaluating the progress. (Statskontoret, 2000) In Australia a stage model is used by ANAO (Australian National Auditing Office) to categorize and evaluate the progress and to guide the agencies in what possible services they could provide to the public. (ANAO, 2000) Basically the same model as in Sweden has been used for benchmarking the program eEurope 2002 only with slight modifications. (eEurope, 2003) The consultancy firm Cap Gemini in their fourth measurement published in October 2003 conducted this benchmarking study for the European program.

The guiding role and importance of the models in Australia and Sweden raise the question and point out the importance of a solid conceptual foundation for these models. We have however identified some unclear definitions and that the stages in these models are not as distinct from each other as they need to be in their guiding and evaluating role. This paper will address these models and discus their conceptual foundations. In the process we will point out shortcomings and suggest changes that in a more distinct way can separate services of certain types from each other. We will also discuss certain embedded assumptions in the structure of these models. Although several models are discussed we will give the Swedish model presented by SAFAD special attention (Statskontoret, 2001). The other models discussed are the model by Layne & Lee (2001) mentioned above and the model by the National Auditing Office in Australia (ANAO), also mentioned above (ANAO, 2000) and a model by Hiller and Bélanger (2001). These models have several properties in common; they categorize the development into different stages, the models from Australia and Sweden have purposes to measure, point out direction and evaluate the emergence of e-services in a national context and the Layne & Lee model attempts at categorizing the development and to point out difficulties at each stage.

2   Stage models for public e-services

This section presents the models up for discussion in this paper. These models have varying purposes described below but in general terms they bear the basic features in common. All divide the development of eGovernment into several stages; all of them bear a deterministic characteristic in describing a development from a simple information service to a more refined one-stop government.

2.1   ANAO model

This model is developed by the Australian National Auditing Office to categorize the government agencies electronic service delivery via the Internet. This model divides the delivery of services into 4 categories or stages, indicating that this is a model pivoting the emerging e-services and the development of e-services. The purpose of this model is to be the basis of auditing work conducted by this organization and to help government agencies in finding what services to deliver online. (ANAO, 2000)

Stage 1: Publishing information:
At this stage providing static information about the agency and downloadable and readable publications from the agency to the users are the pivoted and focused issues. Access to information is not limited. Interaction between user and e-service are limited to an inquiry and search functionality.

Stage 2: Interaction:
This stage involves limited interaction possibilities in government agency databases to the users. This is done with expanded search and filtering possibilities as well as calculation services for calculating, debts or levels of government subsidies. There is still no limitation regarding accessibility to the site and services.

Stage 3: Transaction of secure information:
Stage 3 requires secure identification related to the individual interacting with the government agency. Data access is restricted to a specific individual who is provided personal information and services. The providing of personal information requires a higher level of secure channels

between agency and the user. Example services are retrieving cargo import information, and lodgment of tax returns. Creating services on this stage involves addressing risks involving security, privacy and financial transactions. What separates this stage from the two prior stages is the need for secure identification of the user identity.

Stage 4: Sharing information with other agencies:
The last stage covers the exchange of information between different government agencies regarding a specific user (A business, organization or individual). ANAO exemplifies this with an agency notified of a change of address, a bit of information of interest for all government agencies involved in providing services to this individual. This information is to be shared with these other agencies. As in stage 3 this exchange of information need the user to be identification to make sure that the information provided and spread is correct.

2.2 SAFAD model

The Swedish Agency for Administrative Development (SAFAD) presented this model influenced by the Australian model (above). This model is based on the assumption that technology and service levels are intimately interwoven factors in the emerging eGovernment services. As in the Australian model there are diagonal stages apparent that according to SAFAD are clearly distinct from each other in functional terms.
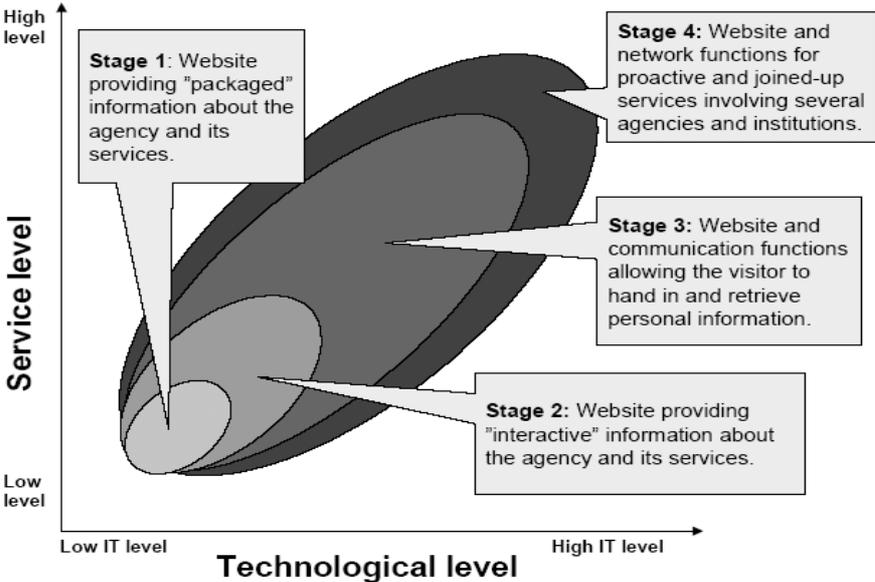

Figure 1: Stage model from the Swedish Agency for Administrative Development (Statskontoret, 2000)

Stage 1: Information
This stage pivots on the presentation of static material such as publications and information about the services provided by the agency. SAFAD describes this information as "packaged" by the agency with only limited possibilities to interact with the website. This functionality is basically limited to search and inquiry as in the Australian model above. According to SAFAD this stage include services such as presenting the mission of the agency, parliament bills relating the services of the agency and providing mail access for inquiries.

Stage 2: Interaction

SAFAD describes this stage as providing "interactive information". This includes the possibility for basic interaction with the website. At this stage services as searching in agency databases, ordering printed publications, downloading and ordering forms relating agency services and subscribing to newsletters from the agency. This stage range from completely public services such as searching in databases to basic identification of the client that is limited to email addresses or mail addresses.

Stage 3: Transaction
This stage includes picking up and leaving personal information related to the services provided by the agency. This includes initiating and following agency specific services by the agency. To be able to provide this type of services online the client need to be securely identified. This stage ranges from initiating a simple case with identification of the client to more advanced transactions such as tax declaration online.

Stage 4: Integration
The last stage of the SAFAD model addresses the integration of services between government agencies. This is the realisation of a one-stop government that regardless of organizational boundaries provide services at one point of entry even where several agencies are involved. Addressed at this stage is the complete process of a service provided online, from initiating the case to paying the service, tax or what the service is about online. This mean that the organisational boundaries in the government structure is somewhat erased or is left with no or little visibility to the clients.

2.3 Layne & Lee model

This model is derived from observations on the evolving eGovernment in the United States. Although the model is derived from research and experience from a federal government structure it can be used on other government structures as well. Layne and Lee (2001) state that the model and the related discussion initiate from the state level but can be used on federal as well as local level. Layne and Lee see the development of government agencies as a natural progress in which the agency evolves because of and in response to functionality needs and customer expectations. In the realization of these four stages the result will be true one-stop shopping for the citizens.

Stage 1: Catalogue
This stage focuses on establishing an online presence for the government agencies. This includes the efforts of many government agencies in the basic web development of presenting information about the agency and publications made at the agency. According to Layne and Lee the movement into this stage is initiated because of external pressure in terms of citizen and business expectations. The name of this stage, catalogue, is derived from the typical functionality that is afforded by the agency. The agency will at this stage publish documents and information that is of general nature. This is information in general terms about the agency and its services. At the end of this stage the agency will address the need for an organised portal site that present the published documents and information in a structured and usable way.

Stage 2: Transaction
The second stage according to Layne and Lee is a focus shift towards integrating the internal systems in the agency with the website. In doing this the agency will allow the clients to interact with personal information in transaction-based services provided by government

agency. This stage will allow citizens to renew licences and pay fines online in integration with agency internal systems. The end of this stage will according to Layne and Lee be focused on the full integration of agency systems with the web interface allowing the transactions between client and agency to be posted directly into the agency systems minimizing the interaction with agency staff.

Stage 3: Vertical integration
This stage and the last stage are based on the distinction between government functions and government levels. The vertical integration addresses the integration between different levels of government but in the same functional areas. Layne and Lee exemplifies this with the integration of local level business license application being linked to state and government level to obtain an employer identification number. In other words this stage will consist of the linking of local level systems to higher-level systems.

Stage 4: Horizontal integration
This last stage focuses on the integration of information systems in government agencies with different functionality that has some relation in common to the clients. An example of horizontal integration is the possibility to pay different business fees and taxes to different agencies at the same time because of the integration of these systems in the different agencies.

These last two stages involve that the government agencies will not only address publishing information, information systems development and integration of website and internal systems but the organisational development in focusing on the processes in the agency relating to other government agencies.

2.4 Hiller & Bélanger model

This model by Hiller and Bélanger (2001) differ from the models above in adding a fifth stage stating the importance of political participation.

	STAGES OF E-GOVERNMENT				
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Type of government	Information	Two-way communication	Transaction	Integration	Political participation
Government to Individual — Services	Description of medical benefits	Request and receive individual benefit information	Pay taxes online	All services and entitlements	N/A
Government to Individual — Political	Dates of elections	Receive election forms	Receive election funds and disbursements	Register and vote. Federal, state and local (file)	Voting online
Government to Business — Citizen	Regulations online	SEC filings	Pay taxes online Receive program funds (SBA, etc.) Agricultural allotments	All regulatory information on one site	Filing comments online
Government to Business — Marketplace	Posting Request for Proposals (RFP's)	Request clarifications or specs	Online vouchers and payments	Marketplace for vendors	N/A
Government to Employees	Pay dates, holiday information	Requests for employment benefit statements	Electronic paychecks	One-stop job, grade, vacation time, retirement information, etc.	N/A
Government to Government	Agency filing requirements	Requests from local governments	Electronic funds transfers		N/A

Figure 2: Stages of E-Government (Hiller & Bélanger, 2001)

Stage 1: Information

This is according to Hiller and Bélanger the most basic form of eGovernment, where information is simply posted on the agency website. These information websites contain general information about services provided by the agency and information directed towards the public including businesses, politicians or other government agencies. The biggest challenge is to maintain the quality of information to ensure that the information is updated and accurate. This stage is in a high degree implemented in the government agencies.

Stage 2: Two-way communication

At this stage government agencies allow users to interact with the agency in simple requests. According to Hiller and Bélanger this is often the case of email services provided by the agency. This stage includes services as requesting information from the agency or requesting the government agency to send back personalised services via mail or email. Hiller and Bélanger exemplify this as applying for new Medicare cards or benefit statements from the government.

Stage 3: Transaction

At this stage government agencies provide the possibility to interact with the agency and to conduct transactions completely online. According to Hiller and Bélanger this is the most advanced level of eGovernment widely available. Services at this stage can be renewing licences for businesses and individuals and paying fines and taxes online. At this stage public servants are replaced at large extent by the possibility for clients to conduct self-services online.

Stage 4: Integration

This stage contains the integration of government services. This can and is most frequently done with a single portal allowing clients to access services at a single point of entry. By using a single point of entry clients can access services at one place no matter what agency that actually offers them. One of the biggest obstacles according to Hiller and Bélanger are the lack of integration of back-office systems between government agencies. Integration of back-office systems and online services could mean saving a lot of time and resources for the government agencies involved.

Stage 5: Political participation

The last stage of the model political participation includes services such as voting online and posting comments online. Hiller and Bélanger argue that although this can be seen as a part of stage 2, two-way interaction, the importance of the political dimension motivate a separate category or stage for this type of services. Currently there are very few services available that fall into this category. The uniqueness of the privacy and security concerns in this stage is one of the main factors behind stating this as a separate category. In the future of transaction-based eGovernment include the possibility of voting online.

2.5 Comparative discussion

All of these models start off with a stage of providing information to the public. After this stage the models begin to differ from each other in a more substantial way. ANAO and SAFAD continue with an interaction stage where there is increasing interaction between agency website and the client. Hiller and Bélanger continue in their second stage with two-way communication a stage where the client and agency exchange email and order publications in communication with the agency. The third stage In ANAO, SAFAD and Hiller

and Belanger and the second stage of Layne and Lee are more or less the same. At these stages the client and agency exchange personal information about the client in a secure fashion. There are however some important differences between these stages. SAFAD is focusing less on financial transfers between client and agencies; the other models state this as an important feature of the applicable stage.

The models by SAFAD and ANAO are very similar altogether. The division into 4 stages that are basically the same except for the last stage where SAFAD pivot the realization of networking agencies and ANAO limit the discussion to sharing information. On this point we argue that the sharing of information is only a small part of what integration of governments in e-service development will include. The next step in the models is the integration of government agencies. In Layne and Lee this is divided into vertical; cross-hierarchal integration and horizontal; cross-functional integration. The other models do not separate the cross-functional and cross-hierarchal integration from each other.

Only one model (Hiller and Bélanger) discusses the participative dimension of eGovernment. This is in our view a completely different thing with a very complex nature best left to discussions on eDemocracy. We share the view of Dahl (2000) who states that democracy must build on more than formal influence possibilities as in Hiller and Bélanger. Information, knowledge, resources and influence are according to Dahl important prerequisites for democracy. A discussion of public administration (eGovernment) including some instances of eDemocracy requirements will on this later point be very limited so in our view this is better left to a separate eDemocracy discussion.

3   Conceptual framework: e-services as technology mediated communication

In order to understand and evaluate the different stage models described above we need a conceptual framework. We need concepts to interpret and analyse the different stages; the meaning of each stage and differences between stages. An e-service means usually that an external user (a citizen) interacts through a user interface of a public IT system based on web technology. The citizen searches for information or provides some information to the government agency. An e-service means communication between citizens and a governmental agency. In Sjöström & Goldkuhl (2004) and Goldkuhl et al (2004) a communicative model of user interfaces is presented. This model is based on semiotic foundations; mainly the differentiation of semiotic functions made by Bühler (1934). Three basic functions are identified (figure 3): 1) Symptom (an expressive relation), 2) signal (an influence relation) and 3) symbol (a referential function).
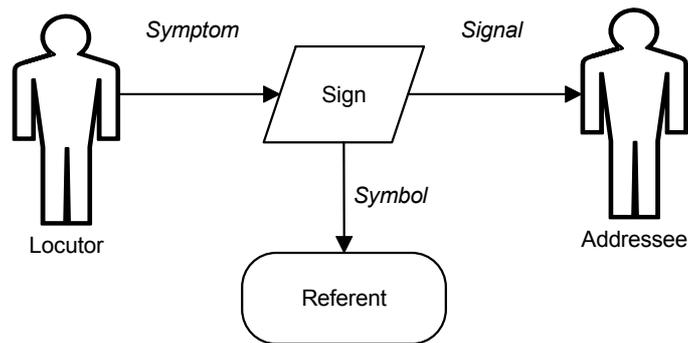
Figure 3: Sign in a communication context describing three basic functions of the sign (Sjöström & Goldkuhl, 2004)

This semiotic view emphasises signs as objects of communication. A sign is an expression of the locutor. It is as a signal directed towards an addressee and it refers to some state-of-affairs (the referent) through the symbolic function. Someone says something about something to someone. This is a basic communication model. Sjöström & Goldkuhl (2004) used these semiotic foundations to develop a model of communication through a user interface. We use this model here. We have adapted it to an e-service context (figure 4).

A citizen interacting with a public IT system through a user interface can be both a locutor (providing messages to the government agency) and an interpreter (reading messages from the agency). Messages should here be interpreted in a generic sense; as signs. The user interface consists of action possibilities; an action repertoire providing the user of it with reading, formulation and navigation possibilities (Goldkuhl et al, 2004). An IT system is considered an action and communication system. The described communicative model of user interfaces is part of the information systems actability theory (ISAT); confer ibid, and e.g. Sjöström & Goldkuhl (2004), Goldkuhl (2002) and Ågerfalk (2003).
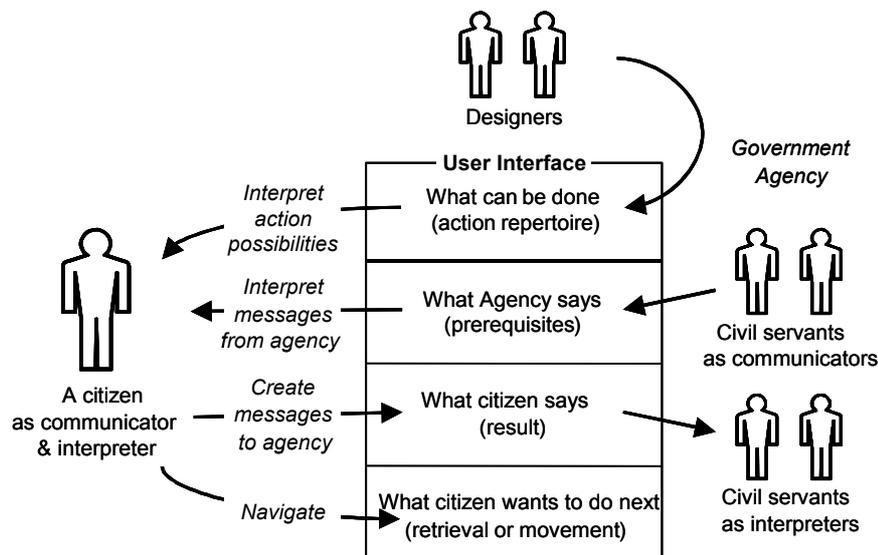
Figure 4: A communicative perspective on user interfaces - adapted to public e-services; (based on Sjöström & Goldkuhl, 2004)

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This means that a public e-service system is a system for communication between a government agency and citizens. Our focus is on what is done through the user interface of the e-service system. The agency uses the public interface as way to communicate to citizens. What kind of actions can be distinguished in such a communication? Some communicative actions may be aimed for the public in the meaning of all possible citizens. Other communicative actions may be directed towards particular citizens and should be constrained to just these clients.

Public actions mean providing information about the government services, the mission of the agency or information about how to apply for a service or benefit. The other part of the distinction, a constrained action, is the case when a client access information about himself or some belonging of himself. This is information that needs to be handled securely and that is of no interest to other people and should not be accessed by anyone else but the agency and the client. A third category in between these two categories is a directed service. This could be the case where there is no need to identify the client in a secure way but the information delivered is of interest only to the client himself. This is the case when answering specific questions such as when my car is up for inspection by the agency or when the public mail company returns a code that can be used to identify where the package is in the delivery process. This third category is about information and services that need not to be handled securely and that is of no interest to other people but the client himself. This leaves us with three categories of government actions; actions directed towards the public, directed actions that involve a specific client but need not to be handled securely and constrained actions directed to a specific identified client that is handled securely (table 1).

	Public actions	Directed actions	Constrained actions
Client	All citizens	Specific, known	Specific and identified
Personalization	None	Semi personalized	Fully personalized
Privacy need	None	Indirect identification	Total integrity control

Table 1: Characterization of different e-service actions of a government agency

Within the information systems actability theory, Goldkuhl (2002) has described different IT usage situations. In ISAT an IT system is seen as a *system for technology mediated communication* (e.g. Sjöström & Goldkuhl, 2004). This means that there will be communication directed to other persons through the system; users provide messages to the system (a *providing situation*). This means also that there will be messages aimed for some user of the system, with origin from other people's communication (a *receiving situation*). The providing situation and the receiving situations can be performed more or less interactive. Goldkuhl (2002) distinguishes between *uni-directional* and *interactive mode* when reading or formulating messages through the interface. A providing situation can be performed with guidance and support by the system towards the user i.e. an interactive mode. However, the main direction of messages is from user to system, therefore it is called providing situation. In a receiving situation, the user might need to input some parameters in order to access the required information (ibid and Goldkuhl et al, 2004). This means that that there is some interaction needed. However the main direction is from system to user in a receiving situation. Uni-directional and interaction modes should however not be seen as two distinct classes. There is rather a continuum – degree of interactivity – where uni-direction and high interaction are the two extreme points.

The two usage situations (providing and receiving) can however be combined sometimes. A *conversational situation* appears when there is proper providing (formulation messages to others) and proper receiving (reading messages from others) in one usage situation. In such a situation there is not only a system's guidance for providing messages. There are important messages exposed to the user by the system. In such a situation there is not either only some search parameters typed by the user into the system in order to receive messages to read. There are important messages formulated by the user into the system in order to be forwarded to other persons. It is not only the case of an interactive mode. It is the case of both providing and receiving messages in a conversational situation.

Conversational and receiving situations can be followed by situations where the users utilizes the information from the system in his actions outside the system. Such situations are labeled *consequential situations*. Situations occurring before providing and conversational situations are called *preconditional situations*.

The user's direct use of a system is guided by the action repertoire of the system as described above. This action repertoire are rules which define not only actions to perform but also what kind of messages are possible to transfer through the system; the formal workpractice language of the system (Goldkuhl & Lyytinen, 1982). To formulate and implement these systems rules is to develop the system. This kind of situation can be called *regulative situation*. The rules do not only pre-define the users' direct interaction with the system. It also pre-defines the system's automatic actions. An *automatic situation* occurs when messages are produced by the system without any direct human intervention, only based on a calculus implemented in the system's software (i.e. the pre-defined rules of the system). The different usage situations are depicted in figure 5.
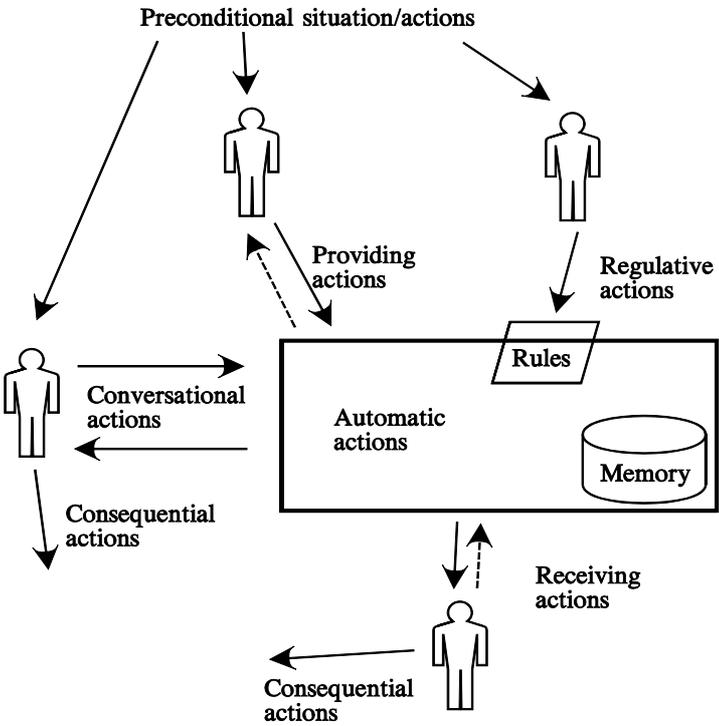

Figure 5: An information system and its usage situations
(from Goldkuhl, 2002)

4 Evaluation of stage models

4.1 Providing information from Agency

The first stage of the SAFAD model is a clear case of what we discussed earlier in this paper in terms of services that can be categorized as *public actions* conducted by the government agency. The information presented is about the agency and its services not about a particular client. This is eGovernment in the role of providing information. Services or websites that provide information do not bear the characteristics of information that need to be *personalized* or *private*. This information is directed to all citizens that do have a need or interest in this certain piece of information. In our point of view this makes stage one a clear case of *public actions* conducted by the government. Relating this to the theory of communicative action described above in figure 3 we find that the typical referred object at this stage is related more to the agency, the guiding set of rules, and organizational structure than to the client himself. Where the referred object is more interwoven with the client himself at higher stages, for example where the client himself are applying for a benefit, the need for identification of the client is crucial. At this basic level of services the need for identification of the client is nonexistent and the actions are publicly available.

If related to the information systems actability theory, actions conducted by the client at stage 1 in SAFAD are categorized within a receiving situation. It can however be argued whether this is the case of uni-directional mode or interactive mode. We argue that this stage should be categorized as being conducted in a uni-directional mode because of the limited interaction at stage 1 in SAFAD. In stage two of the SAFAD model the categorization related to the conceptual framework is no longer a clear case. As described above this second stage includes tasks as downloading forms, searching government databases, ordering publications, subscribing to information, asking questions and ordering printed publications. This is in our view two types of services: 1) Services based on actions that are directed towards the public as in stage 1 and 2) directed actions that at least indirectly identifies the client. Downloading forms, searching databases are the same type of services as described above as directed towards the public. These services do differ from the services at stage 1 in SAFAD because of the more complex interaction. As said above this is no longer an issue of receiving actions conducted in uni-directional mode these services are most definitely done in interactive mode. Services as asking questions, ordering printed forms, ordering printed publications and subscribing to information all require the client to be identified at least to a certain extent. In these later services the client announces himself as the addressee for receiving this requested information.

4.2 Identifying the client

We have in the previous section briefly addressed the issue of basic identification of the client. This discussion is derived from the distinction between services directed towards the public, directed services that need the client to be indirectly identified and constrained services that need the client to be securely identified in section 3.

The tasks of ordering publications, subscribing to information, asking questions and ordering printed publications are services that need a certain amount of identification of the client. This is the middle category in table 1 above, directed action. The client announces himself to the agency as an addressee for communicative action. In these services the client is identified, but

not securely. The information is in no way classified or private, it is more a task of identifying the client to the extent of knowing where the client can be located in order to send the requested information to the right place. This is related to a request from the client as an addressee for information that needs the client to be known. It is a request outside the current situation, either repeatedly as in a subscription for information or on a one-time occasion as in a request for information to be sent to the addressee. This was earlier categorized as *directed* government action. The degree of personalization is limited to the extent of identifying where the client can be reached and not identifying the client with a social security number, secured login or electronically signed requests. This is evidence of the need for a stage or category that includes this degree of identification of the client. Another difference from the previously described services included in SAFAD stage 2 is visible from the application of the actability theory. These services are still conducted within the receiving situation but the difference is that these are clearly conducted interactively in interactive mode. There is a clear evidence of user interaction guided by the IS and thus conducted in interactive mode. There is also a certain element of formulation apparent in this type of services indicating that there are providing actions involved. Because of the need for identification that differ from the need at higher stages we argue for a need to separate these services from the services that need a more refined, or secure, identification of the client. We also argue that the difference in identification between these services and serviced providing information at SAFAD stage 1 and parts of stage 2 need these services to be in a category of its own.

The model used by ANAO is at these first two stages basically the same as the model by SAFAD. According to this fact the discussion will take the same course. Stage one and two are not clear when it comes to the borders between these two stages as in the SAFAD model. The same difference in the degree of identification between stage 2 and 3 is apparent in ANAO as well as in SAFAD. Layne & Lee do another classification of the stages than these two prior models. Layne & Lee describe an initial stage; *Catalogue* that deal with the basic provision of information and documents. (Layne & Lee, 2001) The second stage *Transaction* deals with personalized services pivoting services that include payments of some sort. In Layne and Lee there is no difference drawn from the degree of identification. In this way the categorization of a subscription service according to Layne and Lee is in our view not clear whether this should be categorized into transaction or catalogue. The model by Hiller and Bélanger do not differ substantially from the SAFAD and ANAO models in dividing the early development into information provision and two-way communication. The criteria separating these stages from each other in Hiller and Bélanger are the basic personalization of services and not increasing interaction.

We previously defined the level of identification in services as a part of one out of three categories; public actions, directed actions and constrained actions. In this evaluation we have addressed services using public actions and directed actions covering stages one and two in the SAFAD model. Stage three in the SAFAD model is about the unique identification of the client in secure transactions of personal information in services. At this stage in the SAFAD model the issue is of transferring personal data between client and agency through an IS. This indicates that stage 3 in the SAFAD model is devoted to the constrained actions conducted by an agency or client. The action being constrained goes both ways. In providing actions the IS identify the client in order for cases to be initiated by the right person. Receiving actions identifies the client to the same extent; in order for the IS to make sure that the information is received by the correct client and no one else. The actions undertaken by the government agency is constrained at this stage.

4.2.1 Differences in initiation of the cases

Initiations of the cases are a crucial part of the distinctions between eGovernment services. By stating this we mean the difference between cases initiated through the usage of a user interface in a government agency website and a case initiated outside the system through the use of traditional means like mail or hand in delivery to the agency.

The services that are initiated outside the scope of the IS can be categorized as preconditional actions according to the actability theory. Initiation is conducted as actions outside the IS that are prerequisites for the later use of e-services in the process of the case. An example of this type of initiation is the Swedish national authority that handles financial aid for students (CSN). This agency uses initiation of cases conducted outside the scope of IS. By doing this the agency can work around the crucial identification part of eGovernment services. This is done by identifying the client traditionally through a signed document (application) after this initiation the process of administrating loans is started. (www.csn.se) The following actions are after this initiation to a large extent carried out through e-service interaction (Website and voice system) using a code mailed back to the client via traditional mail. The actions of initiation is as said earlier conducted as preconditional actions. The later interactions with the IS in administrating loans are conducted as both providing actions (a study insurance that can be sent in through IS use) and receiving actions; these actions can be, getting information about pay dates for the loan and the amount due to be paid. Regardless that the case is initiated outside the IS the fact that the client is securely identified remains and qualify this as constrained actions undertaken by the agency.

The other type of initiation that is carried out inside the scope of an eGovernment service means that the initiations are carried out through the usage of an IS. This type of initiation can be technically more complicated because of the need to securely identify the client. Although higher level of technical difficulties initiation done inside the IS will be more efficient because of the elimination of paper initiations.

4.2.2 Manual and automatic case processes

Another important issue is whether or not the case process is a computer aided manual process or a process involving automated decisions in certain cases. In a project under start-up we study an e-service project that pivot automatization of work processes in a process for granting a permit for drivers license. In the current situation this granting process is entirely manual. The purpose of the project is to automate this granting process for the applications that are clear cases, or green, where no obstacles against granting can be found in government databases. This project is a perfect illustration for an observed dualism in emerging e-services in Sweden between automated and manual work processes. Above, we argued that initiation of a case is a crucial difference between services. All services cannot and need not to be automated. One need for services to be automated is clearly defined rules and legislation that can be programmed into an IS in regulative actions. This is not always and cannot always be the case because of certain cases being complex and certain types of cases being hard to predict in the process of formulating legislation. Certain cases are too complicated or need the client to be present in order to make a decision.

The service mentioned above is another category of services where the process is at least partly automated. This means that the decision if a client should be granted a permit for future drivers license is decided if nothing indicates complications based upon programmed rules in the IS. If something indicates a breaking of any of the programmed rules, the application is

handed over to a handling officer for manual decision in the case. A manually handled service will according to the actability theory be initiated through the usage of an IS in providing action. The IS will appoint the case to a handling officer who based upon the facts will come to a decision in the case. The results of the decision will be forwarded to the client who in receiving and consequential actions can follow up the case. The middle part in this case is based on a conversational situation where the handling officer and the IS on a regular basis mix automatic actions, providing actions and receiving actions.

The automated service described above is different. There will still be providing actions where the client initiates the case. There will also be a receiving situation where the client informs himself of the decision taken by the IS on behalf of the agency. The middle part of this process is conducted in a fully automated fashion. This part is built up from automatic actions according to the actability theory. This automatic part of the process is built upon regulative actions programmed into the IS by the designer.

Services as granting a permit where all data is existing in the material put into the system by the client or existing in government systems are services that can be automated in this way. The picture is however somewhat different in cases such as if a client is sick to the extent of early retirement. In this case we cannot see that the decision will ever be able to be automated. The application can be put into an IS, the client can be informed about the process but there will be personal meetings required and rules programmed into the IS cannot simply take this decision instead of a handling officer.

4.3   Government-to-government actions

The concept of government-to-government actions is handled briefly in the models described in section 2. ANAO limits the discussion to sharing information between agencies. (ANAO, 2000). SAFAD extends the discussion a bit further in defining stage 4 as a stage of joining-up services that involve more than one agency or institution. (SAFAD, 2000). In Layne and Lee (2001) this issue is treated with the division of integration into vertical and horizontal integration. In the stage of vertical integration agencies on different levels of the government structure join-up and provide services or share information. The horizontal integration spans across different functions in a case process. Hiller and Bélanger (2001) treat this differently in applying the government-to-government dimension to all stages. These treat the aspect of integration of government agencies as another aspect of government-to-government actions than cooperation and joint efforts. Hiller and Bélanger also have a stage called integration that handles the single point of entry and the centralization of services into a portal.

The difference between vertical and horizontal integration as discussed by Layne and Lee (2001) is in our view more applicable in a country organized in federal, state and local levels. In counties such as Sweden the division between vertical and horizontal integration is less usable to describe integration in the development of e-government services. Another issue discussed in Layne and Lee is that at lover stages the work processes in agencies need not be addressed and redesigned as much as at higher stages. This indicates a shift in focus from the publication of information and publicly available interactive functionality related to databases and services where impact on work processes are limited into a focus of addressing and redesigning the work processes at higher stages. At higher stages in these models the technical and organizational complexity is higher and more crucial to address.

We argue in the same way as Hiller and Bélanger when stating that cooperation between agencies can be conducted at all stages. Two agencies can join forces in providing information related to both agencies on a single point of entry. There are also agencies in Sweden that provide paper forms issued at another agency and that should be handed in at the other agency because of a case process that relate both agencies. An example is the Swedish agency for Road traffic administration that offers downloadable forms in drivers license application cases that is to be handed in at another agency. This is an issue of cooperation between agencies in aiding the client in the process of requiring the requested documents or forms. This aspect of government-to-government cooperation is in our view important for the future work to establish a one-stop eGovernment but it is not an issue of integration of government systems into services. The government-to-government actions focused in this section is focusing on the integration of systems into services that pivots on establishing a single point of entry in a case process of for example an application that bridge agency borders. Another example of public services that integrate agencies is joint web productions. An emerging project we are studying aims at closing the gap between intertwined agencies in the area of drivers licences. This web portal will present information related to cases involving drivers licenses (application, report lost, applying for a remake etc), cases that now are spread between several different agencies. The volumes of theses cases are low indicating that they will not be of high priority to become e-services. Instead of e-service development in these cases, work is focused on helping clients to contact the right agency, something that is cost efficient as well as increase the service level. The application for drivers license is however a service with a volume that justify building an e-service.

Other subcategories that are identified depend solely on the role the third party agency or other organization has in the case process. These roles can differ from providing decisions needed for the case-handling agency to continue in taking a decision relating a specific client. Another role is when the third party agency provides access to a database where the case-handling agency can access required data on regular predefined basis.

An agency or third party can be a providing actor for a case process. This can be an optician that needs to issue a certificate for a passed eyesight control in a driver's license application or a decision from one agency that is needed in order for a case process to begin or continue. In order for this application process to complete this information need to be put into the IS. For example; the optician is participating in this case process as a provider of information and decisions in conducting providing actions.

Another subcategory is a situation where a needed piece of information is stored in a third party agency database. The primary agency that takes the actual decision is in this case a receiving actor that accesses the third party agency database retrieving information in receiving actions. This is the case when a car is up for inspection. The agency that conducts the inspections and where bookings are conducted has no database of cars and owners of its own. This agency in Sweden is relying on the central vehicle registration database in the Swedish road traffic administration. The road traffic administration is not active in this case in other aspects than providing access to this database. The road traffic administration is a passive providing actor in providing an action repertoire to the primary agency. The agency that conducts the inspection and time booking is a receiving actor in this matter.

In complex cases there can be several stages that must be passed in order for the case to be completed. This is the case when a business wants to relocate to a new municipality. In this process several instances need to make independent decisions along the way. These agencies

together build up a case process on an aggregate level but the decisions themselves do not include other actors than the agency or department itself. A service summoning these decisions that need to be taken is making this process transparent to the client but there is no need for integration in the process of taking these independent decisions. This is rather a case of a transparent client oriented decision process.

4.4   One-stop eGovernment

We have briefly addressed the purposes and characteristics of these models and their view on eGovernment evolution as something following these stages. SAFAD see these stages as a growth model where the development of eGovernment service should be carried on to stage four where the one-stop government is reached. (SAFAD, 2000) The same issue is focused in Layne and Lee (2001), ANAO (2000) and Hiller and Bélanger (2001).

From a pragmatic point of view we argue that eGovernment services should be designed as *adequate services* in relation to corresponding needs. We agree with the goal of a one-stop government where the services of the entire public sector can be reached at a single point of entry. This is however in our view a completely different goal than realizing the rest of these stages in an orderly fashion.

According to SAFAD (2000) there are two important functions, goals or motives for eGovernment. These are internal and external efficiency aided by the use of information systems. This will build up the total efficiency of the agency. The internal perspective contains the realization of more effective processes in order to save resource or use these in an optimal way. The external perspective is about making client actions toward government agencies more efficient for the clients (for example by making actions simpler through "intuitive" and available interfaces). This calls for a balanced view on eGovernment services that recognize the importance of implementing services on an adequate stage. For example, an information service at stage one as discussed above can make a huge impact on the efficiency of an agency because of a more transparent display of criteria related to a certain case. This can later on result in less faulty applications.

The question of one-stop government is intertwined with the previous discussion about the extent of eGovernment. In our view one-stop government and the integration of government agencies in services that involve one or more agencies are different issues. The integration of agencies is one important part of the realization of one-stop eGovernment but this is the case with the rest of the stages as well. Integration of agencies is a necessary prerequisite for one-stop eGovernment, as the user needs not to know the borders between two different agencies in a case process. In our view one-stop government is more than that. The client should be able to reach all government services at a single point of entry enabling the client to ignore the organizational structure of the government. This is a whole other dimension than the stages of services previously discussed. A one-stop government will be built up from services at all stages based on user needs. Thus the e-service output will be based on the concept of adequacy. One-stop government will based on this argumentation be a dimension embracing the stages of e-services.

# 5   Reformulation – Outlining a refined model

The discussion conducted in the previous section outlined shortcomings and a need for a more refined model that will be presented in more detail in this section.

The first service category (C1) in the model shown below is limited to services that need no identification of the clients. As such these services are publicly available to all government citizens in a continuum of increasing interaction possibilities limited by the absent need for identifying the client in any degree at all. The continuum of services spans from directly available information such as the phone number of the agency to advanced search and acquire functionality as in weather services and search functions in a government database. In figure 6 below this continuum of services is shown as stage 1. This stage includes services at both stage 1 and 2 in the SAFAD model leaving certain services that were categorized into stage 2 in SAFAD, services that needed the client to be indirectly identified.

The second service category (C2) in the model shown in figure 6 is built up from services that pivots on and needs the client to be indirectly identified. This type of services was in section 3 described as services that has a specific addressee for the actions conducted by the government. This stage does not involve the secure identification of the client.

The third service category (C3) in the model shown in figure 6 is divided into several subcategories. The stage as whole is based upon the need for a securely identified client in services that transfer information that is of no interest and that should not be accessible to people other than the client himself. The most important issue is that no one but the client himself should be able to initiate a case that relate to a specific client. For example no one should be able to apply for social benefits on behalf of someone else with or without permission. This is the main difference delimiting this stage from the previous stage 2. We have also identified certain subcategories related to this stage. The first issue is the initiation of the cases. One way to address the issue of identifying the client is to initiate cases outside the scope of IS. (SC1) In this case the process of identification is carried out via the traditional signed document. After this initiation the case is handled inside the scope of IS. The next subcategory is naturally a category where initiation is carried out inside the scope of IS via secure identification. (SC2) Further distinction is drawn between manual and automatic case handling inside government agencies. A case process involving manual handling can be initiated inside or outside the scope of IS but the decision will be taken by a handling officer in the agency but the communication with the client is done inside the scope of an IS (SC3). In automated case handling the decision in certain cases will be conducted automatically by programmed rules in an IS. Apparent services of this type is initiated inside the scope of IS but this can as well be done via input of scanned applications into the IS for automated decision. (SC4)

The fourth service category (C4) in the model below handles the government-to-government integration. This category can be divided into several subcategories for integration of services where the first subcategory of integration is joint web productions bridging the borders between government agencies (SC5). The next category is where an agency can be relying on input information or a decision from a providing actor, such as another agency or third party organization in order to be able to take a decision in a case relating a specific client. (SC6) Another category is the need for accessing a database in another agency for receiving a piece of information needed for the decision to be taken in a certain case (SC7). A fourth subcategory (SC8) is when certain decisions need to be taken independently by several agencies or departments in order for the case process to be completed. This relates a case process that is one process for the client but several decisions in the government organizational structure. Services summoning services that constitute this kind of process make a decision process transparent to the client.
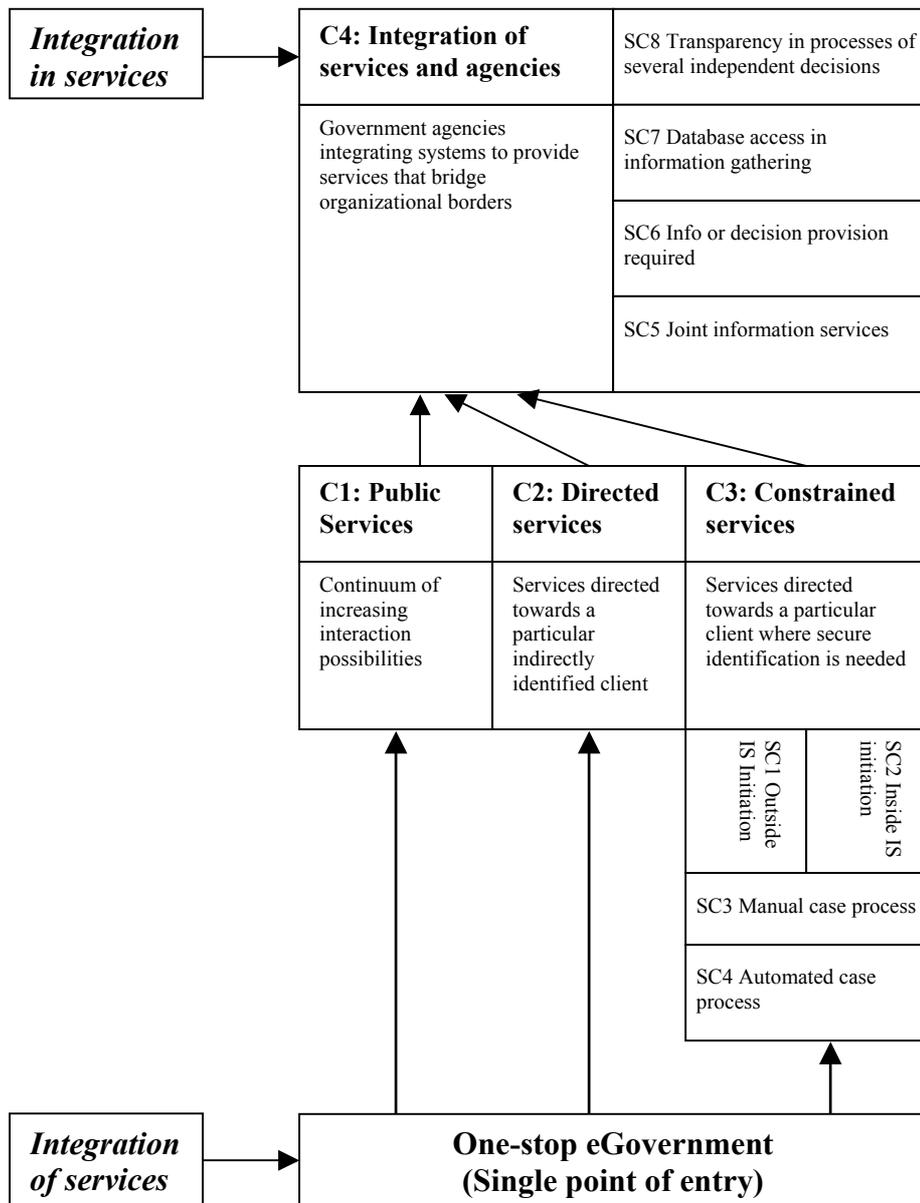
Figure 7: Refined model categorizing services and evolving eGovernment

In figure 7 the concept of one-stop eGovernment is treated differently than in the models presented in section 2. In section 4 we argued that one-stop eGovernment is related to another dimension of e-service development than in the presented models. In our view this is more an issue of a single point of entry than a stage in itself. Some issues related are however that case processes divided between two different agencies must be handled together thus some issues involving stage 4 must be treated in the realization of one-stop eGovernment. This will however not change the fact that a system of e-services pivoting on adequacy will be built up from services at all categories from 1 to 3 with or without integration as in category 4 based on the identified needs of the clients. This is shown in the figure below where one-stop eGovernment sums up all the stages in the model, based on applicability and adequacy such as cost-efficiency and client needs. This model leaves us with two types of integration, one

conducted when e-services are provided at a single point of entry, *integration of services*. The other is *integration in services* when government agencies are integrated in the provided e-services.

6 Concluding remarks and future work

We have discussed several stage models in this paper based on the conceptual framework described in section 3. Our findings are that these models are lacking in clarity when dividing the service output and evolution into the stages they describe. The borders between the stages are unclear and not distinguishable from each other based on the criteria given in the models.

The refined model of service categories in eGovernment is based on several important issues discussed in this paper. At first we argue that identification level of the client is the most important issue to separate stages and services from each other. Several of the models base the division of early stages more on complexity. In our view this is not a fruitful way of distinguishing stages or categories from each other because of complexity being more of a continuum of increasing level of complexity. There is simply nothing to build a distinguishable category on based on complexity of a service. We described identification as something that can be described into three categories, none, indirectly identified (based on for example home location or email address) and uniquely identified (securely identified).

Other important issues in the separation of categories are the initiation of the cases taking place inside the scope of IS or outside the scope of IS and manual versus automated decision making taking place in the e-service. The discussion of integration of government agencies in service provision is based on what role a third party agency has in a case process managed by another agency. This were distinguished in three categories; first a category of providing unique information or decisions needed in the case process, secondly a category of providing a repertoire for action possibilities in accessing for example a database in the third party agency and the third category are complex case processes that need separate individual decisions in separate agencies where the client need them all in order for taking a decision. An example is relocation a business to a different municipality where environmental, building applications and more independent decisions are needed in order for the client to be able to act. Services addressing this issue make a process transparent to the client but do not interact more than in providing information at a single point of entry.

Based on the conceptual framework and the analysis of the models included in this paper we present a refined model (Figure 7) for eGovernment services. This model has several differences from the models that were analysed in the paper. This is not only in redesigning stages into more distinguishable and conceptually founded categories. A more important issue is the question of stages in itself. In our pragmatic view, simply applying a model and achieving all stages in it, do not achieve the end result of one-stop government. This issue need more analysis in the decision making of what services to develop. A one-stop government will in our view be built up from services at all service categories based on a decision of what level of complexity is applicable, needed by the clients and cost efficient for the society as a whole.

Important work in the future is to further develop the model described in section 5 refining the issue of back office integration between government agencies. The most important future task is to apply this model in practice as a pragmatic instrument and to evaluate the categorizing function of the model.

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