**IST PROJECT 2001-35399** 



## A Governmental Knowledge-based Platform for Public Sector Online Services

# **Deliverable D71:**

**A Framework for e-Government Services** 

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## **Executive Summary**

This document presents the **SmartGov framework for e-government services**. The overall aim of the SmartGov project is to specify, develop, deploy and evaluate a knowledge-based platform to assist public sector employees to generate online transaction services. It achieves this by simplifying their development, maintenance and integration with already installed IT systems.

The SmartGov project, through its software platform, aims to minimise the reliance on IT skills to develop e-government services. However, e-government also brings new styles of communicating, new behaviours, new organisational structures, new processes, new paradigms, new threats and new opportunities.

The framework for e-government services includes reference models for:

- the **processes** behind the design and delivery of e-government services
- **co-operation** in public authorities, both internal and external
- **social acceptance** of e-government services

It is intended to benefit any public authority that is planning or already delivering electronic transaction services, whether or not they have access to the SmartGov platform. It is designed to help improve co-operation, effectiveness and efficiency

The framework is underpinned by the **e-government services ontology**. This is intended to provide a common understanding of the principles of e-government services, an understanding from which people can communicate, discuss and build models of their own.

In building our framework, we made use of interviews and workshops within the City of Edinburgh Council and the Greek Ministry of Finance.

Our framework is based on the premises that:

- public services **meet the needs** of citizens and businesses;
- public authorities co-operate with the public and private sectors to jointly deliver services;
- services are constrained by legislation and resources;
- **better services** are the result of **monitoring** both the quality of services and the satisfaction in services
- the monitoring of costs and benefits is a key part of the affordability and sustainability of e-service projects

Recognising that that there is much more to success in e-government than getting the technology right, the framework takes a **sociotechnical** approach, in which we describe the social and cultural aspects of services, rather than only the technical artefacts and knowledge of artefacts.

Our framework explores the part played by the various roles in the **processes** behind e-services. The main **roles** in e-services are managers, domain experts, IT staff, service workers and end users (the citizens or enterprises that make use of the service). The processes in the **life cycle of e-services** are: identify the service, carry

out a feasibility study, prepare the business case, implement, deploy, operate, monitor and improve, and finally discontinue.

Developing e-transaction services requires the establishment of multi-disciplinary relationships in which parties **co-operate**. Many different co-operative structures are possible: internal to public authorities, with other public authorities, with the voluntary sector and with the private sector. There are a handful of different **modes of co-operation** and many different **justifications** for co-operating. Some principles remain the same across all modes of co-operation: be clear about the **shared purpose**; be clear about the justifications; be clear about the **roles**; acknowledge **complexity** and learn to cope with it.

We have developed new models of **social acceptance**, based on **trust**. Our models cover **internal** trust relationships and **external** trust relationships. There are significant differences in the models when services become **electronic**. The modes of trust are **latent** trust (not context-specific, existing for a long time) and **situational** trust (context specific, existing for a limited period).

The full e-government services **ontology** is provided as an appendix.

## 1 Introduction

This document describes the work undertaken in WP7 of the SmartGov project. The overall aim of SmartGov is to specify, develop, deploy and evaluate a knowledgebased platform to assist public sector employees to generate online transaction services by simplifying their development, maintenance and integration with already installed IT systems.

In WP7 we are concerned with developing the SmartGov framework for egovernment services. We argue that, for an e-transaction service to be accurately developed and successfully deployed, a framework for e-government services comprising various models needs to be developed. The framework we have developed addresses 3 important concepts, which are:

- Processes: based on a sufficiently detailed inspection and understanding of current processes, target models for new and rearranged roles and processes have been elaborated.
- Co-operation: models supporting co-operation have been developed. One online form for the end-user can in reality require co-operation by different departments, as well as inter-agency co-operation (*e.g.* local government, health, social security *etc.*) and co-operation with private partnerships.
- Social acceptance: models that support the acceptance of online transaction services, focusing on issues such as privacy, trust and satisfaction, have been developed. Electronic commerce has emphasised contractual trust, and focused on technological issues like security and authentication. Here, we focus on representations of trust and acceptance, taking a more socially oriented approach.

Importantly, the framework is underpinned by an e-government services ontology.

## 1.1 Purpose

Our ultimate goal in carrying out this project is to enable better public services. The project contributes to this goal by supporting public authorities in planning, designing, delivering and maintaining electronic transaction services.

This deliverable goes hand in hand with the SmartGov platform. It is intended as both a guideline and a reference for public authorities that are using the SmartGov platform. In this respect, the reference part of the document contains the underlying theory and rationale from which the guidelines have been produced. Section 10 of the document provides the guidelines.

The document goes further, however: it is intended to benefit any public authority that is planning or already delivering electronic transaction services, whether or not they have access to the SmartGov platform.

## **1.2 Non prescriptive**

We start with the premise that it is impossible and fruitless to derive prescriptive tools for providing government e-services. Circumstances vary so much from service to service: across public authorities, cultures, management regimes, legislative environments, political climates, legal systems, educational systems, value systems and more.

Success of a service depends on its context, on many conditions (internal and external), on the talent behind the service and on the perception of the recipients of the service.

We cannot hope to cover all such contexts and conditions. We do aim for a set of guiding principles against which people can think, plan and act.

## 1.3 A general framework

The framework is intended to be general, *i.e.* applicable to a wide range of situations in e-government.

The value of a general framework is that it sets the context for discussion, action and development of ideas. It provides a supportive foundation and structure within which and from which ideas and models can grow.

## 1.4 Underpinned by an ontology

One of our major contributions in this framework is the *e-government services* ontology.

We are very aware of some difficulties that are caused by departmental-style organisation in public authorities. One of these is that different departments can hold different mindsets. These are sustained in spite of many similarities across departments, in terms of their processes, or the delivered services, or both.

One of our hopes is that our general framework can help to improve co-operation, effectiveness and efficiency. A major contribution of the framework is therefore a common understanding of the principles of e-government services. An ontology provides such a common understanding.

An ontology represents a view of a "world" that is commonly identifiable by those who know about the world.

We often use the word "domain" to describe a convenient portion of the world or a portion of our lives, about which it is useful to talk.

An ontology defines the concepts and relationships of a domain, in a way that those who know about the domain can easily identify with, share and find useful in some way. In this project, we have defined the *e-government services ontology*, which we present in section 4. The framework in section 5 is described by making reference to terms and relationships in the ontology.

## **1.5 Addressing the barriers**

Our framework attempts to help public authorities surmount some of the barriers in planning, designing and delivering e-transaction services. Identifying the potential source of barriers can often help people to understand what actions might be most useful to attempt to overcome them. Much of the work in e-government until now has emphasised the tangible barriers concerned with legal constraints and resources: money, people and technology. Our framework does not address these directly but

rather takes a socio-technical approach and considers the less tangible constraints. Our intention is to help people to see where these intangible barriers, perhaps more within their control, occur because of culture, organisation, training and communication. To do this, we acknowledge, and indeed focus on, the social and organisational aspects of e-government transaction services.

## **1.6 The big difference with "e"?**

In one respect — that of the *principle* of service delivery — we have found it hard to separate the "e" when looking at e-government. Almost all of the observations that we make regarding services — the processes, co-operation, trust and social acceptance — apply whether or not the service is delivered electronically. In particular, our ontology for e-government services is dominated by terms that have no particular electronic association.

The recent OECD policy brief on e-government [1] acknowledges this: "The impact of e-government at the broadest level is simply better government — e-government is more about government than about 'e'."

Wherever possible within the framework, we identify where "e" requires special attention. [2] notes that the biggest impacts of information technology in general are to do with:

- scale: the ability of governments to do things on a scale that was previously impractical
- scope: the ability of governments to reach into people's lives in ways that were inconceivable in the past
- integration: the ability to bring information together in new ways
- speed: the ability to act and react much more quickly than before

From the citizen's perspective, equality of access to services is one of the other major issues in delivery of e-services: how do those without the necessary equipment or skills take advantage of e-government? This is a question that we address only indirectly within this framework.

However, we also acknowledge that, although the principles of service delivery remain the same, the skills, modes and techniques required to work electronically and deliver electronically can be quite new to government staff. Indeed, as we point out in section 7.2.5, Extra value services, the capabilities of e-services are different.

In public administration, this often requires a significant reorganisation effort, to ensure efficiency of the new workflows. Countries such as Sweden and Denmark are making this the main priority. When such change in work practices are required, powerful social and psychological factors are important, such as group dynamics, motivation, fear of change, ability to learn and the establishment and maintenance of trust.

It is not just IT skills that one needs to acquire (although the SmartGov project aims to minimise this need) but also new styles of communicating to adopt, new behaviours to adapt to, new organizational structures to adjust to, new processes to learn, new paradigms to understand, new threats and opportunities which constantly change. The 'e' in e-government does not stand for "easy"!

## 1.7 "E" is just part of the service

Related to 1.6, it is also clear that many government services have components that are necessarily physical, for example repair of roads, collection of refuse, pest control, building inspection and most health care.

However, as with 1.6, this does not require a major shift in approach from the present situation. There must be few, if any, government services that are not already supported by electronic transmission of information in some way. Increasingly, too, field workers have remote access to electronic systems while they are fulfilling the physical aspects of services.

#### 1.8 The framework

We use the picture in Figure 1 as our reference for the e-government services framework.

It is based on the premise that:

- public authorities provide services to meet the needs of citizens and businesses
- public authorities co-operate with other government organisations to jointly deliver services
- public authorities co-operate in public private partnerships to jointly deliver services
- services are constrained by legislation and resources
- better services are the result of monitoring both the quality of services and the satisfaction in services
- the monitoring of costs and benefits is a key part of the affordability and sustainability of e-service projects

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#### Figure 1: the framework as a picture

The framework is described in section 5.

#### **1.9 Applying the framework**

How might a public authority go about applying this framework?

It is anticipated that people involved at various stages of service planning, design and delivery will use this framework as a reference, both operationally and in training.

To allow this, we will provide, in addition to this document, two access routes to the framework:

- The SmartGov knowledge base In configuring the SmartGov software platform for the application trials, we will make the framework available in the SmartGov knowledge base, so that it is accessible in the same way as any other knowledge that is provided in or added to the SmartGov knowledge base.
- A standalone reference
   For those who do not have access to the SmartGov software platform, we will
   provide a standalone reference version of the framework, containing the main
   points extracted from this document.

The framework has the potential to encourage people in public authorities to take a *holistic* view — one in which an understanding of the whole picture can help identify the most 'acceptable' and least 'acceptable' actions, in both the short term and the long term.

However, *holistic* is an overworked and poorly understood term. No matter how much one appreciates the value of "helicoptering out" and looking at the whole picture, it is often difficult to know what to look at and how to interpret it. We do not give guidance here on holistic thinking. A gentle introduction is [3]. For a deeper treatment, see [4].

As a general rule, we encourage people to use "zoom control" as much as possible:

- 1. Zoom out to see the whole picture
- 2. Then zoom in on the bits where action might be most profitable
- 3. Then zoom in further to design and apply the appropriate action
- 4. Then zoom out to see the effect on the whole picture. Start at step 1 again.

This framework is written so that readers can dip into the topic that is currently of most interest to them as they use zoom control.

## 2 Rationale

This document aims to meet the objectives of Work Package 7 of the SmartGov project:

- To develop new reference models including process and role models that help public authorities to realise the full potential of the SmartGov platform.
- To develop new reference models in the area of business networks and Public Private Partnership in order to enable better co-operation of citizens, Public Authorities and third-party service providers.
- To investigate and develop social acceptance models relevant to the introduction of the SmartGov platform in the participating public authorities to overcome organisational and cultural barriers.
- To develop a framework within which our reference models can be applied, by Public Authorities and by researchers.

Below we elaborate on our interpretation of these objectives. What is a reference model? What is a framework? How general can our framework be? What approach should we take? What issues is the framework designed to tackle? How should the framework be made available?

### 2.1 Reference models - a model of modelling

There are several definitions of *reference model*. They depend on the intended use of the model. Most definitions generally describe a "model of modelling", *i.e.* not a representation of the real world, but a representation of how to go about describing and managing the real world.

A purely scientific definition would, however, suggest that the reference model *is* a model of the real world. It represents the consensus, among the scientific community, that it is the best possible model, given the available information.

For our purposes, given that the delivery of online government services is relatively new and that the complete process is, as yet, poorly understood, we adopt the "model of modelling" view. The idea of consensus is still vital. Our model of modelling should represent a consensus of current understanding in the domain of electronic service delivery.

The primary reason for developing a reference model is to allow people to discuss, reason about and take action within a particular domain. It is assumed that a reference model is authoritative: that it carries a seal of quality and that people can rely on it to be fit for its purpose. Acknowledgement within the model of existing standards is taken for granted. Its context in relation to other research and development work is also made clear. Several builders of reference models stress its value in education. Others are concerned with the development of standards — to them, the reference model *is* the standard. It can also describe typical patterns in the domain and act as the template for the development of working systems.

Because a reference model is a model of modelling, it defines:

- the building blocks (usually abstract concepts) that are used in models of the domain
- relationships between the building blocks
- how to build models

It is useful if a reference model also includes examples of models. It is also useful if it makes clear which known features of the domain are not included in the model. In SmartGov we have sought to build reference models that can:

- support discussion
- assist progress
- educate
- act as templates.

The target audience for our reference models comprise: planners, owners and designers of services within public authorities; other researchers; and tool vendors.

For those who want to build models, it is very useful to be given some guidance on selection of tools and some reference models do this.

#### In summary, our working definition is:

A *reference model* is an abstract definition of how to describe and develop a domain of interest: a model of modelling. It is assumed to be authoritative and a sound basis for discussion, exploration, learning and development.

## 2.2 Frameworks

A single reference model is often described as providing an abstract *framework* to establish common understanding, identification of issues and a context for discussion. A framework suggests a safe foundation and structure within which to build, and several reference models can fit inside the same framework. Disparate models can fit together and be coherent inside a *unifying framework*.

#### Our working definition is:

A *framework* provides a supportive foundation and structure within which and from which ideas and models can grow.

#### 2.2.1 A general framework

The field of government services is large. We have sought to provide broad, rather than deep coverage of the field. Our goal is a general framework with which most public authority workers can identify, from which they can work when designing and delivering electronic transactional services.

Such a general framework can be adapted and applied as appropriate.

In the United States, the "Clinger Cohen" Act of 1996 required every government agency to ensure that its Chief Information Officer is responsible for "developing, maintaining, and facilitating the implementation of a sound and integrated information technology architecture." Many of these are based on the Zachman

Information Systems Architecture [5]. Zachman's framework identified the kinds of work products needed for people to understand and thus build a given system or entity.

The Zachman framework encourages a non-rigid approach to the development of systems. Instead of a series of steps, the approach is organised around the different viewpoints, or perspectives, of the various players.

This framework provides for six windows from which to view the enterprise, which Zachman terms "perspectives" on how a given entity operates. These are the rows in Figure 2 below:

- the strategic planner objectives and scope
- the system user or owner model of the business
- the system designer model of the information system
- the system developer technology model
- the subcontractor detailed representation
- the system itself functioning system

As well as these perspectives, the framework suggests the kinds of things that people should be looking at. Each of these "models" can be associated with each of the above perspectives. Shown as columns in the framework, they cover:

- *what* the entity uses to operate
- *how* the entity operates
- *where* the entity operates
- *who* operates the entity
- when entity operations occur
- *why* the entity operates.

The Zachman columns are, rather than models, guides to the type of things or parameters that one would represent in models. An individual model would take a particular perspective and represent particular types of things or parameters.

An excellent introduction to the Zachman Framework has been written by David C. Hay, of Essential Strategies, Inc. See <u>http://www.tdan.com/i001fe01.htm</u>

#### Figure 2 (next page): the Zachman framework

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A Framework for e-Government Services

	WHAT	HOW	WHERE	WHO	WHEN	WHY
	DATA	FUNCTION	NETWORK	PEOPLE	TIME	MOTIVATION
SCOPE (contextual)	List of things important to the business	List of processes the business performs	List of locations in which the business operates	List of organisations important to the business	List of events or cycles significant to the business	List of business goals & strategies
Planner	Entity = Class of business thing	Process = class of business process	Node = major business location	People = major organisational unit	Time = major business event or cycle	Ends & means = major business goal or strategy
BUSINESS MODEL (conceptual)	e.g. Semantic Model	<i>e.g.</i> Business Process Model	<i>e.g.</i> Business Logistic Systems	e.g. Work Flow Model	e.g. Master Schedule	e.g. Business Plan
Owner	Entity = business entity Relationship = business relationship	Process = business process I/O = business resources	Node = business location Link = business linkage	People = organisational unit Work = work product	Time = business event Cycle = business cycle	End = business objective means = business strategy
SYSTEM MODEL (logical)	e.g. logical data model	e.g. Application Architecture	<i>e.g.</i> Distributed System Architecture	e.g. Human interface architecture	e.g. Processing structure	e.g. Business rule model
Designer	Entity = data entity Relationship = data relationship	Process = Application function I/O = user views	Node = Information storage function Link = Line characteristics	People = role Work = deliverable	Time = System event Cycle = Processing cycle	End = Structural assertion Means = action assertion
TECHNOLOGY MODEL (physical)	<i>e.g.</i> Physical data model	<i>e.g.</i> System design	e.g. Technology architecture	<i>e.g.</i> Presentation architecture	e.g. Control structure	<i>e.g.</i> Rule design
Builder	Entity = segment, table <i>etc.</i> Relationship = pointer, key <i>etc.</i>	Process = computer function I/O = data elements, sets	Node = hardware, system software Link = line specifications	People = user Work = screen formats	Time = execute Cycle = component cycle	End = condition Means = action
DETAILED REP'TATIONS (out of context)	e.g. Data definition	e.g. Program	<i>e.g.</i> Network Architecture	<i>e.g.</i> Security Architecture	e.g. Timing definition	e.g. Rule specification
Subcontractor	Entity = field Relationship = address	Process = language statement I/O = Control block	Node = address Link = protocol	People = identity Work = job	Time = interrupt Cycle = machine cycle	End = sub-condition Means = step
FUNCTIONING ENTERPRISE	e.g. DATA	e.g. FUNCTION	e.g. NETWORK	e.g. ORG'ZATION	e.g. SCHEDULE	e.g. STRATEGY

Zachman's framework provides a way to identify and describe an entity's existing and planned component parts and the parts' relationships before one begins the costly and time-consuming efforts associated with developing or transforming the entity. Since Zachman introduced his framework, a number of other frameworks have been proposed. In September 1999, the federal CIO Council published the Federal Enterprise Architecture Framework (FEAF), which is intended to provide federal agencies with a common construct for their respective architectures Similar to the Zachman framework, the FEAF's proposed models (columns) describe the *data, applications, technology* and *people*.

An example of an individual architecture based on the FEAF is the Treasury Enterprise Architecture Framework (TEAF) [6]. The TEAF's columns are *functional*, *information, organizational* and *infrastructure*, with correspondences as shown in Figure 3:



#### Figure 3: the FEAF and the TEAF

The USA's Office of Management and Budget (OMB) has an office of Federal Enterprise Architecture Program Management, details of which can be found on its web site <u>http://feapmo.gov/fea.htm</u>. It breaks an enterprise architecture into five categories:

• Business reference model: Describes the activity in terms of its business operations

- Performance reference model: Describes the means to measure the performance of the activity
- Data and information reference model: Describes the data needed to support the activity
- Service component reference model: Identifies the support services needed to complete the activity
- Technical reference model: Describes the standards for the technology needed by the activity

The OMB states that "Effective use of enterprise architectures is a recognized hallmark of successful public and private organizations." [7]

Our framework, addressing the processes, co-operation and social acceptance, reflect a focus on a socio-technical approach, as explained in the next section.

## 2.3 A socio-technical approach

Existing frameworks for e-government, for example [8, 9] typically focus on the technical and technological aspects, where the technology is related to artefacts and knowledge of artefacts, rather than the social and cultural artefacts related to people. Recognition is now being made that there is more to success than getting the technology right. For example, Stuart Hill of BT stated in 2002 [10] that

Just e-enabling is not the answer. That's why, thus far, the technology hasn't worked as it might. Change has to extend way beyond the technology.

Other frameworks, such as the United Nations Public Administration Network's G2C2G, focus on the relationship between government and the citizen.

Also, the OCED now asserts that e-government is more about government than about "e" [11]. Earlier OECD briefings, like [11], while acknowledging the need to "manage knowledge and human resources", do little to address these social issues directly. More recently, the OECD talks about the effects of e-government on society, but gives no guidance on how to address the social aspects of the development of e-government [1, 12].

Our aim here is to take a more socio-technical approach, in acknowledgement of the observation in [13] that organisations are

made up of people (the social system), using tools, techniques and knowledge (the technical system), to produce goods or services valued by customers (who are part of the organization's external environment). How well the social and technical systems are designed with respect to one another and with respect to the demands of the external environment determines to a large extent how effective the organization will be.

So, to assess human and organisational outcomes the social, psychological, environmental and technological factors are assessed as a whole.

Therefore our framework proposes 3 perspectives through which to view etransaction services: *process*, *co-operation*, and *trust and social acceptance*.

#### 2.3.1 Processes in e-transaction service delivery

These are the typical significant processes in the lifecycle of an e-service:

- 1. Identify Service
- 2. Feasibility Study
- 3. Prepare Business Case
- 4. Implement
- 5. Deploy
- 6. Operate
- 7. Monitor and Improve
- 8. Discontinue

As part of our framework we elaborate these in turn, particularly noting the roles and interactions of people rather than just the mechanical sequencing of activities.

#### 2.3.2 Co-operation

Our goal here is to help people to build fruitful relationships. These are already common in e-government, as found in a recent survey of local public authorities in England [14].

Local authorities evidently see the benefits of working in partnership with other organisations to help them implement e-government and to meet the 2005 target for egovernment, no doubt as a way of gaining access to additional capacity, expertise and funds. Almost all (94%) local authorities have set up a partnership arrangement with organisations in the public, private or voluntary/community sectors in relation to egovernment.

... most e-government partnerships are with adjacent/different tier local authorities. It is, however, also common for local authorities to set up e-government partnerships with health local authorities/trusts, private sector technology suppliers and community/voluntary organisations. In summary, 61% of e-government partnerships are with the public sector, 20% are with the private organisations and 19% with community/voluntary sectors.

We aim to help people understand the nature of existing and proposed co-operative relationships. This becomes more important as countries like Scotland make it a statutory duty of public authorities to have more integrated planning of all aspects relating to people's quality of life — social, educational, cultural, health, economic, environmental, transport, safety and security [15].

#### 2.3.3 Trust and social acceptance

Here we want to address both the social acceptance within the public authority and service delivery co-operating partners, and the social acceptance of e-services by the customers, that is the citizens and the businesses who receive these services.

We argue that the foundation of social acceptance of e-transaction services within a government agency is trust. We have examined current descriptions of trust within the field and from these descriptions have developed models of trust to describe the

relationships between the various agents during the design and deployment of e-transaction services.

#### 2.4 Framework delivery medium

Our intention is to make the framework available not only to those using the SmartGov platform but also to those working without the platform.

**Within the SmartGov platform**, the framework will be made available as content in the basic knowledge base that is delivered with the software. This knowledge base is available as *knowledge units* that are associated with various components of a service, or more generally, with terms and definitions that are relevant to the service.

We intend to populate the SmartGov knowledge base with portions of the framework in WP8 and evaluate it in WP9.

With regard to **Standalone delivery**, before the end of the SmartGov project in January 2004, we will create a standalone version of the framework. This will contain the salient points, principles and guidelines from this report.

### 2.5 Scope of the framework

The framework will be successful if it equips people with insights so that they can understand their specific socio-technical barriers and design actions to overcome them. The emphasis is on social rather than technical barriers. Our intention is to redress the balance of previous frameworks which focused on the technical barriers.

It is interesting to note from the survey of English local authorities [14] mentioned in 2.3.2 above that the typical barriers identified by the authorities themselves are: lack of financial resources (65% of respondents), lack of staff (57%), security issues (56%), lack of staff training (54%), and privacy issues (51%).

A previous report about the same local authorities [16] found that

Many councils identify funding, a lack of ICT skills and reluctance to change as the key factors impeding delivery...

We do not address here the first of these, the financial barrier. For one thing, [16]

... elected members are understandably reluctant to divert scarce resources into e-Government projects that are unlikely to win them votes.

With regard to lack of staff, the SmartGov approach to the design of e-transaction services aims to reduce the dependence on IT staff. With regard to security issues, while we mention issues like digital security, authentication, digital signatures and the like, we leave a full treatment of the technology to other publications such as [17]. In this document we aim to give people enough insight to help them to fear change less and to identify those areas where further analysis and further training of staff will be useful.

We are *not* here concerned with *process modelling*, *i.e.* the task of modelling the processes that describe the services themselves. This is handled in projects like PROMOTE [18]. However, we do describe in general the processes involved in planning, designing, delivering and maintaining e-government services.

Other issues that we do not cover in detail, that have been highlighted by other researchers, are:

- consulting with the public and business
- promoting access to e-services
- programme and project management
- costs and resources
- flexible working
- e-engagement and democracy

In an Annex to Deliverable D41 [19] of this project we considered the high level barriers, listing them under categories: legislative, administrative, technological, user-culture and social. We do not intend to elaborate on this list further. In general we are not keen to make lists of socio-technical barriers in a document like this that is intended to be a positive aid to understanding e-government. People know their own jobs well enough and it can be counter-productive to check off one's job against such lists. Neither would we feel confident that we could take each barrier and provide a complete recipe for overcoming it. As we have stated, we would rather equip people with insights so that they could understand their own barriers and design actions to overcome them.

## 2.6 A standalone ontology

The e-government services ontology is loosely coupled with the SmartGov software platform, as shown in Figure 4:



foundations

working software



The SmartGov platform (1) contains a knowledge base that is organised according to taxonomies (2). These are trees of terms that are of relevance to e-government services. They are organised in a way that is convenient for public authority staff. The taxonomies (2) contain the terms of the e-government services ontology (3). In

addition, the ontology (3) is a fundamental part of the framework (4). (The way in which the taxonomies are used in the SmartGov platform is elaborated in [20].

As explained in 2.4, we intend the framework to be usable outside of the SmartGov platform. Similarly, the e-government services ontology will be made available in a format<sup>1</sup> that allows it to be examined on its own.

Our ontology is not restricted to any specific purpose. This is in contrast to efforts such as [21] that define detailed vocabularies, the main objective of which is to guide the search for material. Neither are we defining metadata for government information systems, as reported in [22].

As we stated earlier, a major contribution to the framework is the e-government services ontology, which provides a common understanding of the principles of e-government services and supports intra and inter governmental agency communication. We hope that our ontology can be used, adopted or adapted as required.

<sup>&</sup>lt;sup>1</sup> The ontology will be available in plain text and in RDF (resource description framework) format on the SmartGov web site (<u>www.smartgov-project.org</u>). This will allow those with specialised software tools for browsing ontologies to examine the structure of the ontology.

## **3** Research approach and findings

The development of the framework has been informed by our work with the user groups in the SmartGov project: the General Secretariat for Information Systems in the Greek Ministry of Finance (GSIS) and the City of Edinburgh Council (CEC). CEC is one of Scotland's 29 local authorities, which have responsibility for a wide range of vital public services, including district courts, community leadership, community planning, consumer protection, economic development, education, emergency planning, flood prevention, environment, environmental health, housing, leisure, recreation, licensing, planning, police, fire services, public transport, registration of births, deaths & marriages, the electoral register, roads, provision of infrastructure, social inclusion promotion, tackling poverty, social work, community care, valuation and rating.

We have performed interviews and workshops in an effort to determine what might be useful for public authorities. We summarise our results here. Our work has also been informed by our findings from the literature review and from our experience as researchers in previous research projects.

### 3.1 Interviews

As part of Work Package 4 of the SmartGov project we conducted semi-structured interviews with 16 people engaged in managing and delivering a range of external services: national taxes, local taxes, housing provision, benefits management, school education, library and leisure services, environmental services, social work, digital inclusion and planning. We also spoke to people delivering internal services, specifically in personnel and management.

We derived user requirements for the SmartGov platform from these interviews and have reported them in [19], where we have also listed the barriers to successful e-government, in these categories: legislative, administrative, technological, user-culture and social.

We have used the material from these interviews and from a previous in-depth study in the City of Edinburgh Council (amounting to around 200 semi-structured interviews), to inform us of the terms that we should include in the e-government services ontology and, in turn, address in this framework.

#### 3.2 Workshop on social acceptance

This was one of our earliest activities, in which we sought to find an appropriate starting point and a way ahead. Those attending were from City of Edinburgh Council (CEC) and researchers in social informatics from Napier University. Our objectives were to:

- explore the various facets of social acceptance
- decide which aspects of social acceptance to study in the SmartGov project
- identify disciplines, areas of work and theories that might be useful
- suggest how user research might be carried out in SmartGov

• suggest useful formats for delivering the SmartGov "framework"

We asked people to engage in two exercises:

- conduct a brainstorm in which people were asked, in groups, to come up with as many angles on social acceptance as possible in 6 minutes
- build a model that connects some of the brainstorm terms. (For this exercise, each group was asked to work with the terms that had been generated by a different group.)

The results helped us to understand the issues that need to be addressed in considering social acceptance and trust relationships in e-government.

The results of this workshop are in Appendix 1 on page 97.

#### 3.3 Workshops on the public authority view of services

We conducted two workshops at CEC, one with middle and senior managers, the other with operational staff. As well as describing what SmartGov was about, we made it clear to people at the workshops that we were developing an ontology for e-government services, and stated these objectives:

- to explore the terms in which council staff describe services
- to assess the relevance of the ontology terms already derived by Napier
- to explore the ways in which council staff might categorise the terms
- to decide how to develop and refine the ontology further

We asked people to engage in two exercises:

- describe a service, either existing or planned, in whatever way was natural for them. The results are summarised in 3.3.1 and presented in detail in Appendix 2.
- use the multi-dimensional technique of card sorting to determine the relationship between the terms in the ontology and to uncover any missing terms. The results are summarised in 3.3.2 and presented in detail in Appendix 3.

In 3.3.3 we summarise the results of the CEC workshops.

#### **3.3.1 Service descriptions**

We allowed the workshop participants to choose the service that they wanted to describe, large or small, general or specific. This is in keeping with our generic approach to the e-government services framework; we wish it to be applicable over a range of service sizes and types.

We also gave them guidance on how to go about building a model:

- Start at the top level and work down:
  - motivation for the service (at strategic level)
  - stakeholders
  - aims and objectives
  - main operations and roles played in them
  - information and artefacts that are used, passed around or produced

- special situations
- All the time, think of the essential concepts and the key terminology that you are using
- Extract the key terms and write them down
- Organise and structure the key terms in a meaningful way

Of our four groups, two chose to create generic models of services.

One of these generic models, suggested by members of CEC's Corporate Services department, was motivated by CEC's ongoing Smart City project to transform the delivery of services to Edinburgh's citizens. Smart City has an associated change management programme within the public authority.

The other generic model, suggested by operational staff in the Housing and Leisure departments, was motivated by their commitment to meeting the needs of citizens.

The other two groups described specific services. One was the Council Tax, which is a property-based tax that applies across the whole of the UK, but is set, administered and collected by local public authorities. The other was the "Equipment and Adaptations" service, which helps ill or disabled people to remain living at home rather than come into institutional care. This is the service that CEC is running as their pilot application on the SmartGov platform.

We were a little surprised that only one of the models, the second generic one, had a procedural or dynamic element. The others were more declarative, with hierarchical presentations of terms. It would be interesting to explore the reasons for this further. Was it just the format and length of the workshop, or is there a way of regarding services that is not captured adequately in process-oriented descriptions?

The main outcomes of the workshops were the reinforcement of our ontology definitions and the basis for the framework of e-government services in Figure 1 on page 11.

#### 3.3.2 Card sorts

Card sorting is a technique that is well known in knowledge engineering. Its aim is to get access, without asking questions directly, to experts' knowledge of a domain. It usually uncovers mostly declarative, structural knowledge, as opposed to procedural knowledge.

In the card sorts, people worked in groups of about 5 or 6. In total we performed the card sort four times over two workshops. Each group was given a pack of the same 175 cards, each with a term that we were proposing might be relevant to public services — in effect, candidates for terms in the e-government service ontology. Each group was asked to sort the cards into whatever piles were meaningful for them. They were free to discard terms that they found irrelevant or not useful. We also allowed them to write new cards for any useful terms that we had not given them.

When the cards had been sorted, we then asked them to say on what basis the sort was made and what the piles represented.

In general, we found that the groupings of cards distinguished between:

- A Framework for e-Government Services
- what happens inside the public authority and what happens at the delivery interface
- people-centred issues and process-centred issues
- issues that are positive for the public authority's image and those that are negative

They also emphasised:

- drivers of service, including the meeting of needs, citizen satisfaction and constraints imposed by regulations and budgets
- means of communication, both internally and externally
- the importance of work practices and "the system"
- stakeholders
- performance measures
- trust
- accountability

These results also helped us formulate the framework of e-government services in Figure 1 on page 11.

#### 3.3.3 Summary of results from workshops

What we found from our workshops was that, from within CEC, there were broadly two views of services:

- the strategic and design view
- the operational view

We have borne in mind these two views when devising the e-government services ontology (section 4 below) and framework (section 5 below).

Note that these are broad generalisations and rather subjective observations on our behalf. However, we find it instructive to note their characteristics below.

The first of these — the strategic and design view — describes aspects such as:

- the need for services
- the motivation for providing them; the "drivers"
- the constraints of the environment in which they are provided (regulatory, fiscal and political)
- the responsibility for them
- the planning and resourcing of them (financial and personnel)
- the image of the public authority and the individual services
- partnership

The second view — operational — focuses more on aspects such as:

- meeting the need
- service delivery media
- failure in delivery
- the relationship with the citizen
- citizen feedback
- work practices
- the working environment
- on-the-ground resourcing

• staffing issues

Deliverable D71:

As might be expected, the first view is held more by those with policy and strategy oriented responsibilities, for instance those in CEC involved in the Smart City project. However, we did note that those closer to the "coal face" — sometimes referred to as the "street level workers" — have a good grasp not only of the operational view but also the strategic and design view. We found this to be true of those without management responsibility just as much as those with management responsibility. This observation first of all suggests that there is a strong ethos of service awareness throughout CEC. Secondly it suggests that any successful knowledge management effort will harness the knowledge of the street level workers. It must provide rewarding and fruitful methods and situations in which they feel comfortable, fulfilled and trusting enough to communicate and collaborate.

As a side effect of these workshops, we observed that people across the board were delighted to take time out from their everyday work to participate, for two main reasons:

- It gave them the opportunity to "helicopter out", as we mentioned in 1.9, and take a different perspective on the services for which they were responsible.
- It gave them the opportunity to share with people in other roles and disciplines. This, again, helped them to take a different perspective, and also helped them see that others, working in different "departments", held similar views and faced the same challenges.

These observations indicate the value of participative methods to support knowledge management.

## 4 The e-Government Services Ontology

In this Section we present the e-Government Services Ontology. We start in Section 4.1 by motivating the need for an ontology, then discuss the methods employed in deriving the ontology in Section 4.2, and finally present the e-Government Services Ontology in Section 4.3.

### 4.1 The need for an ontology

Increasingly e-government services are being developed that cut across old department lines and there is an increasing need for intra and inter governmental agencies to work more closely together, moving towards joined-up government. With this change comes the need for better communication between people and a need for a common vocabulary and understanding of terms that are being shared. An ontology provides such a communication between people and organisations.

An ontology is an agreed set of concepts and relations that are meaningful to the members of the community it serves. It represents a view of a "world" that is commonly identifiable by those who know about the world. Its role is to be a common language through which knowledge about a specific domain can be described, organised and disseminated. Thus an ontology can be of considerable value to any large, complex organisation such as a public authority.

The e-Government Services Ontology is at the core of the framework for the SmartGov processes, business process models and social aspects.

This work on the e-Government Services Ontology has also been disseminated through the following publications: [23], [20].

## 4.2 Developing the ontology

Here we give the background to our work and describe our method for constructing the ontology. In Section 4.2.1 we introduce the Enterprise Ontology – which is the starting point on which we have chosen to build the e-Government Services Ontology – discuss the core concepts on which it is based in Section 4.2.2, before describing the methodology adopted for constructing the e-Government Services Ontology in Section 4.2.3.

#### 4.2.1 The Enterprise Ontology

We start by introducing the Enterprise Ontology [24]. This work was undertaken by the Artificial Intelligence Applications Institute at The University of Edinburgh and its collaborative partners during the Enterprise Project, with the goal of creating a collection of terms and definitions relevant to business enterprises<sup>2</sup>. Since its publication, the ontology has become widely accepted as a useful ontology of generic business activities. Recognising that many of these activities are common

<sup>&</sup>lt;sup>2</sup> Both John Fraser and Ann Macintosh were then members of AIAI and were part of the Enterprise project core team.

with public authorities, we have saved ourselves time and effort by building the egovernment service ontology around it.

The Enterprise Ontology defines concepts within four broad categories: activity, organisation, strategy and marketing; it also imports a standard ontology of time. All of the concepts formally defined within the Enterprise Ontology are listed in Table 1. They are fully defined in [24]. Those that we have used in the definitions in the e-government service ontology are shown in *italics*.

#### Activity

Activity, Activity Specification, Execute, Executed Activity Specification, T-Begin, T-End, Pre-Condition, Effect, Doer, Sub-Activity, Authority, Activity Owner, Event, Plan, Sub-Plan, Planning, Process Specification, Resource, Resource Allocation, Resource Substitute, Capability, Skill

#### Organisation

Person, Machine, Corporation, Partnership, Partner, Legal Entity, Organisational Unit, Manage, Delegate, Management Link, Legal Ownership, Non-Legal Ownership, Ownership, Owner, Asset, Stakeholder, Employment Contract, Share, Shareholder

#### Strategy

*Purpose, Hold Purpose, Intended Purpose*, Purpose-Holder, Strategic Purpose, Objective, Vision, Mission, Goal, Help Achieve, Strategy, Strategic Planning, Strategic Action, Decision, Assumption, Critical Assumption, Non-Critical Assumption, Influence Factor, Critical Influence Factor, Non-Critical Influence Factor, Critical Success Factor, *Risk* 

#### Marketing

Actual Customer, Potential Customer, Customer, Sale, Potential Sale, For Sale, Sale Offer, Vendor, Reseller, Product, Asking Price, Sale Price, Market, Need, Market Need, Segmentation Variable, Market Segment, Market Research, Brand, Image, Feature, Promotion, Competitor

#### Time

Time Line, *Time Interval*, Time Point

#### Table 1: Overview of the Enterprise Ontology

For our purposes the Enterprise Ontology concepts in the first three categories are very relevant and we make extensive use of some of them within our definitions of terms. In the fourth category, marketing and selling are not activities typically undertaken by a public authority and there are not usually any competitors. However, there exist many similarities between, for example, a SALE and provision of a SERVICE, and with a degree of consideration and slight alteration of their definitions many of these concepts can still be used.

While the purpose of an ontology is to produce a common understanding of a domain that can be shared, it cannot exist in isolation from the real world and certain

terms and concepts are required to be assumed in order to define the Ontology itself. This is the role of the meta ontology presented in the next Section.

#### 4.2.2 The meta ontology

The meta ontology provides the basic building blocks that we use to construct the ontology. These are primitives that we define outside the context of the ontology and for the purposes of the ontology are assumed to have no other meaning than the ones we assign to them. As we are basing our ontology upon the Enterprise Ontology, the Enterprise meta ontology is the most reasonable starting point for our own meta ontology. The terms used in the Enterprise meta ontology are given in Table 2, and defined both formally and informally in [24].

Entity	a fundamental thing in the domain being modelled
Relationship	the way that two or more Entities can be associated with each other
Role	the way in which an Entity participates in a Relationship
Attribute	a Relationship between two Entities (the "attributed entity" and the "value" entity) in which, within the scope of the model, for any particular attributed Entity, the Relationship may exist with only one value Entity
State of Affairs	a situation; it consists of a set of Relationships between particular Entities; it can be said to hold, or be true (and conversely to not hold and be false)
Achieve	the realisation of a State of Affairs, <i>i.e.</i> being made true
Actor Role	a kind of Role in a Relationship whereby the playing of the Role entails some notion of doing or cognition
Actor	an Entity that actually plays an Actor Role in a Relationship

#### Table 2: The Enterprise Meta Ontology

We have found that there is a number of other fundamental concepts whose definitions we need to take as given, and cannot be defined in terms of other concepts. These are: *perceive*, *will*, *can*, *right*, *desire*, *true*, *false*, *equal*, *increase*, *decrease*, *agree*, *similar*, *same*, *different*, *hold* (*have*), *must*, *required*, *legislation*, *expected*, *actual*.

#### 4.2.3 Developing the e-Government Services Ontology

Much work has been done in the development and refinement of methods for creating ontologies, such as the DECOR approach of [25] and the PROMOTE method of [26]. All use a broadly similar strategy of gathering information from domain experts, then undergoing an iterative process of defining and structuring

concepts with repeated reference to the domain experts. This was also our approach.

The steps we have undertaken in the development of the ontology are as follows.

**a.** Gathering the data – this involved a variety of approaches designed to elicit information from as many sources of 'expertise' as were available.

- Interviews as part of the definition of the user requirements for SmartGov a number of interviews were conducted with staff of the Public Authorities (CEC and GSIS in Athens) and this provided a good distillation of much of the domain knowledge. In addition, the CEC had also conducted a major programme of structured staff interviews as part of an analysis of their organisation, and 59 of these were made available to us. These provided a useful corpus of documents to analyse.
- Analysis of Web documents the world wide web is an increasingly popular outlet for disseminating results and provides ready access to sources of information not readily obtainable elsewhere. Much work is currently being done by other public authorities and this should not be ignored. In particular a consortium of 5 public authorities within the UK taking a Life Events focused approach devised a list (CUPID) of some 500 processes undertaken within a UK public authority in [27]. Through manual inspection of these processes we observed that they seem to fall naturally within one of 5 high level types including APPLY and INFORM, and 10 subtypes such as SERVICE and TAX. These all became concepts within the ontology.
- Word frequency counts of written documents the size of the corpus of documents we acquired from the CEC interviews was too large for us to read thoroughly within the timescales of the project so we resorted to an automatic approach, counting word frequencies. The modelling tool we are using for constructing the ontology, called Kaon (available at http://kaon.semanticweb.org/), has a frequency counting function that incorporates a simple natural language engine enabling it to filter out and ignore common parts of speech such as determiners (the, a, etc.) and gave us a comprehensive list of terms of which ones whose counts were over 150 were deemed most relevant. This gave us 164 terms as a starting point. Many of them were variations in the same root, but it was important to retain them initially, because many, such as RESPONSE and RESPONSIBILITY, though derived from the same root, have very different semantics.
- Workshops we have described these in section 3 of this document. They provided a useful source of information.

**b.** Defining the concepts – the terms we extracted by the various means formed the initial set of concepts. Through thorough examination of them by members of the project team, these were pruned of terms that had very similar or the same semantics, and the remaining set were defined solely in terms of the meta ontology and the other fundamental terms in 4.2.2. This resulted in the initial ontology.

**c.** Structuring the ontology – an ontology as a list of defined terms in itself is not particularly useful. The next stage is to relate the concepts to each other in some form of hierarchical model. In addition to providing an improved visualisation of the

relationships present it also allows one to see inconsistencies, redundancies and any omissions from the definitions that we may need. As mentioned earlier we are using the Kaon modelling tool to develop this.

**d. Refer back to the experts** – in order to assure that our model is a fair and accurate representation of the world it is attempting to describe, and that it is useful in its desired role as providing a common understanding of the domain in question, we made frequent reference back to the domain experts through regular meetings.

To create the best possible ontology steps **b**, **c** and **d** have been iterated through a number of times.

### 4.3 The ontology

**Appendix 4** describes the e-Government Services Ontology in detail. First, there are lists of the terms deemed as fundamental, then the ontology terms are shown according to their particular types: Relationships, Entities, State of Affairs, Roles and Attributes respectively. Note that the word Role is used here in a rather technical way. It is the way in which an Entity participates in a Relationship; it defines the part played by an Entity in a Relationship.

## 5 The Overall Framework

### 5.1 Objective

With the search for general principles in mind, we have worked towards describing a general framework for e-government services.

We have addressed three areas in particular:

- processes for e-service delivery
- models of co-operation
- issues in acceptance of e-services

#### 5.2 Candidates

We have explored two generic approaches with a view to the possibility of presenting our framework in terms of them:

- the Viable System Model of Stafford Beer [28]
- the Zachman framework [5], or variations of it.

#### 5.2.1 Viable System Model

This describes a generic model — in effect itself a framework — for systems of all kinds — biological, economic, social, organisational — that are able to maintain a separate existence. So it could be used to model a public authority, one of its departments or indeed a society that is serviced by a public authority.

The power of the viable system model is that any viable system can be described by having five subsystems, each of which plays a particular role in the system. In turn each of the subsystems can be a viable system in its own right, with its own five subsystems. This encourages a holistic approach and "zoom control" as we described in 1.9.

A viable system model always relates to a purpose: an aspect that we found attractive because of the importance that we attach in section 8 to the common purpose of co-operative activities.

Once one has mastered the principles of the viable system model, one can describe, understand and re-design a system for a particular purpose. Ideally, one then has some degree of confidence in the anticipated effects of re-design.

Since design of services is a fundamental focus of the SmartGov project, this also suggests the potential value of the viable system model.

However, the complexity of the model, and the long learning curve required to master it, make it an unrealistic choice for a framework such as this, which we are intending to be usable and accessible to a wide range of public authority staff without specialist knowledge.

Those interested in learning about the Viable System Model should consult [29] for an excellent introduction.

#### 5.2.2 Zachman framework

We have already introduced the Zachman framework in 2.2.1 above. We believe that it provides an excellent generic backdrop against which to describe an enterprise, communicate what is known and unknown, and build working information systems.

However, we feel that it provides an engineering-oriented view of an enterprise and we are afraid that it encourages a reductionist approach. Taking a socio-technical approach, the most useful models to build would encompass several cells in the Zachman framework, cutting across both perspectives and "models" (a term that we prefer to replace with "guides").

In contrast, our intention with our e-government services framework is not to compartmentalise, but to encompass. It is in this spirit that we have derived the framework that follows.



5.3 The framework

#### Figure 5: a model of government services

Figure 5 shows a general view of government services. It is based on the premises that:

- public services **meet the needs** of citizens and businesses
- public authorities **co-operate** with the public and private sectors to jointly deliver services

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- services are constrained by legislation and resources
- **better services** are the result of **monitoring** both the **quality** of services and the **satisfaction** in services
- the monitoring of **costs** and **benefits** is a key part of the **affordability** and **sustainability** of e-service projects

With reference to the e-government services ontology of section 4, the key concepts in the framework are defined as follows:

service:	an agreement, possibly tacit, between a public authority and customers for the public authority to provide resource(s) with the purpose of meeting a need
citizen:	a person to whom a public authority is accountable
business:	(as the Enterprise definition of <i>corporation</i> ) a group of persons recognised in law as having existence, rights and duties distinct from those of the individual persons who from time to time comprise the group
need:	a relationship between a legal entity and a state of affairs that is the difference between the true state of affairs and a defined standard state of affairs
legislation:	an enacted law or group of laws
organisation:	(as the Enterprise definition of <i>corporation</i> given above)
public authority:	a legal entity that has responsibility for public activities
resource:	(as the Enterprise definition of <i>resource</i> ) the role of an entity in a relationship with an activity whereby the entity is or can be used or consumed during the performance of the activity
strategy:	(as the Enterprise definition of <i>strategy</i> ) a time-based plan to achieve a set of purposes
policy:	a high-level purpose and the principles by which it is to be achieved $% \left( {{{\left[ {{{\left[ {{{\left[ {{{c}} \right]}} \right]_{{{\rm{c}}}}}} \right]}_{{{\rm{c}}}}}} \right)$
quality:	measurements relating to the actual effects of an activity and the expected effects
satisfaction:	a relationship between a legal entity and a state of affairs in which the legal entity perceives the state of affairs to be acceptable
monitor:	an activity in which a legal entity uses a performance-measure to improve
cost:	a decrease in a resource
benefit:	an increase in some attribute that is held by a legal entity to have value





Figure 6: the direct impact of electronic services

In Figure 6 we show, in the shaded box, those areas where making services "e" has the most direct impact. We elaborate on this in section 7 below. In sections 8 and 9, our sociotechnical approach expands this, taking us to all parts of the model, including those outside the shaded area. First we explore the main roles played in e-services.
# 6 Roles in e-services

Earlier in the SmartGov project, the consortium had identified these roles in the design, development, delivery and maintenance of e-government services:

- managers
- domain experts
- IT staff
- service workers
- end users

In our e-government services ontology we define a Role in the same way as in the Enterprise ontology, *i.e.* as the part played by a legal entity in a relationship. Our definitions in the ontology of these roles are necessarily general:

**MANAGER:** a role in which an actor manages

**DOMAIN EXPERT:** a role in which a person knows more than most other people about a domain

IT STAFF: staff with responsibility for IT

SERVICE WORKER: a person who executes an activity specification of a service

**END USER:** a role in which a legal entity receives an e-service

For those engaging in the design and delivery of e-services, these general definitions do not explain fully what the roles entail. Below we give fuller definitions.

### 6.1 Managers

The managers are responsible for organising and supervising public services. They make decisions about the implementation of new services or the alteration of existing ones. In order to accomplish this task, they need to have a strategic view of the provision of services. They should be able to define high-level managerial statistics and metrics. These metrics will combine both quantitative and qualitative assessments, and they could be, for example, the number of citizens that access the service, the use ratio of specific elements of a form, error percentage, performance indexes and so on. This information is necessary to evaluate the acceptance of the service by the public, its usefulness and effectiveness, the common errors during its development and operation, possible complaints by the public and to measure its impact and benefits. By taking all these into consideration, managers are able to decide about future changes in the service or the creation of a new one. Usually, there is more than one manager, in the same public authority, who wishes to have access to the same data and statistics.

### 6.2 Domain experts

The domain experts possess the necessary background knowledge for the design and the implementation of a public service. This knowledge includes the legislation that a service is based on, that is laws, processes, directives, prerequisites and so on. Domain experts play a consultative role to the managers for the design, evaluation and possible alterations of public services. To this end, they need to define and obtain statistics and metrics of similar kind to those of the managers. They design the interface of the service and the structure of the form, which is what service users will fill in. They attach their knowledge about legislation, supporting procedures or required documents to the form elements. They define validation checks, which are not limited to data type constraints, but also include inter–element relations that should be satisfied within the form or even relations that should hold between different forms. Finally, domain experts provide end users with accompanying manuals, instructions and sets of examples, to help them use the service. It is possible that more than one domain expert works for the implementation of the same service.

During the development of an e-service, the domain experts may have to collaborate with the IT staff to communicate to them their domain knowledge. Collaboration has to take place when the tasks to be performed require higher technical skills than the domain experts possess, and when the links to the installed IT systems or third party systems have to be established.

### 6.3 IT staff

The IT Staff possess the necessary technological knowledge for the development of an electronic public service. They design the system from scratch, defining system architecture, database schema, user interface and functionality. They also provide the necessary interfaces for data exchange between the electronic service platform and the back-end systems. During the life cycle of the service they have to collaborate with the domain experts to integrate the domain knowledge, which is of vital importance, to the application. At the same time they play a consultative role to the managers and the domain experts with respect to the technological aspects of the e-service. In addition, they need to define and obtain technical level statistics and metrics to acquire valuable insight about the efficiency of the system. Furthermore, they are responsible of the maintenance of the e-service. They have to handle omissions and problems that may occur in the electronic services, which could be for example programming errors, alterations caused by changes of the supporting legislation, modifications suggested by the managers or the domain experts.

They are also responsible for the management of user accounts, the integrity of the data (back up functions *etc.*), providing to support the users of the e–service and for the security of the system, though some of these tasks may be handled by suitably trained Service Workers.

### 6.4 Service workers

The Service Workers encompasses all of the public authority staff involved in the day to day running of the service. They are the ones who operate the SmartGov platform and process the data it collects from the users for the provision of the service.

Under the supervision of the managers the service workers may make small modifications to the online content as becomes necessary. One of their tasks will also be the specification of log files - which contribute not only to the accountability and the non-repudiation but also to the observation of the of system performance and the production of qualitative measurements such as system usability, identification of common errors made by the users. They will be responsible for the collection and maintenance of the SmartGov statistics that the managers will use to analyse performance.

### 6.5 End user

The end users are the citizens or enterprises that make use of the service. Currently, their physical presence in the public authorities is required in order to make use of the provided service and they often have to meet various prerequisites, such as documents, certificates etc. for bureaucratic reasons. Sometimes they have to visit the public authority more than once in order to obtain what they need. This is a time consuming process, and especially difficult for people with special needs, those who work full-time, and the elderly. They often do not have any technical skills.

# 7 **Processes for e-service delivery**

Public authorities are very different to commercial enterprises and as such pose an interesting challenge for developers of smart online services. In providing ecommerce services, organisations are providing services to their specific customers whereas government services are for the public at large. A public authority cannot choose its customers but rather has a duty to ensure full access to all services by everyone. E-commerce services are typically focussed around single events, *e.g.* buying a car, or opening a bank account, where buyers and suppliers work in an environment that is open to competition. E-government services are much wider, encompassing a range of events, services and political processes that are by their nature open to contention.

Given this there will be constraints on the deployment of e-services within a public authority that do not exist in the commercial sector, and thus, as an e-service is underpinned by one or more processes, they too will be constrained. Undoubtedly the most important consideration is that the public authority has a duty to provide full access to its services by all of its citizens, and thus as not all citizens will necessarily have access to online facilities (or even if they do some may still prefer not to take advantage of them), electronic services will need to operate in tandem with more traditional service delivery approaches and this has to be a consideration.



Figure 7: Impact on e-service delivery

In consideration of processes for electronic service delivery we return to the Figure of section 5.3, which is reproduced again in Figure 7. In the earlier sections, it was observed that all of the elements within the shaded region either impacted on or were impacted by electronic service delivery but with little reference being made to the details. In this section, we shall seek to unpack this. First, we note that there are two key aspects

- a. The processes involved with setting up, operating and maintaining a process the e-service's lifecycle.
- b. The context in which the processes are managed.

## 7.1 The e-service lifecycle

This section outlines all of the important stages in the e-service lifecycle. At the top level these stages can be categorised by the following:

- 1. Identify Service
- 2. Feasibility Study
- 3. Prepare Business Case
- 4. Implement
- 5. Deploy
- 6. Operate
- 7. Monitor and Improve
- 8. Discontinue

We begin with the identification of a service in 7.1.1 and describe all of the stages through to the discontinuation of the service in 7.1.8. Finally we relate these stages to the 5 roles of section 6.

### 7.1.1 Identify service

Much work has already been done in identification of services in Public Authorities, and initiatives that have set out to do this exist across the world. An example in the UK is the Life Events Access Project  $(LEAP)^3$ , which has come up with a set of processes called the CUPID list [27].

Unlike the commercial sector, probably the most important source for the identification of a service in a public authority is through legislation. By this method, the central government decides that there is a need for a particular online service and amends legislation to make the public authority accountable for its provision in their region of responsibility. The role of the public authority in this instance is thus to take note of the changes and action them.

In the current climate of public authorities with many established services provided through conventional non-electronic channels but a relatively undeveloped electronic delivery strategy, the major challenge is to provide an online flavour to these already

<sup>&</sup>lt;sup>3</sup> the LEAP project is an initiative involving 5 UK Councils. Full details of the project are available online at <u>http://www.leap.gov.uk</u>.

existing services. A naive approach to doing this might be to simply create some electronic forms analogous to the existing paper-based approach and place them on the public authority's website. While straightforward to implement, the citizen is unlikely to perceive any real value in accessing the service this way – especially if the total extent of the online content is a set of documents that need to be printed off and completed by hand – and the uptake is likely to be poor. A better strategy is to consider a more holistic approach and ask how can the delivery channel be most effectively utilised in the provision of the service? This probably will require analysis and re-engineering of existing and related processes, possible investment in back-office infrastructure, and consideration of the impact on other related services. Such activities may take time and have cost, but the importance of doing them cannot be understated – many have failed or have been significantly compromised due to failure to complete an effective analysis.

Before moving on to the feasibility Section it is worth noting that identification of a eservice may also arise through the discretion of managers responsible for provision of a particular service or services.

## 7.1.2 Feasibility study

The feasibility study is intended to provide an initial investigation as to the viability of an e-service. It should not be too detailed or long-running, but serve to filter out impractical projects before any great resources are expended. Useful questions to consider at this stage might include:

- Cost are there resources available? is it likely to provide good value? and some element of risk assessment of the accuracy of the cost estimate and chances of it growing much larger during the course of the project?
- Impact on existing business processes will it work alongside existing processes or is re-engineering required? which processes need to interact with it? do they require any special consideration? will other processes need modification?
- Timescales what is the likely time period required for the project? can a more longer-term approach be adopted or are the needs more immediate?
- Appropriate/adequate technology available does the technology to do the job exist? for IT projects does the public authority have the necessary IT infrastructure, hardware and/or software platform on which to deploy the project? is it viable to upgrade any part if this is needed?

The feasibility study provides opportunity to experiment with a variety of high-level concepts and alternatives at minimal cost, so as to provide an informed background for any proposals that may later be tabled.

### 7.1.3 Prepare business case

Assuming the feasibility study is favourable, the next stage is to prepare a more detailed plan for the project, which is often termed a 'Business Case'. The role of a business case is a proposal for the project to internal management. Such a document should contain estimates of cost, resources required, timescale and some analysis of the impact on the business in addition to justification of the perceived value that the project may have.

Here though, the boundary between a traditional project proposal and business process analysis is perhaps a little artificial, as an effective business case would ordinarily require a degree of business process analysis in order to answer the key questions of justification and impact. However it may not always be efficient or appropriate to do too in-depth an analysis at this stage.

There are many modelling paradigms that have found wide-spread acceptance which could be used at this stage, such as [30], [31], and for solutions that may require software code there are languages such as UML that support the whole process from preliminary modelling of the business processes to the generation of actual code. Many commercial tools exist on the market that use a variety of these paradigms. A popular UML tool is Rational Rose [32].

The advantage of using such tools or modelling frameworks is that modelling of the business can be undertaken at a level sufficient to justify to managers – whose knowledge is necessarily fairly high-level – to commit resources for the project, but then when more detailed modelling is required at the specifications stage all of the previous effort can be readily re-used.

### 7.1.4 Implement

Current wisdom – especially in the field of software engineering [33] – is that rather than taking a sequential approach to implementation during which a complete and detailed formal specification is drawn up at the start and the different steps are worked through in turn resulting in a product at the end, an iterative approach is preferred.

Essentially the iterative approach has all of the same components as the traditional sequential method commencing with a stage of business process analysis and drawing up of specifications, but the latter may only be fairly high level initially, with more flesh added in subsequent cycles. At each new iteration there is opportunity to engage with the customer to ensure that all of their requirements are being met and is advantageous, as often some of the specifications do not really become evident until things have started to take shape.

The iterative approach does introduce some extra overhead in that there needs to be strict monitoring of progress and management of the sweeps through each iteration, however empirical studies suggest if this is done effectively the project is likely to be more successful. It is also desirable to use tools and processes that will support an incremental approach in which items can be easily added during later stages, rather than being too rigid. There are now a number of tools and methodologies available which support this approach, including the Rational Unified Process (RUP) [32].

### 7.1.4.1 Model business processes

The first major stage of any implementation is to model existing business processes. As has been already stated it may be desirable to undertake some elements of this (albeit at a higher level of abstraction) during the Business Case stage, so care should be taken to employ an appropriate method or tool so that any earlier work can be used as a foundation to the more detailed modelling.

There are many frameworks that can be used for the modelling of business processes. Among them is BPML [31] which is a meta language for describing

business processes, the Zachman framework [5] presents a matrix formulism that can be used to classify different aspects of the business processes, and IDEF [30] uses a diagrammatic approach.

Commercial tools exist to facilitate Business Process Modelling. Two of the major operators in this market are Casewise (<u>http://www.casewise.com/</u>), and Rational (<u>http://www.rational.com/</u>). Casewise is specifically designed for business process modelling, whereas Rational products support varying aspects of RUP and are useful for progressing beyond the modelling to drawing up specifications, and managing the later phases of a project. With this approach one might initially draw up use-case diagrams of existing business processes, such as in Figure 8. These pictorially describe different scenarios of use that 'actors' (people or machines) make of the system.



#### Figure 8: Example of a business use-case diagram

These then give the context, and can be used as the basis for the project specific use-case modelling in the specifications stage, next.

### 7.1.4.2 Produce Detailed Specifications

The detailed specifications define the functionality of the service to be developed. In the UML approach these are initially done through use-case diagrams. The advantages of this approach are that it enables technical and non-technical people to

come together and discuss the service specifications in a way that is intuitive, allowing technical staff, managers and even citizens (if desired) to help define it. An example of a use-case diagram for a stores management system is shown in the Figure.



Figure 9: Example use case diagram for a stores system

To complement the use cases, sequence and state-chart diagrams may also be drawn to describe specific sequences of events or states the system goes through under certain conditions in more detail.

Very often these UML diagrams will form the contract between a supplier and customer for the project. It is important to realise though that the specifications should not necessarily state things down to the very fine details, but merely provide the requirements of the core behaviours of the system to be built. The finer details will be honed in consultation through the iterative development process next.

### 7.1.4.3 Develop Components

The development phase will be incremental through the RUP or similar approach. Initially effort will be focused on the most important aspects of functionality and solving any major technical obstacles that could endanger the project. The first iteration may be little more than a simple prototype demonstrating the feasibility of the chosen approach, it all depends on the difficulty and complexity of the project. For larger projects different components may be developed by separate groups – for example there might be separate database and front end authoring teams.

There are many best-practice guidelines available for implementation of online services. The UK government has provided two useful guides for Public Authorities to assist in creation of XML [34] and building websites [9].

For the SmartGov platform this will consist of developing Transaction Service Elements (TSEs), Knowledge Units (KUs) and ultimately linking them all together under a Transaction Service (TS). For full details please consult D51-61 [35] available on the project website at <u>http://www.smartgov-project.org</u>.

### 7.1.4.4 Integrate Components

Larger projects may involve integration of components developed by separate teams. The key to success is to formally define the interfaces between the components at an early stage and adhere to them. If this is done well initially, problems arising later through incompatibilities between components will be kept to a minimum.

### 7.1.4.5 Test and Evaluate

At the end of each iteration should come a test and evaluation stage. This enables monitoring of the progress made and allows any omissions or weaker areas of the project to come to light while there is still opportunity to address them. This is an essential activity in the management of any project, and performed well can be highly instrumental in keeping the project on track.

At the end of the development stage there should be a full test of the complete working solution. If this can be done as a small-scale pilot with real users of the system then this could greatly help the identification of any issues that may not have been apparent to either the developers or the manager instigating the project.

### 7.1.5 Deploy

Too many projects have floundered in the past not because of the technology, but due to a failure to bring the staff on board. Important aspects to consider are:

- 1. Keep staff informed this is a pre-requisite, as a failure to do so could lead to a sentiment among staff that changes are being steam-rollered in behind their backs, and consequently create a hostility towards it. This is especially true if there becomes a perception that jobs are at risk.
- 2. Give adequate training without adequate training it is unlikely that the service will operate to its full potential. This could as a result lead to frustration amongst users and staff alike. At its most extreme, staff with little understanding of the system may fail to appreciate any value it may offer, consequently it falls into disuse, and ultimately fails. A little staff training also sends signals that staff are deemed important enough to be invested in, and is excellent for general morale.
- 3. Provide opportunity for feedback this not only allows for constructive input from those who actually operate the system on the ground and thus improve the quality of the service offered, but gives staff opportunity to feel involved, greatly

term acceptance by staff.

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increasing the chances that staff will buy-into the system, and securing its long-

Paying attention to these in addition to the normal logistics and practicalities of rolling out the full working system will maximise the likelihood of success. A popular term for these activities in the current literature is change management. For a useful publication relating these issues to the specific arena of public authorities consult [36].

### 7.1.6 Operate

Operation of the service will clearly involve processing of the transactions made by citizens. The level of involvement will depend on the service. For many services there will be scope for automating some of the basic checks and balances to verify customer details and eligibility, but inevitably there will be a point where human intervention is required (*e.g.* to make decisions on a claim).

In addition to the day to day running of the service (staffing and maintenance of IT components) public authorities are required to keep abreast of changes in legislation or government directives which may impact on the services provided. For many services this may be infrequent (annually or less often), but for some it may be monthly or even weekly. The managers have the responsibility for keeping abreast of the changes, but there will need to be procedures in place so that, should there be an item that requires modification of an online form or other part of the electronic provision of the service, this can be filtered down and quickly responded to by suitably trained staff.

### 7.1.7 Monitor and improve

It can be seen from Figure 7 that there are three aspects to monitoring an online service

- 1. Internal quality control
- 2. Feedback from customers
- 3. Costs and benefits

Internal quality control is done in-house through comparing the operation of the service against a set of pre-defined performance measures. It is important to consider carefully the nature of these measures so that they facilitate collection of data most relevant to the service in question. For example for a service that is likely to be high volume the number and highest rate of transactions are important for verifying that the servers (computers) can cope, whereas for low volume services this is unlikely to be useful.

Some useful metrics to consider include time spent filling out a form, average number of mistakes, percentage of applicants who gave up before completing the form and some indication of the point reached and time spent before this occurred. In addition things such as volume of the online service, hits on the website and locations accessed provide useful indicators as to how well used an online service is and what kinds of use are made.

In ascertaining feedback from customers the web provides a very easy channel. The immediately obvious (and widely used) mechanisms for feedback that this facilitates are email – through a 'mailto' link on a web page – or explicitly defined feedback forms. However it should be noted that even if they are proficient in the technology and happy to use online services, some citizens may still prefer to communicate directly with a human when they encounter a difficulty or formally in the case of a grievance, so phone and address details should be made readily available on the website. For a more in-depth discussion of the issues of online feedback mechanisms see [37].

Public authorities have a duty to ensure the most benefit possible to citizens and businesses. However, they have limited resources at their disposal and also have a duty to citizens and business to use their resources wisely. For e-services to be affordable and sustainable, public authorities need to identify clear ownership early in the project and assign responsibility for monitoring of the expected benefits.

### 7.1.8 Discontinue

Finally when an e-service comes to the end of its useful life it must be discontinued. There may be a variety of reasons for this, including:

- 1. Funds no longer available
- 2. Need no longer there
- 3. Changes in legislation

Whatever the reason, discontinuation will at the very least require removal of associated forms from the web servers in order to physically disable it, however there may be an impact on what happens to the items created for and by the operation of the service.

Most crucial of these is the customer data generated. For a whole host of reasons it is likely that there will be a wish to retain the data. In this instance it is important to make reference to the Data Protection Act ([38], [39]) to ensure that the rights of the citizen are not breached.

If the service is being discontinued because there are no longer any funds available to support it, it is worth considering whether this is a temporary or permanent arrangement, or whether some other agency may be able to carry on the service.

The need no longer being there could arise in the case of disaster relief or some other instance to provide a short–term service at a local level.

Changes in legislation could include an overhaul of tax or benefit regulations, which could result in some services becoming obsolete. However, commonly one service becoming obsolete may well be replaced by something similar but operating under different conditions, and in all instances of a service being discontinued it is worth considering what elements of the transaction service could be ported as templates for future services of a similar type.

For the SmartGov platform consider also how any knowledge that has been accrued through the creation and deployment of the service could be applied and used to enhance other existing services.

### 7.1.9 Relationship between the actor roles and e-service lifecycle

We now relate the 8 stages of the e-service lifecycle to the 5 actor roles described in Section 6. This is shown diagrammatically in Figure 10.

It will be apparent that many of the stages in the e-service lifecycle are likely to have multiple actor roles associated with them – for instance Managers, Domain Experts and IT staff are all likely to provide input to the feasibility study. In the Figure we have chosen to illustrate only the role that has primary responsibility for each stage.

In this representation it can be seen that it is the IT staff who are considered to have the main role in implementation and deployment of an e-service platform, and this has been very much the traditional approach to e-services. However this forces a significant part of the workload to be channelled through a relatively small number of people and creates a bottleneck. Furthermore with IT staff generally not being Domain Experts they may not have the knowledge to create the most effective eservice for the given domain.



Figure 10: Participation of the different roles in the e-service lifecycle

The SmartGov Platform attempts to address this by placing much of the implementation load in the hands of the Domain Experts (and the Service Workers), leaving only the specialist implementation tasks for IT staff. This should result in the creation of a more effective e-service, and a smaller IT bottleneck.

### 7.2 The context of e-service processes

The previous Section sought to outline the stages and processes involved in an eservice's lifecycle describing actions that needed to be performed and considered some of the issues. We now take a systemic approach and consider the context in

which a service resides and the factors that impact upon it. To do this we return to Figure 7 and examine each of the boxes in the shaded region. These are the factors identified as having a direct impact on an e-service.

### 7.2.1 Legislation

In the model we have presented, the requirements for a service are initially generated by needs that a citizen or business within the public authority's area of responsibility may have. In an ideal world the need might go direct to the public authority who then attempts to satisfy it through creation of an appropriate service. However, in a real world of finite resources and other considerations the path is not straightforward. Generally what happens is that the needs reach the ears of politicians, who act as a filter, and during the course of time some will become legislation or government policy, and it is this that feeds into the public authority. We are not concerned here with the details of the political processes so have shown the link between needs and legislation as a simple causal relation.

In addition to the legislation and government directives that may dictate the services that can be provided by a public authority, attention should also be paid to general legislation pertaining to digital technologies (such as the internet), and the personal rights of the citizen. Probably one of the most important pieces of legislation to consider in this respect are data protection acts such as those operating in the UK [38] and the European Union [39].

### 7.2.2 Policy and strategy

The legislative and other sources of input from the political arena go into the melting pot within the public authority, along with other considerations such as local issues/needs, and from it all the public authority develops a policy.

The policy gives the core objectives and areas of priority, without explicitly specifying how they are to be achieved. It is in a way a kind of mission statement for the public authorities. It may state the principles against which the objectives are to be achieved.

In the UK, one example of policy for public authorities is digital inclusion, in which it has been observed that there is a danger that IT illiterate and poorer people could get left behind in the march toward digitalisation of services.

Policy in turn must lead to the creation of a strategy, which is a plan for how to achieve the policy objectives.

At the European level there are already policies and initiatives in place concerning the development and deployment of e-services. See for instance [40].

### 7.2.3 Resources

Resources is used here as an umbrella term for all things that can be utilised in order to deploy a service. They include consumables such as finances and equipment, as well as things that are not consumed such as information. (See the ontology in Section 4.3, and the Enterprise Ontology [24] on which our definition is based.)

The primary resource is of course finance – as this usually can be used to acquire other resources – and, while originating from citizens and businesses, will come through one of two channels:

- 1. Directly from citizens this will be through local taxes (such as Council Tax in the UK), and through payment for services such as leisure facilities.
- 2. Indirectly (from central government) these will be funds the central government receives from citizens and then passes down to public authorities as it chooses. Most notable of these is income tax.

Other resources that will be important for e-service provision will include IT equipment and staff. With products like SmartGov, it is hoped that the reliance on IT staff will become less. This means that resources can be saved as domain experts can concentrate on what they know and are good at.

Other service providers – such as voluntary sector and charitable organisations – may also play a part.

One important resource that is frequently neglected is staff training. Adequate staff training can play a big role in delivering a quality service, not only increasing competence, but also the investment in people can be a real boost to staff morale.

### 7.2.4 Monitoring the service

An important activity in effective service delivery is monitoring. This provides the vital feedback to ascertain whether the service is working effectively and take action if necessary. There are two sources of monitoring to consider. We have named them

- 1. Assessing Quality
- 2. Assessing Satisfaction

These are basically the feedback paths, internally within the public authority, and externally from the citizens and businesses who may interact with the service(s).

### 7.2.4.1 Assessing quality

Assessing quality is done in-house through comparing the operation of the service against a set of pre-defined performance measures. It is important to consider carefully the nature of these measures so that they facilitate collection of data most relevant to the service in question. For example for a service that is likely to be high volume the number and highest rate of transactions are important for verifying that the servers can cope, whereas for low volume services this is unlikely to be useful.

It has two components to it; there is off-line quality control and on-line quality control. The off-line quality control encompasses things such as the design and layout of the e-service delivered and will initially have been considered during the implementation phase of the service. However, over time design philosophies and agreed best practices will change, and these should be periodically reviewed and used to benchmark the service – especially if the e-service delivered has been long-running. There are many best-practice guidelines available for implementation of online services. For example the UK government has provided two useful guides for public authorities to assist in creation of XML [34] and building websites [9].

The on-line quality control relates to the performance of the e-service analysing data that is collected (in real-time). As we noted in 7.1.7, some useful metrics to consider include time spent filling out a form, average number of mistakes, percentage of applicants who gave up before completing the form and some indication of the point reached and time spent before this occurred. In addition things such as volume of the online service, hits on the website and locations accessed provide useful indicators as to how well used an online service is and what kinds of use are made.

Locations accessed has implications for the design/layout of the e-service website so it can be seen that off-line and on-line activities may often be related, and the distinction is sometimes perhaps a little artificial.

### 7.2.4.2 Assessing satisfaction

In ascertaining satisfaction of the customers, the web provides a very easy channel. Again, as we noted in 7.1.7, the immediately obvious (and widely used) mechanisms for feedback that this facilitates are email – through a 'mailto' link on a web page – or explicitly defined feedback forms. However it should be noted that even if they are proficient in the technology and happy to use online services, some citizens may still prefer to communicate directly with a human when they encounter a difficulty or formally in the case of a grievance, so phone and address details should be made readily available on the website. For a more in-depth discussion of the issues of online feedback mechanisms see [37].

However the feedback is obtained it is then important to act upon it, and for this to be effective there needs to be strategies in place. One method commonly adopted is to set targets for response times to an enquiry which may vary according to the communication method, but this is insufficient for full assessment of satisfaction as unless the feedback is seen to have been enacted upon prolonged customer satisfaction is unlikely.

### 7.2.5 Extra value services

In addition to simply being another medium through which a public authority provides a core set of services, there is scope for an e-service delivery platform to provide additional supporting services that may not be feasible through other means. These we have coined as Extra Value Services as they add value to the services a public authority already provides.

Services that may fall into this category include

- 1. Retrieval of up to date information by a citizen
- 2. Instant feedback or monitoring the status of their application by a citizen

With suitable forethought at the early stages of designing an e-service, many of these extra value services can be built in with little or negligible extra effort and could do a great deal to improve a citizen's trust and confidence in a public authority through facilitating more transparency in their dealings with the citizen.

There are also ways that e-service provision might simply add value to a citizen's interaction with a public authority. The obvious example of this is that services may provide convenience and ease of access to services by some customers who may

for example by working full-time and therefore are unable to deal with the public authority during office hours, but can do so out of hours from their home PC.

### 7.3 Guidelines for processes in e-service delivery

We conclude this Section with some guidelines for those interested in e-service delivery in Public Authorities. They come in two parts:

- 1. Guidelines for the e-service lifecycle
- 2. Guidelines for taking account the context of the e-service

### 7.3.1 The e-service lifecycle

The key stages in an e-service — 'e-service lifecycle' — are as follows:

- 1. Identify Service the key driving factor in choice of services is legislation. A number of sources have made attempts to document the diversity of services performed by public authorities. For an example consult [27].
- 2. Feasibility Study should consider cost, impact on existing business processes, timescales, and whether appropriate/adequate technology is available to implement the e-service.
- Prepare Business Case primarily intended as a justification to management as to why an e-service is required, it can be useful to adopt an approach that can be readily extended to produce the specifications. Useful processes to adopt that could assist in this task include [30-32].
- 4. Implement an iterative approach to implementation is generally deemed superior to sequential [33].
- Deploy the importance of communicating with staff is often underestimated in the deployment phase. Keeping staff informed, providing adequate training, and allowing opportunity for feedback will all greatly increase the chances of longterm success of a project.
- 6. Operate get the balance right between automation and the human touch. Put the processing in the hands of knowledgeable people when necessary.
- 7. Monitor and Improve both internal (from staff) and external feedback (from customers) should be periodically sought, and seen to be acted upon.
- 8. Discontinue impact on related services should be assessed before removing any components. There are also issues of archiving data accrued during operation of the service.

### 7.3.2 The context of e-services

The operation of an e-service within a public authority will be impacted upon by a number of factors. Important ones deserving consideration include:

- 1. Legislation particularly important is data protection [38, 39].
- 2. Policy and Strategy for within the European Union see [40].

- 3. Resources usually boils down to finance, but consider also how other (voluntary) agencies might be able to assist in delivery of an e-service.
- 4. Monitoring the Service:
  - a. Assessing Quality in-house comparison against specified performance measures
  - b. Assessing Satisfaction external feedback from users of an e-service, which can be conveniently achieved through online forms [37].
  - c. Weighing up costs and benefits allocating responsibility for assessing benefits and justifying the sustainability of services.
- 5. Extra Value Services are there ways in which the electronic medium might be utilised to provide functions that enhance a service at little or no extra cost?

# 8 Models of Co-operation

### 8.1 Introduction

In this section we aim to help people in public authorities to build fruitful relationships to help them to deliver e-government. They will do this by understanding the nature of existing and proposed co-operative relationships.

Developing e-transaction services requires the establishment of multi-disciplinary relationships. Such relationships are both a consequence of the re-designed e-service involving more agencies (internal and external) and also a consequence of the incorporation of the technology itself. When introducing the framework as a whole in 5.3 we indicated the various agents that need to co-operate and stated that:

- public authorities co-operate with other government organisations to jointly deliver services;
- public authorities co-operate in public private partnerships to jointly deliver services.

Although there may be many different co-operative structures, as we note in 8.5.2 below, the principles of co-operation remain the same, whether co-operation is inside an organisation or between organisations, whether co-operation is between "equal" partners or the partners are contributing in different ways and receiving different things.

After motivating the topic, we define co-operation as being based on common purpose. We explore the basic modes of co-operation and how they contribute to common purpose. Public authorities need to be clear what is the common purpose in any co-operative situation.

They also need to be clear about their own and their partners' justifications for cooperating, about some of the common roles and structures of co-operation, and some important issues relevant to co-operation in public authorities in an age of egovernment.

Note that, unlike our treatment of processes in section 7 above and acceptance of services in section 9 below, we do not pick out particular areas of our model of government services (first shown in section 5 and reproduced in Figure 11) in which co-operation applies. While it might be expected to be most relevant in service delivery, co-operation might occur in any of the activities in the framework, including:

- policy and strategy setting
- needs analysis
- resource management
- quality monitoring.

Indeed, co-operation in the activities listed in this list might be more prevalent in these days of electronic services than they were before.

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#### Figure 11: the e-government services framework

#### 8.1.1 Co-operation in e-Government

As we noted in 2.3.2, many co-operative relationships already exist in e-government. We repeat the quotation from [14] here:

Local authorities evidently see the benefits of working in partnership with other organisations to help them implement e-government and to meet the 2005 target for egovernment, no doubt as a way of gaining access to additional capacity, expertise and funds. Almost all (94%) local authorities have set up a partnership arrangement with organisations in the public, private or voluntary/community sectors in relation to egovernment.

... most e-government partnerships are with adjacent/different tier local authorities. It is, however, also common for local authorities to set up e-government partnerships with health local authorities/trusts, private sector technology suppliers and community/voluntary organisations. In summary, 61% of e-government partnerships are with the public sector, 20% are with the private organisations and 19% with community/voluntary sectors.

The Aix Declaration on e-Government was proclaimed at the 1st EGOV Conference, which took place in Aix-en-Provence in September 2002 [41]. It calls for "required breakthroughs in co-operation", stating:

The challenges of E-Government are such that cooperative efforts by a wide range of actors from government, industry, science and the consulting professions are mandatory. Many obstacles have to be surmounted,

including many competing goals, a dense grid of regulations, the fragmentation of traditional public sector institutions and many historical legacies.

e-Government provides a challenge and an opportunity to cut through existing structures — organisational, cultural and psychological — that may inhibit the delivery of good services. [42] observes of the United States that:

To truly achieve a comprehensive E-Government initiative will require both horizontal and vertical integration—horizontal as E-Government efforts must extend to all agencies within a level of government (i.e., federal, state, local) and vertical as E-Government initiatives must integrate across levels of government. Government information, services, and resources reach citizens from all levels of government — to ignore this would be in error.

### 8.1.2 Our view of co-operation

The recognition of the need to co-operate is clear. In the rest of this section, we examine what it means to co-operate and propose some pointers and guidelines for public authority workers who wish to establish co-operative relationships.

First, we look at the definition of co-operation in our e-government services ontology and then examine the simple modes of co-operation. We follow this by examining the various justifications for co-operation and recommend that co-operating parties are clear about the *purpose* of, and the *justifications* for, co-operation. We briefly consider the roles played in co-operation, particularly in e-government.

We acknowledge the complexity of co-operation, particularly its psychology and sociology. We leave the detailed study of this complexity to other fields such as game theory and economics. We consider the special considerations for e-government.

Finally, we provide a set of distilled guidelines for co-operation in e-government.

### 8.2 Definition of co-operation

In the e-government services ontology in Appendix 2 we define co-operation as

a relationship in which at least two legal entities have the same purpose.

In the ontology, having the same purpose implies that there are activities in which the legal entities are engaging. These activities, which may be different for different legal entities, have the same purpose: a state of affairs that the legal entities wish to achieve.

To be less formal, in the rest of this section we use the term "party" instead of "legal entity".

So our first observation on co-operation is that different parties are engaged in activities with a *common purpose*.

## 8.3 Modes of co-operation

Public authorities are well used to working with and beside other parties, large and small, international, national and local: voluntary, non-government, other governments, businesses, citizen groups and individuals. Here we examine the different objectives of e-government for co-operation, and the ways in which the objectives can be achieved.

Different parties may independently have purposes that overlap. For instance, the social work department of a city council wishes to reduce the number of accidents to elderly and very young residents in its rented accommodation; so does the national safety organisation. For each party, this common purpose is just one of its many purposes, as shown in Figure 12.



#### Figure 12: common purpose

In such a case, it is natural for the parties to agree to share in the activities in some way, for example:

 by each continuing with their activities as before and agreeing to share their experiences as in Figure 13:



#### Figure 13: co-operation by sharing experiences

• by agreeing to transfer some activities from one to the other as in Figure 14:

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Figure 14: co-operation by transferring activities

 by one party providing resources and expertise to help the other to execute its activities better or more easily as in Figure 15:



#### Figure 15: co-operation by providing resources

• by one party agreeing to change some of its (other) activities to help achieve the purpose in a different way as in Figure 16:

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Figure 16: co-operation by changing activities

 by combinations of these: combinations that can involve two or more parties, all engaging in one or more of the above modes

Co-operation usually needs to be accompanied by agreements that clearly state what each party provides and receives, and how each party is to behave.

### 8.4 Justifications for co-operation

Each party might have different justifications for making such agreements. Either party may justify them in different ways in different circumstances. Below we examine some of the possible justifications:

- to have the best-skilled people achieve a purpose
- corporate learning
- individual learning
- to improve the quality of service
- to share costs
- to share benefits
- to share risk
- to gain critical mass for achieving a purpose
- to save resources

Some readers may feel that it is more important to consider parties' *motivation*, rather than *justification*. The reason for this might be that motivation suggests more of a sense of the drive behind actions before they are taken, while justification suggests an explanation, possibly after the event.

We agree that motivation is key to the behaviour of co-operating parties. If we were able to accurately explain our motivations and then to record them honestly, then it would indeed be better to focus on motivation. However, the difficulties in *describing* and *recording* motivation make us prefer to focus on justification.

The influences on motivation can be rather complex. Some can be emotional and difficult to explain. For a complex model of motivation that is founded on five different psychological theories, see [43]. As well as the difficulty in describing motivation, a great deal of trust is required to expose one's true motivation to others. Motivations can carry a lot more emotion than justifications.

that people are more inclined to state their justifications rather

As a result, we feel that people are more inclined to state their justifications rather than their motivations. We also feel that any attempt to record justifications has a better chance of being accurate and is more easily questioned and discussed.

We do encourage a statement of justification before the event: a statement of the expected outcomes.

### 8.4.1 Achievement by a better-equipped party

A straightforward justification is that "we were no longer (or never) able do it ourselves and we needed it done". In this case, a better-equipped party can be asked to perform the activities. Usually this is the situation in "principal and agent" relationships as described in 8.5.3 below.

### 8.4.2 Corporate learning

Public authorities hold particular assets and capabilities that are relevant to delivering public services. As the move towards e-government progresses, a whole new set of capabilities is required, capabilities that it may be sensible for public authorities to acquire for the future from elsewhere. These include:

- IT and telecommunication skills, infrastructure and equipment
- creative skills
- communication skills
- teaching and learning skills
- management skills

In this case, the justification is to get access to assets and skills that are reusable in the future.

Indeed, as government becomes more "e", the new capabilities that public authorities acquire may give them the potential to compete with organisations that are currently delivering similar services. This is elaborated in 8.7 below.

Acquiring reusable skills is sometimes referred to as corporate learning. It can, and should be, supported by an integrated knowledge management ethos and practices. Later in this framework we argue that trust is an essential ingredient for knowledge management, which we would define simply as systems and practices to help people to do better in the future, usually by making advantage of the past and present.

Knowledge management implies sharing and co-operation, and can operate at strategic or operational levels. [44] states:

Knowledge management often operates around some key objectives that support the organisation's strategy as a whole. Generally, these can be categorised as Learn (new skills and customer needs), Innovate (new goods and services), Integrate (more flexible and connected organisation), Lever (deploying large scale technologies and share best practices) and Collaborate (developing a knowledge sharing culture).

### 8.4.3 Individual learning

The continuous learning of individuals should not be overlooked. Individual learning through co-operation can have several benefits, such as:

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•

- better service delivery (see 8.4.4 below)
- higher satisfaction levels
- better motivation levels
- more creative thinking

Both individual and corporate learning can be facilitated by good leadership. A good source of the principles of "personal learning" is [3].

### 8.4.4 Improving the quality of service

Parties can work together to bring their complementary assets together to provide a better service than they could individually. This justification is particularly relevant for citizens or businesses served by public authority, where services are frequently delivered by different departments or authorities. The one stop shop concept is a response to the frustration that the recipients of services often feel. e-Government has the potential to support one stop call centres or to provide one stop online portals direct.

#### 8.4.5 Sharing cost

It may be too costly for a party to pay on its own to carry out the activities that can achieve its purpose. In this case it is sensible to ask others, with a common purpose, to share the cost. For example, several small local authorities may not, independently, be able to afford to maintain special expertise in a particular area. By clubbing together they can share the cost and share the expertise.

Note that the "other" party may not necessarily justify co-operation on the basis of sharing cost; it may see other advantages such as corporate learning.

#### 8.4.6 Sharing benefits

Usually sharing the cost goes hand in hand with sharing benefits.

Occasionally a party may co-operate in a spirit of generosity, sharing the costs while allowing the other party to enjoy all the benefits. However, as discussed in 8.6 below, things are usually not quite so simple.

#### 8.4.7 Sharing risk

A party may want to "share risk" with another. In effect, this means that, in the event of failure of some activity, the costs are to be shared. The costs may take one or more of many different forms, usually the loss of some resource. (In the egovernment services ontology in Appendix 2, we define cost of failure as a decrease in a resource as an effect of failure.)

The UK Office of Government Commerce provides best practice advice on managing risk [45]. It suggests this response to risk:

Address each risk as appropriate:

transfer it to the party best placed to manage it...

- tolerate it
- terminate it
- treat it by addressing the probability or impact and so contain it to an acceptable level.

Put in place processes that will actively encourage cooperation and open dialogue between customers and providers. Ensure that providers share information about problems at the earliest opportunity so that small issues do not escalate.

It also suggests this categorisation of risks:

- Strategic/corporate: commercial, financial, political, environmental, strategic, cultural, acquisition, political and quality risks.
- Programme: Procurement/acquisition, funding, organisational, projects, security, safety, quality and business continuity risks
- Project: Personal, technical, cost, schedule, resource, operational support, quality and provider failure.
- Operations: Personal, technical, cost, schedule, resource, operational support, quality, provider failure, environmental and infrastructure failure.

We contend that it is best for parties to be clear about:

- the nature of the risk being shared
- the costs in the event of failure
- who will bear the costs

Often these need to be captured in formal agreements.

Note that it is possible to share risk without co-operating in the sense of our definition of co-operation: for example, a standard insurance policy.

#### 8.4.8 Achieving critical mass

Often a party is capable of making a significant contribution towards achievement of an objective, but is unable to achieve it fully without other resources — human, financial or material — that are only available from other parties. In a case where the other parties are in a similar position to the first party, the pooling of resources can help achieve the critical mass required.

In a way, sharing the cost (8.4.5 above) is a special case of achieving critical mass, in which the resource that must be amassed is all financial.

### 8.4.9 Saving resources

Often, resources can be saved by doing things on a larger scale: purchasing goods, processing material, processing forms, delivering goods, delivering care, *etc.* 

The saved resource need not be financial, although staff time and many other resources are often routinely calculated in terms of money.

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# 8.4.10 Summary

To summarise, possible justifications for co-operation are:

- to have the best-skilled people achieve a purpose
- corporate learning
- individual learning
- to improve the quality of service
- to share costs
- to share benefits
- to share risk
- to gain critical mass for achieving a purpose
- to save resources

It is hoped that public authorities would have a spread of these justifications for cooperation, and that in any particular case the justifications are well thought out.

## 8.5 Roles and rules in co-operation

### 8.5.1 Public authorities as meeters of need

The role of the public authority is to have responsibility for executing activities on behalf of the public. (See the e-government services ontology in Appendix 2.) In this role, the main purpose of the public authority is to ensure that its citizens' rights are protected and their needs and wants are met.

There may be many contributory purposes to this main purpose. However, it should always be possible to identify where the common purpose in co-operation fits and contributes to this main purpose.

### 8.5.2 Structures for co-operation in public authorities

The UK Government's Strategic Partnering Taskforce *Structures for Partnerships* document [46] is an excellent source of guidance on establishing appropriate cooperative structures, agreements and management structures. It describes these:

- public sector consortium
- joint venture
  - $\circ$  with the private or voluntary sectors
  - o with non-profit distributing organisations
- partnering contract
- legal partnership
- limited liability partnership
- service outsourcing
- capital outsourcing
- private finance initiative

#### • concession or franchise

We do not go into these various structures here. Instead we concentrate on the general principles of interaction. We would also warn that the advice in [46] is presented against the English legal system. While the models are likely to be broadly similar in different countries, the details may differ from country to country.

In 8.5.3 and 8.5.4 below we highlight some particular points and principles.

### 8.5.3 Principal and agent

In many co-operative situations the public authority will act as the employer of a contractor who gets paid for their role in the co-operation. This is sometimes referred to as a principal and agent situation: in this case, the public authority is the principal and the contractor is the agent. The employer-employee interaction is similar.

The basis of the relationship is that the principal delegates authority to the agent to act on the principal's behalf. The agent's decisions can have an impact on the principal's welfare. Of course, this is a common situation in commerce.

Its importance in public authority is summed up in [47] in this way:

The main challenge facing all parties in today's increasingly complex forms of ICT partnerships is that despite a recognition of the need to work together in new ways, most organizational processes and most people reside within the realm of contracting, with an emphasis on both cost and control. Although common to all sectors, this point is particularly prevalent in the public sector, as the extra burden of transparency and fairness, the basis of traditional assurances of public accountability, loom large.

Public authority workers should be aware of a dilemma that often arises, when the agent has an informational advantage over the principal and has different interests from the principal. The effort and expense in trying to overcome this dilemma can be considerable: investigating and selecting appropriate agents, gaining information to set performance standards and monitoring agents.

In addition, a public authority worker is on the one hand acting as the agent of the public authority, and may on the other hand be acting as the principal in respect of a contractor. Indeed, it can be argued that the public authority itself is the agent of the public. See Figure 17.

These multiple principal-agent relationships make it especially important that all parties are clear about the common purpose and the respective parties' justifications for engaging in co-operation.





### 8.5.4 Partnerships

Often the word "partnership" is used as a synonym for co-operation in any of its many different forms, as listed above in 8.5.2. We prefer to think of partnership in a narrower sense, one that implies that partners are on a largely equal footing: that the shares of costs, risks and rewards are roughly the same for each partner. In reality, there are often "unequal partners" and again, it is important to be aware of how equal a partnership really is.

Governments are usually strong supporters of partnership arrangements. For instance, in the UK, the Office of the Deputy Prime Minister has funded a Partnership Programme for local councils, in which it supports partnerships of local authorities and has ensured that every local authority in England and Wales is part of one or more partnerships. Many of these are in e-government, under the Local e-Government Shared Service Delivery Partnerships Grant which is aimed at "helping deliver better electronically enabled services" [48].

Public-private partnerships give a wide range of opportunities for public authorities to share risks and costs with others. While the public and the private party need a common purpose as the basis for co-operation, it has to be recognised that there are fundamental differences in the *raison d'être* of the parties, or, as the Gartner consultancy [49] puts it, *mission motivation*:

The private sector is driven by the need to provide profits for stakeholders over a measurable time frame; the public sector is driven by the need to providing protection and services for its citizens and other constituents over a long-term time frame. Government budgets are typically annual and funded in advance; private sector budgets are typically set according to quarter-to-quarter and year-end results.

## 8.6 The complexity of co-operation

The psychology and sociology of co-operation are complex. Many studies have been carried out in the field of game theory to investigate how parties behave according to their goals, objectives, levels of trust, aversion to risk, wealth, expectations, levels of altruism, emotions and external factors.

To participate in co-operative activity means giving up a degree of independence. It means having to weigh up the risks and benefits. Many of these are often unforeseen. We have already mentioned that there may be costs, for instance in managing a principal-agent relationship, that may not be apparent at the start of the relationship. Equally there may be unforeseen side-effects, both positive and negative.

Added to this is the significant factor of the political process. For example, [21] describes a project to improve information sharing across 43 agencies operating on behalf of the mayor of New York. Over a year before the elections for the next mayor, key people in charge of the project were looking to their political futures and moving on:

In the midst of the issues faced by agency leaders and staff, the turbulence of the political environment raises concern about how long the new policies will govern operations in the City.

Another study, of 18 collaborative digital government initiatives in New York State [50] discovered that there were five systemic constraints on collaborative systems:

- differences in roles and relationships
- wide variation in operating circumstances
- diverse missions of government
- nature and pace of technological change
- limitations on public sector ability to adapt to change

Such complexity can never be fully understood or managed. However, it is useful to learn to cope with it, by trying to understand some of the principles behind the way that people behave in different circumstances. [3] is a good introduction.

### 8.7 Co-operation or competition?

Before leaving the topic of co-operation, we should make the reader aware of a particular issue that has resulted in vigorous debate, particularly in the United States. (See, for example, [51], [42]) The issue is that of apparent competition for the same services between the private sector and the public sector.

This is summarised in [51] in this way:

E-government was born in a somewhat confused environment in which more functions formerly served by the government migrated to the private sector. The last decade put a spin on the issue of government competition with the private sector in which the role of each has begun to resemble that of the other. While e-government developed out of an almost entrepreneurial approach toward performing the work of the government, the support for and economic dependence on a flourishing environment for e-commerce has given the private sector more opportunities to provide value-added products based on government information and services. Both are encouraged to make use of information technology and the opportunities it can bring to their work. Updated policy guidelines and legislation combined with the designation of a clearly defined leader for egovernment may be necessary to define the government role in an increasingly connected America.

When times are hard for business, public spending can keep economies afloat, and it can be attractive for private business to seek to take on the delivery of egovernment services. Often this is good for the public authority, as business might have much more experience in areas like e-commerce.

On the other hand, as government gains experience in areas previously outside its capability, it can, for apparently quite sound social reasons, desire to take full responsibility itself for services that were previously delivered by the private sector.

The Software & Information Industry Association in the USA takes a hard line, saying that there must be no competition [52].

At the same time, the UK government is encouraging public authorities to look for "wider markets" for their assets, products, skills and services [53].

We do not so far see this issue reaching the same levels of difficulty in Europe. It is an issue well worth bearing in mind as public authorities gain skills and experience in e-government.

## 8.8 Co-operation in policy making

Our framework addresses co-operation in the sense of working together to *deliver services*. Another form of interaction between public authorities and their clients — citizens and business — is one in which they work together to formulate policy or to make decisions. We view such interaction, in which public consultation is key, within the scope of e-governance, not e-government, so we do not examine it here.

In passing, we note that many of the principles are similar. For instance [47] states:

The rise of e-Governance, with its pressures for a variety of initiatives introducing alternative models of decision making and service delivery, implies a sharing of accountability. The need for collaboration, partnerships and joint ventures grows within government, and often between private and public organizations.

For recent developments in e-governance, see, for example, [54].

### 8.9 Other models of co-operation

### 8.9.1 Tolksdorf's coordination reference model

Tolksdorf [55] identified the existence of models of co-ordination of many kinds and in many different fields, such as computer science, distributed artificial intelligence, organisation theory, economics, sociology, psychology and biology. Inevitably, Tolksdorf concludes that there is

currently no consensus on the relations between coordination, communication and cooperation

and proposes a "coordination reference model", which picks out the common features of the co-ordination models that he examines. The reference model has a set of basic concepts — interactors, relations, non-interactors, operations, attributes and meta-attributes — as below:

- *Interactors* are those entities that are related to other interactors.

- *Relations* associate two or more interactors in some way. Coordination mechanisms then apply to relations amongst interactors.

- Non-Interactors are those entities that are related to interactors or to none.

- Operations can be performed by interactors on non-interactors.

- *Attributes* can be assigned to Interactors and non-interactors do describe them or their current state.

- *Meta-Attributes* describe the models built from those concepts [with respect to] their characteristics.

Although we have found this rather mechanistic view of co-operation useful, particularly in terms of Interactors and Relations, we have found it more useful for this project to look also at the *motivations* for co-operation, specifically *common purpose* and *justifications*.

### 8.9.2 Business process modeling and workflow

Fields of work such as business process re-engineering, workflow management and enterprise integration have, for some time, provided methods and tools for modeling co-ordination [56].

There are several such commercial products across Europe and the rest of the world, such as ARIS, Bonapart, ADONIS, AENEIS, Enterprise Architect, GRADE Modeler, iGrafx Process, INCOME Process Designer, MEGA Process, METIS, Metro, Provision Workbench, Silverrun BPM, System Architect and Prometheus [57].

UML, the Unified Modeling Language [58] is a very widely used approach for building IT systems from requirements gathering to software code writing. UML provides notation for documenting interaction between actors.

These, like the Tolksdorf view, also largely take the mechanistic approach — one that is perhaps appropriate to manufacturing, but not public administration. This point is well described in [59], which identifies not only business process redesign, but also collaborative decision making, as vital in public administration. The authors write of

telecooperation as a holistic vision whose focus lies on work aiming at the support of computer-mediated co-operation in a comprehensive sense... Human work is at the centre of telecooperation... strict co-ordination ceases to be the prime mode of action; it is collaboration that becomes prevalent.

However, even this takes a view of co-operation that is technology-based. We hope that our socio-technical approach helps to add some balance to other mechanistic and technology-based treatments.

## 8.10 Guidelines for co-operation

Here we present guidelines for people who already do, or are about to, work cooperatively on an e-government project or programme.

First, we note an excellent set of "guiding principles for collaborative digital government applications", derived from empirical study of 18 such projects in New York State [50]:

- 1. Have a clear purpose and realistic, measurable expectations.
- 2. Identify and understand all stakeholders.
- 3. Commit to serious partnerships.
- 4. Choose a well-skilled and respected project leader.

### 5. Adopt tools and techniques to manage complexity.

- 6. Recruit a balanced project team.
- 7. Expect to assemble a mixture of resources.
- 8. Communicate as if survival depends on it.
- 9. Pay attention to work processes and practices.
- 10. Demonstrate and refine ideas before implementing.

On closer inspection, many of the above seem to be good advice whether or not the work is co-operative. Numbers 3, 5 and 8, emphasised in bold above, seem most relevant for us, given the way in which we have presented the issues of co-operation in this whole section.

Number 3, commitment to serious partnerships, means

... active, trustful relationships focused on common goals; real sharing of risks, resources and benefits; and healthy interdependence as well as clear and logical division of responsibilities

Our main messages are:

- Be clear about the shared purpose
- Be clear about the justifications
- Be clear about the roles in co-operation
- Acknowledge complexity and learn to cope with it.

# 9 Issues in Social Acceptance of e-services

### 9.1 Introduction

In this section, we aim to help public authorities to understand the environment of trust relationships within which service delivery exists. This understanding will enable the social acceptance of e-government and thus the acceptance of those services delivered electronically. Without such acceptance, the value of e-government is minimised.

We define social acceptance as describing a level of comfort that a social group has in relation to some object or situation, such that they are able to rely upon it and assimilate it into their culture. We argue that this level of comfort is based fundamentally on *trust*. It can be shown that *knowledge* and *education* regarding the object are motivators of this level of comfort. However, these motivators are essentially reliant on trust. The knowledge and its source have to be trusted by the social group, otherwise the education process is counterproductive and does not engender the required level of comfort.

We are concerned with two specific social groups:

- 1. The governmental organisation or public authority and service delivery cooperating partners who have to accept e-government in general as a set of new working methods. They will also have to accept new process models and new co-operative relationships as part of a new working environment.
- 2. The service users: the citizens and the businesses who receive these services, who need to accept e-government as a new method of service delivery and the new methods of communication with the public authority that result.

We define a framework of trust and use this framework to develop two models of trust:

- Internal Trust Model describing trust relationships for social group 1.
- External Trust Model describing trust relationships for social group 2.

The special case of trust relationships in the design and development of knowledgebased systems such as SmartGov is covered by [60].

Some authors argue that trust in e-government is only related to regulation of the Internet, data protection and physical security levels and, as such, suggest specific legislative and technological solutions to engender trust [61]. We are explicitly not examining in detail these solutions as they are dealt with expertly at a number of locations:

http://www.rsasecurity.com/solutions/government/index.html

http://www.ukonlineforbusiness.gov.uk/cms/template/infor-security.jsp?id=212908

http://www.cl.cam.ac.uk/~rja14/econsec.html

http://www.ctg.albany.edu/publications/reports/inet\_security\_seminar/inet\_security\_s eminar.pdf

## 9.2 A framework of trust

We argue that trust is a relationship based on a disparity (or perceived disparity) of power between entities.

Trust is accepted vulnerability to another's possible but not expected ill will (or lack of good will) toward one. [62]

One trusts when one is involved in this power disparity as the powerless entity. Trust has no real meaning without there being this disparity of power between the actors, yet the lower this disparity is, the easier it is for trust to develop. In the case of citizen's trust in government, this power disparity is not the exercise of government power over the citizen. For example, the citizen trusts government to meet their needs, but in order for there to be trust, government must have the "power" to fail to meet these needs.

Our models of trust require a rigorous set of trust definitions which include the various targets of trust [63], bases of trust and the possible modes of trust:

#### Targets of trust

Or	rganisational	trust where the target is an organisation or corporate body, not an individual [64].
Pe	ersonal	trust where the target is an individual [65].
Im	personal	trust where the target is an entity other than individual or organisation.
Bases of trust		
Kn	nowledge	trust based on knowledge of the trustee or their past actions, reputation [66].
De	eterrence	trust based on trustor's ability to retaliate against breaches of trust [66].
Ins	stitutional	trust based on the existence of rules or a legal framework that prohibit breaches of that trust [67].
Pe	ersonality	trust based on an individual's innate propensity to trust as a character trait [68].
Cu	ultural	trust based on the tendency to trust and mechanisms of trust within that cultural paradigm.
lde	entification	personality based, specifically reliant on empathy between trustor and trustee [66].

In the context of e-government we are mainly concerned with knowledge, institutional, cultural and identification bases of trust.

#### Modes of trust

Latent trustIn the Government Service Ontology in Appendix 2 we<br/>define latent trust as; a Relationship between two LEGAL<br/>ENTITIES in which one has SITUATIONAL TRUST in the
other in all possible ACTIVITIES in which the other could be an Actor.

This is the trust that is assumed to exist over a relatively long time frame. It is largely institutional in base and may be written into procedures, or exist as tacit knowledge within individual agents or the social group. It is a level of trust that is accepted as a given. This trust is not dependent on a specific context; it is more generic in nature. It is society's level of trust that exists before direct engagement has occurred. This is a structural social construct.

Situational trust In the Government Service Ontology in Appendix 2 we define situational trust as; a Relationship between two LEGAL ENTITIES and an ACTIVITY (that one of them will EXECUTE or has EXECUTED), in which the other LEGAL ENTITY has BELIEF that the EFFECTS are or will be ACCEPTABLE

This is a trust relationship that is negotiated in the present time between agents directly. It has a relatively short time frame and exists only for the specific trust relationship. This is an agency based social construct. It is specific to the context of the relationship [69, 70].

Trust bases and targets constrain and are constrained by the context or genre of the trust relationship. Transitions from one type of trust to another also occur within certain models and this can only be adequately described with the above set of trust definitions.

In the following sections we consider our models of trust which describe:

- internal trust relationships and
- external trust relationships.

In each case we present a model of the trust relationships based on the two modes - *latent* trust and *situational* trust - as defined above.

# 9.3 The internal trust model

Here we describe models of trust relationships within the service delivering entity (the governmental organisation or public authority and service delivery co-operating partners). This is shown as the *service delivery complex* in Figure 18.

There are several channels of communication between the various actors across the inter-departmental or inter-organisational boundaries. Communication across these boundaries relies on trust. There is also communication between individual members of the same department, and these communications are also subject to trust relationships.

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Figure 18 : Internal trust in relation to the e-government services framework

Figure 19 and Figure 20 show respectively the inter-organisation and interdepartment trust relationships.

The specific trust relationship present in each case depends on the nature of the communication, the actors involved, the level of regulation of the relationship and its formality. It is also influenced by the information and resources being transferred and the nature of the service delivered.

In highly regulated areas, where procedural motivations take precedent, there is a degree of *latent* trust in place that facilitates the social acceptance of communication. This can be considered as a foundation layer for the trust relationships that have a relatively long time frame and are assumed to exist by the agents involved. The target of such trust is likely to be organisational or impersonal and the trust largely institutionally based.

In less formal relationships there may be a strong reliance on continually negotiated, contextually dependent, interpersonal trust, based on personal, not institutional factors. These relationships constitute the top of the model in Figure 19 and Figure 20, *i.e. situational* trust mode. If at first point of contact latent trust is present, then situational trust can build on this.

Latent trust is likely to be coded into procedural practices, and as such may be more robust and less prone to loss/erosion. Latent trust may also be held as tacit

the individuals involved thus it may in some cases be difficult to

knowledge within the individuals involved, thus it may, in some cases, be difficult to express and thus examine.



Figure 19: inter-organisational trust



#### Figure 20: inter-departmental trust

# 9.3.1.1 Internal latent trust model

Here latent trust has its bases largely in institutional trust, that is mediated through rules and laws governing the individual organisations and also regulations found in external, state law and any contractual agreement between the co-operating parties. However, this relies on common agreement between the bodies involved or reliance on laws administered by an external third party to which both submit. Legislation will affect these relationships, often directly in terms of data protection law and legislation created to permit public-private initiatives.

There are distinct differences between the public authority and the external bodies as organisations, and this will have an effect on the nature of trust relationships that occur between them. Within a single organisational entity, it is possible to implement initiatives that directly increase the level of latent trust between departments. Typically inter-departmental relationships will have a common institutional rule set and organisational culture providing a common foundation for cultural and knowledge based trust, as well as institutional trust. This is shown by the outer box in Figure 20. However, by the same token it is possible for organisational procedures to detract from a level of latent trust.

We describe this model by taking each of the key bases for trust in turn.

# Knowledge based trust:

It is possible to argue that there is greater degree of transparency in the interdepartmental model than in the inter-organisational model. This greater degree of transparency facilitates a level of knowledge-based trust [71] that might be absent from the inter-organisational model.

#### Institutional based trust:

Institutional based trust forms a major basis for this model. Each organisation will have its own institutional rules, which underpin institutional trust. In this instance, external law will have a strong role to play as the guarantor of this trust.

#### Cultural based trust:

Public authorities have an obligation to meet the needs of their service users (citizens and businesses) as shown in 8.5.1. Political motivation may be a strong element of the organisation culture within the authority and essentially absent from that of a private business partner. Conversely, profit accumulation and responsibility to shareholders constitutes a major motivation for the private business partner. Such differences in culture will mean that different cultural determinants of trust exist in these organisations and this may form barriers to trust between them.

#### Identification based trust

There will also be a degree of latent trust generated informally, over time, based on personal identification and contact. This applies to both the inter-departmental and the inter-organisational model. As agents in the system have prolonged contact through consistent instances of situational trust, so a tacit knowledge of that trust will form. There will be a minimum level of trust required to make a co-operative relationship function adequately [69]. This level will vary for each specific service and the modes of co-operation as mentioned in 8.3.

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# 9.3.1.1.1 Comments on internal latent trust model

Much of this latent trust can be directly coded into the e-service delivery platform. In the case of SmartGov, this may be in the form of knowledge units or form part of the interface design; it will also be included in any codified procedure. In the interdepartmental model, it should be relatively simple to include a level of latent trust within the service delivery platform. However, inter-organisational latent trust will be problematic. The absence of common institutional rules between the co-operating bodies may be a barrier to effective inclusion of codified latent trust. This should be addressed during the development of the electronic service.

Additionally, it may be possible, or necessary, to include certain situational trust relationships in the electronic service delivery platform. This may, for example, include form validation checks, or client record cross-referencing. This may expedite the delivery of the service, but the exact nature of the given situational trust relationship should be fully understood, as some of its utility may be lost in this transformation. In such circumstance, this situational trust will become latent trust. It is arguable that, given the commonality of culture in the inter-departmental model, as opposed to the inter-organisational model, the transformation to latent trust will be easier.

The introduction of the computer as a new agent in the system also affects this mode of trust. Computer-to-computer trust is essentially latent and will be constructed in the development phase, relying largely on institutional and knowledge based trust.

# 9.3.1.2 Internal situational trust model

In the case of situational trust, the target is typically an individual, and there may be a range of trust bases: cultural, knowledge and identification. These trust relationships will also draw from the pool of latent trust underpinning the system. Such relationships may be directly specific to an individual instance of the service being delivered, *i.e.* an individual client case.

# Knowledge based trust:

There will be a strong element of knowledge based trust. Thus, a service may involve a range of semi-permanent trust relationships between the agents involved. This is seen in the knowledge of contacts and relationships that an individual may build up over time through being involved in a particular service.

# Institutional based trust:

This is less evident in this model.

# Cultural based trust:

A common organisational culture is important here. Individuals sharing the same culture thus share, to some extent, the same motivations and have a common experience on which to base cognitive cues that are relevant to the organisational environment. Thus, they operate within a common environment and so lack any ambiguity in semantics. In this environment, interpersonal trust is able to flourish.

# Identification based trust

There will be a strong element of trust based on identification and, similar to knowledge based trust, this can be seen in the existence of contacts and relationships that build up over time.

The knowledge and identification based trust relationships may endow the agents involved with some power in their domain. These power structures may be more apparent in the inter-organisational model where the lack of a common culture and operating rules puts greater emphasis on interpersonal trust.

# 9.3.1.2.1 Comments on internal situational trust model

The communication medium is likely to have a significant effect on this level of trust [72]. In particular, by introducing an e-service delivery platform, there will be a specific limited set of cognitive cues available to trustor and trustee, and the e-service will take place in a specific time frame. This will affect the interpersonal trust relationships conducted through the e-service. Situational trust is likely to be more fluid than latent, with greater likelihood of moving from one trust state to another, through to distrust in some cases. As mentioned in the latent model, some situational trust can be codified into the e-service delivery platform. This exercise would be non-trivial and the nature of the trust relationships involved should be fully understood before they are codified into the platform.

In effect, the e-service introduces a new agent — the computer. There will be computer-to-computer trust, which is essentially latent. In addition, there is human-computer trust. This is likely initially to be situational trust, but may, through use, undergo a transition to latent.

Where situational trust has undergone this transition to latent there may be a change in any power structures present; persons whose power or status in the group was determined by their access to and trust with other individuals extra to the group, may have that power undermined if these trust relationships are transformed to latent trust. Greater reliance on electronic communication, with its de-emphasis on human contact, will lessen the importance and impact of human-human contact networks. Thus, power structures based on these contacts will diminish.

The ability to include certain elements of latent trust in this situational trust medium may have an effect on how this situational trust is formed. It is logical to assume that this would give rise to a greater reliance on institutional trust as a basis for situational trust. It is also logical to assume that such communication media will constrain the range of options or actions available to the agents using it. This will have an affect on trust relationships and must be borne in mind in design and development [73].

# 9.4 External trust model

Here we examine and develop models of the trust relationships that describe the contact between a service-delivering public authority (plus co-operating bodies) and the external service-receiving world of citizen and business.

These trust relationships are most readily identified in the relationship sphere in Figure 21, which shows the various spheres in which e-service actors operate.

Figure 21 (next page): interrelated spheres



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The following models are essentially models of trust in government. For the body of citizens and businesses, acceptance of e-service delivery as a concept, and the acceptance of the electronically delivered service are, we argue, based on trust. Figure 22 shows a topography of the trust without the e-service; Figure 23 show the topography when the service is electronic.



Figure 22: pre e-service topography of trust



Figure 23: e-service topography of trust

# 9.4.1 External latent trust model

Although this model is specific to public service provision, latent trust may be targeted more at the government in general. To an extent, this model describes unidirectional trust relationships emanating from the citizen. In this model, latent trust is the background level of trust that citizens and business entities hold in government. The government consists of a political and an apolitical body, and so we have to consider the implications that the political aspect has in this model [74].

The general actions of the public authority may be used as indicators of its overall trust-worthiness. This may extend to the political party in control and its past actions or reputation. It may even extend to trust or distrust of the ideology held by that party. It is also possible that external events may cause an indirect change in trust of government [75, 76].

The external latent trust model has a variety of bases that will vary with time and from one individual to another.

#### Knowledge based trust

This will increase over time as more services are delivered electronically and as more citizens use e-services. However, this implies trust in a number of different service features such as electronic data gathering, electronic authentication and electronic delivery scheduling. Obviously there is a high trust requirement in these mechanisms, and this requires new motivations due to the absence of the human element.

Perceptions of these will vary according to the particular service and the demographics of the group or individual in receipt of that service. Knowledge based trust is likely to be the major base in this instance, as institutional based trust could do little to mitigate against errors committed by machines. In this instance, education of society as to the nature of the e-government would be vital. This issue will also form part of the situational trust layer when related to specific instances of delivery of a service.

Where co-operating service delivery bodies are involved, we have the issue of trust in the interconnectivity of systems and the integrity of systems outside of direct governmental control.

The use of non-protected personal data by private business is already an issue and this issue is likely to affect trust in e-government in general, and especially where there is contact with private business through PPP.

Initially, transparency of the benefits of e-government to society, and of the security and privacy precautions taken, will be instrumental in building this trust. Transparency of motivation is linked to this. Citizens will be more likely to trust the concept of e-government and thus have trust in the government concerned, if they can understand the motivation behind it.

# Institutional based trust

Initially trust in e-government is likely to be based on institutional based trust, as there will be little knowledge in society of it. Issues regarding its value and safety will probably be paramount, making institutional protection fundamental. It would be in the interests of government, then, to make transparent the protective measures and legislation planned or implemented. Institutional based trust relies on knowledge of the institutional protective laws and rules.

# Culturally based trust

It is arguable that many western societies have seen a move towards more cynicism in government actions in recent years [77]. There also exists a strong culture of cynicism of private business and this may affect trust in government where private funding initiatives are implemented [78]. However, through time, as e-services become more common and are more widely accessed, e-government itself becomes an affecter of culturally based trust. Once assimilated into the culture, e-government will be subject to this form of trust as a specific target. It will also affect the nature of culturally based trust in government in general.

# Identification based trust

This basis of trust will have less impact on the latent trust model, as latent trust is less concerned with agency and more concerned with structural elements.

# 9.4.1.1 Comments on external latent trust model

Trust in government is not simply targeted on a single entity that is government; there are several targets that together create a trust in government. The entity that we refer to as government in this instance consists of the state, the democratic process, the legislative process and the executive. Trust in the democratic system

and the legislature, the "measures and balances", are vital components of the trust in the state [79]. It is trust in these institutions that permits citizens to have institutional based trust in the public authority that they will not exercise their power to the detriment of the citizen. There will also be trust in the executive branch and the individual institutions that make up the service providing entity; this may be knowledge based as well as institutional.

Trust in the system of service delivery will also be a factor. This includes trust in the mechanisms that are used to define eligibility for a service and the mechanisms that are then used to deliver that service. Perceptions of these will vary according to the particular service and the demographics of the group or individual in receipt of that service. This issue will also form part of the situational trust mode when related to specific instances of delivery of a service.

A specific aspect that warrants further discussion is the issue of co-operating service delivery bodies, *e.g.* Public-Private Partnerships or Private Finance Initiatives (PPP or PFI). These initiatives constitute a target of trust in their own right. In this latent mode, the issues are:

- Trust in the concept of PPP and the motivations for it
- Trust in the institutions and business bodies as autonomous agents in the system
- Trust in the mechanisms for engaging and holding private organisations accountable. This issue will also form part of the situational trust layer. Transparency and accountability are vitally important in the creation and support of PPP.

Trust of the co-operating service delivery bodies becomes complex, as they may not have the perceived levels of accountability and transparency that are applied to the public authority. Thus, it is difficult to rely on institutional based trust as heavily. Trust here is more likely to be based on knowledge and a degree of risk assessment, although there is a certain amount of reliance on legal protection. There may be higher levels of distrust of PPP by citizens, and distrust of the motivation behind and the concept of PPP. This spills over onto the public authority even where there is no specific PPP delivered service [80].

# 9.4.2 External situational trust model

This is more about trust relationships between individuals (as opposed to society) and the public authority; it is bi directional and less abstract than the external latent trust model. This model is a complex of many concurrent trust relationships related to specific agents and specific instances of service delivery. It is mediated through direct citizen to government communication and is often connected to a specific service. As in previous models, this model both draws upon and feeds the latent model.

The targets of trust are both personal and impersonal:

- public authority staff (individual and group)
- other service delivery agents, citizens and business customers

- publicity material (by extension its author)
- e-government interface (machine)

The personal trust is bi-directional as service delivery agents are trustors of the service receivers too. The public authority representative has to trust the citizen or business to provide the correct information and to fulfil any requirements they may have as recipient of the given service. Business trust may draw heavily on risk analysis. Citizen's personal trust will draw from the latent mode, bringing those trust assumptions to the specific relationship in the situational mode.

The actual requirements of the specific e-service will affect the nature and extent of trust in the relationship. For example, the requirement to impart extensive personal information is very trust-heavy. In this case, the individual is trusting several targets, which include the staff of the public authority who will be using the information provided, the electronic system that handles the information and the governmental legislative system that will process and protect the information.

The trust relationships will have a variety of bases, and there is likely to be some development from an initial base to another base as the relationship proceeds. Much of the initial trust would need to be based on institutional trust, perhaps with some element of knowledge-based trust. Drawing from the latent layer, culturally based trust will also be a factor.

# Knowledge based trust

This will increase over time as the individual uses more e-services but will initially be limited to the latent mode. It is likely that knowledge based situational trust will quickly become the dominant type. This builds directly in individual engagement with e-government. This of course relies on sufficient initial trust to begin the engagement.

# Institutional based trust

Trust in the e-service mechanism will, in the absence of experience based knowledge, need to be institutional in basis. The citizens and business customers will rely on the existence of regulation to ensure that the e-service functions properly. The addition of PPP essentially introduces new agents to the system and, where there is contact with these new agents, there is a trust relationship. Here institutional trust plays a strong role, as the individual is heavily reliant on legislative protection from the non-governmental body.

#### Cultural based trust

Over time, once assimilated into the culture, specific e-services will be subject to this form of trust in the situational mode. Initially this trust base is mostly confined to the latent mode.

#### Identification based trust

This is likely to play a strong role in person-to-person communication, especially in a direct face-to-face context. In the electronic delivery platform, it is difficult to convey the information required to form this trust.

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# 9.4.2.1 Comments on external situational trust model

Before the delivery of e-services, the external trust model could rely heavily on latent trust. However, with the introduction of e-service, the external situational trust model becomes dominant and is important to the social acceptance of e-services. This is due to the lack of service history surrounding a newly introduced e-service and the cultural novelty that is connected with it. Once the concept of e-government is fully assimilated into society, we may see a return to more emphasis on latent trust.

Communication media have a profound effect on trust based on this model. In direct person-to-person contact, interpersonal trust develops with such bases as knowledge and identification. There will be some degree of trust directly in the person, as opposed to the organisation they represent, and some trust in the role of the person. The lower the proportion of direct person-to-person contact, the greater the reliance on institutional trust. This may affect the trust relationship in the form of limiting cognitive cues required by the agents to develop trust. This may be more or less important depending on the nature of the service. Research shows that where there has been no prior human contact, trust in an electronic forum is difficult to secure, and that this is also dependent on the relative importance of the subject of that trust [70].

It is essential to address the problem of engendering situational trust in an electronic environment, as this trust will be fundamental to the social acceptance of egovernment. This trust will be knowledge based and will develop over a short time period.

Time is also a differentiating factor between communication media. Direct interpersonal communication has, essentially, zero time, whereas, at the other end of the scale, written, postal communication has a significant time factor. This time factor affects cognitive information in the form of a delay in feedback to given information. In an online environment, communication can be regarded as instant.

As mentioned in the latent mode of this model, the advent of PPP has had an effect on trust in government in general and will also affect the e-service model [80]. In this situational layer, this trust will become apparent where the electronic communication involves the private business partner. Where a citizen is not explicitly aware of the involvement of a partner business in the electronic element of the service, there may be little impact to situational trust. This, one could argue, is an example of less transparency assisting in trust development. However, this is a dangerous approach that would risk major regression of trust development. Where knowledge of PPP involvement is available, it would be advisable to demonstrate security and protective measures in place. The issue of data protection is likely to be magnified with the inclusion of PPP.

Latent trust will affect the situational, especially where current events affect the latent trust of government. This will "spill over" into situational trust relationships either negatively or positively. Events that politicise the populous to a greater degree than what is considered normal, will also directly affect the situational trust level of the model [75].

Finally, self trust is of particular importance in this model as this new electronic communication medium constitutes a challenge to the user's knowledge and ability. Here education and training in the relevant skills becomes important.

# 9.5 Guidelines for engendering trust

Below are sets of guidelines to assist in engendering both modes of trust within the specific social groups.

# 9.5.1 Engendering latent trust in the internal model

- **Cultural convergence:** Foster shared values across organisational boundaries to address the issue of a lack of common culture.
- **Co-operative**: Adopt guidelines from section 8.10
- **Contractual agreement:** use contractual agreements to create a strong foundation for institutional based trust.
- **Legislation:** as above, legislation can be used to enable institutional based trust.
- **Trust based organisational culture:** Implement internal trust improving initiatives, reward trust and collaboration. Increase cross department communication.
- **Ensure system integrity:** this applies to both internal and inter-organisational systems. Make this integrity visible to staff.
- **Computer-to-computer communication:** Consideration of computer-to-computer communication and coded latent trust. Build trust into the system.

# 9.5.2 Engendering situational trust in the internal model

- Online environment: Perhaps the greatest challenge is to design an online environment that engenders trust. This is an immense area of study and there is a plethora of material available for guidance. Factors to address are: mitigating the affects of limited cognitive cues, security issues, the aesthetics of the environment, content and information, the needs of the user and the nature of the service being delivered. We examine the main points in Appendix 5.
- **Transparency:** Make available information regarding purpose and justifications of co-operating organisations. Similarly, make available information regarding security and data integrity of other organisations' IT infrastructure.
- **Legislation:** ensure adequate legislation governing collaboration, and make staff aware of this where relevant.
- **Increase communication:** increased communication across departments and between partners where possible.
- **Implement trusting culture:** implementing rewards for trusting and trustworthy behaviour and reducing competitive behaviour within the organisation will reduce barriers to trust.
- Education: educate staff about benefits of e-service delivery to them and their clients.

# 9.5.3 Engendering latent trust in the external model

Here we suggest how public authorities can best encourage latent trust in electronic services:

- **Transparency:** provide information to the public regarding the motivations for e-government. Include a description of clear objectives and benefits. Also, show costs and adequate address of issues. Provide education and information to the public: what e-government is, why it is beneficial, how to use it.
- **Examples of success:** Where possible, examples of previous success will help foster knowledge based trust in the e-service.
- **Citizen engagement:** Involvement and consultation of public will also help to legitimise e-government and thus foster trust.
- **Protective legislation:** provide a protective legal framework tailored to the new e-service environment and make this publicly known. This is essential to enable institutional trust.
- Awareness: being aware of the issues that concern citizens and general public opinion regarding e-government, will help government to produce valuable targeted information.

# 9.5.4 Engendering situational trust in the external model

Here we suggest how public authorities can best encourage situational trust in electronic services:

- **Transparency:** Transparency of motivation is discussed in the latent trust model, but is still relevant here. Additionally, transparency of agents and systems helps engender situational trust. This is especially true where PPP are involved with respect to agents. It is also important in engendering trust in the electronic communication medium.
- **Knowledge and education:** Information concerning the benefits of egovernments and the measures taken to address any risks should be publicly available. Education of citizens as potential users of the e-government system is essential to attain a level of engagement that will lead to increasing knowledge based trust.
- **Security:** this is related to transparency, in that there needs to be reliable security in place in the electronic service delivery system to protect the data of the user. This security needs to be transparent or visible in order to engender trust.
- **Legislative protection:** Coupled with security provided at the technological level, there needs to be a protective legal framework, as mentioned above.
- The online environment: Perhaps the greatest challenge is to design an online environment that engenders trust. This is an immense area of study and there is a plethora of material available for guidance. Factors to address are; mitigating the affects of limited cognitive cues, security issues, the aesthetics of the environment, content and information, the needs of the user

and the nature of the service being delivered. We examine the main points in Appendix 5.

- **Accountability:** It is important to maintain human accountability within the framework of the electronically delivered service
- **Citizen engagement, responsive government:** Actively involving the public in the design and implementation of the service will help to engender trust. Consultation prior to roll out of an e-service is a useful method of engagement.
- **Citizen empowerment:** Providing the public with the intellectual tools to engage in the online environment will empower them. This lessens the power disparity between state and citizen thus helping to engender trust in e-government.

# **10 Distilled Guidelines**

This section gives a summary of the framework as a set of generic guidelines, usable by anyone, whether or not they have access to the SmartGov platform.

# **10.1 Processes in e-service delivery**

# **10.1.1** The e-service lifecycle

The key stages in the an e-service – often known as the 'e-service lifecycle' – are as follows:

- 1. Identify Service the key driving factor in choice of services is legislation.
- 2. Feasibility Study should consider cost, impact on existing business processes, timescales, and whether appropriate/adequate technology is available to implement the e-service.
- 3. Prepare Business Case primarily intended as a justification to management as to why an e-service is required, it can be useful to adopt an approach that can be readily extended to produce the specifications
- 4. Implement an iterative approach to implementation is generally deemed superior to sequential.
- Deploy the importance of communicating with staff is often underestimated in the deployment phase. Keeping staff informed, providing adequate training, and allowing opportunity for feedback will all greatly increase the chances of longterm success of a project.
- 6. Operate get the balance right between automation and the human touch. Put the processing in the hands of knowledgeable people when necessary.
- 7. Monitor and Improve both internal (from staff) and external feedback (from customers) should be periodically sought, and seen to be acted upon.
- 8. Discontinue impact on related services should be assessed before removing any components. There are also issues of archiving data accrued during operation of the service.

# **10.1.2** The context of e-services

The operation of an e-service within a public authority will be impacted upon by a number of factors. Important ones deserving consideration include:

- 1. Legislation particularly important is data protection.
- 2. Policy and Strategy.
- 3. Resources usually boils down to finance, but consider also how other (voluntary) agencies might be able to assist in delivery of an e-service.
- 4. Monitoring the Service:

- a. Assessing Quality in-house comparison against specified performance measures
- b. Assessing Satisfaction external feedback from users of an e-service, which can be conveniently achieved through online forms.
- c. Weighing up costs and benefits allocating responsibility for assessing benefits and justifying the sustainability of services.
- 5. Extra Value Services are there ways in which the electronic medium might be utilised to provide functions that enhance a service at little or no extra cost?

# **10.2Co-operation in e-services**

Principally,

- Be clear about the shared purpose
- Be clear about the justifications
- Be clear about the roles in co-operation
- Acknowledge complexity and learn to cope with it.

Do this in the context of overall good practices:

- Have a clear purpose and realistic, measurable expectations.
- Identify and understand all stakeholders.
- Commit to serious partnerships.
- Choose a well-skilled and respected project leader.
- Adopt tools and techniques to manage complexity.
- Recruit a balanced project team.
- Expect to assemble a mixture of resources.
- Communicate as if survival depends on it.
- Pay attention to work processes and practices.
- Demonstrate and refine ideas before implementing.

# **10.3 Social acceptance of e-services**

To assist social acceptance within the service delivery complex:

- have transparency of motivation
- have strong legislative framework
- educate users
- demonstrate benefits
- provide solid data security
- reward trusting and trustworthy behaviour

• adopt a human centred design approach

To assist social acceptance within society at large:

- have transparency of motivation
- have transparency in the online environment Why-is this required, What is it for, Who gets to see it, How is it protected
- have strong legislative framework
- provide the citizen or business customer with the skills needed
- educate about the benefits
- be accountable
- demonstrate safety and security of online transactions
- involve the citizen
- be culturally sensitive
- adopt a human centred design approach

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# Appendix 1. Workshop on social acceptance

# A1.1 Position statements

Before the participative part of the workshop, various participants made position statements about trust:

**Person 1** presented a broad view of the relevant features, with particular reference to e-voting. Main questions to be asked are:

- What must be accepted?
- Will the application be accepted by everyone?
- Why not to accept?

There are four levels of social acceptance:

- Generally accept the application as a new way of doing things... by demonstrating pilots and being transparent about the operation
- Get the first time users... by education and motivation (*e.g.* financial)
- Establish regular users... by recording special cases, improvement and customer management
- Increase user numbers... promotion, group targeting and user surveys

**Person 2** made us aware of the three main areas of interest in human-computer interaction research:

- accessibility
- usability
- acceptability

**Person 3** suggested that we take a view that focuses on people, then processes, then technology.

**Person 4** reminded us that there are two main sets of people on the "provision" side: local authorities and the people who build systems for them.

**Person 5** said that a big aspect of trust is the identity of the party that you need to trust. **Person 6** agreed: surveys have shown that people trust the Social Work department far more than the department that administers council tax.

# A1.2 Results: three models

# A1.2.1 A progression from users to technology

Group X's model was presented as a progression through:

users ...  $\rightarrow$  culture ...  $\rightarrow$  usability ...  $\rightarrow$  process ...  $\rightarrow$  legal ...  $\rightarrow$  technology

# Terms in each category were:

users→	culture→	usability→	process $\rightarrow$	legal→	technology
gender	cynicism	incentivisation	processes	recordable & verifiable	open source
young people	initial test	personalise	improving utility	data protection	system failures
digital divide	recent fiascos	semantics	feedback	safety & security	non-hackable
dissemination	perception	flexibility	current methods	accountability	compatibility
class	Big Brother	credibility	project length	transparency	
language		simplicity			
culture		fun			
		human empathy			
		not too glossy			
		beauty			

#### Some comments:

Suggest a culture change: think of people rather than users.

The importance of project development and project management is evident.

The progression suggests a problems  $\rightarrow$  solutions approach... a "shaky" way to look at the whole issue!

So, what is the driving force behind the whole exercise of service delivery? Money?

In fact, with reference to Group Z's model below — a systems view — the driving force may well be frequency of use or critical mass.

# A1.2.2 A broad grouping of concepts

Group Y's model was a broad grouping of loosely related concepts:

		vision			
how people feel	system requirements	access	ensuring usability	system features	
		trust applications			

Concepts in each group were:

 vision purpose, bureaucracy/fear, importance of service to individual, political risk, concept

# • **how people feel** reputation, reciprocity, recommendation from others, preconception, integrity, engagement (and lack of), harmonisation, understanding

Deliverable D71:

system requirements transparency, legality, accountability, legal reform, privacy

- access
  location, digital divide, community, culture
- ensuring usability efficient, ability to record, avoid repetition, support, education (employee & public)
- system features

accessibility, invisible, visibility, availability, security, trust, reliability (organisation and system), responsiveness

trust applications
 auctions, sport, gambling, newspapers, book shops, finding a present

# Some comments:

Above all there must be a vision that embodies the removal of barriers to access.

The category how people feel suggests separate aspects or perspectives: people and system.

The term political risk suggests fear of innovating, bureaucracy and the need for good education.

# A1.2.3 A systems view

Group Z produced a causal model view. Figure 24 is the original digital photograph from the workshop, which is redrawn in Figure 25:

- each of the nodes represents a quantity (perhaps measurable, perhaps not)
- each of the arcs represents a causal influence: as one quantity increases, another is caused to increase (no label on the arc) or decrease (a minus sign on the arc)

The existence of loops in these models indicates the possibility of interesting, often unpredictable, behaviour.

At the heart of this model is frequency of use or critical mass. There are potentially several subloops that are worth exploring.

#### Some comments

What constitutes critical mass? Is there a threshold frequency or percentage of people?

Frequency of use can be enforced, *e.g.* by providing only one way of achieving something. This in turn can lead to exclusion, as people opt out of using the apparently enforced tool.

Reputation seems a key feature of the main loop in this model. Perhaps this is the key to social acceptance?

Some researchers focus on satisfaction as the key to acceptance.

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A Framework for e-Government Services



Figure 24: a causal view of social acceptance — original from the workshop

Deliverable D71:



Figure 25: a causal view redrawn

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# Appendix 2. Workshops on services: service descriptions

We asked people to describe a service, either existing or planned, in whatever way was natural for them. We allowed the workshop participants to choose the service that they wanted to describe, large or small, general or specific.

We also gave them guidance on how to go about building a model:

- Start at the top level and work down:
  - motivation for the service (at strategic level)
  - stakeholders
  - aims and objectives
  - main operations and roles played in them
  - information and artefacts that are used, passed around or produced
  - special situations
- All the time, think of the essential concepts and the key terminology that you are using
- Extract the key terms and write them down
- Organise and structure the key terms in a meaningful way

Figure 26 - Figure 29 summarise the descriptions of services that were produced.

Figure 26 and Figure 27 show generic models of services across CEC.

Figure 28 on page 105 is a view of the role and operation of the Council Tax, which is a local property-based tax.

Figure 29 on page 106 shows a model of the "Equipment and Adaptations" service. This is the service that CEC is running as their pilot application on the SmartGov platform.

#### Deliverable D71:



Figure 26: generic model of service delivery

Figure 27 (next page): a generic view of customer services

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Figure 28: a public authority view of Council Tax

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#### A Framework for e-Government Services



#### Figure 29: the equipment and adaptations service

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# Appendix 3. Workshops on services: card sorts

Card sorting is a technique that is well-known in knowledge engineering. Its aim is to get access, without asking questions directly, to experts' conceptual knowledge of a domain. It uncovers almost exclusively declarative, structural knowledge, as opposed to procedural knowledge.

In the card sorts, people worked in groups of about 5 or 6. In total we performed the card sort four times. Each group was given a pack of the same 175 cards, each with a term that we were proposing might be relevant to public services. Each group was asked to sort the cards into whatever piles were meaningful for them. They were free to discard terms that they found irrelevant or not useful. We also allowed them to write new cards for any useful terms that we had not given them.

When the cards had been sorted, we then asked them to say on what basis the sort was made and what the piles represent.

Note that some of the groups, because of the time they spent in discussion about the cards and piles, did not manage to sort all of the cards given to them. In the results below the headings represent the card piles created by the users.

#### Card sort 1

Bin

thing

#### Delivery

activity, alternative, alternatives, attribute, authority, choice, choose, delivered service, develop, developer, feature, immediate, impression, improve, potential service, process, promoter, promotion, provide, provider, provision, receive, service, service delivery, service provider, services, system, transport provision

#### Info

applicable, application, apply, communication medium, eligibility, enquiry, form, inform, information, letter, mandate, officer, publication, requirement

#### Negative

actual fee, complain, complaint, consequences, cost of failure, delayed, dispute, failure, failure to fulfil contract, failure to meet need, fee, give payment, give tax, legal entity, licence, payment, penalty, requested fee, tax, tax payment

#### People

citizen, city, co-operation, competitor, customer, department, elect, electorate, market, market need, market segment, people, perceived need, potential customer, product, promote, public (adj.), public (noun), publicise, region, relationship, requester, resource, segmentation variable, staff, term of office, the system

#### Perform

advice, contract, legal, manage, market research, monitor, monitor activity, performance measure, services available, statutory, time interval, time line, time point, when

#### Positive

achieve, benefit, delegate, give, given, grant, help (assistance), incentive, rebate, response, reward, safety net, volition,

#### Service

activity specification, actual customer, assistance, budget, cultural provision, desire, direction of flow,

Deliverable D71:

education provision, environmental provision, equipment, experience, failure to satisfy contract, failure to satisfy desire, help (vb.), household, housing provision, issue, know, leisure provision, monitor achievement, need, perception, received, recipient, request, risk, social provision

#### Unknown

book, booking, contact, flow, front desk, how to do, processed, role

#### Card sort 2

#### **Bin/Unused**

acceptable state of affairs, actor role, alternative, consequences, feature, given, processed, provider, requester, segmentation variable, state of affairs

#### Communication media

brand, communication medium, contract, form, front desk, letter, promote, publication, publicise

#### **Council people**

achieve, achievement, authority, belief, co-operation, dispute, entity, how to do, incentive,

know, manage, manager, monitor achievement, officer, performance measure, promotion, relationship, responsibility, reward, security, staff, the system

#### **Customer does**

application, apply, book, booking, choose, complain, complaint, contact, dispute, elect, enquiry, give payment, know, rebate, receive, received, request

#### **Customer drivers**

desire, eligibility, failure to fulfil contract, failure to meet need, failure to satisfy contract, failure to satisfy desire, incentive, need, volition, voluntary, will

#### Fiscal

actual fee, book, fee, give tax, payment, penalty, requested fee, tax, tax payment

#### Image

acceptability, accessibility, accountability, credibility, image, impression, perception, public (adj.), public ownership, relationship, sense of security, situational trust, transparency, trust

#### Service delivery

achieve, improve, information, market need, market research, monitor, perceived need, requirement, resource, statutory

#### Service drivers

activity specification, applicable, budget, cost of failure, develop, failure, failure to meet need, know, legal, mandate, monitor activity, need, purpose

#### Services

activity, benefit, cultural provision, delivered service, education provision, environmental provision, grant, housing provision, leisure provision, licence, market, potential service, product, provide, provision, safety net, service, service delivery, services, services available, social provision, system, transport provision

#### Stakeholders

actual customer, citizen, city, competitor, contractor, council, customer, delegate, department, developer, electorate, household, legal entity, market segment, people, potential customer, promoter, public (noun), recipient, region, role, service provider

#### System

direction of flow, flow, information, know, process, risk, security, system, the system

#### Time
Deliverable D71:

## We give

activity, advice, alternatives, assistance, attribute, choice, equipment, experience, give, help (assistance), help (vb.), inform, issue, response

## Card sort 3

### Bin

delegate, the system, segmentation variable, situational trust

### Spine

electorate, term of office, elect, requester, council, cascade (info)\*, statutory, provide, purpose, promotion, enquiry, staff, department, relationship, manager, customer, service provider, market research, market need, education provision, complaint, failure to fulfil contract, services available, publication, promote, publicise, voluntary, co-operation, flow, performance measure, provider, potential service, potential customer, experience, risk

### The "All"

Public (noun), public (adj.)

### **Offshoot of spine**

Failure, role, social provision, sense of security

### Process (any point on spine overall relevance)

Service delivery, front desk, communication medium, manage, system, safety net, consequences, perception, provision, responsibility, services, service, process, resource

## Card sort 4

### 1 (unnamed categories)

sense of security (trust)

### 2

situational trust, competitor, accountability culture\*, actor role, feature, segmentation variable

## 3

citizen, people, relationship, impression, perceived need, perception, voluntary (local govt), contract, local authority\*, public ownership, accountability (pervasive), culture citizen\*, experience (previous)\*, tax payment, public (noun), trust, failure to fulfil contract, know

### 4

work practice\*, develop, application, know, issue, work environment\*, process, system, how to do, experience, trust (co-operation)\*, officer, work practice requirement\*, form, activity specification (work practice?), the system \*, received

## 5

legal (constraint define), requirement, statutory, term of office, duty\*

## 6

image, customer experience\*, accessibility, client\*, credibility, know, inform, promotion, promote, potential customer, how to do-customer info\*, promoter, direction of flow, external trust\*, understand\*, transparency

### 7

authority (management), credibility, partnership (trendy semi-formal)\*, risk, culture\*, manager, delegate, trust internal\*, accessibility management & communication\*, attribute (blame), job security\*, joint working\*, monitor achievement (performance training appraisal), co-operation (less formal)

## 8

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Deliverable D71:

services, compliment\*, complain, help (assistance), requirement\*, purpose, delayed, failure to meet need, social security\*, social provision, application (solve)\*, need, accessibility\*, transport provision, provision, product, monitor, environmental provision, booking, acceptability, customer (not citizen)\*, delivered service, service delivery, potential service, develop, leisure provision, alternative, know, management\*, resource, provider, accessibility, housing provision, trust delivery\*, recycled service\*, budget

# Appendix 4. The e-Government Service Ontology

## A4.1 Meta terms

**Entity** a fundamental thing in the domain being modelled

- **Relationship** the way that two or more Entities can be associated with each other
- **Role** the way in which an Entity participates in a Relationship
- Attribute a Relationship between two Entities (the "attributed entity" and the "value" entity) in which, within the scope of the model, for any particular attributed Entity, the Relationship may exist with only one value Entity
- **State of Affairs** a situation; it consists of a set of Relationships between particular Entities; it can be said to hold, or be true (and conversely to not hold and be false)
- Achieve the realisation of a State of Affairs, *i.e.* being made true
- Actor Role a kind of Role in a Relationship whereby the playing of the Role entails some notion of doing or cognition
- Actor an Entity that actually plays an Actor Role in a Relationship

## A4.2 Fundamental terms

Some terms that we found necessary to use were difficult to define in terms of the meta ontology. These terms are deemed to have definitions that are universal. Their meanings are assumed and are not defined by the ontology:

perceive, will, can, able, right, desire, value, principle, true, false, equal, increase, decrease, large, agree, similar, same, different, hold (have), must, required, legislation, expected, actual, in common

Wherever they are used in the ontology they are given in italics.

## A4.3 Relationships

**ACCEPTABLE:** a Relationship between a LEGAL ENTITY, a DESIRED State of Affairs and a *true* State of Affairs in which the two States of Affairs are *similar* 

**ACCESSIBLITY:** a Relationship between an Actor and an ACTIVITY SPECIFICATION in which the Actor is *able* to EXECUTE the ACTIVITY SPECIFICATION

**ACCOUNTABILITY:** a Relationship between LEGAL ENTITIES in which one *must* JUSTIFY their ACTIVITIES to the other

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**ADVICE:** ASSISTANCE in which the RESOURCE is INFORMATION

**APPLICATION:** a Relationship between two LEGAL ENTITIES in which one states its *desire* for a RESOURCE or AUTHORITY from another

**APPLY:** an ACTIVITY the EFFECT of which is an APPLICATION

**AUTHORITY:** a Relationship between a LEGAL ENTITY and an ACTIVITY SPECIFICATION in which the LEGAL ENTITY *has* a *right* to EXECUTE the ACTIVITY SPECIFICATION

**BELIEF:** a Relationship between a LEGAL ENTITY and a State of Affairs in which the LEGAL ENTITY holds the State of Affairs to be true

**BENEFIT (general):** an *increase* in some Attribute that is held by a LEGAL ENTITY to have *value* 

**BENEFIT (payment):** a STATUTORY PAYMENT by a PUBLIC AUTHORITY to a LEGAL ENTITY with the INTENDED PURPOSE of *meet*ing a NEED

**BOOK:** an ACTIVITY, the EFFECT of which is a BOOKING

**BOOKING:** a synonym of RESOURCE-ALLOCATION

**BRAND:** a name identifiable by CUSTOMERS associated with one or more SERVICES of a SERVICE PROVIDER

**CHOICE:** an ACTIVITY SPECIFICATION with the same PRECONDITIONS as another, but a different EFFECT

**CHOOSE :** an ACTIVITY in which the Actor uses *will* to reduce the number of ALTERNATIVES or CHOICES to one

**COMMUNICATION MEDIUM:** a Relationship between two LEGAL ENTITIES through which INFORMATION *can* be GIVEN

**COMPLAIN:** ACTIVITY in which a LEGAL ENTITY INFORMS another of FAILURE

**CONTACT:** a Relationship between two LEGAL ENTITIES, at least one of which *holds* the PURPOSE of INFORMING

**CONTRACT**:a Relationship between two LEGAL ENTITIES and an ACTIVITY SPECIFICATION in which the LEGAL ENTITIES *agree* to EXECUTE the ACTIVITY SPECIFICATION

**CO-OPERATION:** a Relationship in which at least two LEGAL ENTITIES *have* the same PURPOSE

**COST:** a *decrease* in a RESOURCE

**COST OF FAILURE:** a COST that is an EFFECT of FAILURE

**DELEGATE:** (as defined in the Enterprise Ontology) a kind of MANAGING ACTIVITY in which a RESPONSIBILITY or AUTHORITY is GIVEN to an Actor (usually at a lower level in a MANAGEMENT CHAIN)

**DEVELOP:** an ACTIVITY, the EFFECT of which is a SERVICE

**DISPUTE:** a Relationship in which two LEGAL ENTITIES do not *agree* about a State of Affairs

## **ELECT:** an ACTIVITY in which CITIZENS GIVE MANDATE

**ELECTRONIC SERVICE (e-SERVICE):** a SERVICE in which RESOURCES are PROVIDED ELECTRONICALLY

**ELIGIBILITY:** a Relationship between a LEGAL ENTITY and a SERVICE, indicating that the LEGAL ENTITY *has* the *right* to be the CUSTOMER in the SERVICE

**ENQUIRY:** ACTIVITY in which a LEGAL ENTITY states their *desire* for INFORMATION

**EXPERIENCE:** a Relationship between a LEGAL ENTITY and an EXECUTED ACTIVITY SPECIFICATION

**FAILURE TO FULFIL CONTRACT:** a Relationship between a State of Affairs and a CONTRACT in which the CONTRACT'S ACTIVITY SPECIFICATION was not EXECUTED

**FAILURE TO SATISFY DESIRE**: a Relationship between a LEGAL ENTITY and a State of Affairs in which a *desire* of the LEGAL ENTITY remains after EXECUTION of an ACTIVITY

**FAILURE TO MEET NEED:** a Relationship between a LEGAL ENTITY and a State of Affairs in which a *need* of the LEGAL ENTITY remains after EXECUTION of an ACTIVITY

**FLOW:** a synonym of GIVE

**GIVE:** an ACTIVITY, the EFFECT of which is that OWNERSHIP of a THING changes from one Actor to another

**GIVEN:** a Relationship between two LEGAL ENTITIES and a THING in which OWNERSHIP of the THING changes from one LEGAL ENTITY to the other

**GRANT:** a PAYMENT by a PUBLIC AUTHORITY whose INTENDED PURPOSE is to HELP a CUSTOMER

**HELP (vb.):** an ACTIVITY involving two LEGAL ENTITIES, in which the PURPOSE of one is to *increase* the ability of a NEED of the other to be *met* 

**HOW TO DO:** a synonym of ACTIVITY SPECIFICATION

**IMPROVE:** an ACTIVITY whose INTENDED PURPOSE is to *increase* a PERFORMANCE MEASURE of an ACTIVITY SPECIFICATION

**INCENTIVE:** synonym of REWARD

**INFORM:** an ACTIVITY in which an Actor GIVES INFORMATION to another Actor

**ISSUE:** an ACTIVITY in which a PUBLIC AUTHORITY GIVES a LICENCE or a RESOURCE to a LEGAL ENTITY

**KNOW:** NON-LEGAL OWNERSHIP of INFORMATION

**LATENT TRUST:** a Relationship between two LEGAL ENTITIES in which one has SITUATIONAL TRUST in the other in all possible ACTIVITIES in which the other could be an Actor

**LICENCE:** AUTHORITY to EXECUTE a particular ACTIVITY SPECIFICATION

**MANAGE:** (as defined in the Enterprise Ontology) the ACTIVITY of assigning PURPOSES and MONITORING their ACHIEVEMENT

**MANDATE:** a Relationship between a PUBLIC AUTHORITY and CITIZENS in which the CITIZENS GIVE AUTHORITY (to the PUBLIC AUTHORITY) to DEVELOP and PROVIDE SERVICES

**MARKET:** all SERVICES and POTENTIAL SERVICES

**MARKET NEED:** an identifiable NEED of CUSTOMERS that is not fully *met* by current SERVICES AVAILABLE

**MARKET RESEARCH:** an ACTIVITY whose PURPOSE is to KNOW *more* about a MARKET

**MONITOR:** an ACTIVITY, in which a LEGAL ENTITY uses a PERFORMANCE-MEASURE to IMPROVE

**NEED:** a Relationship between a LEGAL ENTITY and a State of Affairs that is the *difference* between the *true* State of Affairs and a defined *standard* State of Affairs

**PAYMENT:** an ACTIVITY in which a RESOURCE of *monetary value* changes OWNERSHIP between two LEGAL ENTITIES

**PENALTY:** a change in agreed EFFECTS of an ACTIVITY EXECUTED by a LEGAL ENTITY when another LEGAL ENTITY fails to ACHIEVE an ACTIVITY for which it *has* RESPONSIBILITY under a CONTRACT

**PERCEIVED NEED:** a Relationship between a LEGAL ENTITY and a State of Affairs that is the *difference* between the *true* State of Affairs and a State of Affairs *perceived* by the same LEGAL ENTITY

**POTENTIAL SERVICE**: a possible future SERVICE

**PROCESS:** an ACTIVITY SPECIFICATON

**PROMOTION:** an ACTIVITY whose primary PURPOSE is to *improve* the IMAGE (of a SERVICE, BRAND or SERVICE PROVIDER)

**PROVIDE:** ACTIVITY in which a RESOURCE is GIVEN

**PROVISION:** a Relationship in which a LEGAL ENTITY PROVIDES to another

**PUBLIC (adj.):** a Relationship between the PEOPLE and a THING in which the PEOPLE *have* OWNERSHIP of the THING

**REBATE:** a PAYMENT by a PUBLIC AUTHORITY to a LEGAL ENTITY that *has* GIVEN too large a PAYMENT

**RECEIVE:** see GIVE

**RECEIVED:** see GIVEN

**REQUEST:** an ACTIVITY in which a LEGAL ENTITY INFORMS another of its *desire* for a RESOURCE

**RESPONSE:** an ACTIVITY EXECUTED by the LEGAL ENTITY that *has* RECEIVED an ENQUIRY or APPLICATION

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**RESPONSIBILITY:** a Relationship between a LEGAL ENTITY and an ACTIVITY SPECIFICATION in which the LEGAL ENTITY *must* ensure the ACHIEVEMENT of the ACTIVITY SPECIFICATION

**REWARD:** a RESOURCE, AUTHORITY or RESPONSIBILITY GIVEN by one LEGAL ENTITY to another on ACHIEVEMENT of an ACTIVITY for which the other LEGAL ENTITY *has* RESPONSIBILITY

**RISK:** a Relationship between a LEGAL ENTITY and an ACTIVITY or ACTIVITY SPECIFICATION indicating a level of BELIEF in the likelihood of ACHIEVEMENT of a State of Affairs

**SATISFACTION:** a Relationship between a LEGAL ENTITY and a State of Affairs in which the LEGAL ENTITY *perceives* the State of Affairs to be ACCEPTABLE

**SENSE-OF-SECURITY**: a Relationship between a LEGAL ENTITY and a State of Affairs in which the LEGAL ENTITY BELIEVES that the State of Affairs is SECURITY

**SERVICE** an *agreement*, possibly tacit, between a PUBLIC AUTHORITY and CUSTOMERS, for the PUBLIC AUTHORITY to PROVIDE RESOURCE(s) with the PURPOSE of meeting a NEED

**SITUATIONAL TRUST:** a Relationship between two LEGAL ENTITIES and an ACTIVITY (that one of them will EXECUTE or has EXECUTED), in which the other LEGAL ENTITY *has* BELIEF that the EFFECTS are or will be ACCEPTABLE

**TRANSPARENCY:** a Relationship between a PUBLIC AUTHORITY, a CUSTOMER and a THING in which the CUSTOMER KNOWs about the THING

**VOLITION:** a Relationship between an Actor and an ACTIVITY SPECIFICATION in which the Actor can CHOOSE to EXECUTE the ACTIVITY SPECIFICATION or not

# A4.4 Entities

**ALTERNATIVES:** ACTIVITY SPECIFICATIONS that are *different* from each other but have the *same* EFFECT

ASSISTANCE: a RESOURCE GIVEN during HELP

**CITIZEN:** a PERSON to whom a PUBLIC AUTHORITY is ACCOUNTABLE

**CITY:** a REGION

COUNCIL: a PUBLIC AUTHORITY

**DEPARTMENT:** an ORGANISATIONAL UNIT within a PUBLIC AUTHORITY

**DOMAIN:** a set of Entities and Relationships with something *in common* 

**HOUSEHOLD:** a LEGAL ENTITY of one or more PERSON

**INFORMATION:** a RESOURCE that is not *consumed* 

**OFFICER:** a PERSON with RESPONSIBILITIES in a particular DEPARTMENT

**PEOPLE**: synonym of PERSON

PUBLIC (noun): synonym of CITIZENS

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**PUBLIC AUTHORITY**: a LEGAL ENTITY that *has* RESPONSIBILITY for PUBLIC ACTIVITIES

**REGION:** a geographically bound LEGAL ENTITY within which a PUBLIC AUTHORITY has RESPONSIBILITY

**STAFF:** a PERSON with RESPONSIBILITIES in a PUBLIC AUTHORITY

**SYSTEM:** a MACHINE

**TERM OF OFFICE:** the TIME INTERVAL during which a PUBLIC AUTHORITY *holds* a MANDATE

**THE SYSTEM:** all of the Entities and Relationships in a PUBLIC AUTHORITY

# A4.5 State of Affairs

**APPLICABLE:** a State of Affairs in which a Relationship *exists* between an Attribute and an Entity

**BUDGET:** a State of Affairs that defines RESOURCES

**COMPLAINT:** a State of Affairs that is an EFFECT of a COMPLAIN ACTIVITY

**FAILURE:** a State of Affairs in which an EXECUTED ACTIVITY is *different* from its ACTIVITY SPECIFICATION

**IMAGE:** a set of properties that a CUSTOMER believes to be true of a BRAND, SERVICE or SERVICE PROVIDER

**IMPRESSION:** a State of Affairs that is a set of Attributes about THINGS that a PERSON *perceives* 

**PROCESSED:** a State of Affairs in which an ACTIVITY *has* been EXECUTED

**QUALITY:** a State of Affairs that is set of measurements relating to the *actual* EFFECTS of the EXECUTED ACTIVITY and the *expected* EFFECTS of its ACTIVITY SPECIFICATION

**REQUIREMENT:** a synonym of PRECONDITION

**SECURITY:** a State of Affairs in which only DESIRED RELATIONSHIPS are *true* 

**SERVICES AVAILABLE:** a State of Affairs in which a PUBLIC AUTHORITY offers to deliver SERVICES to its CUSTOMERS

**SERVICE DELIVERY**: a State of Affairs in which a particular CUSTOMER is receiving the SERVICE

## A4.6 Roles

**ACTUAL CUSTOMER:** the Role of the LEGAL ENTITY RECEIVING a SERVICE

**ACTUAL FEE:** the Role of the RESOURCE agreed to be GIVEN by the ACTUAL CUSTOMER to the SERVICE PROVIDER in exchange for the SERVICE in a DELIVERED SERVICE

**COMPETITOR:** a Role of a SERVICE PROVIDER in a Relationship with another SERVICE PROVIDER whereby one offers one or more SERVICES AVAILABLE that

could limit the SERVICES DELIVERED of one or more SERVICES of the other SERVICE PROVIDER

**CUSTOMER:** the union of POTENTIAL CUSTOMER and ACTUAL CUSTOMER

**DELIVERED SERVICE:** the Role of the RESOURCE that is GIVEN by a SERVICE PROVIDER

**DEVELOPER:** a Role in which an Actor DEVELOPS

**DOMAIN EXPERT:** a Role in which a PERSON KNOWS more than most other PEOPLE about a DOMAIN

**ELECTORATE:** the PEOPLE who ELECT the ELECTED BODY

**END USER:** an ACTUAL CUSTOMER of an e-SERVICE

**EQUIPMENT:** a Synonym of RESOURCE

**FORM:** a COMMUNICATION MEDIUM between a PUBLIC AUTHORITY and a CUSTOMER in which specific INFORMATION is REQUESTED and the GIVING of INFORMATION is DELAYED

**FRONT DESK:** a COMMUNICATION MEDIUM between a PUBLIC AUTHORITY and a CUSTOMER in which the PUBLIC AUTHORITY is represented by a PERSON and the GIVING of INFORMATION is IMMEDIATE

**HOUSING/EDUCATION/LEISURE/TRANSPORT PROVISION:** a Role of a PUBLIC AUTHORITY in which it has STATUTORY RESPONSIBILITY to *meet* CITIZENS' NEED for housing/education/leisure facilities/to move within the REGION

**IT STAFF:** STAFF with RESPONSIBILITY for IT

**LETTER:** a COMMUNICATION MEDIUM between a PUBLIC AUTHORITY and a CUSTOMER in which the GIVING of INFORMATION is DELAYED

**MANAGER:** a Role in which an Actor MANAGES

**PERFORMANCE-MEASURE:** a measure of how an ACTIVITY is ACHIEVING the INTENDED PURPOSE of its ACTIVITY SPECIFICATION

**POTENTIAL CUSTOMER:** any LEGAL ENTITY who may become an ACTUAL CUSTOMER

**PRODUCT:** (as defined in the Enterprise Ontology) the Role of a RESOURCE in a FOR-SALE Relationship

**PROVIDER:** a Role in which a LEGAL ENTITY PROVIDES

**PUBLICATION:** a COMMUNICATION MEDIUM in which a PUBLIC AUTHORITY GIVES INFORMATION to its CUSTOMERS

**PURPOSE:** (as defined in the Enterprise Ontology) a Role of a State Of Affairs

**RECIPIENT:** a Role in which a LEGAL ENTITY becomes the new OWNER of a RESOURCE

**REQUESTED FEE:** the Role of the RESOURCE being REQUESTED by a SERVICE PROVIDER in exchange for SERVICES AVAILABLE

**RESOURCE:** (as defined in the Enterprise Ontology) a Role of an ENTITY in a Relationship with an ACTIVITY whereby the ENTITY *is* or *can* be used or consumed during the ACTIVITY

**SAFETY NET:** a Role of a PUBLIC AUTHORITY in which it *has* STATUTORY RESPONSIBILITY to PROVIDE RESOURCES to CUSTOMERS that *have* a NEED that cannot be *met otherwise* 

**SERVICE PROVIDER:** the Role of the LEGAL ENTITY who offers to DELIVER, or actually DELIVERS, the SERVICE

**SERVICE WORKER:** a PERSON who EXECUTES an ACTIVITY SPECIFICATION of a SERVICE

**SOCIAL/ENVIRONMENTAL/CULTURAL PROVISION:** a Role of a PUBLIC AUTHORITY in which it has STATUTORY RESPONSIBILITY to *meet* CITIZENS' NEED for social/environmental/cultural well-being

**TAX:** a STATUTORY PAYMENT to a PUBLIC AUTHORITY by a LEGAL ENTITY in return for SERVICES

# A4.7 Attributes

**DELAYED:** an Attribute of an ACTIVITY in which T-End is *greater* than T-Begin

**ELECTRONIC:** an Attribute of a COMMUNICATION MEDIUM in which INFORMATION is GIVEN through a computer or similar device

**FEATURE:** an Attribute of a SERVICE which may *meet* a NEED of a CUSTOMER

IMMEDIATE: an Attribute of an ACTIVITY in which T-End is equal to T-Begin

**LEGAL:** in accordance with the law

**STATUTORY:** required by law

**VOLUNTARY:** an Attribute of an ACTIVITY whose Actor has VOLITION

# Appendix 5. Engendering trust in the online environment: Guidelines for web presence design

Trust within the online environment will be situational. This is an arena of individual instances of communication between either agents co-operating in service delivery, or service receivers and these agents. The environment needs to be a conduit of knowledge based trust for the most part, and institutional, identification and culturally based trust to lesser extents. This appendix is concerned with methods of engendering situational trust between actors communicating within the electronic environment.

# A5.1 Appearance

Except for people with impaired vision, most online communication is visual and largely textual, with graphical information playing an augmenting role. Apart from this graphical element, there is no non-verbal communication. Thus the website should be designed to engender trust within this limited cognitive context.

Many existing theories in visual marketing apply and should be borne in mind. In this sense, much of the work carried out in the world of e-commerce on engendering online trust is significant too.

The following are examples of current thought on designing web sites that engender trust:

http://www.ascusc.org/jcmc/vol5/issue2/jarvenpaa.html

http://www.computing.co.uk/News/1136431

Considerations should include the following:

- **Brand image**: Emulate public authority's existing image, ensure that this images conveys a sense of professionalism and reliability or trustworthiness [81]. This is of particular concern where the target audience or user is the public service receiver. It is still worth bearing in mind when designing an inter-organisational interface.
- **Simplicity of design**: Keep design easy to understand, helping enable confidence and self trust among users.
- **Professional look**: As with brand image, use a consistent style through out. Use a well-structured layout with logical navigation to give an impression of reliability.
- Socio cultural sensitivity: Consider the socio cultural character of the target audience <a href="http://optimum-web.co.uk/eupa/smith.ppt">http://optimum-web.co.uk/eupa/smith.ppt</a> and design the online environment accordingly.
- Effective communication: Ensure that all required information is communicated effectively. Ensure that it is relevant and concise. Present this information in a manner that engages the user, and takes as little time and effort as possible form the user, to understand.

- **Transparency and visibility**: Ensure that any processes involved are visible to the user, *i.e.* keep the user informed in real time as to what is happening in any automated parts of the interface.
- Human centred approach: Involve citizen/customer in the development of the interface. Design to meet the needs of the user, not the needs of IT staff or back office systems. <u>http://www.e-envoy.gov.uk/oee/oee.nsf/sections/webqualitybrief-design-</u> framework/\$file/03.htm

# A5.2 Content

Content also has an effect on trust in the online environment.

- **Transparency**: Ensure that all relevant information is contained and that all information contained is relevant. Anticipate likely questions and provide answers. Clearly explain what information is required of the user, and why. State the purpose of the site clearly on the home page, explaining how to use the site and where to get the information required. Explain what agencies will have access to data entered and why.
- Feed back: As mentioned above, feedback of information when some background process is being executed, is very useful in maintaining user confidence and attention.
- Accountability and responsibility: Include contact information and a complaints redress procedure.
- **Data Security**: Include security and privacy information. See next heading

# A5.3 Security and privacy

Highlight the security provision on the site. User confidence can be increased using recognised external certification, which can be displayed on the site. Clearly outline the privacy policy and explain how information submitted by the user will be used, and by whom. Also, explain the rights of the user with respect to this information and, where possible, provide links to information on the relevant legislation. At all stages in a transaction, demonstrate that the information being transferred is secure. Do use secure encryption methods and explain these. Clearly mark secure areas of site as different from rest of site. Give links to legislation where appropriate. Provide receipts for all transactions both immediately and by e-mail.

Below are some links to sites dealing specifically with this issue.

http://www.ctg.albany.edu/publications/reports/inet\_security\_seminar/inet\_security\_s eminar.pdf

http://www.rsasecurity.com/solutions/government/index.html

http://www.ukonlineforbusiness.gov.uk/cms/template/infor-security.jsp?id=212908

http://www.cl.cam.ac.uk/~rja14/econsec.html

The UK Office of the e-Envoy states:

There are four principles that are essential for safe electronic transactions.

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- Confidentiality: Keeping information private.
- Integrity: Ensuring information has not been changed or manipulated.
- Non-Repudiation: The individual who undertook the transaction cannot subsequently deny it.
- Authentication: Confirming the identity of the individual who undertook the transaction.

# A5.4 Feedback and status tracking

Include as much information flowing back to the user as possible. This not only keeps the user informed but also helps also to achieve communication that is more direct. The site should provide access to service request status tracking. This is best provided directly on the site and combined with e-mail confirmation of each stage of order or service request. Provide clear contact details on all pages, showing formal system for contact in the event of failure of service, delay *etc*. State the expected completion or delivery time for the service being requested and provide information about any current delays or other factors that may affect service delivery.