# Evaluating the impact of local e-services



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This report discusses methods and approaches municipalities and governments can use for evaluating e-services, both prior to their design and implementation and to assess their success following deployment. It presents a new evaluation model for e-services that is developed from models currently used in government and the research community.

### 1. Introduction

Over the last decade a growing number of public administrations have adopted e-services to provide their customers with electronic access (via the web, email, mobile phone even interactive digital television) to a wide range of public services. E-services promise cost savings, increased operational efficiency and improved customer service for citizens and businesses, although these benefits must be balanced against the need for costly, timeconsuming and complex development and implementation activities.

It is easy to believe that e-services are silver bullets for public administrations, and to forget that many public services would be impossible or prohibitively expensive to migrate to electronic platforms. To ensure that taxpayers' money is used efficiently it is essential to evaluate the benefits and costs both before an e-service is developed and once it is implemented.

An e-service evaluation can take place at a number of different geographical and organisational levels, i.e.:

- national or international (macro) level,
- sector level (e.g. in health care),
- municipal or organisational level,
- department level, and
- e-service (application) level.





This report is primarily focused on how to evaluate specific e-services – at the application level. Most people would agree that evaluation is important: you need to understand the monetary, organisational, managerial and social impact of e-services. But evaluation is not a simple, straight forward activity. Firstly, it is widely recognised that the effects of IT are difficult to estimate and measure, partly because so many of these effects are intangible. Secondly, evaluation is never 'value-free' – every evaluation comes from a particular perspective and results may be used in different ways by different stakeholders to reflect their own interests. Thirdly, there is no obvious 'best practice' approach for evaluating e-services - every method you can use has its own strengths and weaknesses. Finally, evaluation maybe costly and time-consuming.

Despite these shortcomings, evaluation remains a critical part of e-service implementation and development. Evaluation enables public administrations to judge the pros, cons and motivations for any proposed e-service, and also enables them to draw up a set of metrics for measuring success. This report describes a model for evaluating e-services, based on existing governmental evaluation models and academic research (see Figure 1). It is important for public administrations to use their resources efficiently, so we recommend that organisations use this proposed model as a starting point – and inspiration – to develop their own, more suitable evaluation models (in which evaluation processes with evaluation factors, working methods, guidelines and check lists are specified).



Figure 1: The evaluation process – based upon Dahlgren, L. E., Lundgren G. and Stigberg, L. (2003).

This model may be used even before an e-service is developed to assess the proposed e-service's feasibility. It can also be followed once the e-service is running to evaluate the e-service's effects and impact.

The model consists of 10 steps divided into three phases: the preparation phase, the execution phase and the quality assurance phase (see Figure 1). This structure is a modification of the PENG model (Dahlgren, L. E., Lundgren G. and Stigberg, L. 2003). The PENG model was originally developed to evaluate the net benefits of an IT-related investment. The steps of the PENG model have been slightly modified and extended with ideas that have been taken from theoretical and practical experience of using other evaluation models.

The following chapters describe the different phases and steps of this evaluation model.

### 2. The preparation phase

As every DIY enthusiast knows, preparation is everything. The preparation phase of the evaluation model is an essential part that helps to ensure that the evaluation generates reliable and useful results.

#### 2.1 Clarify the purpose of the evaluation

The purpose of an evaluation will vary, depending on when it is performed in the service development and delivery process.

#### **Pre-adoption evaluations**

If the evaluation is done before the development and adoption of an e-service, its aim is usually to assess the pros and cons (e.g. the benefits and costs) of a proposed e-service. This type of evaluation will attempt to clarify why an organisation wants to adopt a specific e-service, and whether the service is feasible. At this early stage, an evaluation may also be used to identify candidates for e-service development and to prioritise which public services should be the next to go online. In some cases the results of an evaluation may help to ensure an organisation's support and commitment for e-service developments during their development and implementation.

It is important to recognise that a formal, theoretical evaluation of an e-service prior to its adoption also paves the way for better development and deployment. The evaluation should provide a solid foundation - it can identify different perspectives on service delivery and actually increase the benefits and impact of a new e-service as the evaluation exercise raises awareness and helps to motivate employees and other stakeholders to support the development of an e-service. Strictly speaking, these 'pre-adoption' evaluation are not proper evaluations per se (most of the data they use will be estimates rather than measured data) but their value should not be ignored. However, before undertaking a pre-adoption evaluation it is essential that the reasons behind the development of an e-service (cost savings, easier access for citizens, greater reliability, etc.) are clear.





#### **Development stage evaluations**

Evaluations may also take place during the development process, for example before 'toll gates' or decisions points. Evaluations at this stage are generally focused on controlling the progress of the development and ensuring that the e-service project runs to time, to cost and delivers a quality result. An evaluation can identify problems and bottlenecks and help project managers make any necessary adjustments to the project plan.

#### **Post-adoption evaluations**

An evaluation can also be run following the deployment of an e-service. Here the primary goal is to assess the usage and impact of the e-service. For example, the evaluation may check whether the e-service fulfils its goals, meets its specifications or actually realises the cost savings/benefits envisaged at the outset of the project. In other words, post adoption evaluation tries to answer the question: was this development of this e-service worthwhile?

The results from a post adoption evaluation indicate the state of play for the e-service and can therefore be used to identify any changes or additional work which may be required to increase customer value or steer the e-service towards its specified goals (perhaps through training or marketing). A good post adoption evaluation therefore builds a platform for improvements and efficient operations.

#### 2.2 Identify stakeholders and evaluators and create insight

It is also vital to identify all the stakeholders connected with the e-services being examined so that their perspectives can be included in the evaluation. Potential stakeholders include:

- · citizens,
- · other individuals who are 'customers' or service users (e.g. tourists),
- businesses,
- employees of the public administration,
- other government agencies,
- politicians,
- · suppliers and partners,
- · researchers and statisticians, and
- society as a whole.

Each of these stakeholder groups will have their own perspectives, needs/ requirements and prerequisites for each e-service. The exact set of stakeholders will vary depending on the purpose of the evaluation and the service in question, although it is always important to identify and approach the e-service's primary target group.

Once you have identified the stakeholders, it is time to form the evaluation team. A group of five to eight people is generally a suitable size for work of this kind, although numbers will depend on the purpose of the evaluation, the e-service in question, and the previous experience of the team members. It is vital that the group include both decision makers (managers) and 'service experts' (i.e. employees with significant knowledge and experience of the service in question).

Perhaps the biggest question organisations face at this stage is whether the evaluation should be conducted internally or handled by external experts. By forming an internal evaluation team the organisation will have evaluators who are are well acquainted with the organisation, the service in question, the different stakeholders and underlying motivations and objectives for the evaluation. This 'tacit knowledge' should help the evaluation to be thorough, probing and to stick to its brief.

However, there is a risk that an internal evaluator may confuse their roles as an employee and as an evaluator. It is difficult to take a fully objective stance, so problems or failures of the e-service may be diminished or overlooked and the benefits may be exaggerated (or vice versa depending on the person's interests and perceived expectations). Internal evaluators may also lack the necessary experience to perform their role adequately.

To avoid these problems of bias it is often beneficial to out-source an evaluation to external consultants. External evaluators tend to be more impartial, objective and more balanced in their insights as there is a distance between them, the e-service in question and the people involved. However, out-sourcing an evaluation is not only expensive, but the hired consultants may lack the necessary background knowledge or have little motivation to engage with the evaluation or stimulate engagement among stakeholder groups. Finally, an external evaluator may have difficulties in communicating results to the organisation.

#### 2.3 Define the evaluation object

Although clarifying the purpose of the evaluation will provide a framework for the work, it is important (even though it sounds obvious) to define explicitly the object of the evaluation. Both the evaluation team and other stakeholders should have a consensus on what is actually being evaluated. To come to this consensus you will have to answer questions such as:

- What is included and what is not included in the evaluation?
- · Are we studying all e-services in a department, or a specific e-service?
- If we are studying just one e-service, where do the business processes of the service begin and end?
- · Who are the internal and/or external 'customers'?
- · What do the different concepts stand for?
- Are we using the same terminology? Do we, for example, mean the same thing when we talk about a "customer" or a "completed task"?





### 2.4 Describe the evaluation object

It is important to describe an e-service in a way that encourages people to use it. If users perceive some value in using an e-service they will be more likely to start using it or use it more frequently.

Services may be categorised as:

- Key services which are frequently used and highly valuable for the user
- Primary services which are highly valuable for the user
- Secondary services which are of low value for the user

When classifying services according to this system you need to bear in mind the target group - a key service for one group may be a primary or secondary service for another. Services will usually co-exist in clusters where a key service often drives the use of related primary and secondary services. One example of this is the library catalogue. The ability to see and search an online library catalogue is a key service for the library's customers while an online book reservation service is probably only a primary service (valuable but not frequently used) for most people.

The business process(es) of the e-service in question should also be described and modelled (if this has not already been done by the organisation). These process descriptions make it easier for an evaluation to produce estimates of time savings or reductions in complexity that an e-service may be able to offer.

Describing the process(es) behind an e-service is relatively straightforward. First you define the initiator (the actor 'triggering' the service operation) and the customer(s) of the service (the external or internal actor that benefits from the result). Then you identify the activities that build up the process and the order in which these processes must be carried out. Each activity should produce an output that will be used in the next activity until you finally produce an end result.

The output of each activity should be described, along with the process' initial trigger and the final output. The resources required by and used in the process may or should also be defined. Figure 2 shows an example of how a business process may be described graphically.



Figure 2 - a business process model

The description of your e-service should include a lot of detail, for example the goals, strategies, laws, regulations and other conditions that delimit the development of the e-service.

As you describe and delimit the evaluation object, it may be helpful to think of its existence on three different levels:

- the strategic level,
- · the business process or task level, and
- the systems level.

An e-service (or indeed an entire organisation) functions well when these three levels are integrated. The strategic level covers issues such as goals, regulations and decisions about target 'customers' (i.e. a service's main clients). Decisions about the service offering (and the mix of services that are available), the customisation or personalisation of services, and the allocation of resources to an e-service are all part of the strategic level.

The business process or task level focuses on the planning, organising and execution of business processes and activities to deliver value to the customers. Any 'special cases' or variants of a business process may be listed at the process level.

Finally, the systems level describes all the necessary information systems and ICT (software, middleware and hardware) which will enable an e-service to be built and delivered. Systems must also provide adequate security and privacy for users and integrate both internally with other information systems, and externally with other government agencies or businesses (Figure 3).

The model in Figure 3 shows the steps that are needed to describe the object of an evaluation in detail. The arrows highlight the need for interaction between the levels, and make it clear that if changes occur at one level then the possible consequences for the other levels should then be taken into account.





Figure 3 - Defining the evaluation object at three levels

#### 2.5 Selecting the evaluation strategy

The evaluation has been scoped, the brief agreed and the people are raring to go. But before you start, it is good to choose a strategy. At least two different types of strategies are common in evaluations:

- Goal based strategies aim to measure to what extent the e-service(es) fulfils specific goals (e.g. organisational goals, goals for e-government, even national or transnational (EU) goals and targets)
- Criterion based strategies only pre-selected criteria (e.g. user satisfaction, interface design) are evaluated.

You can only follow a goal based strategy if you know the explicit and measurable goals against which the evaluation will be compared. The advantages of using a goal based strategy are that it provides information on how an e-service may be contributing to higher level goals as well as specific e-service/e-government goals. All of the activities in an organisation should contribute to the organisation's goals so this evaluation strategy can provide some insightful results on wider organisational issues.

However, a goal based strategy is not without shortcomings. For example, this approach will not take into account any benefits or costs which are not connected directly to the goals against which the e-service is being evaluated – even though these factors may be important for the customers.

The drawbacks of a goal based strategy can be balanced by following more than one strategy. There are also other strategies such as the goal free strategy where the evaluation tries to identify benefits, costs and problems without starting with a pre-defined set of goals or criteria against which to evaluate.

The choice of the evaluation strategy will also be affected by the use of quality systems or management systems in the organisation. For example, if the organisation uses Balanced Scorecard (BSC) or Business Process Management (BPM) for its quality assurance, any e-service evaluation should preferably reflect the thinking behind these approaches.

## 3. The execution phase

In the execution phase the evaluation gathers and analyses data to produce a set of measurements on the e-service.

#### 3.1 Identify measurements

So which aspects of the evaluation object do you wish to measure? What data, which numbers will provide the best insight into the most important costs and benefits related to the e-service you're evaluating?

If the evaluation team adopts a goal based strategy it is relatively easy to identify the measurements which need to be made, although post-adoption evaluations should also take measurements for the goals specified during the early development of the service.

If the evaluation takes a criterion based strategy, there are three things which need to be measured: time, cost and quality. The evaluation should look at the time it takes different stakeholders to complete a task, the cost of migrating to an e-service and the improvements (if any) in the quality of the service that come from this transition. You could for example evaluate time, cost and quality from the customers' perspective or from the organisation's perspective (or indeed from the perspective of any of the stakeholders listed in section 2.2 - Identify stakeholders and evaluators and create insight. Alternatively, it may be appropriate to focus more on the systems level (i.e. IT, see Figure 3).

In pre-adoption situations a suitable first step may be to let the members in the evaluation team identify potential benefits, problems and costs in a brainstorming session. Other stakeholder could contribute to the evaluation with their own suggestions for indicators that measure service delivery. There are many different ways to evaluate time, cost and quality (see Figure 4).

Once the metrics have been selected, they should each have the following descriptions:

- · Objective describe in words the purpose of selecting this measurement
- Measurement type percent, numbers, nominal, ordinal, interval scale, etc.
- Target what are the target values (expressed in the chosen measurement type)?
- Follow-up responsibility which department and/or actor is responsible for following up and acting on the measurement results?

If, for example, the evaluation team decided to measure the customer or citizen's perspective on a service by measuring customer satisfaction, the indicator they use could be the percentage of customers who complain about the e-service. The service level or target may be that no more than 5% of all users of a specific service make a complaint about the service, and the process owner of the service in question may be assigned the responsibility for achieving the target and following up on any findings from the evaluation.





When identifying suitable indicators for an e-service it is also useful to bear in mind that the organisation may already have a number of key performance indicators (KPIs) which it uses to evaluate and benchmark e-services and the service levels between departments or even between organisations.



Figure 4 - examples of evaluation factors for time, cost and quality

Post-adoption evaluations often use focus group interviews with representatives from different stakeholder groups. The questions that are asked in these interviews should be closely related to the purpose of the e-service or organisational unit in question. For example, if the main purpose of the e-service is to increase democracy, then this topic should be the main focus of the conversation in the focus group.

We have already explained that one of the best ways to identify and structure evaluation factors is to start from the interests of different stakeholders. Figure 5 shows an example of how a 'three level model' can be used to identify relevant evaluation factors for different stakeholders and levels (strategy, process and systems). At the strategy level the overall (e-)service effects or benefits are evaluated. At the process level the efficiency, cost and quality in the service operations (service delivery) are scrutinised. The systems level focuses on how the information systems and the website, for example, affect efficiency, cost and quality.

The evaluation factors in Figure 5 are just examples. The factors that you use in an actual evaluation need to be chosen depending on the purpose of the evaluation, the evaluation object, the target group for the evaluation and the evaluation strategy that has been chosen. It is important to remember that the evaluation method will also influence the evaluation factors: it is possible to measure qualitatively some factors using numerical data (e.g. number of tasks, time from initiating to completing a task etc.), but some factors can only be measured by asking the respondents to describe the value of a benefit or to assess its magnitude on a fixed scale.

	Organisation	Customers	Employees
Strategy level			
	Coherency with legislations, goals and strategies     E-service adoption and use     Target customers reach     Service offerings     Customer relationship     Cost savings     Resources	Relative advantage     Customer acceptance and     satisfaction     "Service access     "Service quality     Democracy & participation	-Relative advantage -Employee acceptance and satisfaction -Empowerment & influence -Decision quality -Working conditions
Process level			
	Number of errands     Time for handling of errand     Quality of input and output     Cost for education/training,     marketing and business     process reengineering	•Ease of use •Time saving •Flexibility & personalisation	•Ease of use •Time saving •Improved workflow
System level			
	System performance     Development costs     Hardware costs     Maintenance costs     Systems integration	•Web site design •Ease of navigation and information retrieval •Information quality •Security and privacy	•Ease of navigation and information retrieval •System performance •Information quality •System quality

Figure 5 - examples of evaluation factors grouped by stakeholder and levels

When a number of benefits or goals (goals are desired or planned benefits) are identified the evaluation team should sort them into categories, refine their definitions if necessary and remove duplicates.

The benefits can also be visualised graphically to show dependencies between them. In Figure 6 the overall benefit or goal is placed on the left. This is fulfilled by meeting the appropriate objective to the right of the goal. The success of these factors depends on meeting further sub-sets of benefits or goals, which are to the right of the objectives. In this way you can see how broad benefits or goal (on the left of the figure) can be met by addressing the more specific and detailed factors that are linked to it. The example in Figure 6 is for a potential new e-service that orders equipment to help customers with a disability. Here each goal or benefit should ideally be measured prior to the evaluation as a benchmark 'as-is' measurement. The target's ideal end state/situation should also be defined.







Figure 6 - Goal/benefit dependencies

#### 3.2 Measuring or valuing the benefits

In a post-adoption e-service evaluation it is usually possible to collect quantitative and qualitative measurements from systems statistics, surveys, interviews, focus groups, etc. In pre-adoption evaluations or feasibility studies only the present state of a service may be quantified – the effects of the adoption can only be estimated in advance. As a general rule it is good to measure everything that can be measured, and to only use estimates for things that cannot be measured in any way. It is always better to use facts and numbers and to minimise the use of estimates and projections.

As we have already seen, a common way to evaluate the benefits of adopting an e-service is to assess how much time and money the e-service can save stakeholders when compared with other channels for service delivery. You therefore need to know the number of service requests that the service has to process, and will then have to estimate how or if this number is expected to change over the next few years. You will then have to estimate how many of these requests can be reasonably expected to be handled via an e-service, and whether the presence of the e-service will actually increase the overall demand for the service. The degree of take-up or the switch over to an e-service is difficult to forecast. Naturally, marketing and communication activities can affect this tranistion, but the users' perceptions of the service in question will also affect their channel choice. For basic, information-based and low value services, ease-of-use is a top priority which favours online services. For more important and personalised services, the choice of channel will depend on whether a user thinks the channel will deliver what they want.

If you really want to find out the difference an e-service makes, it is important to measure or estimate how much time it takes to handle a service request via traditional channels and compare them with how they will be handled by an e-service. The cost of staff time (e.g. for customer service agents, specialist staff, etc.) and other direct costs that are related to the handling of a request should be calculated. The same can be done for the handling of the request through the e-service. These figures will provide comparative figures for the annual cost of the service via different channels, and also indicate the cost savings which the e-service may or may not deliver. An example of these calculations (indicative numbers, showing only cost savings for year three) is shown in Figure 7.<sup>1</sup>

A)	NUMBER OF ERRANDS					0 โ	
A.1	Estimation of errands	Today		year +1		year +3	
A.1.1	Estimated errands per year	5,000	st	5,000	st	5,200 st	
A.1.2	Estimated errands per year as e-service	0	st	500	st	1,500 st	
B)							
B.1	Estimation of time saving per errand			Admini	nstrator	Specialist	
B.1.1	Time per errand at present			15 min		1 min	
B.1.2	Estimated time per errand with e-service			7	min	1 min	
C)	INTERNAL DIRECT COST SAVINGS						
C.1	Cost of personnel (in EUR)			Admininstrator		Specialist	
C.1.1	Cost per hour			25		30	
C.1.2	Handling costs of errands without e-service (time*cost) year 3:				32,500	2,600	
C.1.3	Handling costs of errands with e-service (time*cost) year 3:				30,125	2,600	
C.2	Other direct costs			Co	ost	Comments	
C.2.1	Direct costs of errands without e-service				1560	Stamps & envelopes	
C.2.2	Direct costs of errands with e-service				1110		
2	1						
E)	FULFILMENT OF GOALS						
,		Effect (0-5)					
E.1	Coherens with overall organisational goals	Without e- service	With e-service	Goal improve- ment	Motivations & Suggestions for realisation		
E.1.1	Organisational goal no 1 (overall goal)	0	0	0			
E.1.2	Organisational goal no 2 (sub goal)	0	0	0			
E.1.3	Organisational goal no 3 (sub goal)	0	0	0			
			Effect (0-5)				
E.2	E.2 Coherens with organisational e- government goals		With e-service	Goal improve- ment	Motivations & Suggestions for realisa		alisation
E.2.1	E-government goal no 1 (overall goal)	0	0	0			
		0	0	0			
E.2.2	E-government goal no 2 (sub goal)	0	*	-			
E.2.2 E.3	E-government goal no 2 (sub goal) Summary of effects	0					
E.2.2 E.3 E.3.1	E-government goal no 2 (sub goal) Summary of effects Total Effects (E1 och E2):	0	0	0	1		
E.2.2 E.3 E.3.1	E-government goal no 2 (sub goal) Summary of effects Total Effects (E1 och E2):	0	0 Effect (0-5)	0	1		
E.2.2 E.3 E.3.1 E.4	E-government goal no 2 (sub goal) Summary of effects Total Effects (E1 och E2): Coherens with other goals and qualitative benefits	0 Without e- service	0 Effect (0-5) With e-service	0 Goal improve- ment	Motivatio	ns & Suggestions for rea	alisation

Figure 7 - Calculation of direct cost savings

It is possible to refine the estimates for time and cost savings by breaking them down into activities. A service request has to be registered and checked, and supplementary information may then have to be gathered. The request must then be processed, a decision made and the decision communicated to relevant actors. Finally the request has to be archived. It is possible to observe or estimate how long each of these steps takes. The more the an organisation has mapped and described its business processes<sup>2</sup> (traditional and electronic) the easier it is to estimate or measure how long each step may take.

<sup>1</sup> See the Smart Cities report on 'Using customer profiling and activity based costing for channel shift' – http://www.smartcities.infolusing-customer-profiling-and-activity-based-costing-channel-shift.

<sup>2</sup> Improving business processes and delivering better e-services – http://www.smartcities.info/business-processes





Some metrics are more difficult to estimate or measure in time or financial terms than others. Among these 'soft' benefits are improved customer service, better working conditions, and enhanced democracy. You cannot really put a number on these, although they are certainly benefits which can be delivered.

Soft benefits should be just as thoroughly described as 'hard' benefits – sometimes they may be more important than the more obvious financial benefits. Some organisations insist that all benefits are given a monetary value, so in these cases it may be necessary for the evaluation team to talk to the responsible manager and relevant staff about how a 'soft' benefit could be measured in financial terms (e.g. through time savings).

In some cases it is easier to assign a value to a benefit as a whole, while in other cases it may be easier to break down the benefit into more concrete parts. If the organisation aims to increase the citizens' use of library services, a measurable goal may be to "increase the percentage of citizens that use the library's e-services to renew the loan of an item from 15 percent of users to 25 percent of users in two years." Each goal (or sub-benefit) may be assigned a monetary value, and the sum of all benefits summarised.

Sometimes the financial value of a benefit can only be reached by consensus along the lines of the conversation below:

Question:Is it worth €20,000?Answer:No!Question:Is it worth €10,000?Answer:YesQuestion:Is it worth €15,000?Answer:Probably

The direct cost savings (as shown in Figure 7) can also be augmented with the indirect benefits derived from an e-service. An indirect benefit has positive effects and may even deliver further cost savings, but they are even harder to calculate and quantify.

During these calculations it is important to define how time savings for employees should be monetised – either as reduced labour costs, as providing increased capacity for handling service requests, as improved working conditions (and therefore reducing staff turnover, for example), or as freeing more employee time for value-added (i.e. more expensive) customer service tasks?

It is clear that many of these calculations are based on best guesses and many assumptions. But they must remain reliable. Unfortunately the estimation of benefits is often too positive, while the costs of realising them tend to be understated or ignored.

#### **3.3 Calculating the costs**

There are many costs involved in launching an e-service; of course there are significant start-up costs, but an e-service also has ongoing operating costs. Start-up costs include the procurement of software and hardware for networks or web servers, application servers and database servers. There are also labour costs both for the staff who are planning the e-service, those who are developing service and software specifications, and for IT department personnel who are supporting in the project. The highest labour costs are often for hiring external consultants.

Among the operating costs are the costs for hardware and software maintenance and upgrades, the costs for hosting, and the labour costs for system administrators and external consultants. The costs for performing the operations should also be considered (as in Figure 7). The regular costs for training and education, for marketing and raising awareness of the new channel should be added to these calculations. Figure 4 provides a non-exhaustive list of possible costs which may be associated with an e-service (in post-adoption evaluations, the actual costs can be compared with the estimated costs).

Costs can also be calculated for users. Among these are the cost of switching from traditional channels to an e-service, and any time costs if the e-service turns out to be more time-consuming (at least initially) than the traditional channels. 'Soft' costs can include frustration and lack of security in the new e-service. These costs and the way they actually make the e-service disadvantageous, can also be expressed as risks (see Section 4.1).





## 4. Quality Assurance

This last phase of the evaluation process helps to ensure that the evaluation is reliable and that evaluation results are followed up.

#### 4.1 Classify benefits and assess risks and barriers

Once the results – the hard numbers, the 'soft' observations and calculations of monetised benefits and of service delivery costs – have come in, it is important to then analyse them in a systematic and critical manner. This step tries to answer questions such as:

- Are the results realistic?
- Have we identified and correctly valued the important benefits, disadvantages and costs?

If it is possible, it is always a good idea to compare the results of the evaluation with other evaluation processes for similar services inside the organisation or in other public agencies. The results should also be checked by key actors who are familiar with the service in question and who have been involved in estimating the costs for IT-related change projects.

If the evaluation is examining the feasibility of potential e-services (i.e. a preadoption evaluation) it is also essential to consider the risks and barriers that may influence whether you can achievement the potential benefits that have been identified. These risks and barriers may be administrative, technical, legal, social or user-centred (from both the agency and the client side). If the take-up of an e-service ends up being much smaller or much larger than was expected, for example, then this outcome may have a major impact on the benefits and costs of the e-service.

Three steps should be taken to handle the risks:

- · identify risks (and opportunities),
- estimate which risks are most important (most likely or have the greatest impact), and
- take steps to control and reduce the most important risks.

There are a number of well established methods for identifying and/or valuing risks – for example the SWOT (Strengths Weaknesses Opportunities Threats) analysis is a common approach. To judge which risks are most important, you may assign a risk value to each identified risk, estimating the likeliness that the risk will occur (from 1 = highly unlikely to 5 = highly likely) and multiplying this with the consequences of the risk (from 1 = very low impact to 5 = very high impact). The risks with the highest risk values are the ones which should receive most attention and be reduced wherever possible.

Having assessed the risks, it is time to classify the benefits into three classes:

- Direct benefits are those that have an obvious and clear impact on the financial results (for example, if an e-service is likely to reduces the number of phone calls by 50 percent, it will be possible to reduce personnel costs). These direct benefits may be depicted as green benefits.
- Indirect benefits are less predictable and more difficult to quantify in monetary terms (for example 'reduce costs for sick leave because personnel are less stressed'). Indirect benefits may be thought of as yellow benefits.
- Red benefits are those that are the most difficult to predict or to monetise. These benefits may be very valuable, but you may not be able to accurately predict if they will be realised or what their financial impact is.

#### 4.2 Estimate net benefit

When each individual benefit has been identified, valued, classified and its cost estimated, it is then possible to derive the net benefit of the e-service. The net benefit is calculated from the sum of all the benefits minus all the costs of providing them (see Figure 8). A value factor can also be calculated by dividing the total benefits by their costs.

The net benefit is an extremely useful indicator which can be used to help prioritise development when you have to chose between potential e-services. An organisation may also decide to set a threshold value factor; only e-services which have value factors over this threshold will actually be implemented.



Figure 8 - Example of net benefits estimation

Post-adoption evaluations can also help to measure the net benefit of your new service. At this stage it may also be possible to identify which of the expected benefits were not realised, so it could now be possible to calculate the actual (as opposed to the estimated) net benefit and value factor (see Figure 9).





Sometimes the benefits are not all realised because the estimates in the pre-adoption evaluation were too high. Another reason, however, may be that no-one in the organisation was given responsibility for realising the benefits. Sometimes the estimated benefits require changes to business processes, sometimes employees need education and training, or your citizens need to be better informed about what you are doing. If no-one is responsible for these actions, then they will not happen and the potential benefits will remain unrealised and the net benefit will fall below expectations.





This approach to calculating and illustrating the net benefit of an e-service may be complemented with other financial analyses such as NPV (Net Present Value) or IRR (Internal Rate of Return). Break even analysis can also be used to identify the minimum level of take-up rate that is required for an e-service to begin to deliver cost savings.

## 5. Conclusion

This report offers a model which can be followed to evaluate e-services in public administrations, municipalities and governments. The model sets out a template that can be refined and adjusted to fit each organisation and their standard evaluation practices. In some cases, the model will be unnecessarily complicated: in others it may need enhancing with additional analyses or steps. It is important to be aware though that an evaluation of benefits and costs is only one of many ways to assess an e-service or to decide how it might be developed (or its priority for development). E-services also need to be feasible in terms of complexity, security and customer, employee and partner readiness. While an e-service may look like it could deliver massive cost savings to an organisation, if there are no staff in the organisation with the skills to develop and/or implement the e-service then it may bea non-starter.

On the other hand, sometimes it is necessary to prioritise the development of an e-service which may have a low net benefit to the organisation, but which is necessary because of new regulations or pressure from government agencies.

Finally, we cannot stress enough that an evaluation is worth nothing if it does not lead to action. It is vital that a department or individual is appointed to act on the results of the evaluation, whether it is to ensure that the identified benefits are realised, the potential risks addressed or an existing e-service is adjusted. Evaluations without action are a cost that every public authority should actively avoid.





## 6. Related reading

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This report was prepared for Smart Cities by Monika Magnusson from Karlstad University http://www.kau.se/

# **Smart Cities Guides**

The Smart Clties project has produced a number of guides for municipalities and governments to help them design and deliver better e-services.

- 1. Customer Insight Profiling and Service Design Guide http://www.smartcities.info/customer-profiling
- 2. Creating Customer Contact Centres http://www.smartcities.info/customer-contact-centres
- 3. Creating Municipal ICT Architectures http://www.smartcities.info/ict-architecture
- 4. Improving business processes and delivering better e-services http://www.smartcities.info/business-processes
- 5. Using Co-design to design and deliver better e-services http://www.smartcities.info/co-design
- 6. My City Online making the case for municipal web portals http://www.smartcities.info/web-portals
- 7. Using Geographic Information Systems to provide better e-services http://www.smartcities.info/gis
- 8. An introduction to Municipal ICT Architectures for Managers http://www.smartcities.info/ict-architectureSmart

#### **Cities Research Reports**

- 1. Comparing levels of internet access, internet use and e-government use in the Smart Cities countries
- 2. Customer profiling to target service delivery
- 3. Measuring levels of supply and demand for e-services and e-government: a toolkit for cities
- 4. An introduction to Process Modelling
- 5. Standards for classifying services and related information in the public sector
- 6. The Transformation of City portals
- 7. The Community of Practice as a virtual organisation
- 8. The Community of Practice as a virtual organisation: innovation seeking and knowledge creating
- 9. A Systems Perspective on Security Risk Identification: Methodology and Illustrations from City Councils
- 10. Making customer groups real using personas
- Using Customer Profiling and Activity Based Costing to inform channel shift and to increase service take-up – A practical guide
- 12. Customer Journey Mapping
- 13. What is a service list?
- 14. Ten reasons to use a service list
- 15. Evaluating e-services
- 16. Understanding web accessibility
- 17. Using email to deliver e-services
- 18. Edinburgh's Library App a case study
- 19. BusTracker bus information on the go
- 20. Using geolocation in e-services

These reports can be downloaded from http://www.smartcities.info/research











# www.smartcities.info www.epractice.eu/community/smartcities

The Smart Cities project is creating an innovation network between cities and academic partners to develop and deliver better e-services to citizens and businesses in the North Sea Region. Smart Cities is funded by the Interreg IVB North Sea Region Programme of the European Union.

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