Citizen-centric eGovernment Services

Use of indicators to measure degree of user involvement in eGovernment service development

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***Abstract*—Citizen-centric eGovernment is about user involvement in all stages of the lifecycle of an eGovernment service. The wishes and requirements of the citizens and the administration are not always aligned. User involvement is an important measure to make sure that services become citizen-centric. NET-EUCEN, a EU-supported thematic network on citizen-centric eGovernment, has proposed a framework with a set of indicators to measure user involvement in eGovernment service development and provision. The indicator set is presented and some limitations are discussed.**

Keywords – citizen-centric; user involvment, user participation; eGovernment; NET-EUCEN.

I. INTRODUCTION

Citizen-centric eGovernment is about delivering electronic services focusing on the wishes and requirements of the end-users. In order to capture these requirements, it is important to involve users throughout the whole life cycle of the service. This paper discusses such user involvement and how to measure it using a set of indicators.

User involvement in systems development has been discussed and practiced in the Scandinavian countries since 1975 [1]. Bjørn-Andersen and Hedberg [2] gave the following reasons for involving users in the development of software systems:

- improving the knowledge upon which systems are built,
- enabling people to develop realistic expectations, and reducing resistance to change, and
- increasing workplace democracy by giving the members of an organization the right to participate in decisions that are likely to affect their work.

In a meta-analysis of 25 studies on user engagement, Hwang and Thorn [3] found user involvement beneficial, but the magnitude of the benefits depends on how involvement and its effect are defined.

User involvement is not only important for system development projects. In his book "The Lean Startup", Eric Ries [4] emphasizes the need to learn from customers in order to build products and services that will succeed in the market. He advocates the use of a build-measure-learn feedback loop, where products and services are continuously validated by real customers to find out if they are fulfilling the expectations of the customers or not.

Also, eGovernment researchers have advocated user involvement in development of eGovernment researchers. Richard Heeks [5] remarks: "Of all the stakeholders, the users are those who tend to be most rooted in current system realities, and who best understand when technology-/rationality-driven models will be inappropriate. Giving users a bigger say in systems development can therefore help guard against e-government failure."

In November 2005, the United Kingdom Presidency of the Council of the European Union held a Ministerial eGovernment Conference in Manchester. The ministers approved unanimously a declaration [6], which, among other items said: "During 2006 and 2007, Member States will, through the European Public Administration Network, exchange experiences in developing policies which are inclusive by design, for example, in citizen-centric service delivery or the use of multi-channel architectures".

Blakemore et al. [7] were asked by the European Commission eGovernment Unit to do a 24 months study on citizen-centric eGovernment. The project, called cc:eGov, held a number of workshops and produced a set of "Think papers" to discuss different aspects of citizen-centric eGovernment. The final outcome of the project was a handbook [8]. The study did not emphasize user involvement in the development of services, but were more concerned with transformation of government to be more attentive to the needs and wishes of the citizens.

The European Commission also initiated other projects to explore citizen-centric eGovernment, e.g., "OneStopGov". The project was started in January 2006, and was a thirty six month EU-funded research and development project that aimed at specifying, developing and evaluating a life-event oriented, all-inclusive, integrated, interoperable platform for online one-stop government [9].

User involvement in the whole lifecycle of eGovernment services received focus in 2010, with the establishment of the NET-EUCEN thematic network [13]. One of the activities of this network was to develop a framework for measuring user-centricity at all stages of the service lifecycle. This framework and its indicators will be discussed later.

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II. PERSPECTIVES ON ELECTRONIC GOVERNMENT

Electronic services are, under most circumstances, beneficial for the users. eGovernment services typically includes at least three categories of services:

- Electronic access to government information, where citizens can service themselves (self-service).
- Online transactions with the government through use of electronic forms.
- Access to, and the ability to interact electronically with governmental officials, often through multiple channels (e-mail, chat, SMS).

The two first categories are normally available at all times and from all geographic locations. The last category is limited by the availability of government staff.

eGovernment services can be seen from two different perspectives: the administrative perspective and the citizen perspective. These two perspectives may be in conflict. Verdegem and Hauttekeete [10] argue that eGovernment development suffers from deterministic conceptions, and that, consequently the user seems to be neglected; only minor attention is given to the impact of the electronic service on the customer.

A. Administrative perspective

From the administrative perspective, electronic services can save both time and work for government staff. The City of Copenhagen [11] has calculated the average cost to the municipality for different types of contact with the general public. The cost of a visit by a person is estimated to be close to 10 Euro, while a telephone conversation costs close to 5 Euro. Self-service through Internet costs only 0.40 Euro. These calculations indicate a potential for considerable savings by shifting the contact with the general public to the digital channel, whenever appropriate.

The success of an electronic service can be measured as the ratio between users of the service and the users making personal appearance or telephone calls.

B. Citizen perspective

Citizens want services that are efficient and easy to use. Bertot and Jaeger [12, p. 164] made the following observation: "While users may appreciate the cost savings to agencies for any number of reasons, their primary interest is in their ability to interact with eGovernment services with ease."

For citizens the main objective is to get information, submit forms, or interact with the administration with a minimum of trouble. Neither physical visits to government or municipal offices nor sending ordinary letters are considered efficient.

C. Possible conflicts between the perspectives

In practice, the two perspectives are not necessarily aligned. The following subsections will show some examples for each of the three categories of services mentioned above.

1) Information retrieval

For information retrieval, it is important that citizens can find the information they need. The web site structure must fit the perception of the users, and not the organizational structure of the administration. But, too often, government organization is used as a model for the hierarchical structure of the web site. A citizen may not know what department is handling his or her problem. An alternative solution is to fit the content to current life situation or the intentions of the citizens [9]. If you are a student, you look for certain services related to student loans, housing. etc. If you are a parent, you are more interested in kindergartens and schools, and if you are old, you may want information about care services. Government websites often use words and expressions that are not commonly used by the citizens. A good search mechanism with use of synonyms may help citizens to find what they are looking for.

2) Submission of electronic forms

For the administration, the use of electronic forms may be efficient, especially when the content of the form can be pipelined into back-office systems. But for the user, an electronic form may not be very efficient if the user has to type in information found in paper documents that could otherwise be copied and sent by mail. A user-centric solution would not ask for information the government already possesses. It would also allow the user to save the current work and get back later. If the form has multiple pages, it would allow the user to move back and forth. It would also provide help on how to fill in correct information, and validate this information to make sure that the user does not have to resubmit at later time.

3) Interaction with the government

For the administration, it could be efficient to limit the number of channels for communication. By providing more channels, it is possible to give the citizen options. The possibility to use chat when being in a public place is often preferable to the use of a phone, since chat provides more privacy.

The above cases have shown some examples of misalignment between the administration perspective and the citizen perspective. In order to fit the eGovernment service to the needs of the users, user involvement should be present in the design phase, the development phase, and the assessment phase.

III. NET-EUCEN

NET-EUCEN [13] was a thematic network supported by the European Commission. The network started its activities in April 2010, and the final review meeting was held in May 2013. The network had 23 initial partners, but the network grew to 231 members during the work period.

NET-EUCEN focused on "user-driven services". The involvement of users goes beyond consultations with users or user representation. Users and government staff work together to determine what services to provide and how to provide them. The perspectives, views and skills of the users are complementing the skills of the public service officials.

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As part of the network activities, the network developed a framework to define and measure user-centric services. This framework builds on user involvement in all stages of the service lifecycle.

- User involvement in the design stage. The users are involved in development of ideas and concepts. Focus is on needs and requirements of the users, not technological constraints.
- User involvement in the development and implementation stages. Users are engaged in the initial implementation of the service in order to evaluate its features. Mock-ups and prototypes are used to continuously check that the service is aligned with user wishes and requirements. The aim of the user involvement is to improve the service and to optimize the outcome of the development and implementation.
- User involvement in the deployment and running stages. Users validate the service through testing of flexibility and interoperability. Test results are used to improve and customize service according to changes in political, economic or social environment.

Based on this definition, the network examined case descriptions submitted to the ePractice portal together with cases submitted by network partners. Most of the descriptions on the ePractice portal did not discuss user involvement at all, but case owners were requested to submit additional information. The findings of this study revealed that very few cases were fully aligned with the above definition.

The next step was to construct an indicator set for measuring user-centricity.

IV. INDICATORS FOR CITIZEN-CENTRICITY

One of the aims of the NET-EUCEN network was to construct an indicator set to measure the user involvement in eGovernment projects. The indicator set was developed in workshops with NET-EUCEN partners and invited experts. The resulting indicator set [14] consists of three indicators for user involvement addressing different stages of the lifecycle of the service, and a fourth aggregate indicator to show total user involvement. In most cases, a service is improved during its lifetime through iterations. Figure 1 shows the lifecycle model.

The indicators measure user involvement in the development of a single service only. But, it would be easy to aggregate scores from several services to show how an organizational unit responsible for the services involves users in their portfolio of service development projects

To decide on a set of indicators is not easy, since too many and too complex indicators will make it hard to use, while few and simple indicators may not produce correct measurements. The three first indicators are calculated from a set of binary variables (yes/no answers). The proposed indicator set focuses on user involvement only. The limitations of this rather narrow focus will be discussed later.

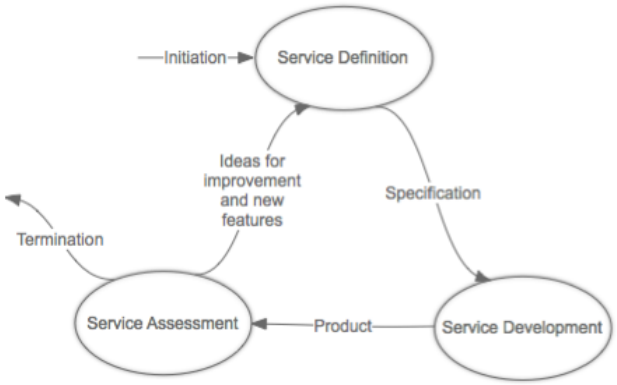

Fig. 1. eGovernment service lifecycle model

A. Indicator 1 - Definition (of the service)

This indicator measures the actual user involvement in the definition of the service.

TABLE 1. VARIABLES FOR INDICATOR 1

Engagement of citizens/users in elicitation of needs	Yes = 0.25 No = 0.00
Involvement of users in the service definition	Yes = 0.25 No = 0.00
Involvement of users in functionalities definition	Yes = 0.25 No = 0.00
Involvement of users in the complete interaction definition	Yes = 0.25 No = 0.00
I1	Max score is 1.0

The first variable is addressing the involvement of users in processes being precursory to creation of lists of actual user needs. Such processes may address how to facilitate user involvement, and what additional user groups include. The second variable is about user involvement in the definition of the service. This is where the list of user needs is developed. The last two variables measure involvement of users in defining the functionality of the service, and the interaction between users and the service.

B. Indicator 2 – Development (of the service)

This indicator measures the involvement of users in the development process.

TABLE 2. VARIABLES FOR INDICATOR 2

Involvement of users/testers in common shared environment	Yes: 0.20 No: 0.00
Involvement of user in interface test and refining	Yes: 0.20 No: 0.00
Involvement of user in functionalities test and refining	Yes: 0.20 No: 0.00
Involvement of user in check of documentation / guidelines	Yes: 0.20 No: 0.00
Involvement of ALL user categories in the tests	Yes: 0.20 No: 0.00
I2	Max score is 1.0

The first variable measures the availability of a common shared environment, where users can share and discuss their opinions related to design issues. The next three variables address user involvement related to different aspects of the

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service itself: user interface, functionality, and documentation. The last variable emphasizes the importance to involve all user groups in the design process, since different user groups may have different perceptions on user interface, functionality and documentation. In such cases, user involvement may be an important driver for individual customization of the final service, e.g., the possibility to turn on additional functionality on demand.

C. Indicator 3 – Assessment (of the service)

This indicator measures the involvement of users in the (continuous) assessment of the service.

TABLE 3. VARIABLES FOR INDICATOR 3

Involvement of ALL user categories in the assessment	Yes: 0.33 No: 0.00
Instrument used gather the users' feedback: phone calls	Yes: 0.0825 No: 0.00
Instrument used gather the users' feedback: web modules	Yes: 0.0825 No: 0.00
Instrument used gather the users' feedback: consultations	Yes: 0.0825 No: 0.00
Instrument used gather the users' feedback: workshops	Yes: 0.0825 No: 0.00
Scope: improvement of the service usability	Yes: 0.165 No: 0.00
Scope: definition of new features	Yes: 0.165 No: 0.00
I3	Max score is 1.0

At this stage, the service is up and running, and used by active users. The involvement of all categories of users counts for one third of the score. It is important to include all categories of users, since they may have different assessments and ideas for improvements. Another one third of the score is allocated to the use of four different instruments for data collection. In order to reach all user categories, it may be necessary to engage users by different means. The last one third of the score focuses on the use of the collected data, if data is used for improvement of the usability and if data is used for defining new features.

D. Indicator 4 – Aggregation of previous indicators

The last indicator is an aggregate of the scores from the three previous indicators. These three indicators are weighted as equal, since user involvement at all stages is considered equally important. This aggregate score is computed as:

$$I4 = I1/3 + I2/3 + I3/3$$

E. User involvement in practice

The indicators do not prescribe specific methods of user involvement. The actual involvement can be done in different ways. Bertot and Jaeger [15] suggest the following range of tools and techniques:

- Focus groups and interviews (with experts and users);
- Usability, functionality, and accessibility testing throughout the design and development process;
- Encouraging real-time comments and suggestions about the services being used;
- Log file and transaction log analysis;
- Providing interactive help screens or telephone assistance; and
- Developing and adhering to measures and standards of service quality.

User involvement may be done on different levels. On the political level user organizations may be involved as representatives for all users, on the system level, some users may speak for the rest, and on the individual level, the user him/herself may be involved in customization of the service.

What methods to use, and which users to involve, will need to be decided for each development project based on the reach (number of users), size and other characteristics.

V. WHAT THE INDICATORS DO NOT MEASURE

The indicators shown in the last section were developed in workshops with network partners and invited experts. The indicators focus on user involvement, and the scores are calculated from a set of binary values (yes/no).

The problem with this "checklist" approach is that it neither quantifies the amount of user involvement, nor the quality of the involvement. The indicators may therefore not reflect the actual benefits received from the user involvement.

User involvement could be quantified by number of users participating and the time spent by the users. However, such quantifications may have limited value, since the optimal involvement will vary from project to project.

Qualitative measures could be efficiency gains as experienced by the users, the usability of the service, the usefulness of the service and such things as availability and accessibility. The users involved would be expected to address such issues, but these aspects themselves are not assessed.

The indicators do not measure the actual depth of user involvement. The involvement can of course be minimal, and the score can still get high.

The initial NET-EUCEN indicator set had some non-binary variables, e.g., percentage of activities that included user involvement, and percentage of user categories involved. During the validation process, these were substituted with binary values, since it was difficult to establish correct values for these variables.

VI. CONCLUSION AND DISCUSSION

The work of the NET-EUCEN network was normative. The network was committed to promote the idea of citizen-centricity through user involvement. The indicator set was one of several measures to draw attention to how users can be involved in lifecycle of eGovernment services. The indicators were chosen to give a high score to those organizations involving users in all stages of the service development.

Citizen-centricity is a mindset. It requires respect for the users as being experts on use. The whole idea of user

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involvement is to listen to, understand and respect the opinions of the users. Collaboration and dialogue, even co-production needs an environment of mutual respect and willingness to see the different perspectives.

User involvement can lead to better services, and even more important, provide an insurance against failures.

A new trend within eGovernment is the movement towards open data. Open data is about giving citizens access to government data through standardized formats and interfaces. Open data brings new opportunities for citizen-centricity. In the future, citizens may develop or orchestrate their own services by interconnecting building blocks with open data sources. The next step for citizen-centric government will then be to provide both data and relevant building blocks. Citizens may then be able to build services themselves.

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