The Treasure of Public Sector Information

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Abstract: The treasure waiting to be discovered here is the big investments in Public Sector Information made by Governments around Europe in past decade that it is still "hidden" due to under usage by its intended audience, the citizens. How can we unleash this hidden treasure? How can we increase the visibility of existing local, regional, national, European stocks of public sector information (PSI) to boost citizen-centric e-Government? How much will cost Public Administrations (PA) digging out this treasure? The aim of SEED (Speeding Every European Digital) solution is to boost "citizen-centric" e-Government services, to reuse as much as possible the European, national, regional and local stocks of PSI and to leverage saving costs of e-Government and e-Governance deployments through a cloud computing approach and a very cheap network of interactive PSA nodes. SEED is making mash-ups of e-Government contents for raising awareness of citizens about e-Government services available across all Europe. It is about transforming PSI in interactive advertisement messages. The paper describes the SEED platform and the technological platform that powers it, highlights the main concepts and presents the initial findings after more than one year of field deployment of seven pilots within six EU countries.

Keywords: public service efficiency and effectiveness, take-up of e-Government service, Web 2.0 in e-Government, e-Participation, Cloud computing, public service advertising, public sector information

1. Introduction

Public sector information (PSI), or government data, refers to all the information that public bodies produce, collect or pay for [1]. Examples are geographical information, statistics, weather data, data produced by publicly funded research projects, or digitised books within libraries. Although PSI is a large market in Europe, estimated around 30 billion euros [4], less than 41% of citizens at average are impacted by this [2]. Loads of pre-existing investments in e-Government back-offices, platforms and services are available across Europe, deploying a wide set of services, but in most cases efforts are duplicated, little to no reuse of e-Government data and information is implemented and obsolete technologies are still put in place.

The overarching aim of "Speeding Every European Digital" (SEED) solution[1] is to boost "citizen-centric" e-Government services, to reuse as much as possible the European, national, regional and local stocks of PSI and to leverage saving costs of e-Government and e-Governance deployments through a cloud computing approach and a very cheap network of interactive PSA nodes. SEED reuses existing PSI making mash-ups of e-Government contents for raising awareness of citizens about e-Government services available across all Europe. It is about transforming PSI into interactive advertisement messages.

2. Digging out the Treasure: transforming public sector information (PSI) into public service advertisement (PSA)

Kerin et al define public service announcement or public service ad as "messages in the public interest disseminated by the media without charge, with the objective of raising awareness, changing public attitudes and behaviour towards a social issue" [3]. The history of PSAs goes back in late 1930s, when the first educational films on topics such as road safety or health care were produced in UK. During the World War II, both UK and USA made use of such films to advertise on war efforts and influence society on a range of fronts. Thus, Public Service Advertising (PSA), or non-commercial advertising, or public interest advertising, or social marketing are all different aspects of the use of sophisticated advertising and marketing communications techniques, generally associated with commercial enterprise, on behalf of non-commercial, public interest issues and initiatives.

There are six steps citizens move through when making decisions: awareness, knowledge, liking, preference, conviction and finally adopt, reflected in behavioural changes or engagement. Public service advertising is a powerful tool in the hands of public administrations (PA) in the first step of the chain (awareness) in order to, in the end, adopt or change behaviour of citizens by stimulating their engagement about services of public interest as e-Government services are. This is the main focus of SEED solution.

[1] http://www.seed-project.eu

The advantages of the Internet Age to more conventional media are not yet exploited in public sector as in private sector. Campaigns require organisations to use aggressive, imaginative tactics, seeking television/radio airtime to convey a focused message, but they are short-timed, and often require huge budgets to access prime time. SEED proposes a new approach in PSA: innovative and affordable interactive-PSA (i-PSA) in Internet age, a cheap, long-term deployment using new ICT channels to reach audiences in an efficient (cost and impact) way. It is based on Digital Signage and Digital out of Home (DooH) communication channels. *Digital Signage* is the use of electronic displays or screens (such as LCD, LED, plasma or projection) to deliver entertainment, information and/or advertisement in public or private spaces, outside of home (Digital Screen Media Association, 2013). When specifically delivering contents in open spaces or in the street, digital signage is called *"Digital out of Home"*.

In the Internet age and latest financial cuts, public bodies need to rely on all assets at hand: public spaces and buildings, existing e-infrastructure, old hardware (sometimes out of service for various reasons) such as info kiosks, PCs etc., already existing public services, and large number of end-users visiting public facilities daily. SEED leverages all these to raise awareness of citizens and, through its *interactive* PSA to aid the driving from awareness to action, engagement. Next section presents the SEED platform and how all these are implemented.

3. SEED platform, a modern tool for mining the Treasure

The SEED platform is 100% Web-based, both for management and playing the content. SEED is a full service served from "the cloud". It is built and deployed on top of the CMS-SOA (Content Management System - Service Oriented Architecture) e-Preventions® platform, developed by IDI EIKON, that is now reaching "Inclusive One Web" paradigm — available to anyone, anywhere, on any device and on any channel — based on open and global Web technologies, like HTML5, CSS, JS, SVG, which lowers implementation costs and simplifies deployment of new applications [5]. This is paving the way to full convergence on PCs, digital TV, mobile, public digital terminals and DooH. It only needs a "regular" Web browser to play the content, there is no need of additional plug-in or proprietary software.

SEED platform acts as a content aggregator enabling PSI stocks integration, relying on a double source of PSI content: *third-party* PSI and *own* PSI. Third-party (external) PSI denotes new services, previously unavailable in pre-existing "local" e-Government sets of services that can be built re-using public information, coming from Open Government Data initiatives in Europe, fitting in the goals and requirements for a future pan-European data portal. For example, services offered by European Job Mobility Portal[2], Eurostat[3], or any other not-own PSI source available at local, regional or national level.

Own (internal) PSI refers to the own source e-Government content created by each local, regional or national public authority that joins SEED platform. Every own PSI source of content in hands of a SEED partner can be reused inside SEED. If own PSI stocks are not ready to be reused, *SEED will add automatically the shell of inclusiveness and "designed for all"*. In turn, own PSI will become PSI ready to be reused by others.

Regardless the type of PSI content (third-party or own), SEED is able to integrate content from a large variety of sources, such as Google Calendar, IP Cameras, Social Networks (Facebook, Twitter), RSS feeders, European Meteo Alarm service, Weather services, Video Sharing Services (YouTube, Vimeo, Ustream), image galleries managed on SEED server and others. These sources of information are transformed into *SEED services*, organized in libraries that can be private or shared.

Delivering i-PSA messages to citizens is achieved by chaining them in a, so called, playlist. A playlist is defined by a sequence of SEED services, each one "played" (i.e. displayed) for a user-defined amount of time (usually seconds to one minute). ***SEED Content Management System*** (Figure 1 left) is the application that allow end-users, with proper roles, to access and manage services and playlists of the platform

[2] http://ec.europa.eu/eures

[3] http://ec.europa.eu/eurostat

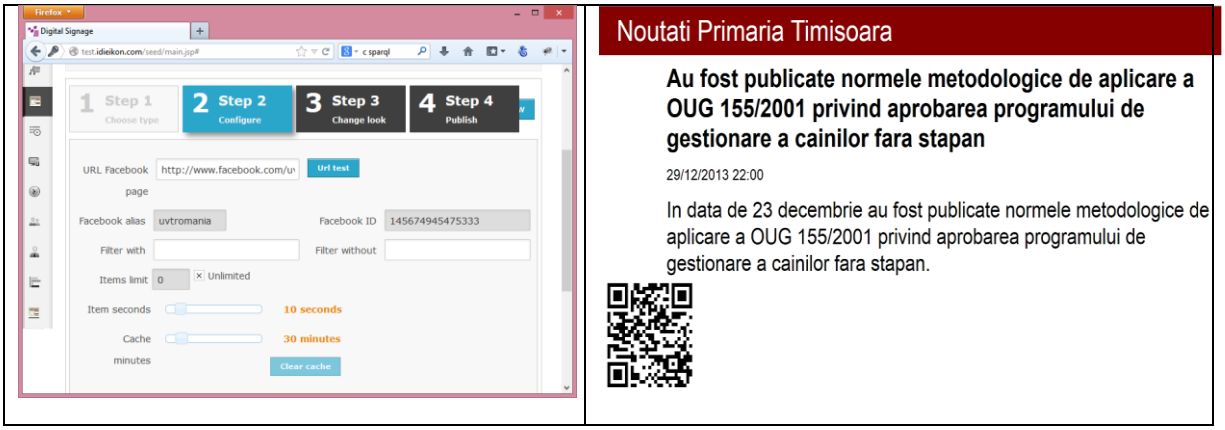

Figure 1: Creating a new SEED service in Content Management System (left); SEED player (right)

The player (Figure 1 right) is the component running on each device and it is responsible to properly render the content of a playlist on that device. The playlist is continuously played during the time interval it has been scheduled to be played on that device. Concretely, it is a pre-defined URL from SEED platform loaded by an Internet browser. The main features of the player include (i) interactivity, the distinguish "tool" that levels-up from awareness to engagement of end-users, (ii) idle time management and (iii) face counting.

Basic interactivity is achieved with *navigation bar* and *interactive button* that allow users to browse through all the elements of the playlist or to load an external site on the device. For un-touchable devices, such as wall-suspended TV sets or projectors, the platform offers *mobile interactivity* by the help of QR[4] codes. When scanned with a mobile device (smartphone, tablet) it will immediately display further information on the mobile device and enable end-users to continue the interaction with the service from their device.

Running on a wide range of devices, SEED player need to integrate and run in parallel with other systems, on a "time sharing" strategy. For this purpose, a component of SEED player was implemented that triggers SEED player after a pre-defined idle time has elapsed on existing systems and investments, such as kiosks running proprietary software. When end-users touches the kiosk's screen, the "native" kiosk software is re-launched.

Face counting is a valuable feature that allows content managers to gain better insights on users' engagement and content: what content draw more interest, what content less etc. For privacy reasons, faces are not recorded, nor tagged or processed in any way.

4. The Treasure: pilots and validation

In this section we will present the initial findings obtained after testing the SEED solution in seven pilots deployed in six EU member countries by public administration for one year period [6]. In all pilots, a total of 85 devices has been configured to run 78 playlists. See Table 1 for details about type of services exhibited through SEED pilots.

Table 1: SEED services

Arts, culture and history	124		Home and community	145
Education and learning	127		Law and enforcement	32
Civil status andrights	60		Meteo and weather	23
Employment and business	54		Motoring and transport	16
Entertainment	140		Taxes and customs	22
Environment and resources	76		Travelling and tourism	118
Health and well-being	65		Social benefits and grants	83

The pilots' staff carried out series of activities, such as organisation of workshops, events, info days, or face-to-face meetings, in order to engage users to use SEED platform and gather feedback from them. Looking at the profile of users who provided feedback at the seven pilots we can see homogeneity in terms of gender of responders: 44% male vs. 56% female, whilst in terms of age, we noticed that almost all responders (94%) are people between 18 and 54-year old, half of them young men and women under 30.

[4] http://www.qrcode.com

Internet is being used for a huge variety of public services. Therefore, it is important to have a view of how frequently evaluated audience access online information and by which means. We noticed that across the six countries, almost all people have internet connection (93%), use personal computer (95%) and smart phone (85%) almost every day. On the other hand, evaluated population is equally using tablet PC (47%) and Smart TV (43%) almost every day and rarely.

4.1 Effective administrative services using i-PSA

In order to assess the impact on administrative services delivered by PA, we asked pilots' staff (i.e. users working to create content within each pilot) and public administration officers what are the main benefits they expect from the new platform. Both categories agree, approximately 9 out of 10, that the biggest advantage of SEED is the easier access to public information, due to a friendlier interface comparing to the traditional e-Government platforms, simple design favouring easier interaction for all citizens, and ubiquitous access. Since the PSA nodes are placed at the most appropriate public places and advertises public services under a simple and attractive design, PA officers, content providers and pilots' staff agree that SEED is really beneficial (80% or more).

4.2 Improve citizens' raising awareness and digital inclusion

We observed that most people who accessed SEED were not informed that there are public services available and now they know and are willing to access these services any time they need. Besides, they consider very important that they can find information through SEED more quickly than before, contacting the public authorities, searching for articles etc. However, there is a small group of people (approximately 1-2 out of 10) who were updated about the local activities on e-Government sector and are using public service before SEED deployment. SEED attracted almost all people who passed by a public place, while more than 90% agree that they paid attention and they realised that there are public services available that they did not know before.

4.3 Saving costs

The current evaluation results show that SEED fulfils the need of public authorities to grow technologically and save money, as officers, content providers and pilots' staff claimed (+90%). On the other hand, citizens' opinion empowers this statement because they really show their preference for SEED system. The results of the survey taken by the pilots' staff shows that the public services that are provided through SEED interface design from different means, are in line with the citizen centric perspectives. Pilots' staff, public administration officers, and content providers, discussed with their friends at other public administrations about SEED technology (+80%), and they find the solution's cost beneficial because Software as a Service (SaaS) model allow them to grow at their own pace, without requiring huge investments upfront (around 80%). Evaluating active users we understand that they found SEED so interesting that they shared their experience with others.

4.4 Usability of SEED platform

The SEED platform has been overall labelled as friendly and ease to use, the current evaluation showing that SEED responds to user's needs of the different stakeholders. About pilots' staff, 90% of responders understood the way SEED exhibits the information and they say that it is easy accessible. They agree that SEED shows to the public the e-Government information in a more appealing way than before. Although SEED design is acceptable for most of the interviewed people, a small percentage (20%) commented that the some aspects of SEED appearance should be improved, like the size of the letters on the screen. The fact that 89% of responders found easy and very easy to follow SEED without help proves the overall usability of the platform.

4.5 Interoperability with local infrastructures and PSI

Approximately 60% of content manager responders managed to integrate easily third parties PSI into SEED. Besides, half of the responders agree that with SEED they managed to offer and monitor a series of different solutions, such as multiple content channels per location/player, behind a unique solution. Despite the low rate of SEED for its overlay capabilities (33%), most content managers (86%) said that this advertising model is very effective and easily manageable as they can see the playlist preview before publishing the content. Another relevant metric for interoperability of a service with external infrastructures is the validity of the information that reaches the end user. In our case, most (~90%) citizens, public administration officers and pilots' staff agree that information delivered through SEED is up to date.

4.6 Scalability and affordability served from the cloud

SEED technology allows to deploy and sustain e-Services over the *Cloud* and can be characterised as a scalable solution because it can support varying traffic needs. It can be also characterised as affordable because its prices are flexible and can adapt to any customer situation, encouraging

pay-as-you-go model. To run SEED it only requires an Internet connection and a Web browser enabled device. From content managers' point of view, SEED provides a web environment where they can roll out information services of different technologies and integrate e-Government services behind a common solution to reach any type of stakeholder.

5. The other side of the coin

The evaluation and validation activities also helped us better understand the weaknesses of SEED solution [7] as they emerged in one year trials. Although supporting the Open Data movement, it was found that many PAs do not publish their content in a re-usable format (RSS, Atom etc.), rather using non-re-usable approaches (static Web pages, PDF documents etc.). Based on this finding, the partners in SEED project had to "evangelise" them on the advantages of open data alternatives, as well to help various content providers to publish their content through more re-usable alternatives, such as RSS feeds.

Although most of public administration officers and pilots' staff (~90%) agree that information delivered through SEED is up to date, in case of third-party sources it is out of SEED control to ensure updated content and thus, we end-up, rarely, with outdated messages displayed on public displays. The workaround for this issue is the development of a feature in the SEED platform to allow filtering of outdated content (e.g. skip tweets or RSS news older than a specified threshold).

SEED multi-channel capability is sometimes obscured by non-fully W3C compliant browsers available on some devices, such as older Smart TVs or kiosks. Fortunately, cheap alternatives like mini PCs (MiniAndroidPC[5], Raspberry PI®[6] etc.) can be used to properly render SEED content on any device, even for older, or without Web browser support devices.

Real-life deployments also surfaced issues related to resources available in organisations working to implement the solution (create, adapt and publish content; deploy the network of public display devices etc). Some users (both population and content providers) are sceptical to new technologies (that is normal), PA need to adapt to new channels and become more open towards citizens, and winning the support of decision makers requires skills, effort and time.

6. Concluding remarks

The evaluation actions organized during one year period helped us to extract the initial conclusions that subscribe the idea that interactive i-PSA advantage of SEED turns existing e-services in into effective channels of communication. It offers governments the opportunity to deliver services "very fast, very cheap and with little upfront investment", proposing solutions to change the way things have always been done. At the same time, SEED highlights several inefficiencies seen in government agencies, such as duplication of systems and stagnation of innovation.

End-users enjoy the multi-channel interaction: starting on one device (awareness), continuing on another device (engagement). Scalability, affordability and long-term sustainability of SEED SaaS delivered from Cloud is something that appeals to users even in the case of government, as most surveyed people is looking for solutions capable to manage a wide range of data and integrate a wide range of different infrastructures (pre-existing or new). Also, in case of PA staff, being able to customise and manage all the information, from any place through any device, is a key feature they are longing to have and that has been found in SEED.

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