Coordination of open data development in Croatia – case study of Environmental Pollution Registry

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Abstract: *The article presents one case of collecting and distribution of open ecological data and internal structure of business processes responsible for their gathering and maintenance. This is elaborated by using BPMN paradigm which presents open data lifecycle from organizational point of view. By such approach potential users and stakeholders gain insight into procedures that gather and deliver open data which gives them opportunity to verify data consistency and influence policy making. The case study presents environmental pollution register and its business process structure.*

Keywords: open data lifecycle, business process modelling

Introduction

Systematical and coordinated development of public administration's on-line services in Croatia started in 2003 with the beginning of main program "e-Croatia 2007" which started in year 2003. Although certain elements and services (like some parts of legislation and infrastructural elements) existed before, this program meant big leap forward because it coordinated efforts of different agencies into coherent framework. From many programs and projects which were implemented at that time we can specify six main axis of development: secure network infrastructure (HITRONET), e-Administration, e-Justice, e-Health, e-Education and e-Business.

Presently in Croatia there are significant number of on-line services at various stages of development that interact with citizens and legal entities. Majority of them were coordinated by Central State Office for e-Croatia which is now part of Ministry of Public Administration but it is worth mentioning that there are also e-services that were developed and exists outside this framework. Previously, Central state office for e-Croatia and nowadays Ministry of Public Administration (MPA) deals with governing and expertise related to development of information systems for government bodies and also coordinates integration of these information systems into a coherent network. MPA also deals with development of legal framework for electronic delivery of public services. In recent years MPA is, together with Commissioner for rights of access to information, responsible for development and implementation of open data initiative.

All these projects left quite substantial number of data in various databases and presently there is ongoing project with aim to make them available to the public in unified manner via common portal.

Some of the open databases are listed in Table I.

Table I. Examples of open data in Croatia.

Ministry	Database name
Ministry of Economy	The register of foreign missions in Croatia
	The register of renewable energy
Ministry of Social Policy and Youth	Address book of social welfare institutions
Ministry of Regional Development and EU Funds	Map of projects
	Development index
	The list of priority for housing

Ministry of Foreign and European Affairs	Catalogue of publications
	Overview of visa requirements
	Translations of Croatian legislation
	Translations of the EU acquis
Ministry of Justice	Court register of companies
	Register of associations
	E-excerpt from the land registry
	Register of political parties
	Register of associations
	Register of foreign associations
	Foundation books
	List of legal entities of the Catholic Church in Croatia
	Data of religious communities in Croatia
	Registry of councils, coordination councils and representatives of national minorities
	Register of representative offices of foreign foundations and trusts
Ministry of Entrepreneurship and Crafts	Data of government subsidies
	Craft register
Ministry of Labour and Pension System	List of employment brokers
	List of employment agencies for occasional work
	List of high schools with permits for mediation for occasional work
Ministry of Maritime Affairs, Transport and Infrastructure	The register of road carriers
	Timetables of flights and sailing
Ministry of Agriculture	Phytosanitary Information System
	Veterinary Information System
	TISUP
Ministry of Tourism	Central Register of categorized objects (tourism, hospitality, renters)
Ministry of Environment and Nature Protection	National database on sea bathing water quality
	National network for monitoring air quality
	Protected natural resources and cultural heritage
Ministry of Construction and Spatial Planning	Approval for construction activities
	The register of persons authorized for energy audits and energy certification of buildings
	Holders of a training program for persons who perform energy audits and energy certification of buildings
	The list of editors
	List of authorized legal entities for validation of construction projects
	List of companies holding granted consent for the performance of professional activities of spatial planning
	The records of persons authorized to issue certificates of factory production control of construction products
	The records of persons authorized to perform the conformity assessment of construction products
	Records of persons engaged in construction project management
Ministry of Health	Waiting lists
	Register of public procurement contracts
	Contents for employment
	Health facilities in Croatia
Ministry of Science, Education and Sports	Registers and lists (e.g. kindergartens, primary schools, higher education, ...)
	Legislation in the field of the activities of Ministry
Ministry of Culture	Register of cultural heritage
	GIS Application of cultural assets of Croatia
	Web search engine for cultural assets of Croatia
	The register of libraries
	The register of theaters
	Catalogue of the library of the Ministry of Culture

The number of open databases keeps rising but the procedures and formats of these data still require substantial level of coordination and elaboration. This is necessary in order to increase confidence in these data and influence the demand side to actively participate in their reuse. This can be done by set of complementary measures but the most important are correct

procedures of data gathering, maintenance, versioning, and provision. This cannot be done relying only on technical solutions or simple regulatory documents but business processes should be established in such manner that they are also entirely open and aligned with open data lifecycle. The fact is that quality of data significantly influences demand side which is still in evolving phase. Public administration should provide sufficient guaranties that data will be provided with adequate quality on timely basis (Brin, 1998) (OECD ECONOMIC SURVEYS: BRAZIL, 2009) (Asgarkhani, 2005). Unfortunately majority of these data caries disclaimer which removes any responsibility from data owner which raises suspicion of possible users into accuracy and durability of exposed data. One possible approach to this problem is based on business process paradigm which enables through analysis of all possible scenarios opens insight into data lifecycle to possible users of data.

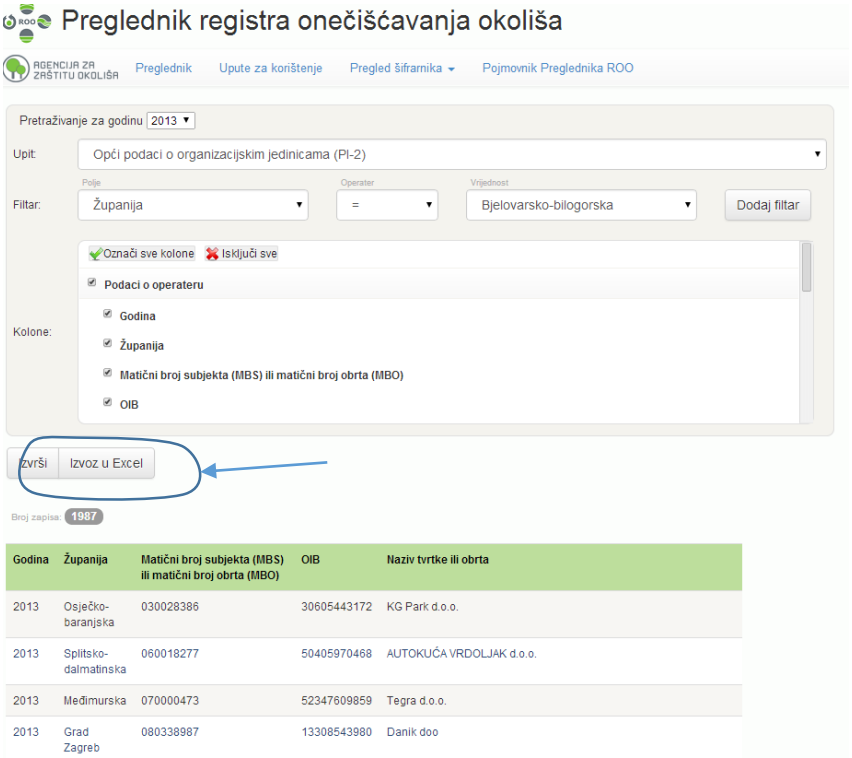
Business process paradigm

Business process paradigm is scientific and professional field which deals with modern organizations and their efficiency (Object Management Group, 2011) (Hoyer, 2008), (Peacoock & Tanniru, 2005). It is important for IS development because such approach emphasizes alignment between business processes and information technology. There are several disciplines covered by business process paradigm such as: modelling, simulation, execution, improvement, reengineering, measurement and management. The rise of Business Process Model and Notation (Object Management Group, 2011) contributed to wide usage and spreading of business process paradigm. This standard is also important for development of new generation of software systems such as service oriented architectures because they rely on direct mapping of business processes to composition of orchestrated services which is significantly different from traditional software development/engineering approach (Avison & Shah, 1997) (Erl & Booch. , 2009).

Environmental Pollution Register

The example elaborated in this paper is related to Croatian environment agency (CEA) and its contribution to open data initiative. CEA maintains Croatian National Portal of the Environmental Pollution Register. Ecology is increasingly important discipline which relies on analysis of large amount of data gathered through long time periods which enables discovery of hidden trends. The broad scope of possible usage scenarios generates major challenges for finding effective ways to discover, access, integrate, curate, and analyze the range and volume of relevant information. It is very important that ecology related data are open and available for various purposes. Unfortunately this is still not sufficiently implemented and some authors present indicators (Reichman, Jones, & Mark P., 2011) which show that less than 1% of the ecological data collected is accessible after publication of associated results and that rather than providing direct access to data, users share interpretations of distilled data through presentations and publications. Pollution register is collection of data about sources, types, quantities and places of deposition of contaminants in nature. The register is regulated by corresponding bylaw and every pollution should be registered in it. Beside technological platform which exposes register as web page (Croatian Environment Agency, 2010) it is possible to export the data and use it for further analysis (*Picture 1*). However, one of the important aspects built into this register is related to accuracy of data and the procedure of data gathering (Croatian Environment Agency, 2010). The idea is to coordinate large number of subjects and

sensors and maintain accuracy of data. The register should transform heterogeneous input data into coherent output ready for reuse.



Picture 1. Screenshot of Environmental Pollution Register.

The process of data collection and maintenance is described by BPMN diagram on *Picture 2*. Diagram has three global parts: Data collection, Data Submission and Data usage. This business process pool distribution is aligned with general open data workflow as elaborated in related literature (Reichman, Jones, & Mark P., 2011). Each of these business process pools is under responsibility of different actors which increases the importance of alignment and coordination among activities. That is why business process modelling is important tool for analysis of procedures responsible for open data delivery and maintenance. Analysis of business process model shows that there are quite substantial number of synchronizing events which helps in management of register. Data consumers can analyze internal procedures, verify data consistency and influence policy making procedure.

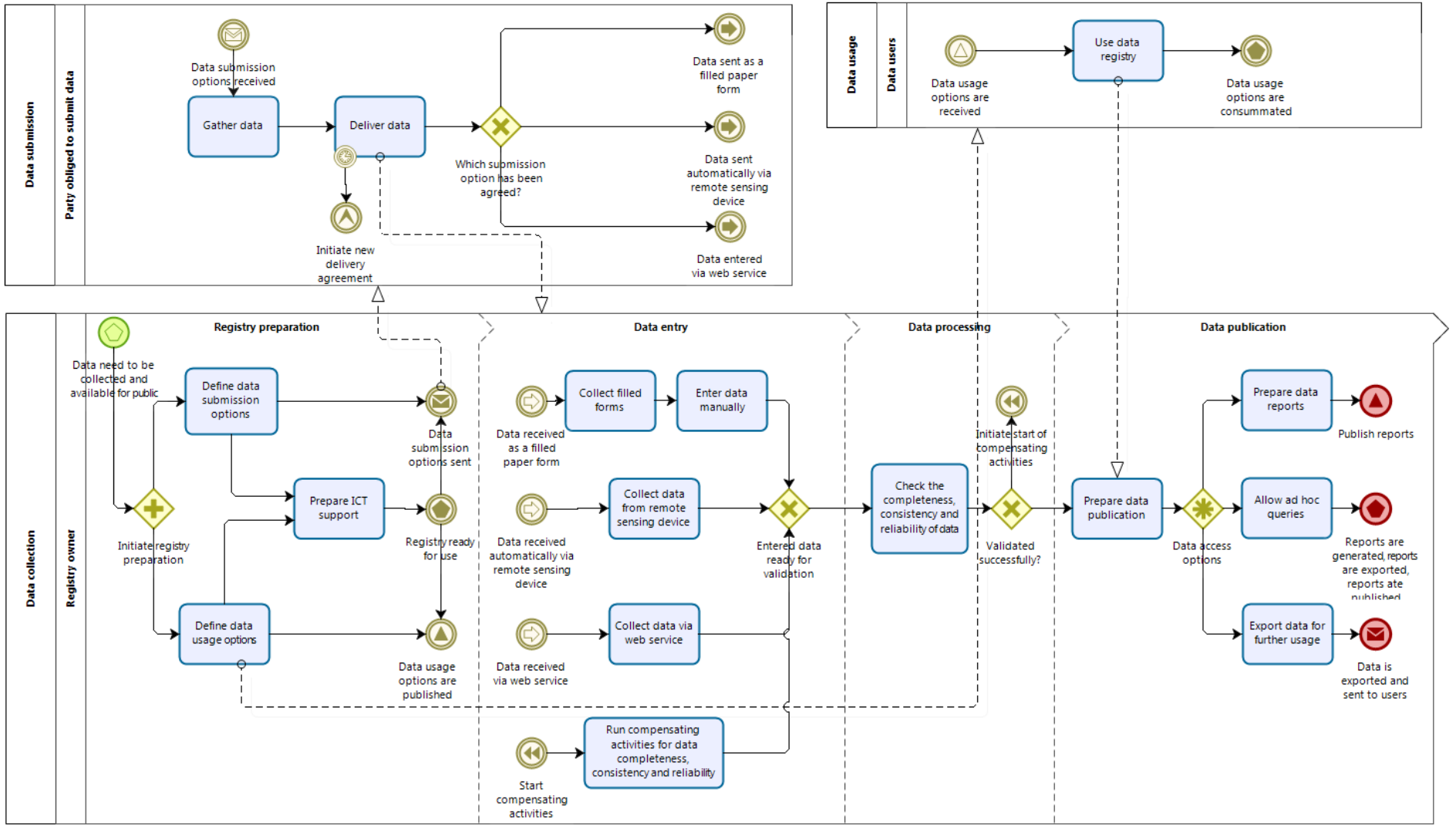


Figure 2. BPMN model of Environmental Pollution Register.

Conclusion

Opening internal data imposes additional responsibilities for public sector entities because it reveals errors and inconsistencies in administrative procedures. That is why technical solutions should be accompanied by correct gathering, distribution and maintenance processes also open for public insight. Additionally the complexity of modern public services which rely on interoperability require through analysis of business processes taking place at different actors and simple descriptions are not always sufficient. Process visualization can be done by various techniques but one of the most viable is based on business process modelling and execution methodologies and related standards. That way entire open data lifecycle can be completely aligned with administrative procedures and corresponding information system.

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