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REGIONAL ASPECTS OF ENVIRONMENTAL INFORMATICS

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Abstract

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Information and communication technology diffuse through the whole of our current practices and form our entire life. Just in the media, at political, economic and scientific level, and often even in normal conversation among people is the global environment very frequented and discussed question. The results of the environment monitoring in Czech Republic (its natural and humane components) are publicized in numeric form (field measurements data including derived indicators) and in cartography representation (Geographical Information System) at any internet servers of various levels of public administration. Environment indicators are nation-wide. At self-government region management authority level publication of regional indicators describing natural and human components of environment is null practically, in both print and electronic form. Similar situation persists in describing preserved natural territories (nature monuments and reservations, Natura2000 areas, etc. …). Somewhat better is the situation of historical and in part of technical objects. Complex description of regional environment is missing.

ICT, environment, environmental information, public information, regional information

Perhaps most influential with respect to life of people at present is the information and communication technology (ICT), in open or hidden way very strongly affects our life, including our comfort, cognition of surrounding world and his adaptation according to our aims and needs. Quality and development of living environment is very important matter and strongly affects public opinion. Our living environment is a mix of nature components of environment modified and perhaps devastated by human activities, but also anthropogenic components formed man for himself – and our civilization gives them priority against natural components. This fact is reality because large number of people lives only in conditions of anthropogenic environment and with natural environment has little to do (apparently at least).

MATERIALS AND METHODS

Aim

The goal of this paper is to identify whether regional public management authorities, in some case municipalities at micro-regions, satisfy legal submissions, i.e. whether environmental information is given to disposal for inhabitants via internet (these information appear at web pages of municipalities), how complicated is the access to this pages, what level of information pages have and how are these information presented (synopses, texts, numeric tables, descriptions, environment indicators, maps, electronic maps – GIS etc.).

Philosophy of task

Not only good material conditions for meaningful human life, but also the knowledge about environment is needed human lives too. This need is even expressed in law specifications.

The basic document of this rank was European COUNCIL DIRECTIVE of 7. June 1990 *on the freedom of access to information on the environment* (90/313/EEC), that define concept of 'information related to the environment' (shall mean any available information in written, visual, oral or data-base form on the state of water, air, soil, fauna, flora, land and natural sites, and on activities (including those which give rise

to nuisances such as noise) or measures adversely affecting, or likely so to affect these, and on activities or measures designed to protect these, including administrative measures and environmental management programs and 'public authorities' (shall mean any public administration at national, regional or local level with responsibilities, and possessing information related to the environment with the exception of bodies acting in a judicial or legislative capacity), specify free access of community to environmental information which are managed by public authorities, fundamental conditions of diffusion and making available information related to the environment to any natural or legal person at his request and without his having to prove an interest. This direction is developed and extended by United Nations Economic Commission for Europe's AARHUS CONVENTION (*Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*) – was adopted on 25. June 1998 in the Danish city of Aarhus at the Fourth Ministerial Conference in the 'Environment for Europe' process. Czech Republic ratified it in autumn 2004, European Community ratified it in February 2005. According to this convention each inhabitant has right to live in the environment suitable to his health and strain and has duty to protect and improve condition of environment in benefit for present and future generations. If citizens shall have this right and shall keep this duty, they must have good access to environmental information, must have the right participate on decision making of environment and must have access to judgment or alternatively to other independent authority (OFICIÁLNÍ STRÁNKA AARHUSKÉ ÚMLUVY; PORTAL EUR-LEX).

Directive 2003/4/EC of the European Parliament and of the Council of 28. January 2003 *on public access to environmental information and repealing Council Directive 90/313/EEC* that coming-out from AARHUS CONVENTION amend Directive 90/313/EEC and upset its acceptance to the date 14. February 2005. This Direction recently establishes *right* of community *on access* to environmental information – formerly *free access*. Other important news is *duty of authorities offer* environmental information with help of *all services of internet* (PORTAL EUR-LEX; HŘEBÍČEK, 2010).

Czech higher law norm, Constitution of Czech Republic (declared by resolve of Czech National Counsel Presidium from day 16. December 1992 like a part of constitutional order of Czech Republic No. 2/93) codifies right of information in Charter of fundamental rights and freedoms in Head Four, article 35:

1. Everyone has right to positive life environment.
2. Everyone has right to timely and complete information about condition of environment and natural resources.

These environment law regulations are concretized in law No. 123/1998 *on right to information about environment* (in actual statutory text). The Czech law was established in years 1995–1998 as a part of Czech law system harmonizing with legislation of European Union (EU). Most important other laws which regulate this problem are (always in actual statutory text): law No. 17/1992 *on environment*, law No. 114/1992 *on conservation of nature and landscape*, law No. 86/2002 *on air protection*, law No. 185/2001 *on waste*, law No. 289/1995 *on woodland*, law No. 387/2005 *on business with reproduction material forest-tree species* and other.

General power has law No. 106/1999 *on free access to information* which imposes to state authorities, territorial self-governing municipality and their authorities and public institutions the duty to offer information related to their activities (§ 1) – according to personal finding during consultation with Ombudsman office is this legislative norm in judicial practice more exploited for wider scope compared to law No. 123/1998. Czech law No. 106/1999 is application of Directive 2003/98/EC of the European Parliament and of the Council of 17. November 2003 *on the re-use of public sector information* (PORTÁL VEŘEJNÉ SPRÁVY).

Informatics is an art and science (together) of representation and processing information… i.e. it is concerned with information and documentation science (NAUMANN, 2009). The term *information and communication technology* (ICT) is more utilized presently perhaps because of better description of both – science and practical application information handling and transmission.

If wish to recognize any subject of our concern we have to describe it well, occasionally to quantify and analyze. Problematics of human environment is very wide problem. The description and quantification each particular component of environment (no matter natural or human ones) is very difficult because of diversity and complexity of objects, their states, activities and phenomena in them. It is possible characterize *environmental information* like *data representation, statistics or other quantitative and qualitative data, which decision-making authorities require for the classification future trend of changes in environment, for environmental policy formulation and refinement and for effective exploitation of all resources* (HŘEBÍČEK, 2010).

There are printed or electronic documents as informatics output of all forms of collecting, processing and scoring of environmental data. These documents contain classified information in form of verbal description, numeric data (often in tabular form), derived environmental indicators, statistical synopses of measured data and territorial or temporal development (e.g. data from air pollution measuring stations, detection of water levels and flows of rivers etc.), their graphic representations and comparisons etc. There are very important and useful theme mapping works (in classical paper form or in electronic form – Geographical Information Systems – GIS) for representation environmental information in territory.

Method of classification

According to available information there was not formed any generally valid and obligatory methodology for classification of environmental web pages. In such case is used *ad hoc* method. Methodology used in this paper is in detail described in other paper (POLSTER, 2010). This method was created for minimization of subjective view to classification of web pages and at the same time for finding level of accessibility to environmental information inside textual or map parts of these web pages. It is necessary to choose first evaluation criteria and corresponding scales for classification of content, ease of access techniques, clarity and completeness of information to estimate levels of environmental information, which are presented on web pages of state or public management authorities and regions in Czech Republic. Afterwards evaluation procedures for general level of web pages can be applied.

Classification criteria

There are in principle omitted technical and aesthetic views during classification. Aesthetics of web pages is only matter of personal taste and way of its perception. That means it is impossible to objectify its perception it sufficiently because of their subjectivity.

It would be possible to apply technical quality classification of web pages, i.e. what program techniques, procedures, tools and languages were used for creation or implementation of pages and eventually how automated system for generating of pages is used. For a visitor of page it is absolutely irrelevant. Web page visitor (user) perceives only content of page, how fast and easy he may access required information, how are these information formulated, whether is sufficient or not etc. Programmers are very high-minded to their creations but for standard user the programmers' view is hidden and user can even neither affect nor criticize it, therefore he ignores it.

For web pages classification there were found user's (resp. amateurish) criteria. In evaluating one does not need any technical knowledge for classification except basic knowledge of internet browser operations. Criteria were divided into two parts: *common* (identification, access) and *specialized* (maps, GIS). In the first group of criteria has been placed: *language version* (alternation) of web page, to *official web alternative* (e.g. tourist web), *locator* which allows to search for engaged words or phrases inside content of web, *pages map* (display whole web structure for event access pass by web menu), *access composition* to environmental content, *reference on environmental information* and their *complexity*, *reference to EIA, SEA pages*, publication according to law No. 106/1999 Sb. information. Summary of second group criteria: maps, thematic territory maps, GIS web application, metadata and accessibility of metadata information system, otherwise for isolated maps in scope of GIS linkage to neighboring territory, how complicated is to access maps or GIS application. To each criterion is assigned evaluation scale.

Classification procedure

Classification of web pages has been processed by visual detection of monitored components and its evaluation by help of given criterion scales, in some case by counting necessary steps useful to access classified elements of the pages. Records of classification were ordered into tables. Tables of detailed classification of all self-government region webs and web of capital Prague were shown in paper (POLSTER, 2010). Analysis of "user friendly" rate of these webs and their environmental content was made in accordance with these tables. There were selected randomly some other webs for extended evaluation: two statutory city webs, two webs of municipality with extended powers and two webs of micro-regions

RESULTS AND DISCUSSION

Classification of self-government regions webs

The aim of evaluation was not creation of some "sequence" of self-government region webs but only to see how self-government region is presented at web space for any user, how can user seek special-interest (i.e. regional environmental) information and how simple or complicated is the access to these information.

Appearance of self-government region webs is very heterogeneous. There are two principle concepts of ordering the title page and all other continuing pages. First concept contains title page menu with significant references to other pages of web tree. Except the title page actual information from self-government region is available. System of second concept shows on title page three or four user's roles (inhabitant, foreigner, businessman, student etc.). After selection of a role they are offering relevant references (only significant for chosen role). In this case the orientation on the web is difficult especially when user chooses wrong role at the beginning. It seems combination of both concepts would be better (example of this is Czech Portal of the Public Administration – http://portal.gov.cz). Every self-government region web has structure and appearance of web elements separate. There is no unified (at least unofficial) approach how to adjust appearance of web pages. In case when user visits only one web of self-government region he has no problem, after initial familiarization he is able to quickly navigate in structure of web. However, if user must visit more self-government region webs, orientation in disparate structures is very difficult because choosing the same information in different webs is too difficult and takes very long time.

We can find environmental information at each self-government region web generally below

reference "Environment" (Životní prostředí). Unfortunately this information is often fragmentary and any self-government region puts them only on official papers (requests, statements, grants, subventions). Other self-government regions publish their environment protection and development region plans, high water plans etc. On all self-government region webs there are missing environment indicators (e.g. air quality and pollutants, water quality etc.). There is one exception – capital Prague has on web relatively detailed natural environment description (geology, flora, fauna etc.). All webs of self-government regions enable some one access to SEA/EIA evaluated projects.

There is much better situation in the area of map information, either in form of separate maps or alternatively in web applications of GIS. Separate maps are for many users more accessible (faster access – GIS machines always need longer time to display required content, more transparent – generally all territories in the region) but user has got no detailed information. GIS applications furthermore require the explicit knowledge for operating them and for selecting the information. This fact is considerable handicap for many user utilizations. Large number of maps does not have character of environmental information (e.g. administrative division, cadastral maps, transport maps, established organizations etc.). Maps with environmental content are always downloaded from server CENIA with limitations in the region territory but don't have completed region specifications (e.g. numbering of Specially Protected Areas is assumed form database of Agency for Nature Conservation and Landscape Protection of the Czech Republic but these numbers do not have any significance for normal web user). There are also missing attachments to neighboring territories – environmental components are not limited by region borders and have over-border links (biocorridors, protected areas etc.). What is absolutely missing, are anthropogenic environmental impacts maps (e.g. traffic noise maps, intensity traffic maps, smog maps etc.).

Statutory cities

Brno (http://www.brno.cz):

Four-language web, combined entry (according to the role of inhabitant, tourist/free time, businessman) and according to problems, complexity of access medium-weight (there are necessary 3–4 steps to access searched information); *environmental information*: actual weather; *references*: transportation, "Urban centre", city territorial plan, maps; in division *"I need handle myself"* references: environment, communal waste and other; *city map portal* (GIS): city map with tool for street searching, bike-trail projects, city territorial plan and territorial planning documentation, city vegetation areas, nature and landscape conservation, geology, power concept, city land price map, salvage centers, air pollutions sources; *separate maps*: traffic noise map, map of brownfields, bike-trails (only in text – reference to another web), registry of city addresses with automatic map display.

Summary: *information about urban and partially about nature environment of the city, metadata system is missing.*

České Budějovice (http://www.c-budejovice.cz/cz):

Three-language web, entry according to problems, complexity of access medium-weight (there are necessary 3–4 steps to access searched information); *environmental information*: several references (environment, bike-trails – inclusive map, waste, airport, railway station, references to transport companies, parking zones, city mass transportation, habitations regeneration, highway D3, weather); *city map server* (complicated access): map of city mass transportation with stops, parking places, streets and plots, public WC, separated waste (container places list), city territorial plan (GIS functionless).

Summary: *information about urban environment of city, natural environmental information and metadata system are missing.*

Municipality with extended powers

Trutnov (http://www.trutnov.cz/):

Web only in Czech, entry according to problems, complexity of access high (there are necessary 4–6 steps to access searched information); *environmental information*: access through town department of environment – forms for official dealing, hunt list, contacts to department; graphical references only on the bottom of the page; town territorial plan, detailed flood plan inclusive maps (map server), town map server – bike-trails, ski-trails, urban area objects, GPS and searching; actual weather and forecast for Trutnov; tourist information.

Summary: *information about urban environment of town, tourist information, natural environmental information and metadata are missing.*

Klatovy (http://www.klatovynet.cz/klatovy):

Three-language web, entry according to problems, complexity of access high (there are necessary 5–6 steps to access searched information); *environmental information*: access through town department of environment – very long description of department sphere of action, contact for department, no other information; official forms are placed at another page (page of summary of all official forms of all departments of the town office), presentation of enclosed project "Klatovy – clean town"; town territorial plan, projects looked on by EIA, town map server – bike-trails, ski-trails, tourist-trails; tourist information (interesting objects, interesting journeys in town surroundings).

Summary: *minimal information about urban environment of town, tourist information, natural environmental information and metadata are missing.*

Micro-regions (municipalities regional associations outside of public management)

Micro-region "Labské skály" – "Elbe Rocks" (http://www.labskeskaly.info):

nine municipalities at north part of district Ústí nad Labem.

Three-language web, entry according to problems, complexity of access low (there are necessary 1–2 steps to access searched information); bike-trails, tourist-trails; excellent environmental information in attached document (.PDF) "Development strategy of micro-region Labské skály"; no maps.

Micro-region "Kahan" – "Miner's lamp" (http://www.mikroregionkahan.cz):

thirteen municipalities at west part of district Brno-venkov (Brno-environs).

Three-language web, entry according to problems, complexity of access medium-weight (there are necessary 2–3 steps to access searched information); bike-trails, tourist-trails, cultural relics, traffic connections, history of coal-mining in region; relief topography map (.PDF); no natural information.

CONCLUSION

Range of publicized environmental information is directly depending on level of public management authority. Nation-wide webs (Portal of the Public Administration, CENIA) publish records of environmental monitoring and have large range of this information but only those with nation-wide availability, e.g. environmental indicators, nation-wide maps etc. Self-government region management authority information without references to region adopts for their territory and publishes them at regional web.

What is relatively good is the level of environmental information at statutory cities but only at maps (thematic separate maps, GIS web applications), verbal and numerical descriptions of city environment are missing. Environmental information of municipalities with extended powers are restricted to planning documents, regulations, official forms and tourist information and maps. Micro-regions (regional associations of municipalities) have generally restricted the information to tourist utilization of their territory. These trends are indicated using analysis of random chosen webs. The entire problematic would, however, need more deep and systematic exploration in future surveys. At the same time would be useful to monitor dependences among any webs of self-government regions and statutory cities or dependences among webs of micro-regions and their municipalities.

SUMMARY

Not only good material conditions for meaningful human life, but also the knowledge about environment is needed human lives too. This need is even expressed in law specifications. The basic document of this rank at European level was COUNCIL DIRECTIVE 90/313/EEC *on the freedom of access to information on the environment* from 1990. This direction was developed and extended in AARHUS CONVENTION (*Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*) from 1998. Directive 2003/4/EC of the European Parliament and of the Council from 2003 *on public access to environmental information and repealing Council Directive 90/313/EEC* coming-out from AARHUS CONVENTION amend Directive 90/313/EEC and upset its acceptance. Here, in Czech Republic, the environment information law regulations are concretized in law No. 123/1998 *on right to information about environment* (in actual statutory text) and in other environmental laws. Public management authorities on different levels of management realize their legal duty to present environmental information via internet. Range of publicized information is directly depending on level of public management authority. Self-government region management authorities adopt information from nation-wide webs (Portal of the Public Administration, CENIA etc.) without concretizing for their region territory. Relative good situation is at statutory cities but only at maps, verbal and numerical descriptions of the city environment are missing. Micro-regions have information generally restricted to tourist utilization of their territory. Detail environmental information describing natural and human components are null practically, in both form print and electronic documents. Similar situation persist in describing of nature and landscape preserved objects, somewhat better is the situation of historical and technical objects. Complex description of regional environment is missing.

REFERENCES

HŘEBÍČEK, J., 2010: *Studijní materiály předmětu FI:PV044 Environmentální informační systémy*. [Informační systém Masarykovy univerzity, online]. Brno: Masarykova univerzita.[open 18. 9. 2010]. URL: <http://is.muni.cz/el/1433/podzim2008/PV044/um/?lang=cs;fakulta=1433;obdobi=4384;kod=PV044;predmet=455048; info=1>.

NAUMANN, F., 2009: *Dějiny informatiky*. Translation Voltrová (roz. Nocarová), M. 1. ed. Praha: Academia. 422 p. Edice Galileo. ISBN 978-80-1730-7.

OFICIÁLNÍ STRÁNKA AARHUSKÉ ÚMLUVY v České republice. [online] [open 14. 9. 2010], URL: <http://www.ucastverejnosti.cz/cz/>.

POLSTER, P., 2010: Úroveň environmentálních informací na webových stránkách krajských úřadů. *Studia Oecologica*, III/2010, 14–25. ISSN 1802- -212X.

PORTÁL EUR-LEX Přístup k právu Evropské unie. Směrnice Evropského parlamentu a Rady 2003/4/ES ze dne 28. ledna 2003 o přístupu veřejnosti k informacím o životním prostředí a o zrušení směrnice Rady 90/313/EHS. [online] [open 16. 9. 2010], URL: <http://eur-lex.europa.eu/cs/index.htm>.

PORTÁL VEŘEJNÉ SPRÁVY České republiky. Zákon č. 123/1998 Sb., o právu na informace o životním prostředí, zákon č. 106/1999 Sb. o svobodném přístupu k informacím. [online] [open 15. 9. 2010], URL: <http://portal.gov.cz>.

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