

## Levels of the Use of Electronic Communities in the Management of Regions

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**Abstract**—The article describes the levels of use of electronic business communities in the management of the city. The study was prepared on the basis of data, observations and investigation at Czestochowa City council, in April and May 2015. The research are related to the development of the concept of Regional Business Spatial Community (RBSC). City Council, along with service providers and providers of media for the residents work for regional development. Five basic levels were identified: informative, tender, negotiative, the level of projects and of processes. In addition to the characteristics of the levels, a qualification of the applied solutions and tools to specific levels has been made. The analysis shows that in the region of Czestochowa, relations at the level I to III occur. The summary indicates directions for further research on the development of electronic business community.

### I. INTRODUCTION

**M**ORE and more new competencies are assigned to modern local self-government bodies. They affect the operation of more and more areas of local life. To accomplish the tasks assigned to the offices, IT tools are becoming increasingly necessary. One of the effects of the use of IT tools is the ability to create electronic communities.

Appointment of electronic communities in cooperation with the local administration aims to create a network of cooperation between different actors operating in the region. These communities can cover various thematic areas, can be open or closed, can serve to establish cooperation or continuous improvement of it.

This study takes the theme of development of electronic communities to support local development. Creating a regional electronic communities the assumption to facilitate the planning, organization and implementation of various projects. The assumptions of creating these communities is to encourage the increase of the activity of different types of entities functioning in the region [1].

In this consideration of these concepts for electronic development levels of the community were proposed. The arrangement of the shown levels is intended to indicate how they should evolve the built communities [2]. The proposed system of levels is the result of the analysis of several years of cooperation of the authors with Czestochowa City Council for the creation of these communities in order to implement selected urban projects.

### II. IDEA OF ELECTRONIC COMMUNITIES

The essence of electronic communities is to join entities, enterprises, institutions and offices in one circle of interest with the use of ICT solutions (information on communication technologies). This idea reminds the use of social networking sites (e.g. Facebook, Twitter, Instagram) by individuals. These people voluntarily create an account in order to communicate and exchange their views. These portals also allow for focusing on specific tasks, objectives and events. Users shall provide one another with information and, this way, form interest groups.

In a similar way, around specific projects and initiatives, enterprises, institutions and offices can be focused. Due to the geographical spread and growing importance of information resources in modern economy and business processes, emerging electronic communities are electronic-virtual. Obviously, they will not use the already existing social networking sites for this. It is necessary to build specific environment - an electronic platform (e.g. Spatial Regional Business Community RBSC - see more [3]).

The basis of the platform of collaboration among electronic communities is an Internet service. Access to the site can be open or closed. This means that only entities that meet certain criteria can use it. Access to the website may also require an invitation by another entity or have the appropriate recommendations. Users of the service can create within its interest circles. These interests may affect ongoing projects, investments, management of the region, cooperation, etc. The implementation of these tasks requires to supply the system with appropriate data and information. The purpose of the scheme is therefore the integration of data from different sources and from many entities. The collected data, according to specific tasks and access rights, would be made available to participants in the electronic community in cloud computing technology.

The basis for the internet system agglomerating online communities can be data from government offices and local government, such as maps, records, information about entities operating in a given area, information about auctions, investments held, etc. On the base constructed this way users would have the option of applying their own information and data (which from the point of view of the community could help to increase the value of the service), from their systems, such as:

- ERP - selected information about the transactions, collaborators, owned resources [4],
- GIS - Spatial information on the nature concerning, for example, distribution of real estate, infrastructure course, scattering branches, commercial premises, the work carried out, etc. [5],
- CRM - selected information about contractors, collaborators, needs in terms of cooperation, missing resources for specific investment or project, etc. [6].

The created website, focusing on electronic communities in a given region becomes a kind of data warehouse. The system integrates data from different sources and in different formats. Then, after establishing rules for access integrated and aggregated data are made available to other participants in the community.

The sharing of data may be controversial and it can raise concerns. Data, information and knowledge are an important part of the organization's resources. They are protected, as this determines competitive advantage. Sharing of information resources within the electronic community therefore requires an appropriate approach and policy. So it is only possible to share such resources, which, in effect, will constitute value added for the electronic community, and, at the same time, can bring tangible economic effects, for example, will allow to gain a business partner, shorten the time of the investment, will help to identify inconsistencies or barriers.

### III. LEVELS OF APPLICATION OF ELECTRONIC COMMUNITIES

The terms of reference of local government are appointed by civil laws. In them they are contained lists of the areas whose functioning is the responsibility of specific levels of local government. The purpose of these offices is to organize the principles of functioning of the individual, identified areas of life, the creation of entities or cooperation with relevant organizations. In addition, in certain parts of the act, they govern the responsibilities and roles of acceptable administrative units. It is worth remembering that the tasks of the local government bodies are not limited to regulation of specific areas of social life and making administrative decisions, but they can also stimulate local activity, both social and economic. The aim is to stimulate local entrepreneurship in various fields of human activity.

The proper functioning of local government administration should be focused on cooperation with the environment. Electronic media may become one of the main channels of both cooperation and mobilization of potential partners. With it one can gain data about the needs occurring in the region, as well as collect the opinions of residents about the planned projects. It is also possible to keep appropriate information in terms of policy and activities of the office, as well as all types of projects carried out in the area. Electronic media can be an important channel of communication between the office, residents and all stakeholders in the area.

When planning the rational use of IT tools in the activities of the local administration and in the broader regional management thread, the application of criteria should be

defined. In these considerations mainly two criteria for the areas of local community life and levels of cooperation were taken into account.

The basic tasks of the governments of cities with county rights in Poland include [7] :

- ensuring spatial order,
- estate management,
- environmental protection and nature conservation and water resources, construction of roads,
- building streets and bridges, traffic organization,
- protection of public transport,
- water supply and sanitation,
- tasks in the field of geodesy, cartography and cadastre,
- education, health and care of the third century people,
- culture (libraries, theatres and other institutions),
- protection of monuments of culture and nature,
- public safety,
- promoting the city,
- social activation of residents,
- creating the city's development strategy.

There are definitely more of the mentioned tasks. However, this citation is to indicate how many different tasks public administrations of cities with district rights have to carry out. To carry out these tasks, the office can create special units for specific tasks or order them to external actors. In some areas, the office can stimulate the construction of infrastructure, which is meant to enhance local entrepreneurship. It happens that in some cases the local government must define a strategy of development of the administrative unit, which may cause stimulation of one sector of the economy at the expense of another (for example, the conflict between cumbersome industry and tourism - especially characteristic for places situated in an attractive tourist area) [8].

In view of the fact that local authorities are elected, making decisions of a strategic nature for the development of the entity must be consulted with representatives of the local community and gather the opinions of residents, take into consideration local needs and ideas for the development of the unit. Very often local authorities are held accountable for actions they have taken for the development of the region and the results they have.

Therefore, their activities must be carried out in different areas and at different levels of cooperation. Analysing the contemporary principles of functioning of local governments, the following levels of cooperation can be indicated (compare to [9]):

1. Information.
2. Tender.
3. Negotiation.
4. Projects.
5. Process.

At the level of information offices collect data about the needs occurring in the region and inform themselves about their own activities. This may involve both information about the activities of local governments (e.g. The information of the topics discussed at sessions of the municipal), as well as planned and the measures taken in the

city in various areas of social life. For example, BIP (Public Information Bulletin) can be used for this purpose.

At the level of tender subject matter exchanges of information refers mainly to the planned projects in the city. Offers can flow in two directions. On the one hand, the offer may flow from potential investors who plan to invest in the city and for this purpose are probing interest in the city and its residents planned investment. On the other hand, the local government may announce emerging ideas and plans for different types of initiatives to the residents to hear their opinions. In this case, you can use the systems to collect and transmit documents electronically, as well as the possibility of collecting public opinion through electronic methods in various vital issues residents.

The level of negotiation is related to the organization of projects implemented in the city. The role of the office may be threefold. The authorities may initiate the project (e.g. construction of the road). Using IT tools may carry out auctions, and then negotiate, it may also organize consortia made up of representatives of many entities, which in turn has to lead to take the project. The second type of the role of the office is to support people's initiatives to be implemented throughout the city. In this case, the city can be a shareholder or, in a variety of ways, support the project implemented, including seeking partners for cooperation. What it can also be accomplished by using IT tools. The third role is to control, which is on one side of verifying all documentation relating to the operation, on the other hand may consist of facilitating and promoting investments.

The level of projects is to create tools which will support the implementation of specific projects. This is particularly true for large projects that will require the cooperation of many entities. In this case, IT tools can be used to establish a communication medium between all the partners involved in the project.

Referring to the contemporary concepts of process management, many projects can be applied to specific procedures for implementation. Using the tools for process design, it is possible to design informatics support for processes carried out in the framework of the project [10]. This can apply both to investment processes and then to the control or management of entities arising as a result of the investments the city [11]. In this way, not only a tool for electronic document flow can be created, but also social tools can be used to create the development of the project's areas.

The above levels of cooperation are the basis for the creation of electronic communities. The thing is that created communities are not homogenous. Hence, it is unlikely to create a single community. As a part of the regional communities, may occur many community sectors (e.g. related to education, health services and municipal investments). Furthermore, many traders may belong to different communities. These communities may be closed and open. In addition, different rules may be accompanied by the possibility of joining the framework of the community. This may depend both on the specifics of the

industry, where a community was established, as well as the level of cooperation.

Construction of electronic communities is a long process and can take many forms, which over time can be converted together with their development. The formation of regional electronic community usually takes place according to certain phases. A significant impact on its shape has also the purpose for which they arise. For the purposes of regional governance can be invoked various communities, which seeks different objectives and designed to satisfy the diverse needs of society.

Bearing in mind the diversity of the community and the objectives of their use in regional management in these deliberations levels of use of electronic community in accordance were adopted with accepted earlier levels of cooperation.

Information level is a kind of substitute for the community. Its aim is the presence of different information or initiatives. Information may involve various important issues in the life of the city. In contrast, initiatives on one hand inform about emerging initiatives, on the other objective is to obtain an opinion, and, above all, support for relevant projects. Generally, the information appears at the integrator (e.g. the town hall), which aims to send a message to the widest possible population. Usually, messages are transmitted to open community, though not excluded is the creation of news compasses closed. Information level may be interdisciplinary.

The level of bidding has been generally assumed by discipline. It refers to specific sectors of social life. It also requires interaction between the initiators of projects, and those who will give an opinion, in the long run, may take part in them. It is worth remembering that not always the initiators are entities that organize the project and in the future will be integrators. The level of bidding electronic community is usually open. Although they may also receive the offer (in particular of a business), which can be routed to a closed community.

The level of negotiating refers to specific planned projects. An electronic community will have to negotiate in order to organize the project from preliminary discussions by submitting comments and offers, and ending with the completion of electronic auctions and having conversations to the conclusion of a relevant investment agreements have in the future supplies. Generally, the community may be mentioned at the outset generally open, but with the implementation of further preparatory activities for the implementation of the project can be closed. It is also necessary to note that many similar communities can be invoked, each for a different project.

With the closure of community at the negotiating level, exclusively to the entities involved in the implementation of the project, it can be assumed that the community moves to the level of the project. At this level it is important to provide adequate communication to the smooth implementation of the project and its management. At this level you will be required a certain level of integration of information systems managed by participants in the

community [12]. These communities typically will be closed. Also in this case there may be many different communities that support various projects.

The level of the process is a further development level of cooperation. It is based on the fact that the project is quite strictly formalized. First of all, procedures for implementation have been strictly defined. Thanks to it, it is possible to control the implementation of all processes within the project [13]. The condition for achieving this level is the right level of integration of information systems of all participants in the community, the availability of tools for modelling processes and their application. Communities are closed. Time may be limited for the time of investment or for the duration of the operation of the project. Comprehensive description of the various levels of use of electronic community are presented in Table. 1.

IV. TECHNOLOGY USED WITHIN ELECTRONIC COMMUNITIES

Implementation of the indicated levels of cooperation within the electronic community requires a set of ICT tools. These tools require proper integration so as to form one coherent system. The functioning of such a system must be network service (Web Service) in database technology.

The simplest in the implementation seems to be the level of information. Technological solutions that can be used is news in the form of blogs, forums and other Web 2.0 tools. They allow the posting of information on existing activities, investments, tenders, etc. Other participants of the community can give opinions and comment on them. Even at this level of the system (such as on social networking sites) should enable the creation of groups and circles of interests around specific themes. Similar approaches may be used as a proposal. However, it is necessary to supplement the system with the possibility of submission of tenders in an automatic manner, e.g. Through a system of forms and attachments. Sent offers should be reliable, which is why the system can be completed with the need for registration, and in some cases it may be required to sign an electronic certificate.

Implementation of negotiation level builds the idea of groups and circles of interest. In the framework of specific initiatives, circles of interests are filled with participants. They become cooperators and collaboration platform offers the possibility of negotiations in the virtual space. The necessary technological solutions in this area appear to be advanced communication tools, video conferencing,

workflow systems and groupware systems (e.g.. Microsoft SharePoint or Novell Open Workgroup Suite).

Implementation of joint projects within the electronic community web platform needs to be supplemented with tools to coordinate and assist in the definition of business factors, making the right decisions about funding and display the status of projects and resources across the enterprise. This type of software helps manage projects and allows collaboration from anywhere using tools for project managers, project teams and decision-makers. An example of such a platform are applications such as Microsoft Project version running in cloud computing technology - MS Project Online.

Support for business process level requires implementation of solutions allowing for the design, implementation and development processes in the context of groups and circles of interest. Applications supporting Business Process Management BPM can also be handled in the cloud. An example of such a solution may be IBM software. As declared by the manufacturer it allows for:

- optimizing operations, providing them with an excellent view of the ongoing work and ongoing tasks based on continuous monitoring and analysis of processes;
- faster execution of tasks through comprehensive collaboration tools;
- secure management of changes and taking them under intuitive supervision;
- offering customers valuable forms of interaction with the inclusion of mobile environments to business processes;
- continuous analysing the business through the integration of business processes with the basic enterprise systems.

Diagram of the functioning of the web service for electronic communities is presented in Figure 1.

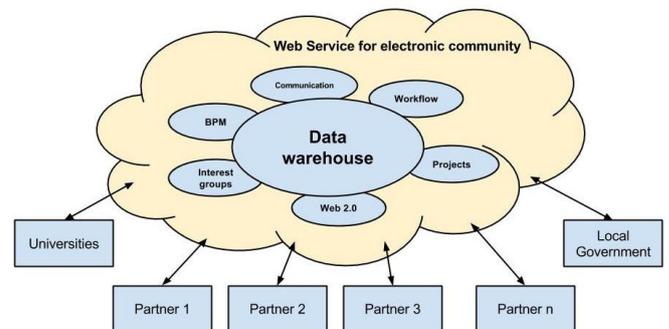


Fig. 1 Scheme of Web Service for electronic community  
Source: Own study

TABLE I.  
CHARACTERISTICS OF COOPERATION LEVEL IN ELECTRONIC COMMUNITIES

Level	Availability	Participants	IT Tools	Range
1. Information	Open, unidirectional	All actors in the region	Web 2.0, Web Services	Regional
2. Tender	Open, two-way	Entities interested in a particular industry	Web 2.0, Web Services, e-forms,	Industry
3. Negotiative	Open/closed	Entities interested in the project	Web 2.0, Web Services,, MS SharePoint, etc	Interested in the project
4. Projects	Closed	Entities carrying out the project	ERP, GIS, CAD/CAM, CRM, – MS Project Online	Stakeholders of the project
5. Process	Closed, formalized	Entities carrying out the project	ERP, GIS, CAD/CAM, CRM BPMN or BPEL	Stakeholders of the project

An important element of web service is a data warehouse. Principles of the data warehouse is presented in Figure 2.

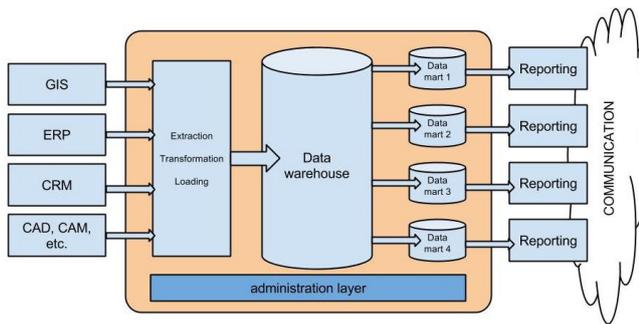


Fig. 2 Data warehouse model for electronic community  
Source: Own study

## V. CURRENT STATUS OF THE FUNCTIONING OF ELECTRONIC COMMUNITY

In the first quarter of 2015 year, a number of discussions and consultations with the Office of Czestochowa, which concerned the current state of the electronic community were conducted. The aim of the study was also to identify potential technological and organizational solutions that can contribute to the development of this type of concept.

The Office, as the body responsible, and strongly interested in the development of the city and the region could potentially become an integrator and leader of this kind of technology. The more that has a large number of information resources, which could become the basis for the initiation of the said web service and data warehouse.

Most of the solutions operating at the moment in Czestochowa's offices, and which can be regarded as the nucleus of the electronic community function on the first level - information. That is, they operate on the principle of communicating information. Offices, institutions and firms have the ability to publish information about their activities, planned investments or needs. Some data is published in the activation of specific social groups. Web 2.0 technologies allow for interaction, feedback.

The most important solution in this aspect is the website of the City Council [www.czestochowa.pl](http://www.czestochowa.pl). It has a thematic areas allowing you to create electronic germs communities in sections: economy, education, culture, sport and tourism,

Web service municipal office is also integrated with other thematic parties, e.g.:

- Public Information Bulletin ([bip.czestochowa.pl](http://bip.czestochowa.pl)),
- The electronic public administration services platform – ([epuap.gov.pl](http://epuap.gov.pl)),
- System of Electronic Communication in Public Administration ([sekap.pl](http://sekap.pl)).

City Czestochowa also has solutions aimed at electronic integration of citizens through a system of public consultation, support local initiatives - [konsultacje.czestochowa.pl](http://konsultacje.czestochowa.pl)

Due to the advantages of tourism and pilgrimage, Czestochowa has a developed system of City Tourist Information Service - [info.czestochowa.pl](http://info.czestochowa.pl).

Part of systems, in particular those which relate to areas of the economy and investment, has the characteristics of a second-level electronic community - level proposals. On the [biznes.czestochowa.pl](http://biznes.czestochowa.pl) is a search system of investment offers. (Business and Real Estate Marketplace). It consists of a main areas: maps listings (map deals), offers base, make an offer and ask for offer.

This system could be a first step for potential investors looking for potential areas for investment location.

A similar function can be performed by geo investor (<http://e.czestochowa.pl/geoportal-inwestora>). Information about the city, the existing administrative procedures, planning and fiscal policy, as well as investment offers in Czestochowa can be found there.

Part of the systems managed by the Office of Czestochowa has elements of Level 3 - negotiation. In particular, it can be seen in GIS, whose task is to record geodetic resources of the city. These systems are at the moment there are models that allow for automation and virtualization negotiation processes, but in the case of the occurrence of such needs, there is the possibility of their development and software.

The study of information systems and web solutions managed by the City and discussions with officials revealed that at the moment no system supports electronic community at the level of implementation of projects and processes. This idea, however, aroused interest. Employees magistrate indicated their willingness to participate in the potential projects in this area.

## VI. DIRECTIONS OF DEVELOPMENT AND CONCLUSION

According to research conducted in the City Hall of Czestochowa it is known that a part of the management office is interested in creating electronic communities, which would facilitate contacts with potential petitioners, investors, stakeholders cooperating and various other organizations and residents. The electronic media allow not only the flow of documentation (eg. taking samples of the documents and their electronic submission), but also allow making contact with various actors. Already, employees of the relevant departments of the Municipal Office in Czestochowa are in contact with the representatives of various organizations, invite to participate in various training meetings and other events. Under mailing lists hides a kind of network of cooperation, especially when many of these entities interactively respond to sent invitations.

It seems that the problem lies in building a tradition of cooperation in the use of IT tools. It also seems that the participants of these forms of cooperation could take a more active part themselves by inspiring their own events, and invite representatives of other entities, including the town hall. In this way, it could be possible to create more circles of the electronic community.

In continued discussion it was noted that communities may be based not only on electronic communication, but also on data exchange. This data is usually registered in closed or only partially open systems of real or potential participants in the proposed community. In principle, from

negotiating the level of communication between participants of the community can be enriched by the exchange of data which may facilitate subsequent cooperation.

At the level of projects, in particular data exchange processes between systems of the users already seems to be rather essential. However, achieving this requires the fulfilment of several conditions. The most important ones include:

- the existence of a genuine desire for cooperation, including the exchange of knowledge and resources between members of the community,
- building ventures involving many actors, where IT tools will become an essential part of management,
- supporting process management in organizations and shaping attitudes among managers of community participants, as well as rank and file workers conducive to the implementation of formalized business procedures
- awareness among others on the electronic community, proposed and submitted socio-economic initiatives, business process modelling tools.
- creating rational data collection systems to support the planning and implementation of regional projects.
- training of specialists in the construction of models describing the processes and selected regional issues, the use of which will require the use of data already collected.

These requirements have been defined basing on research conducted at the office of the city of Czestochowa and on the basis of contacts with companies supplying utilities (eg. plumbing companies, a provider of electricity and gas, etc.)together with other civil society organizations operating in the city of Czestochowa.

By analyzing the obtained results it can be stated that the office fulfils the obligations assigned to it by law. However, there is a will to activate the community of the town, which until then struggling among others with problems such as depopulation and a relatively high unemployment rate in the whole province of Silesia. Therefore, it seems that the establishment of regional electronic community can be one of the factors increasing the activity of residents and reverse adverse trends in development.

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