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THE CONCEPT OF THE LEVEL OF COMPUTERIZATION EVALUATION WITH RESPECT TO PROCESS MANAGEMENT MATURITY BUILDING IN LOCAL GOVERNMENTS

Abstract: In contemporary conditions, organizations look for ways of achieving a competitive advantage in all possible areas. Recently they have turned to improving their managements systems. One possible change is moving away from traditional structures and turning them into processes due to the introduction of process management. In the article the authors have shown the stages through which local governments must move to achieve a full level of process maturity. Special research has been conducted to establish how many local governments in Lower Silesian Viovodeship have introduced fully process management. Also, the research has enabled us to get to know on what level of computerization the local governments are and what technologies they use. Moreover, the use of BPM instruments has been examined. The research has shown that local governments in that region are not advanced in terms of process management practices and technologies in use.

Keywords: computerization, evaluation of computerization, local government unit management, process development levels.

1. Introduction

One of the most important challenges facing local governments is the professionalization of management. This can be noticed in the implementation of methods and techniques making them work better and more efficiently. One of the directions in that area is the implementation of process management. Local governments very often function in a traditional way, which makes it difficult to adjust flexibly to fickle clients' needs.

The implementation of process management is a complex and multilevel problem. In practice we can hear the opinion that process management means the identification

of the main processes. This approach is very typical for ISO norms implementation, where the requirement is to work out the main processes. That is why this problem is often misunderstood. Thus, only in local governments, where authorities are aware of this complexity, is process management implemented fully and is the maturity achieved.

However, even when there is a conscious policy to achieve the levels step by step, a very important aspect is how to evaluate the level of computerization of conducted processes. In this article the basic criteria which have to be met in the computerization development have been described. Special attention has been directed towards the solutions needed to be process mature. The main idea of the article is to work out the concept of the evaluation of the use of informatics systems supporting process management in local governments.

The authors have conducted extensive research regarding maturity level in 107 local governments in Lower Silesia Voivodeship (*województwo dolnośląskie*). The research also was aimed at showing the use of informatics systems in everyday government operations. An additional element that has been researched was the use of Business Process Managements systems (BPM). Such systems are used more and more often by organizations which want to master their process management operations.

2. The levels of process management maturity in local governments

Taking up the process management idea is the first step to be mature in that area. Each level that must be achieved is characterized by more and more complex activities and detailed operations connected with the process approach.

Deciding on the process maturity level, the following elements are considered [Bober et al. 2004, pp. 25–27]:
– identification and formalization of processes in local government,
– deciding on responsibilities for process realization,
– the use of computerization in process management,
– existence and implementation of process monitoring rules,
– existence and implementation of procedures of new processes formation.

According to the classification described in the Institutional Development Program, the first level is characterized by governments which have not identified processes formally. These governments usually operate in a traditional way. Often they realize that they have processes inside, but they have not described and mastered them.

The second level is characterized by the identification of only the most important processes and by describing the way they move through the organization. Moreover, the people responsible for the appropriate realization of the processes have been indicated (process owners). They have the right to monitor and control processes and

change them when it is necessary. To be at the second level, it is also necessary to control if the main processes are realized according to a formally agreed plan. When such control results in processes are led properly, the effectiveness of an organization increases.

The third level is characterized by the identification of most of the processes and the description of the way they follow. In that case, it is also necessary to have process owners who are responsible for appropriate realization of the processes. They also can control and monitor the processes and change them. Most of the processes are conducted according to a formal plan which is evaluated daily. Moreover, at the third level there is a general understanding of process management among workers because the workers have been trained in that area. This results in a bigger acceptance of organization activities in the area of process management.

The fourth level means that the processes which need computer support have been highlighted and the support has been provided. This means that for the government to be at the fourth level, it is necessary to implement a lot of informatics systems projects. They may be helpful in the operations as well as in monitoring and processes control.

As the results of research have shown, the realization, monitoring and evaluation of informatics projects is the key barrier to develop process management in local governments. The problem is that very often the actions to become process mature are abandoned and the maturity is not completed.

The last level, the fifth one, means that the procedures of mastering the processes have been worked out and implemented. It is possible to establish new processes when:
– the tasks of government change;
– there is a need to realize the aims from the strategy;
– other external factors appear.
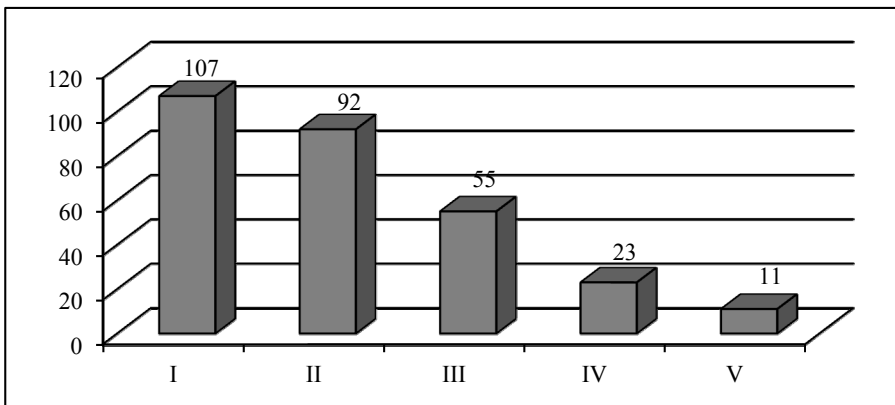   The tools of improving the processes at this level are:
– processes audits,
– systematic self-evaluation,
– the evaluation and analysis of results,
– benchmarking of processes with other governments.

It must be stressed that to get to the fifth level governments must use the informatics systems. The development of process management is connected with the service for the client, so the informatics systems are the condition which determines the progress and organizational development [Chomiak-Orsa, Flieger 2011a]. Thus, in all the operations realized at the last level of process management, it is possible to use informatics systems. It is preferred to have the situational approach which requires to use the systems made for a specific organization.

Thus, the model level of process maturity is about the identification and description of most of the processes within an organization. The workers responsible have been given their responsibilities and the workers of an organization have been

trained accordingly. The processes have informatics systems support and they are monitored, improved and changed if it is necessary.

The authors conducted the research at the beginning of 2011. The aim of the research was to establish the number of local governments which are at the given level of process maturity. The researched governments came from Lower Silesian Viovodeship. A total number of 107 organizations were researched by questionnaires and direct interviews with the authorities or IT specialists. The results regarding the level of process management maturity and development are presented in Figure 1.

Figure 1. Evaluation methods in effective ICT projects implementation

Source: research results.

The governments which have been classified in the above groups were characterized by a full formalization and description of process monitoring, management and evaluation. The conditions in these areas for local governments have been described in Chomiak-Orsa, Flieger [2011b].

As Figure 1 shows, only 11 out of 107 governments can be classified as process mature. Such a low result was caused by scarce informatics systems usage. Although almost all the governments use the Internet to inform inhabitants and organizations, the use of informatics systems was at a very low level. Advanced informatics tools supporting process management were used by only 17 governments (see Table 1).

3. Informatics systems as conditions to achieve process maturity

Our analysis of process management maturity indicates that the use of modern technologies is necessary to achieve maturity. To support process management, BPM systems are used. Their main goal is to make it easier to identify, model, improve, make simulations and control the processes. Such systems should make it possible to

analyze the historical data gathered after the process is finished. Thus, the feedback is used to improve the next processes.

The use of BPM systems makes it possible to improve the processes and actions in the area of process management. They help from the first to the last level of process maturity. Their big advantage is that they help users in static, dynamic and functional area and also in the process of implementation of new structures. In the BPM systems groups, most often can be found [Bitkowska 2009, pp. 131–132]:

– Business Activity Monitoring – delivering ongoing data as for processes monitoring;
– Business Process Analysis – analysis in order to improve processes and lowering the costs; the program helps to define, describe, document, analyze and model processes;
– Business Process Management – implementation programs which also may be used in everyday process management;
– Business Process Management Suite – individually made programs which enable to model and simulate processes operations; they also help to integrate the processes with existing applications;
– Service Oriented Architecture – programs which help to graphically present the processes as a system of connected services; thus, it is possible to connect the processes better.

The programs listed above are the most often used and considered to be the most effective in process management development. Because of them, it is possible to define, improve and manage the processes. However, the implementation of such programs in an organization is one of the most difficult tasks due to their complexity and difficulties with measuring direct benefits. The implementation of BPM systems brings effects within years after their implementation due to more effective management in general. The most often used systems on the market are ARIS, iGrafix and Adonis.

The ARIS system is a method to analyze and model processes. The result of that is the creation of integrated system of information processing. That way the organization standardizes processes and can be flexible as for meeting clients' needs. This is possible because the improvements in processes may be implemented and also new processes may appear. In this system the analysis is about networks of processes and information flaw. It helps to harmonize both areas.

The IGrafix system is a contemporary version of graphic methods. It consists of a range of graphic programs for modeling, simulations and management of processes and documentation. The organization may create processes maps, connect the processes and resources, and simulate model solutions to make them the most efficient.

The Adonis system helps in the construction, analysis and improvement of processes and also documents management. Moreover, it allows constructing controlling systems and managing the process risk. This system is similar to ARIS.

Using BPM tools in the improvement of processes in local governments requires the realization of a number of informatics projects. Conducting full informatics projects in many researched local governments was impossible because of financial and human constraints [Chomiak-Orsa, Flieger 2011c].

4. The diagnosis of the level of computerization in process management development

The research to show how the information technology is used by local governments was conducted from two perspectives. The first one was to evaluate the use of the technologies in everyday governments operations. The research was closely related to the levels of process maturity shown in Figure 1. The results are shown in Table 1.

As visible in Table 1, the basic problem with getting process mature is not integrating internal systems efficiently enough. Implementing Internet technologies to communicate with clients is commonly used by local governments. More and more governments have an interactive website which allows downloading forms in an electronic version and sending them back to governments. In direct research with government workers, the authors established that in most cases these are simplest solutions with e-mail boxes. However, there are first local governments which try to use electronic transactional systems. In the future it can enable them to offer services in an electronic form.

The main problem is to integrate individual systems from different functions of the governments. There is a lack of fluency of information sending as well as access to information resources by office workers. Only 23 local governments stressed the possibility of using data bases in their work.

Also, as for the use of IT technologies for electronic process monitoring and control, the results are not satisfactory. Only in 17 local governments have there been some actions to implement an electronic documentation management system. The system helps follow the forms electronically. The active use of such systems has been detected in only nine cases.

From the information gathered from respondents results, it seems that training in IT technologies in governments is common. As many as 98 governments have regular training in the area of IT use in everyday operations.

A positive aspect is also the existence of procedures letting governments evaluate the effects of using IT systems for daily processes. These procedures are followed in 29 out of 107 local governments.

Together with the use of IT systems, the authors researched the use of BPM systems in improving process management in local governments.

BPM tools, which were described in the second point of the article, are more and more often used by companies. They allow automatization, improving the processes, analysis, modeling and constructing as well as implementation and monitoring. Thus, they are extremely helpful and necessary in process organizations.

Table 1. The implementation of information technologies in local governments operations

Evaluated condition	The number of governments that met the condition
I. Process level	
– Local government uses procedures of management of information technologies according to the requirements stated by the law	107
II. Process level	
– In local government the Internet is used.	107
– There is own regularly updated website providing basic information for inhabitants.	101
– There are network solutions allowing mail to be sent internally in order to make office workers communication easier.	48
– The systems for evidence and archiving are implemented	107
III. Process level	
– The website contains the elements not only for information but also allows downloading forms.	73
– Regular training for office workers and managers in the topic of used technologies takes place.	98
– Documents systems implementation takes place	35
IV. Process level	
– There is a website that allows downloading and sending forms in an electronic version.	63
– The system to monitor the stage of cases in an electronic way has been implemented	17
V. Process level	
– There are solutions letting electronic transactional system provide services in an electronic way.	13
– The office workers use information coming from integrated data bases in network way.	23
– There is a periodic evaluation as for the effectiveness of the informatics systems in daily operations.	29
– The tools for electronic monitoring and controling processes are used.	9
– The systematic analysis of market solutions is made and benchmarking of solutions used in other governments takes place.	21
– The solutions are adapted flexibly	8

Source: research results.

Thus, it is important for local governments to use BPM systems to get to higher levels of process management. The results concerning using BPM systems are shown in Table 2.

Table 2. The implementation of BPM systems in process management improvement

Evaluated condition	Number of local governments
I. Maturity level	
– having an electronic document with procedures according to legal requirements,	107
– using programs as Word, Excel and Paint for working out the instructions,	107
– using simple tools as Visio for graphical presentation of processes,	58
– using BPM tools such as ADONIS to present the processes	19
II. Maturity level	
– identification of main processes without informatics support,	96
– identification of main processes with the support of informatics,	19
– creating process cards with tools as Visio,	58
– creating process cards – with the use of BPM systems	19
III. Maturity level	
– specification and project of processes, matching process owners – without the support of informatics,	87
– specification and project of processes, matching process owners – with the support of informatics,	58
– specification and project of processes, matching process owners – with the use of programs as Visio,	19
– specification and project of processes, matching process owners – with the support of BPM systems	
IV. Maturity level	
– using process specification for ongoing analysis of correct processes construction,	29
– using process specification to choose informatics system supporting everyday government operations,	30
– transformation of constructed specification with the use of BPM tools in application used in given areas in local government	7
V. Maturity level	
– implementation of electronic system to support process management – system bought on the market,	20
– implementation of electronic system to support process management – system made individually from dedicated application made by means of BPM systems	6

Source: research results.

The analysis of the answers given in the questionnaires as well as the answers given in the direct interviews has shown that local governments which decided to use BPM systems from the very start of implementing process management had far fewer problems at later levels. It was easier for them to implement informatics systems supporting documents management and monitoring of processes in action.

Only in a few cases (19 out of 107) were advanced BPM systems used for analysis, modeling and construction of processes. The most often used was the Adonis system (11 cases), then iGraphix (5 cases) and ARIS (4 cases).

Relatively often the Microsoft Visio program was used (51 cases) to prepare graphical process flaw through the local governments. However, this software – easy to use for the workers, allows processes only to be shown graphically but does not allow changing processes into an application.

5. Conclusions

The research results shown in the article have highlighted the strong relationship between the level of process maturity at which local governments are and the technologies used in everyday operations. This means that getting to the highest level of process maturity is possible only by the implementation of integrated informatics systems. They allow sharing the information between processes and between government workers cooperating in providing public services.

The difficulties that local governments have to develop process organization is most often the lack of a complex approach to the computerization process. Often it is also the decision to use information technologies only in some distinct area, for example, to communicate with inhabitants or store documents in files.

Very interesting results have been gathered as for the evaluation of BPM systems. In local governments where from the very beginning of process management the Adonis and iGraphix systems were used, it was much easier to move through levels of process maturity. This means that these systems are really helpful and should be used by organizations wanting to be fully processed.

In local governments a lot of money has been spent at the second level on governments workers training as well as on identification, analysis and formal description of processes using the systems mentioned above. However, later on, at higher levels it was much easier, and less time was spent, and less effort was made.

Local governments which did not train their office workers in the area of information systems had more problems with getting to higher levels of process development. The governments often had the analysis made by some external organizations and did not involve their own office workers in these actions. Only 26 local governments out of 61 having analysis made got on the fourth level of process development. The rest is still at the level of implementing systems of electronic documents management.

References

Bitkowska A., *Zarządzanie procesami biznesowymi w przedsiębiorstwie*, Vizja, Warszawa 2009.
Bober J., Mazur S., Turowski B., Zawicki M., *Rozwój instytucjonalny*, Małopolska Szkoła Administracji Publicznej w Krakowie, Kraków 2004.

Chomiak-Orsa I., Flieger M., Computerization as the improvement of processes in local governments, [in:] J. Korczak (Ed.) *Advanced Information Technologies for Management*, Zeszyty Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław 2011a.

Chomiak-Orsa I., Flieger M., Inżynieria procesów zarządzania na przykładzie wybranych gmin w Wielkopolsce, [in:] J. Gołuchowski (Ed.), *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach z serii „Studia Ekonomiczne”*, Katowice 2011b.

Chomiak-Orsa I., Flieger M., Evaluation methods in effective ICT projects implementation, [in:] L. Maciaszek (Ed.), *Business Informatics*, Zeszyty Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław 2011c.

KONCEPCJA OCENY POZIOMU INFORMATYZACJI W OSIĄGANIU DOJRZAŁOŚCI PROCESOWEJ W URZĘDACH GMIN

Streszczenie: W obecnych warunkach funkcjonowania organizacje poszukują możliwości budowy przewagi konkurencyjnej w każdym z możliwych obszarów funkcjonowania. Współcześnie coraz częściej zwracają się ku systemom zarządzania. Jedną z możliwych zmian jest rezygnacja z tradycyjnych struktur na rzecz wprowadzenia struktur procesowych. W artykule autorzy poddali analizie poziomy dojrzałości procesowej, które organizacja powinna przejść, aby w pełni wdrożyć zarządzanie procesowe. W tym celu przeprowadzono badania w urzędach gmin mające odpowiedzieć na pytanie, ile z urzędów w województwie dolnośląskim w pełni wdrożyło zarządzanie procesowe. Poza tym, zbadano poziom informatyzacji urzędów oraz rodzaj używanych technologii. Dodatkowo zbadano zastosowanie instrumentów BPM. Wyniki badań pokazały jednoznacznie, że badane gminy pozostają na niskim poziomie dojrzałości procesowej i nie wykorzystują w pełni narzędzi informatycznych sprzyjających ich rozwojowi.

Słowa kluczowe: informatyzacja, ocena poziomu informatyzacji, zarządzanie w urzędach gmin, poziomy zarządzania procesowego.