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# Case Study: Development of Egovernmnet Information Systems in Bulgaria

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# **CASE STUDY: DEVELOPMENT OF EGOVERNMENT INFORMATION SYSTEMS IN BULGARIA**

*Research in Progress*

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## **Abstract**

*The paper discusses the need of software development process for eGovernment information systems in Bulgaria. The author has experience as a team leader of control and acceptance group of several eGovernment projects in the last years. The topic is eGovernance.*

*Keywords: eGovernance, eGovernment, software development process, RUP.*

## 1 Micro, Small, Middle and Big Enterprises

European Commission in [European Commission (2003)] defines the SME (Small and Medium-sized Enterprises) as given in Table 1.

Company category	Employees	Turnover
Medium-sized	< 250	$\leq 50\,000\,000$ €
Small	< 50	$\leq 10\,000\,000$ €
Micro	< 10	$\leq 2\,000\,000$ €

Table 1. Company size.

The last two columns are alternatives, i.e. the turnover or balance sheet total can be taken into account. Big companies in Bulgaria are local branches of big international corporations like SAP Labs Bulgaria, VMware Bulgaria etc. Their market strategy and management are formed outside the country and do not depend on the local market. There are some exceptions among big companies that are local market oriented, like BulgarGas Holding, AEC Kozloduy, but they are government property and are not “free market players” in the full meaning of that term.

In that situation, the Bulgarian government can be viewed as the only one big independent local enterprise.

National Statistical Institute of Bulgaria data [National Statistical Institute (2016)] states that the average number of employees in local companies is 14-15. This means that Bulgarian local market is dominated by medium-sized, small and micro companies.

## 2 Projects and Company Size

The information systems managed by medium-sized, small and micro companies correspond to their company size, this means that Bulgarian companies predominantly use medium and small information systems. The consequence of this is that the software development process for such information systems can be light weighted. Most of the software development processes are offered in two versions for large and small projects, like Rational Unified Process (RUP) [IBM (2006)].

The consequence of this is that Bulgarian software development companies predominantly have expertise on small projects, but not on large projects.

On the other side is the Bulgarian government and especially in the case of eGovernment projects. These are large projects and must be developed with software development processes for large projects – not for small ones.

In [Software Measurement Services Ltd (2003)], the projects are classified more precisely on the base of “function points” as shown in Table 2. The function points are defined in [IFPUG (2003)] as:

- Function points are a logical size measure (as opposed to a physical size measure like lines of code or objects).
- Function points measure software size based on the functionality requested by and provided to the end user.
- Function points are derived from requirements and are applicable for measurement throughout the entire development life cycle.

- Function points are comprised of inputs, outputs, inquiries, internal data, and external interface data.

Relative Size	Size Code	Function Point Size (IFPUG)
Extra-extra-small	XXS	$\geq 0$ and $< 10$
Extra-small	XS	$\geq 10$ and $< 30$
Small	S	$\geq 30$ and $< 100$
Medium1	M1	$\geq 100$ and $< 300$
Medium2	M2	$\geq 300$ and $< 1000$
Large	L	$\geq 1,000$ and $< 3,000$
Extra-large	XL	$\geq 3,000$ and $< 9,000$
Extra-extra-large	XXL	$\geq 9,000$ and $< 18,000$
Extra-extra-extra-large	XXXL	$\geq 18,000$

Table 2. Project size.

## Government as Corporation

To some extent, the Government can be viewed as a corporation. Therefore, the Government must implement Corporate governance, and more specifically Information Technology (IT) governance that is "... leadership, organizational structures and processes to ensure that the organization's IT sustains and extends the organization's strategies and objectives." [IT Governance Institute (2003)].

In the last 10 years, the Bulgarian government administration has found that without IT governance it is impossible to create interoperable information systems. Many information systems in different departments have been created but to make them interoperable after that is difficult or even impossible.

The first attempts have been done several years ago. For IT governance purpose, initially, several very-very popular standards, like XML and HTTP, have been adopted. This line of development has been supported in the next years and now a big enough collection of international standards are established for eGovernance.

But there were 3 regulations that had been totally banned by the government departments and the developers. The first one was homemade by the government administration experts. This regulation was devoted to the user interfaces. There were rumors that it was a translation in Bulgarian of some master thesis from Malaysia. It contained such details like what fonts to be used and at what size – very outdated and detailed proposal to be used. As result of that no information system with such interface compliant had ever been created. The second one was so called “unified environment for e-documents exchange”. Such a project had been even funded and implemented. The project was not based on some well-known standard like ESB (Enterprise Service Bus) [Wikipedia (2016)], but, instead, again something homemade had been produced. As result of that the implemented system has never been used. The third one was so called “service repository”. The implementation was not based on some well-known standards like UDDI (Universal Description, Discovery and Integration) [OMG (2014)] and again something homemade had been produced. The biggest problem with this repository was the regulation that every e-service must be implemented and registered in that repository only in one version and single implementation. This means that if some e-service has been implemented for the municipal-

ity of some small village and registered in the repository then just a same service must be used in the big town municipality. This regulation, as proposed must totally boycott the eGovernment development. It is clear that this regulation has been violated for the sake of eGovernment.

Now, Bulgarian eGovernance has a framework for interoperability, strategy for eGovernment, road map for the next years, standards repository, interoperability repository and intentions... [Ministry of Transport, Information Technology and Communications (2016)] There are no eGovernance processes, organization structure, infrastructure, development processes and many more. The focus in the next part of this paper is only on the development process.

## **Development Process**

Part of the eGovernance is the software development process. This process must be used for all software development projects.

The first attempt to be established such a process has been done 4 years ago. At this time, in the tender dossier for a package of eGovernment projects had been postulated that RUP had to be used as software development process. RUP had been previously used at the National Customs Agency for several software development projects run mainly from international companies. In reality, the government experts from the other government departments did not have the needed experience to be involved in RUP.

Another permanent problem with the government experts is that there is a stable flow of experienced experts from public sector to the private one – the payment in the last one is more attractive. This problem was solved, at this time, for the first time, by hiring external experts from the universities to control the development process. The hired experts had been used for technical expertise and for milestone acceptances.

Academicians are natural allies to the government – they do no play on the free market or participate in trusts and consortiums with the developer companies. Something more, they are responsible for their behavior in scientific and public societies.

Only Bulgarians companies won this tender with the consequences mentioned above. They all declared in their offers that RUP would be used as software development process. Initial intention of these companies, in reality, was that some kind of documents would be delivered but software development process RUP would never be used. Their intention was that some people would write documents and other ones would develop the software without any connection among the documents and software artefacts! But this did not happened – the control group was responsible all kind of artefacts to be synchronized and these artefacts to be RUP ones. The control group strongly applied this rule. As result of that the developers got furious. They started to search for lobbies on all administration levels to abandon the RUP post factum.

The fact was that these companies did not have expertize on RUP. Some of them had used this software development process in consortium with other leading international corporations, but had never used it alone.

It was clear that the projects would go to failure. The control group and the developers had to find some way to collaborate. The solution was the control group expertize to be formalized and responsibility for phase acceptances to be taken only by the government administration, i.e. the control group to have only consulting role but not the responsibility for phase acceptances.

Finally, with many negotiations the projects ended with a delivery of intended products but not with the best quality.

In the next eGovernment tender the schema had been repeated but with some steps back for the development process and some steps forward for the control activities. In the tender dossier, RUP was not mentioned as obligatory process, instead, its characteristics had been included as requirements: phases, artefacts, UML etc.

At this time, the companies self-oriented to the RUP, preferring some lightweight versions. They had declared in their offers that would use RUP as a software development process.

This freedom for the software development process created many problems: instead of fixed set of artefacts to be used – many variants had to be controlled. It is impossible for a standard expert to know the RUP variants, but for academicians, with some additional efforts, it is possible. The control group (in reality two groups) was the same as before.

But now, the role of control group was not solely formalized, instead it had responsibility for acceptances. Members of the control group had to participate in all official meetings with the developers, to sign meeting notes and protocols and in reality to be fully functional representatives of the government.

The effect of this arrangement was that control on the projects increased. Now, the conflict between academia and industry happened face to face. It was really dramatic. The developers that usually do not follow any software development process, and that have declared to follow some RUP version, view its obligations as an unnecessarily academic exercise. Again they tried to apply here their “practices” from small and medium projects, but the control group did not permit that. As result, there were reproaches for sabotage on their work, „it is a real project but not master thesis“ etc. The control group firmly stayed at its positions with the support of the government administration.

Fist phases of all projects were not accepted. Never mind that remarks on the artefacts were very detailed and clear, the developers asked for meetings with the evaluation team. For some companies, one meeting was enough but for the others - not. After that, most of the developers started to follow the declared by them version of RUP.

When a phase is not accepted it is not charged. Because the time goes, the companies continue to work on the next phase and at the same time to rework the not accepted one. This economic enforcement compels them to follow the process.

Finally, all projects successfully finished with many remarks and obligations for the next following 3 years support period.

The companies are not happy with this approach – they have no freedom to do what they want. The government experts are happy – they have allies, respectful allies that firmly stay on their positions.

## **Conclusion**

In a market that does not stimulate the usage of software development processes, the only chance is the government to force establishment of such a process, especially, if the developers depend very much of the government orders. The experience shows that when the government declare its process, the companies follow it.

Establishment of a standard software development process in the government is a mission for increasing the competitiveness of Bulgarian software companies. There are good examples in Poland how adoption and systematic use of RUP in companies lead to successful participation on the global market.

In this context, the automatization tools play a leading role for software development process. It is very primitive idea not to use such tools because “they are expensive and complex” and instead to use, in the best case, some free open source tools. This is the predominant case in Bulgarian software industry. These ideas force companies to extensive development but not to intensive one, and to worst productivity. In Bulgaria some professional organizations of software companies have declared the need for 25 000 - 30 000 programmers for the next 10 years. The universities in the country every year produce about 1000 - 1500 programmers – it is impossible to be achieved such a goal. Import of programmers is not an alternative for Bulgaria – the payment is not so attractive and/or the potential foreign programmers do not have the needed qualification. The main reason for this orientation is the low productivity level in Bulgarian software companies: one thing is to dig a hole with a shovel another thing is to do it with an excavator. The solution is to use software development process automatization tools to increase productivity and then there will be no need for such a quantities of programmers.

From the above presented arguments, it follows that the establishment of software development process for eGovernment projects and its automatization must be a critical mission of the government for the software industry in the country.

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