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## INTRODUCING PROCESS MANAGEMENT IN E-GOVERNMENT AND HEALTHCARE

Відкритий сектор економіки має, у порівнянні з іншими секторами, відносно недостатньо розвинену структуру інформаційних систем. У цьому контексті є сенс вважати важливими зниження витрат та спрямлення робочих потоків. Проте, незважаючи на важливість управління процесами, у теперішній час є дуже мало керівних документів, які допомагають впровадити управління процесами у користувальницьку адміністрацію. Мета цієї роботи – дати огляд можливої інфраструктури для аналізу проєктів з управління процесами. Шляхом використання цієї інфраструктури ми аналізуємо систему управління у Болгарії та адміністрування охороною здоров'я у Ірландії. Наш аналіз дав деякі цікаві результати.

The public sector has shown that it has, compared with other sectors, a relatively underdeveloped information system structure. In this context the importance of reducing costs and streamlining workflows and processes is ever more recognized. However, despite the importance of process management, currently there are internationally very few guidelines provided for introducing process management in public administration. The objective of this paper is to outline a framework for analyzing process management projects. By using this framework we analyze a system in the public administration of Bulgaria as well as an implementation of a healthcare administration system in Ireland. Our analysis revealed some interesting results. The reasons for failure in public administration are rather content and structural in nature than solely project management issues.

**1. Introduction.** In order to improve the efficiency and effectiveness of the public sector a number of reform initiatives emerged over the last two decades [6]. Influenced by the rapid advancement of information and communication technologies (ICT) the introduction of effective information systems became the primary mean for increased efficiency and effectiveness in the public sector. In order to modernize public management many organizations have implemented new ICT systems. Innovative solutions for communicating with citizens are broadly referred to as electronic government (e-government), digital government, electronic administration [2] or in the case of healthcare e-health. In this context many organizations and researchers emphasize the importance of introducing process management and redesigning processes. Among many challenges, most stress interoperability of information and communication systems and the link to processes that they support as crucial [32].

The concept of interoperability encompassed interactions at local, national and international level. It requires organizational, semantic and technical inter-

operability [16]. However, in order to achieve semantic and technical interoperability, most researchers argue for organizational interoperability. Furthermore, methodologies supporting the introduction of process management (PM) should be focusing on integration and collaboration. However, due to the different characteristics of various sectors, these methodologies are typically domain specific. Many PM methodologies do not address interoperability directly and thus lacking to support collaboration. This is especially true for methodologies tailored to the public sector. As emphasized by many researchers and practitioners, there is a need to develop procedures, guidelines and conceptualizations to introduce PM in the public sector. It is expected that PM helps to improve the management of complex administrative processes.

In order to analyze the challenges in the public sector, this article illustrates two typical case scenarios; one in public administration and one from the healthcare industry. The cases differ significantly from the private sector for which already a plethora of case studies, description and some methodologies exist. Many concepts successfully applied to the private sector are failing, due to the different objectives and particular characteristics of the public sector. The public sector aims in serving the society and shows fundamental different hierarchical and organizational structures responsive to politicians. The public sector is inhabited by institutions of politics, government and bureau (administration), whereas the private sector is occupied by market institutions and profit driven structures [21].

Three significant differentiations between the two notions can be observed. (1) The public sector is driven by public interest, while the private sector is concerned by private interests [21]. (2) The public sector relies on stakeholders, while the private sector is shareholders dependant. Implementing policy or delivering services, public organizations should pay attention to satisfying their stakeholders, whereas private firms provide shareholders with an adequate return on their investment. (3) The private sector is competition-based, whereas in contrast the public sector is oriented towards factors like service delivery, information provision, knowledge identification, sharing and utilization. Within the public sector changes and service improvements are traditionally not driven by competition [11].

As one of the largest consumers of public spending, the healthcare sector is increasingly recognized as an important economic sector with rapidly growing expenditure. However, symptomatic for the public sector and the healthcare sector in particular, in most public organizations a relatively underdeveloped information system structure exists [27]. These inadequate information systems along with general challenges like declining resources, increasing complexity coupled with an increasing need for high quality services, highlights the need

for improvements and adequate ICT systems in the public sector. Recent efforts have been made, for example concepts to integrate healthcare systems or to implement smart card systems for electronic patient record [25]. Despite these efforts in many countries, concepts for the implementation of adequate information systems in the public sector are often far away from realization.

In conjunction with the implementation of ICT systems in the public sector, attempts have been made to apply process management for many years [28]. Due to the success in the private sector, process management is presumed as a successful means of reducing costs and increasing productivity and quality [3]. Process management projects aim to streamline the services and processes, thus making it more cost efficient, while delivering better quality and reducing response times. In recent years projects have achieved real benefits from process management and flow investigation. Surveys show, that if successfully implemented, process management can save up to 79 per cent of cost and time [4]. In the US for example, the length of stay for patients has fallen by 33 % as a result of the introduction of clinical process management [5].

Regardless the high exception and successful implementations of process management, at present no consistent method for implementing process management in the public sector has become a de facto standard. As of yet, each administration still explores and tries to learn from their experiences, and the experiences of others. This is the focus of our current research, in which we aim to develop a framework for designing and introducing processes management to public administration and healthcare

For our research we use tow case scenario to identify success and failure factors, which in turn forms the basis to propose a conceptual method for introducing process management in public administration. Our research is based on literature review and supported by semi-structured interviews with professionals in the public administration and a hospital in the Dublin Area.

The reminder of this paper is structured as following: In section 2 we provide an overview of process management and information Systems. The value creation in the public sector is discussed in section 3. Section 4 provides a general framework for introducing process management, which assist us in analyzing process management in the public sector. The framework is then applied to two cases, one from e-government and one from the healthcare sector. The two cases are presented in section 5 and section 6. Section 7 presents a summary and a conclusion of our research.

**2. Process Management and Information Systems.** In order to make organizations more effective and efficient, a common element of current approaches is the concept of (business) processes management. Processes are seen as one of

the core elements to improve organizations. Literature provides various definitions for (business) processes [1, 22], hence we need to clarify our understanding used in this article. Our work is based on two widely adopted definitions on design and management of (business) processes [23, 22, 29].

Davenport and Short [13] have defined the concept of a business process as a set of logically related tasks performed to achieve a defined business outcome. Similar, but emphasizing the client-centered aspect of business processes. Hammer and Champy [20] have defined it as a collection of activities that takes one or more kinds of input and creates an output that is of any value to the customer. It is recognized that there are different types of processes in organizations [1] that include operational, support, direction setting and managerial processes.

Processes extend over different functions and encompass suppliers and customers, and thus are complex and difficult to organize. Different management practices being required for the successful implementation of (business) process management. From a research perspective, a formal design and implementation methodology, formal specifications and models and architecture to integrate all system elements are required. A critical success factor for implementing (business) processes is to enable interoperability as well as the ability to understand change and its effect across all dimensions of the organization (e.g. the people, resources, processes and citizen). This requires a wider definition of information systems. We define information systems as socio-technical subsystems of organizations, which comprise all information processing actions as well as the associated human or technical actors in their respective information processing role.

Literature provides us with various suggestions that help to introduce process management [8, 3]. Similarly, software engineering has developed numerous models which support the total life cycle of information systems. Popular examples of procedural models are for instance the “waterfall model” [31] or the “spiral model” [7]. Suggestions for process projects exist for example in [3].

From a perspective of project organizations, most authors state that top management support and commitment are vital, thus resulting in projects which are carried out in a top-down participation. However, the participation and acceptance at an operational level are also essential for the success of process management. The process owners should be involved in the design and modeling phase of each of the processes. An important aim of any process management project is to enable interoperability and promote integration of administrative and business functions throughout the organization. Taking the degree of specialization and complexity of typical administrative processes into considera-

tion, process management teams should comprise of experts with skills from each units, which in turn promotes knowledge sharing and communication. In order to plan, control and audit the project progress and resource spending (costs and time), goals and measurements are essential. Both strategic aims for the project and project-specific aims should be considered.

**3. Value Creation in the Public Sector.** One distinctive problem of process management in the public sector is the unclear value proposition. Compared to the public sector, the conceptualization of “value” appears to be easier in the private sector. Value in the public sector is usually not a price for a services and it is neither the costs of performing it. The assessment of values could lead also to political debate. Eventually, even if “value” is defined within this specific environment, the public organization may have to continue to carry out procedures that do not result in any direct value [19].

The predominant approach within the literature is to consider a value reflected by stakeholders [9, 10]. In this case, the value within public organization is multi-faced and encompasses many different elements [19]. However, it might not be possible and feasible to attempt to satisfy all stakeholders, which evokes the need for identifying some key stakeholders. Fulfilling the expectations of the key stakeholders is indirectly connected with the organization’s performance [10]. It can be argued that the primary stakeholders of all public organizations are the citizens (or businesses respectively). Thus, the prevailing purpose of public organizations is to create “public value” and their success strongly depends on the key stakeholders’ satisfaction [24].

**4. Framework for introducing Process Management.** In addition to an unclear value proposition in the public sector, there are further reasons for difficulties of process management in the public sector. Reviewing literature we identified two main areas, one being technical in the form of design, modeling, and implementation and secondly as organizational in the form of project and change management issues. Often projects are technically driven with no clear and formulated (business) objectives before commencing the actual projects [33]. However, implementing a new technology will often require the redesign of critical processes and the alignment to strategic objectives [15]. Experiences, for instance made at the Leicester Royal Infirmary in the UK, demonstrate the short-term and technical focus [18]. Besides, specific to the public sector are frequent arguments from professional that the variation in public administrative processes prevents process management.

In order to assess the success and failure of process management projects it is necessary to format or develop an evaluation framework. We build on the

work from Larsen and Bjorn-Andersen [22], which provides an evaluation framework for Business Process Projects. However our analysis is limit to selected evaluation parameters. The selection is based on qualitative assessment of their importance for the project. Furthermore, we categorize our analysis in *project management issues* and *content and structural issues*.

Project management of a project is important, particularly for modeling projects, since the classical tasks of project co-ordination are supplemented by defining models and implementing changes. One of the main aspects and activities carried out in early phases of process management projects are processes modeling. Typically process models are described as *as-is models*, and *to-be models*. The models contain activities and organizational structures as well as the process dynamics. Different alternatives should be assessed in respect to project and organizational aims. The quality of models can be evaluated using modeling guidelines, for example as proposed by [30]. Criteria may include correctness, relevance, economic efficiency, clarity, comparability, and systematic design.

There is a close relationship between business process design and business process modeling, where the former refers to the overall design process involving multiple steps and the latter refers to the actual representation of the business process in terms of a business process model using a process language. Modeling languages and techniques include for instance UML, entity relationship modeling and event-driven process chains building generic constructs for modeling human roles, processes and technologies. In practice, the building of these models is supported by process engineering tools (Like ADONIS or ARIS), which implement the methodology and modeling language. Consistency between the design methodology and models are ensured via meta models. Finally, the designed process and architectural models are implemented as a particular operational system for production and coordination (e.g. real world information system). The implementation aspect is usually referred to as migration or change management plan.

Table 1

General evaluation framework

<b>Project Management</b>	<b>Content and structure</b>
Project planning	As-is process and organizational model
Project Organization	To-be process and organizational model
Measurement and Control	Migration and change management plan

In summary, our evaluation framework is categorized into two parts, firstly the project management aspects which includes the project planning, the project

organization and secondly project measurement and control incorporating models and plans which are created resulting in documents (see Tab. 1).

**5. Administrative Processes in E-Government.** We examined a public organization based in Bulgaria (District Governor of Veliko Tarnovo District). We selected one of the services provided, analyzed it and analyzed it using the framework. It is followed by a discussion and an evaluation.

The District Governor is considered as territorial body of the executive power. Appearing as a middle level between central administration (the government) and local territorial administration (municipalities), the main responsibilities of the District Governor are concerned with coordination and control, (Law for the administration of Republic of Bulgaria, Art. 19 (3). Art. 29 (1), (3), Art. 57 (2) cited and translated in [26].

For our analysis we selected the process of the administrative service: “Approval of changes of district transport schedules”. The District Governor is responsible for the coordination and approval of any changes to the transport schedules between the territories of two or more municipalities. The actual service of transportation of the citizens is outsourced. The legal bases for performing the service is according to decree № 2 from 15<sup>th</sup> of March 2002 for the terms and regulations for approval of transport schedules for carrying out of public transportation of passenger with buses and cars. The service is provided only for municipalities [17].

The performing of the service is initiated by an “argumentative proposal” for any changes of the transport schedules. The proposal is completed by the mayor of the correspondent municipality and brought to the attention of the District Governor. Within one month the District Governor should approve the requested changes or give justified refusal [17, 26].

Modeling and analysis of the current situation helped to provide more transparency and understanding. However, it also reveals weak points in the process design. For instance, as the service is very rare difficulties concerning the necessary knowledge and professional experience for performing the service might occur. It is not possible to be familiar with the law regulation for each of the performed services. There will be a need for exploring the law base before initiating performing of the service. Furthermore, there could be a need for consultancy with senior co-worker(s) about the interpretation of the law bases. There is a need for organizing committee meetings (consisting of representatives of other organizations concerned with the changes of the transport schedules). This evokes bringing external actors to the organization.

Reviewing the process setup and the related projects, the difficulties with this particular process are rather content and structural in nature. Indeed,

Knowledge sharing, its organization and learning was identified as crucial. The knowledge typically is acquired through internal and external learning. If this is not enough, further consultation and collaboration for performing the task is required. Overall, the modeling and analysis of the current situation showed that the service delivery will be dependant on a collaborative practice.

**6. Process Management in Healthcare.** A popular example in Ireland is the implementation of PPARS (Personnel Payroll Attendance and Recruitment System). The system aims to be a standardized healthcare Human Resource (HR) and payroll system for the Irish healthcare sector. The system is seen as crucial to improve the healthcare sector, as human resources (HR) account for approximately 70 percent of overall expenditure on health [14]. The system was intended to be used by all health agencies and hospitals throughout Ireland. It should help to address deficits in essential and timely human resource information including workforce planning, time management, staff retention, recruitment, and benchmarking and management information. However, the project is generally regarded as not successful, with a large overdrawn budget. It lacked the required functionality that it was envisaged to achieve. Other examples in healthcare show similar results and many projects in healthcare are failing to achieve their potential.

The system was originally initiated in 1995, with an official launch in 1998. It was due to be completed in December of 2005, with the aim to standardize and integrate the Human Resource management and payroll of each health board and health agency in Ireland. The need for such a system stems that each board and agency was responsible for their own Human Resource and payroll function. Most of the personnel and payroll processes were labor intensive with a high degree of manual involvement and diversity. The vision was to provide an integrated Human Resource system which incorporated payroll, attendance and time management. On a technical level, the system is based on SAP R/3, a standard Enterprise resource and business process management package. R/3 is modular oriented and provides standard (reference) process models for various business functions, like sales, materials management, production, finance, accounting, quality management and human resources in an enterprise.

In a first phase, the system has already been implemented in a number of agencies [14]. However, recently the PPARS project attracted a large media attention for the reasons of budget overspending and problems with the project. The project led to a considerable amount of reports and presentations concerning the system, for instance presentations by PPARS project managers. Two common problems seem to be mentioned in most of the reports: the high level

of variances and diversity in payroll throughout the Health. Besides, poor project management and process flow and problems with managing to keep ahead with changes in the environment (HR recruitment, staff movement) are mentioned. The following sections contain a summary of indicative results from the interviews with experts involved in the PPARS system implementation. Our qualitative analysis revealed interesting results. In essence, the project can be characterized as a technical oriented rather than process or organizational driven project. The major challenges are rather content and structural in nature than solely in project management based issues.

Generally inadequate project management is often stated as reason for project failures. For the PPARS project, the project management was mainly carried out by an external consulting organization. Typical problems with project management stated in the interviews for instance were: inexperienced employees, week governance or time pressure during the pilot test phase. Also, some interviewees mentioned that clearer objectives and measurements concerning common payroll processes for all health boards were required.

The key area of concern was time management and the large amount of varying differences in Healthcare. These content and structural issues seem to be a unique problem, specific to the healthcare domain. As the Health Service is (still) mainly paper based and sometimes poorly organized, modeling As-is processes and structures were challenging or even impossible. The required time in the Health Service is based on demand for care, resulting in high variability. A key example would be number of critical cases, which then determines the number and qualification of staff needed. The figures change daily with a high degree of variability here again. Also, different payroll regulations, time management procedures and shifts are applied in different health organizations (e.g. over time and sick leave). The attempt to standardize these procedures, revealed another problem. Individual interpretation of regulations and definition in payroll were common. Different interpretations of the Health care paying rules were being implemented in each separate organization. This led to the realization of errors being made within the Health Service but also the ability for organizational change was restricted. Obviously these regulations and procedures were not standardized prior the PPARS system approach. A large feasibility study in 1998 revealed the type of variances that were present regarding payment and employment conditions.

The specific challenges in the (Irish) healthcare sector, made the modeling of realistic to-be processes and structures extremely complex. On the one hand, the incorporation of all variances in payment was infeasible from a system point of view. The system was regarded as being "inflexible". On the other hand, the standardization of all payroll processes, terms and organizational structures

requires a large reorganization of the payroll organization. Indeed, the proposed payroll procedures needed changes in the work processes and schedules. However, this was not complete and even during the implementation phase certain processes were frequently “changed before going live”. Staff training was sometimes behind the system implementation. As result, line managers sometimes were not aware of the new procedures and had to consult IT personal to explain regulations already implemented. Generally, the interviewees felt that there was not enough focuses on managing the required changes to implement standard processes.

**7. Summary and conclusion.** Process Management provides continuous improvement in streamlining the public organisations, delivering better quality and reducing costs. However, projects are challenging and often fail. This paper described indicative results towards implementing guidelines for introducing process management in public organisations. Numerous failure stories and discussions with professions in the public sector are illustrating the need for such guidelines. This paper describes some indicative results from analyzing a national project in Ireland and administration processes in Bulgaria. Our indicative analysis showed that introducing standard processes in public administration can be challenging. Problems in public administration are rather content and the structural nature of the domain then solely a project management issue. In our future research, the analysis will be further structured and extended.

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