Introduction of supply chain management concepts in e-government research and practice

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Abstract: The paper deals with various aspects of e-government and highlights the importance of the holistic treatment of business process renovation in order to facilitate the transition towards e-government. It analyses both upstream and downstream supply chain renovation and describes a four-step procedure for downstream renovation. A new definition of e-government that includes the whole supply chain of the public administration is proposed. The chief problems of the proposed approach are analysed, along with some interesting topics for further research.

Key-Words: e-government, supply chain management, business process renovation, e-procurement

1 Introduction

E-government (EG) has been conceptualised as the intensive or generalised use of information technologies in government for the provision of public services, the improvement of managerial effectiveness and the promotion of democratic values and mechanisms. Information technology (IT) has the potential to transform government structures and improve the quality of government services. Technology provides improved operational efficiency by reducing costs while increasing productivity and creating services provided by government agencies that are of better quality [15].

EG should integrate information systems and business processes through the whole value chain [9]. However, EG implementation is only feasible if it is introduced hand in hand with business renovation [18]. Governments should focus on streamlining the core processes and reaching customers in a more efficient manner [2].

Despite certain calls to study supply chain management in e-government context [24], [4], [13], this seems to be an under researched area. Therefore, the development of efficient approaches to government renovation for both upstream and downstream supply chains (SC) is needed. This is especially true of the upstream chain of EG because most practical and research efforts have been targeted towards the downstream side.

The paper's main contributions are thus twofold:

- it highlights the importance of the holistic treatment of EG with BR/BPR in both upstream and downstream SCs; and
- a possible methodology for business process modelling and renovation of upstream supply chain is proposed.

The paper has the following structure: in the next section the general concepts of process renovation are presented. The importance and specifics of renovating upstream and downstream SCs are highlighted. Possible problems in implementation are briefly discussed in the case study. The main findings and suggestions for further research are summarised in the conclusion.

2 Process renovation in e-government context

The essence of EG is to radically change the ways and mechanisms of operating the administration and, as a result, also the basic principles on which these mechanisms have been developing in the last few decades or even centuries. Despite EG having received much attention from academics and business the success of EG projects is limited. Even the most mature countries have tapped less than 20% of their potential [2]. Further, the literature reports the experience with EG initiatives as chaotic and unmanageable [22]. In spite of this, many papers in leading research journals could be characterised as displaying naive optimism by simply regarding IT as a good thing and ignoring the evidence of the widespread failure of EG [20].

Following the four-stage EG development model developed by Layne and Lee [22], a literature review [25] shows that in most countries it was relatively easy to achieve the first (information) stage, which refers to the introduction of information services, as this step does

not require specific changes in the internal operations of the administration and in business processes and procedures. What is much more complex is the introduction of more demanding, so-called transaction services which enable all phases of a selected administrative procedure or process to be executed electronically. As a rule, this requires a complete renovation of administrative operations, internal business processes and procedures, the integration of registers and public databases, the alteration and completion of material legislation and the development of new organisational regulations, classifications and standards. BR is therefore a prerequisite for attaining the 3rd or 4th stage.

Therefore, this paper presents an approach to identifying the current state and renovation of EG operations and consequently its informatisation. The paper substantiates the thesis that EG requires a major business change [6]. This is not self-evident to all those involved – chief information officers in the private sector have ranked the simplification of business processes as the no. 1 critical success factor (CSF). On the other hand, CIOs in the public sector listed that as only the 8th CSF (out of 23 CSFs) [36]. This means that more has to be done in order to communicate the importance of business renovation to decision-makers in the public administration.

Although business modelling as part of BPR is widely used in the private sector, BPR has to be adapted with great care to the public sector. Usually, public sector organisations face challenges that differ from the challenges of private companies. Public sector organisations have to meet multiple, often conflicting goals and they are subject to constraints of a financial, legal, contractual, personnel and institutional nature. Radical process-focused change in public sector organisations can only be achieved through deep changes in their bureaucratic practices which cannot be achieved without a change in the law. The desired outcome of BR is a growing, profitable and competitive enterprise for a private organisation; whereas for a public organisation the desired outcomes focus on the delivery of necessary, cost and time effective services.

Traditionally, EG has been seen as the communication between the government and its citizens via computers and a Web-enabled presence [11]. Therefore, this view of EG only includes the perspective of the upstream SC – communication between the government and its citizens. Accordingly, in the rest of the paper two aspects of process renovation in EG are presented – namely the downstream (defined for the purpose of this paper as the oversight of materials, information and finances as they move in a process from ministries and governmental bodies to citizens) and upstream (defined as the oversight of materials, information and finances as they move in a process from suppliers to ministries and governmental bodies) SCs – both are shown in Fig. 1.

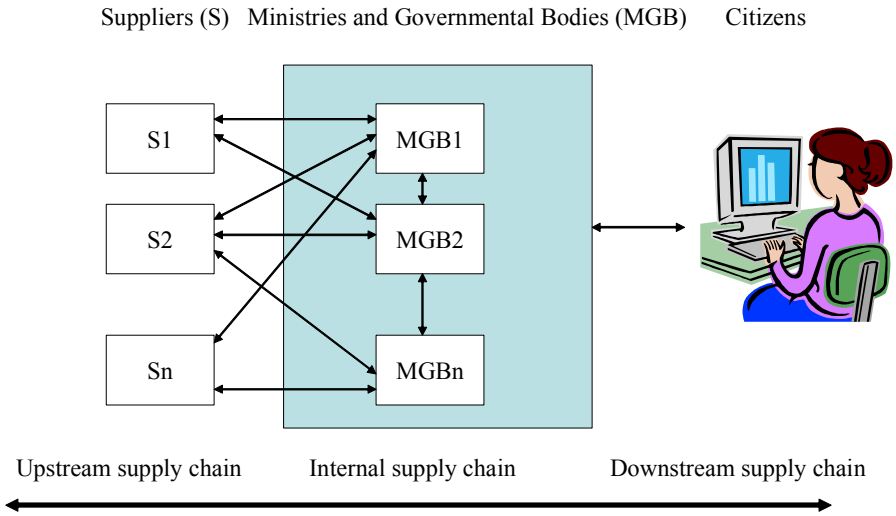

Fig. 1. E-government supply chain

2.1 Downstream supply chain

Much of the past research on EG focused on the practical and technical dimensions of getting information and services online, including presence, availability, efficiency, effectiveness, capacity and design [3]. EG is attested to have the potential to shape public orientation so as to be more customer-oriented – the latter is one of the most often cited topics in EG research [32]. As a

consequence, the study of EG has expanded in recent years and researchers are developing theoretical and conceptual models to understand different aspects of downstream EG [14]. The introduction of EG increases the choice for the citizens, especially the choice of access channel (call centre, face-to-face, Web etc.). However, much has to be done to improve the services behind the access channels that often remain entrenched in their departmental silos [21]. A key approach to process-oriented EG is the application of BPR across government in order to foster essential benefits [17]. Namely, the needs of the users of EG services and resources should be the motivation of all efforts in downstream SC and user-centred evaluations of EG Web sites are needed [3].

Downstream SC has been widely studied probably because the informatization of services for final customers is a 'quick gain' and also recognised by voters and various rankings (e.g. [35]). The latter recognise the importance of an upstream SC but have only decided to include those services offered to citizens in their rankings! While important, this focus obscures a significant and important dimension of EG – the renovation and informatization of upstream SCs.

In addition, it should not be forgotten that both downstream and upstream SCs are interconnected. Although the needs of the final customers are important, customer concerns, specially in long-lasting processes, can change over time so support has to provide flexible services and adjustment among different providers [37] – that cannot be achieved without the renovation of the upstream SC.

2.2. Upstream supply chain

In order to streamline and integrate the EG supply chain, BR should also include a renovation of the business model of the upstream SC. BR projects would thereby become much more complex, yet governments could foster future benefits that would spill over to their customers – citizens and other stakeholders (companies, non-government organisations, foreign entities etc.). EG leads to a business process change which necessitates an increased understanding of EG-related sourcing and its integration with traditional public management information systems [33].

Realisation of the importance of the upstream SC is not new: a report published by McKinsey and Company [1] estimates that the US government could reduce its expenditure on procurements by USD 100 billion by aggregating its procurement activities and putting them online. Therefore USA e-government strategy (already in 2002) listed SCM as a possible approach to reduce costs and improve quality [12]. Most EU member states procurement purchases are estimated to involve 10-15% of GNP or some 25-30% of public expenditure [7].

In the private sector the importance of supply chain management (SCM) is growing and should assume a more strategic role in the future [16]. Still, the introduction of SCM concepts to the public administration seems to be an under-researched area – namely only one (1!) out of 100 papers reviewed in [5] deals with the SCM in the public administration. There is little discussion of the implementation and organisational/management models of e-procurement in the government sector [10].

Therefore, the applicability of concepts from the SCM field to the public administration should be studied. The evolution of EG may therefore be classified in four stages of putting government online (stage 1); end-user involvement (stage 2); integrated solutions for citizens (stage 3); and towards SC integration (stage 4). While the first three stages generally follow most of the known definitions (such as [22]), the possibility of the transition towards the fourth stage has so far not been studied.

EG should be viewed as an integrated SC that includes ministries and government bodies, citizens and suppliers and integrating them up- and downstream in a SC. Such a view is process-oriented and represents a shift in business doctrine that is changing the traditional organisational models, business processes, relationships and operational models that have dominated the public sector in the past few decades.

Lately new procurement business models have also been implemented for organisations' operations in the public sector all over Europe [29]. However, the largest potential savings originate from lower prices due to centralised spending and the full potential of IT can only be achieved through horizontal integration among governmental departments. A more comprehensive effort to share information across agencies seems to be necessary [23]. The prerequisites for the integration of new technologies in governmental purchasing are the analysis and improvement of the existing business processes, the systems and organisation structures [29].

Although federal agencies are looking to the private sector for examples of 'best practices' when implementing EG initiatives [26], SCM principles often seem to be neglected. Although scattered claims about the rising importance of SCM in the public administration have appeared, so far the potential benefits have not been studied.

The main problem is that the renovation of SC in the private sector usually means integration with suppliers, common projects and proactive relationships (see e.g. [34]), which are usually impossible in the EG context due to laws and regulations. SCM concepts cannot be adopted to EG from the business environment without caution. In the public administration all these issues are

closely affected by the law and regulations since the public administration has to comply with the public procurement legislation. Even putting that aside, the variety of purchased goods is greater and the number of customers (governmental agencies) and the suppliers is excessively large [29].

Our main proposal is therefore the following four-step procedure in implementation:

1. identification of the key business processes: a quick win strategy should be employed: the most relevant process for renovation and SCM should be identified. Special attention should be paid to the feasibility of implementing e-procurement: standard products with considerable purchasing amounts should be chosen. In such a way the early results would enable the enhanced motivation of the employees and managers and ensure the continuation of the project;
2. modelling and renovation of those business processes - see e.g. [17] for a detailed methodology of modelling and renovation of processes in public administration;
3. use of simplified and clear processes to 'plug-in' the suppliers using a 3D matrix including processes, suppliers and products. The matrix should contain all the necessary data about the products that the public administration is purchasing; the suppliers and their approved capabilities and a description of the business processes that need to be performed in order to make the purchase; and
4. application of one of the concepts from the business world (e.g. cross-docking, e-markets) on a case-by-case basis: the simplified processes along with the up-to-date matrix should be used to plug-in the suppliers on a case-to-case basis each time an aggregate purchase for one of the standardised products is to be made. In such a way the considerable price reductions of externally sourced goods through direct, real-time and transparent competition between suppliers [19] could be achieved.

It should be noted that the implementation of the proposed four-step methodology is not a one-time project in public administration; neither the problems of the whole EG SC can be tackled in one project due to budget and operational perspective problems. Rather it is meant as a "strategic vision" that should be behind the efforts in EG to avoid searching for local optimums.

Finally, since the definition of the field predetermines the research orientation a further problem is that several definitions are too narrow – we list 'the communication between the government and its citizens via computers and a Web-enabled presence' [11] or 'the use of information and communications technologies in government settings' [14] as typical examples. Therefore, we propose the following definition (partly adapted from the definition of SCM in [8]: EG means the renovation, informatization and possible integration of key business processes in public agencies from the end-user to original suppliers that provide products, services and information that add value for citizens and other stakeholders in order to increase general public welfare while taking the public sector's specifics into account.

In this way the proposed definition enables research on a wide variety of topics that are crucial for the successful operation of EG. It also recognises the difference between the goals and operations of the private and public sectors [36].

2.3. Failure to implement SCM to e-government – a brief case study

The possible problems in informatization of EG SC are illustrated with a brief case study case study that describes the failure of implementing the e-procurement portal in Slovenia in 2004-2005. Other countries have realized between 10-12% savings with such portals [28] and the benefits for Slovenia were estimated to be between 7000 and 50000 € of daily savings [31].

While the preparatory activities for the project were on-time, several deficiencies were found The project was delayed considerably and the report of the revision committee listed business process renovation with subsequent informatization as one of the main (unfulfilled) prerequisites for success of such project [31]. AS-IS process models were not developed. Several good practices in process renovation (step 2 in our proposed procedure) were not followed, such as end-user involvement [31]. Consequently the responsibilities and rights of different organizations could not be properly defined and the extent of work of external developers and consultants could not be properly defined [30].

Due to deficiencies in first two steps obviously the implementation of the next two was not possible and the development of the portal was severely delayed. The portal (http://www.narocanje.si) was finally developed in 2007 and recently commenced its operations.

Further case studies are planned to test the applicability of proposed procedure to public administration – see e.g. [17] as a detailed case study of renovation of a Slovenian Ministry

3 Conclusion

In the paper we highlighted the importance of renovating both the upstream and downstream SCs of the whole public administration. We proposed a four-step approach towards such renovation efforts along with the new definition of EG. Only the proper renovation and

informatization of all parts of the EG SC in various organisations in the public administration can lead to the described benefits and provide a foundation for the introduction of advanced concepts such as the management of operational risks and business continuity management.

In order to reap the full benefits both upstream and downstream SCs should be properly renovated. This was also recognized by policy makers - the newly approved strategy for EG development in Slovenia in the 2006-2010 period [27] identifies BPR as both one of the main problems and key success factors of introducing EG.

Further applicability of one of the concepts from the business world (e.g. cross-docking, e-markets) for EG integration along with a possible modification of private-sector methods should be tested with the case study.

Therefore, this area offers several important issues for further research, such as: the measurement of business benefits of introducing EG and the need for case studies about usage of renovated and simplified processes to 'plug-in' the suppliers in e-government supply chain.

References:

[1] Al-Kibsi G, de Boer K, Mourshed M, Rea NP. Putting citizens on-line, not in line. McKinsey Quarterly, Vol. 2, No. 2001, pp. 65-73.

[2] Andersen KV, Henriksen HZ. E-government maturity models: Extension of the Layne and Lee model. Government Information Quarterly, Vol. 23, No. 2, 2006, pp. 236-248.

[3] Bertot JC, Jaeger PT. User-centered e-government: Challenges and benefits for government Web sites. Government Information Quarterly, Vol. 23, No. 2, 2006, pp. 163-168.

[4] Brown D. Electronic government and public administration. International Review of Administrative Sciences, Vol. 71, No. 2, 2005, pp. 241-254.

[5] Burgess K, Singh P, Koroglu R. Supply chain management: a structured literature review and implications for future research. International Journal of Operations & Production Management, Vol. 26, No. 7, 2006, pp. 703-729.

[6] Burn J, Robins G. Moving towards e-government: a case study. Logistics Information Management, Vol. 16, No. 1, 2003, pp. 25-35.

[7] Carayannis E, Popescu D. Profiling a methodology for economic growth and convergence: learning from the EU e-procurement experience for central and eastern European countries. Technovation, Vol. 25, No. 1, 2005, pp. 1-14.

[8] Chan F, Qi H. An innovative performance measurement method for supply chain management. Supply Chain Management - An International Journal, Vol. 8, No. 3, 2003, pp. 209-223.

[9] Chen J, Lee T. Utilizing the Internet as a competitive tool for non-profit organizations Journal of Computer Information Systems, Vol. 41, No. 3, 2001, pp. 26-31.

[10] Coulthard D, Castleman T. Electronic Procurement in Government: More Complicated than Just Good Business. The 9th European Conference on Information Systems: Bled, Slovenia, 2001: 999-1009.

[11] Evans D, Yen DC. E-government: An analysis for implementation: Framework for understanding cultural and social impact. Government Information Quarterly, Vol. 22, No. 3, 2005, pp. 354-373.

[12] Executive office of the president. E-Government Strategy. Washington, D. C., 2002.

[13] Gansler J, Lucyshyn W, Ross K. Digitally Integrating the Government Supply Chain: E-Procurement, E-Finance, and E-Logistics. E-government series. IBM Endowment for the Business of Government, 2003.

[14] Gil-Garcia JR, Martinez-Moyano IJ. Understanding the evolution of e-government: The influence of systems of rules on public sector dynamics. Government Information Quarterly, Vol. 24, No. 2, 2007, pp. 266-290.

[15] Gil-Garcia JR, Pardo TA. E-government success factors: Mapping practical tools to theoretical foundations. Government Information Quarterly, Vol. 22, No. 2, 2005, pp. 187-216.

[16] Giunipero L, Handfield R, Eltantawy R. Supply management's evolution: key skill sets for the supply manager of the future. International Journal of Operations & Production Management, Vol. 26, No. 7, 2006, pp. 822-844.

[17] Groznik A, Kovacic A, Trkman P. The Role of Business Renovation and Informatization in E-government. Journal of Computer Information Systems, Vol. 49, No. 1, 2008, pp. In press.

[18] Groznik A, Vicic D. E-government: the role of business renovation and informatisation. Management, Vol. 11, No. 1, 2006, pp. 91-109.

[19] Hackney R, Jones S, Lösch A. Towards an e-Government efficiency agenda: the impact of information and communication behaviour on e-Reverse auctions in public sector procurement. European Journal of Information Systems, Vol. 16, No. 2, 2007, pp. 178-191.
[20] Heeks R, Bailur S. Analyzing e-government research: Perspectives, philosophies, theories, methods, and practice. Government Information Quarterly, Vol. 24, No. 2, 2007, pp. 243-265.
[21] King SF. Citizens as customers: Exploring the future of CRM in UK local government. Government Information Quarterly, Vol. 24, No. 1, 2007, pp. 47-63.
[22] Layne K, Lee J. Developing fully functional E-government: A four stage model. Government Information Quarterly, Vol. 18, No. 2, 2001, pp. 122-136.
[23] Lee J, Kim J. Grounded theory analysis of e-government initiatives: Exploring perceptions of government authorities. Government Information Quarterly, Vol. 24, No. 1, 2007, pp. 135-147.
[24] Lee S, Tan X, Trimi S. Current practices of leading e-government countries. Communications of the ACM, Vol. 48, No. 10, 2005, pp. 99-104.
[25] Leitner C. eGovernment in Europe: The State of Affairs. eGovernment 2003 Conference: Como, Italy, 2003.
[26] McGregor MA, Holman J. Communication technology at the Federal Communications Commission: E-government in the public interest? Government Information Quarterly, Vol. 21, No. 3, 2004, pp. 268-283.
[27] Ministry for Public Administration. SEP 2010: E-government strategy of Republic of Slovenia for 2006-2010 Period (in Slovenian),. Ljubljana, 2006.
[28] Novakovič S, Černe M. Uporaba EU izkušenj pri vzpostavitvi nacionalnega informacijskega sistema javnih naročil DOK_SIS 2005. Media Doc: Kranjska Gora, 2005.
[29] Panayiotou N, Gayialis S, Tatsiopoulos I. An e-procurement system for governmental purchasing. International Journal of Production Economics, Vol. 90, No. 1, 2004, pp. 79-102.
[30] Računsko sodišče republike Slovenije. Porevizijsko poročilo o popravljalnih ukrepih v zvezi s projektom portal za javna naročila. Ljubljana, 2006.
[31] Računsko sodišče republike Slovenije. Revizijsko poročilo o smotrnosti porabe proračunskih sredstev pri izvedbi projekta Portal za oddajo javnih naročil. Ljubljana, 2006.
[32] Schedler K, Summermatter L. Customer orientation in electronic government: Motives and effects. Government Information Quarterly, Vol. 24, No. 2, 2007, pp. 291-311.
[33] Scholl HJ. Electronic government: information management capacity, organizational capabilities, and the sourcing mix. Government Information Quarterly, Vol. 23, No. 1, 2006, pp. 73-96.
[34] Trkman P, Štemberger M, Jaklic J, Groznik A. Process approach to supply chain integration. Supply Chain Management - An International Journal, Vol. 12, No. 2, 2007, pp. 116-128.
[35] United Nations. UN Global E-government Readiness Report. From e-government to E-inclusion. New York, 2005.
[36] Ward MA, Mitchell S. A comparison of the strategic priorities of public and private sector information resource management executives. Government Information Quarterly, Vol. 21, No. 3, 2004, pp. 284-304.
[37] Wetzel I, Klischewski R. Serviceflow beyond workflow? IT support for managing inter-organizational service processes. Information Systems, Vol. 29, No. 2, 2004, pp. 127-145.