

Reaching inter-institutional business processes in e-Society

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Abstract

Each business enterprise strives to achieve the most efficient organization of its operations. While business enterprises can influence internal factors of organization, external factors are more rigid. Public organizations have less of an incentive to be efficient. Furthermore, their organization is less favorable since the decision making is centralized and highly formal (i.e. legislative). Adoption of business process orientation (BPO) paradigm, with an emphasis on the management of internal factors of organization, has provided business organizations with substantial savings and improvements in efficiency. However, external factors also have a high potential for improvement of efficiency. For instance, development of supply chains or value chains has proven that external factors can be harnessed to provide additional sources of competitiveness. Other external factors can also be used to improve the performance of individual organizations, an entire industry or economy as a whole. These synergic effects can be achieved through a unified and virtualized communication infrastructure, document exchange and conduct of business transactions. The goal of this paper is to present business environment properties in an e-Society that can be further developed to enhance integration between organizations and public institutions, which in turn can be used to create and manage inter-institutional business processes. This type of processes can promote e-business and e-business models to a new level of efficiency, making a whole industry or national economy comparatively more competitive in international markets.

Keywords: business processes; public administration; e-business; e-society; interactions

JEL Classification: M15, O31, C31

1. Introduction

Recent trends in business organization show that increasing numbers of companies focus their organizational efforts on their business processes. This approach is known as business process orientation (BPO). While the introduction of ICT implementations which make processes more efficient and help create products with

higher value for end customers improves business performance by manipulating mostly the internal factors of organization, a large array of external factors stays outside the scope of BPO framework.

The goal of this paper is to present the idea of broadening the view of BPO to an industry level or even the level of a country's entire domestic economy. In this setting, if life cycles of products and services are treated as business processes, even external factors can be manipulated to achieve a better competitive potential of the entire industry or economy. An appropriate implementation of ICT is crucial for the successful activation of the efficiency potential of the external factors of organization. According to the European Guide to good practices in Knowledge Management (CEN, 2004), a similar information infrastructure was proposed for the production segment of a society, where publicly available knowledge is collected and disseminated to all eligible entities including businesses and governmental institutions. The main contribution of this paper is that it incorporates the third segment of the society into the framework : customers or end users of all the products and services provided by the businesses and governmental bodies. The information infrastructure to achieve these goals becomes a virtual business environment where publicly available information, products and services can be traded, even produced and delivered. The system can be managed by creating inter-institutional business processes that can be hard-coded to provide even more opportunities for all the parties in the economy.

The paper is structured as follows: Section 2 gives a background on business processes and BPO. Furthermore, it describes E-business, a new business model highly dependent on ICT. As will be shown in this section, the infrastructural design of electronic connections among organizations within a business process should reflect the nature of their interaction. This is why Section 3 pays special attention to comparison of interactions in traditional societies with low availability of IT solutions, and in e-Societies with IT intensive solutions. Next, based on these comparisons, we present a new system of classification of interactions within an e-Society. All of these interactions may appear as elements of inter-institutional business processes. Section 4 discusses the advantages, possibilities, weaknesses and possible threats of the proposed integration of business processes within an industry or an economy. A possible implementation solution to this challenge is given in the form of a virtual business environment and virtual business processes. The final section contains conclusions and final remarks on inter-institutional business processes.

2. Background

2.1. Business processes and Business process orientation

Promoting higher levels of communication between functional departments of organization has moved the focus from the static elements of organization to the dynamic elements, i.e. processes that are undertaken by functional departments and organization as a whole. Process organizations appear as a result. (Davenport, 1993; DeToro & McCabe, 1997). Approach to business organization based on business processes first started developing in the 1990s. A number of definitions of business processes can be found in current literature:

1. Business process is a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer (Hammer & Champy, 1993).
2. Business process is a structured, measured set of activities designed to produce a specified output for a particular customer or market (Davenport, 1993).
3. Business process is any activity, or set of activities, that combine inputs adding them new value thus producing outputs for internal (i.e. inter-organizational) or external customers (Harrington, 1991).
4. Business process is a structured, analytical, inter-functional set of activities with a clearly defined beginning and conclusion/end?, where creation of added value for a consumer is occurring in more or less constant intervals (Bosilj Vukšić, Kovačić & Hernaus, 2009).

A comparison of the above definitions shows that business processes are based on the system approach to business organization, with an emphasis on inputs and outputs of activities that are well structured and defined so that they can guarantee repeatability and quality of output for consumer. The substantial structure of processes allows them to be hierarchically organized in five different levels or segments (Melan, 1993): processes, sub-processes, activities, tasks and steps.

Adaptation of existing functional departments and other organization forms starts with the analysis of business processes that aims at identifying core business processes. Acquired information and knowledge is then used not only to adjust these business processes and business organization, but also to improve infrastructural elements (e.g. to develop an integrated information system and to introduce business flow management systems). Business process models are created and new organizational knowledge about existing processes is identified. Information system is used to store this knowledge in the form of process repository, allowing for better management of processes and dissemination of knowledge throughout the organization.

Advantages of BPO are establishing of more economical business organization structure and shortening of

time needed for business operations. Consequentially, higher flexibility of the organization is achieved. Better response time to changes in customer demands results in higher customer satisfaction, which leads to overall higher productivity, speed and efficiency of the organization. Another important set of advantages of BPO refers to employees. BPO promotes teamwork and enables a better overview of organization goals, which, in turn, increases employee motivation.

However, the adoption of BPO poses a couple of challenges. A higher level of coordination of all organizational activities and inter-functional teams is required. Furthermore, it is necessary to associate teamwork results with the overall performance of the organization. To overcome these challenges additional effort is required both from management and other employees. The key elements for success are competent management, high motivation of employees and adequate organizational culture. Introducing adequate information system for employees and a reward and motivation scheme can contribute to successful adoption of BPO, but these measures require adequate information infrastructure.

By introducing and developing new segments of information infrastructure (such as Knowledge management systems or Supply chain managements systems) organizational activities become more technology dependant, but they can also be used to create new electronic types of activities and interactions within an organization and between the organization and its surroundings.

2.2. E-Business and E-Government: New business models

Intensive use of ICT initiated new innovative business models that heavily rely on ICT and specifically on the Internet as the basic infrastructural component. Electronic business or e-Business encompasses all types of electronic information exchange (within the organization or between the organization and its partners and customers) which are deployed to support one or more business processes.

The irrefutable relationship between business processes and e-business is confirmed by the DTI definition of e-business (DTI, 2000): E-business is described as the ultimate integration of all segments of ICT with all business activities so that business processes are fully redefined and based on ICT. In other words, overall business processes are re-enacted as part of a new innovative business model.

There are two basic groups of reasons for the implementation of e-business:

- (1) to improve efficiency of operations and
- (2) to improve organizational competitiveness.

Improvement of efficiency can be achieved through:

1. decrease of delivery times of inputs (i.e. raw materials, components, semi-products, etc...)
2. decrease of distribution times of outputs (i.e. produced goods and services)
3. decrease of procurement costs and sales costs
4. decrease of operation costs

Improvements of competitiveness can be achieved through:

1. encouraging customer demand
2. improvement of quality and assortment of goods and services
3. introducing solutions aggressive competitors already use to maintain existing market shares.

The difference between e-business and e-commerce is that e-commerce is a part of e-business, while e-business can include (and usually does) e-commerce, but it can also contain other ICT implementations, besides those in sales and procurement functions.

In current literature it is common to differentiate between electronic business and electronic government, where the latter usually refers to public administration. E-government is described as an application of ICT and methods of electronic commerce in governmental and public institutions that cater to the needs of citizens and entrepreneurs (Holden, Belew, Elad & Rich, 2009). More general definitions by Turban & King (2003) and by West (2005) describe e-government as a government model that utilizes ICT to integrate flows and interdependencies between the government, entrepreneurs, citizens and public institutions.

In the first definition, e-government represents merely a new medium for communication between government/public institutions and other entities of a society. The second definition, however, treats e-government as a comprehensive form of government organization. E-government should be treated as a complete business system that incorporates all elements that can be found in any business organization with specific tasks and functions. By means of analogy we can see that the first definition likens e-government to e-commerce in a business environment. As e-government activities include more than simply communication with citizens and entrepreneurs, e-government should be treated as a specific type of e-business. Similar to E-Business, one of the goals of e-government is to increase efficiency, shorten response times and create additional value for its users – citizens and entrepreneurs – by introducing ICT-supported changes in its organization.

A further comparison of definitions of e-business and e-government shows that they have the essential elements in common, the only exception being the domain of activity. Businesses try to optimize their operations to gain

a competitive advantage and higher consumer satisfaction while e-government should aim at optimizing their operations to decrease public costs of the governmental apparatus and gain higher user satisfaction that can motivate citizens to exercise their rights and promptly enable entrepreneurs to start economic activities, production and employment. In this sense we can understand e-government as a specific type of e-business which aims to serve the public (not private) interest in achieving advantages from ICT and higher efficiency of the overall society.

The current frontiers of BPO are equal to the frontiers of a specific business organization, or a specific supply chain. Production inputs and outputs also play a role as objects of other social processes (i.e. transformations or interactions) that do not take place within the borders of business organization. Some examples of these processes are consumption of production outputs, reusability and recycling. Fuchs (2008a) finds that this incompleteness of output life-cycles and application of ICT only on the production side represent the key reason why the goals of sustainability theory cannot be achieved. An example of unsuccessful goal of sustainability is the idea of dematerialization of production. Dematerialization refers to using production inputs that have already been used in the production-consumption cycle without adding new natural resources to the following production cycle. Electronic publishing is a good example as written sources of information are available in digital form for accessing and distribution. It was expected that the consumption of paper will decrease as electronic publishing develops, but recent studies reveal a rising trend of paper consumption (Fuchs, 2008b). Furthermore, electronic publishing even encouraged this trend further since electronic documents are reprinted even more frequently than before (Hilty & Ruddy, 2000). Consumption should be organized as well as production and interlinked with it into a unique cycle to achieve a sustainable society.

Available ICT solutions and new business models can be put to best use only if a systematic and unified approach to supporting electronic business is adopted on the national level. This type of social integration can only be initiated by government authorities. Namely, it is necessary to adopt a legal framework that makes electronic transactions and documents equal to their physical counterparts. If e-business and e-government can process electronic counterparts of production inputs and outputs, as well as valid and legally accepted electronic forms and documents, the overall economy can gain a substantial competitive advantage. This high level of integration can be achieved by the creation of a unified electronic infrastructure that can support all possible interactions between all of the constituents of a society. This type of information infrastructure could serve as the foundation of a virtual business environment. In order to disclose the specifics of this virtual business environment it is neces-

sary to compare the interactions that take place in an economy (or more generally in a society) before the expansion of ICT and the interactions present in a society which is highly dependent on ICT.

3. Interactions within traditional societies and e-societies

There are three groups of stakeholders in each economy (or more general society). Each of these groups has its particular interests regarding the allocation of wealth, realization of their driving goals and satisfying their own needs. These groups are: businesses (B), consumers (C) and government and public administration (G). If businesses (B) and government (G) use electronic models for communication and exchange of goods and services, consumers (C) are compelled to adjust their habits to these new modes of interaction. When an advanced level of ICT usage (including Internet) is present in all of these groups we can refer to this type of society as an e-Society.

and services or information about companies through new means of communication (i.e., Internet or mobile communications).

Surprisingly, application of ICT in government and public administration is very similar to ICT applications in businesses. Most of these applications follow the same business models even though they should be modeled and adjusted to serve as public goods, especially if the purpose of ICT implementation is to support interactions between institutions and the rest of social entities.

In order to analyze interrelationships between different entities and stakeholders in an e-Society and, based on the results of this analysis, implement ICT applications that can promote efficiency of business processes on an overall, national level, we should use multiagent system methodology. It is appropriate for the task as it uses interactions as its starting point. According to Carley and Newela (1994), all of the interactions that can be established between individual entities belonging to any of

Table 1: Agent interaction classification matrix

| | | Situational knowledge → increasingly rich situation | | | | |
|--|---------------------------|--|--|-------------------------------|------------------------------------|---|
| | | non-social task | multiple agents | real interaction | social structure | cultural historical |
| Cognitive architecture ↓ increasingly limited capabilities | omnipotent agent | goal directed | -exchange theory -turn taking -modelling of others | timing constraints | class differences | organizational goals historically situated |
| | rational agent | -reasoning -information gathering | -learning from others -negotiation | miscommunication | social mobility | social cognition emergent norms |
| | boundedly rational agent | -satisfying -planning -adaption | group making | -social planning -coercion | -altruism -information networks | moral obligation role emergence |
| | cognitive agent | compulsiveness | group think | social interaction | automatic responses to status cues | group conflict develop language & institutions |
| | emotional cognitive agent | habitual, variable performance | -protesting -courting | -game -mob action | campaigning | team player -norm maintenance -ritual maintenance |

Application of ICT in business is mainly achieved through interventions in internal organization of business operations and it promotes interaction within the organization. A smaller portion of applications in ICT concerns organizations, usually smaller businesses, that venture using ICT as a means of interconnecting with their business partners to form supply chains. Other ICT applications are typically used to enhance the availability of products

described social stakeholder groups can be described as one of possible social agent types given in the classification matrix in Table 1. Social interactions are categorized according to two dimensions: cognitive properties of an entity and complexity of the situation or environment. The most basic cognitive entities have only basic information processing abilities, while a more complex cognitive apparatus includes reason and emotions. The

complexity of situation spans from individual, non-repetitive, goal-driven simple situations to highly complex situations that involve different social components, such as social structures, cultural and historical context. For each combination of these dimensions a different type of interaction occurs. In multiagent systems the most important types of interactions are social interactions, cooperation, teamwork, and games. These interactions are the most characteristic for B and C segments of a society. Additionally, social planning and social force are interactions associated with G segment. Depending on the type of interaction, each agent uses its cognitive capacities as best as possible, but goals can only be realized if a communication infrastructure is in place (i.e., ICT in an e-Society). Examples of interactions between social stakeholders related to ICT (Chaffey, 2007) are given in Table 2.

Most of the given examples represent coordinated cooperative interactions between social stakeholders (according to Fasili (2007)). We can also see that for interactions within each social group there are competitive types of interactions, particularly collective competition and different types of competition over resources.

The same examples also reveal that each stakeholder group has different social responsibilities which determine hierarchical relations among the groups. The most important property is the direction of social feedback, used as a regulatory and adaptive mechanism of a society. The superior group has to provide a feedback infrastructure in order to maintain its own corrective and adaptive mechanism.

Table 2 presents feedback interactions in the cells below matrix diagonal. This is because Cs have the least impact on social organization. They are the end consumers of all final goods and services provided by society. Next are Bs who provide corrective feedback only to a part of society as they cannot command Cs. The highest authorizations and responsibilities for functioning of the entire social system are reserved for public administration and government and this is why they should use all the feedback generated by other entities while they do not produce any feedback in terms of social organization. Finally, the hierarchy runs in the direction opposite to feedback and can be defined as $G - B - C$. In business it is customary to describe types of interactions as e.g. B2C, which means that a business model is based on business initiating the communication towards the customers. If we take into account the above mentioned hierarchy, we can add that businesses have a responsibility of maintaining the communication infrastructure to allow appropriate feedback. Finally, a complete framework of possible interactions between social stakeholders in an e-society has been defined in view of the fact that the initiation of interaction and maintenance of communication are the responsibility of the first, or

superior participant of the interaction, whereas evaluation and feedback are the function of the second, inferior participant of the interaction. This framework yielded the creation of different business models widely available in scientific and professional literature (Holden et al, 2009; Chaffey, 2007; Varga & Čurko, 2005). G determines work conditions, control and legislative conditions for the entire system. At the same time, contemporary, ICT intensive, business process-oriented G, governed by value for end user must provide communication channels for all of its end consumers, i.e. businesses (B) and citizens who are G's customers (C). This is why G2B and G2C represent the first two basic interaction relations. Businesses (B) recognize their end users in customers and other businesses, so they engage in two types of interaction relations - B2B and B2C. A B never initiates or enforces communication conditions towards G so there is no B2G interaction relation. In literature we can often find this type of business model but it is important to understand that in this case G is the end user of products and services so the true nature of the interactions is B2C. Finally, C includes e-citizens or consumers or customers who are never responsible for the initiation of communication, as they are at the end of the production-consumption chain. B and G should always provide C with communication tools and use the feedback received to re-evaluate their products and services. This is why there are no interaction relationships where C is the superior participant. One exception is the interaction relation C2C which denotes direct interaction between consumers. Infrastructure for this type of interaction is provided by businesses but they do not interfere with the content of this interaction. The subject of this interaction is only information unaccompanied with any product or service as C does not produce. The importance of this type of social interaction can be seen from the implications and rise of Web 2.0 paradigm.

G2G is a redundant interaction relation for this framework as it denotes interactions within government bodies and public administration institutions themselves. These institutions strive to present themselves to other members of the society as one compact unit (i.e. simply as G). Consequently, problems of G2G interactions are internal organization issues that should be solved by implementing BPO and an appropriately centralized information system.

The role of government and public administration (G) is crucial since the fundamental responsibility of government is to enact and regulate conditions for all economic activities. Moreover, G enacts strategies for the development of industries and businesses, which includes electronic business and electronic commerce as well. Globalization additionally strengthens this function of government. Furthermore, it stresses the importance of establishing an open public information infrastructure. Impact of open public information infrastructure can be seen in Figure 1.

Table 2: Example transactions for each type of social interactions

From: Content and service providers...

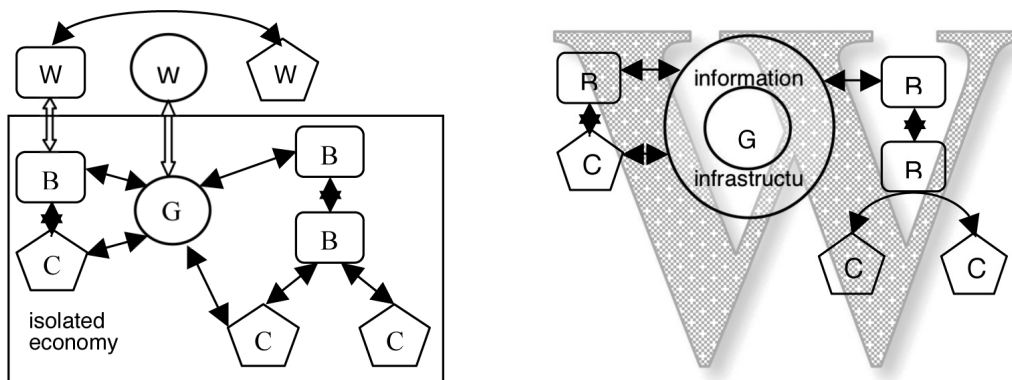
| | Customers (C) | Businesses (B) | Government (G) |
|----------------|---|--|--|
| Customers (C) | <ul style="list-style-type: none"> - online auctions - peer-to-peer services - blogs, online communities - product recommendation systems - social networking services | <ul style="list-style-type: none"> - transactions - public relations - brand development - information media - comparison mediators | <ul style="list-style-type: none"> - administrative transactions - government information - municipal information |
| Businesses (B) | <ul style="list-style-type: none"> - reverse auctions (pricelines) - customer feedback - Internet communities and campaigns | <ul style="list-style-type: none"> - transactions - public relations - information media - B2B markets | <ul style="list-style-type: none"> - public administration services - administrative transactions - legislative |
| Government (G) | <ul style="list-style-type: none"> - citizen feedback through individual or civil initiatives | <ul style="list-style-type: none"> - businesses' feedback for government institutions | <ul style="list-style-type: none"> - internal services - information exchange |

Towards: ...user of content or service.

The first part of this figure illustrates a lack of an appropriate information structure. Interaction capabilities between members of each social group are very limited. The impact of hierarchy between stakeholder groups is very pronounced. Customers can establish direct interactions only within national boundaries, but formal exchange of information is not possible without close supervision of other stakeholder groups. Supervision may include reediting of information or censorship before intended information is publicly available. Moreover, the interaction of customers or businesses with their international peers is highly formalized and cost ineffective. Communication is established using a regulatory mechanism that involves a chain of intermediates. The interaction with international entities usually has to be achieved physically, which is time consuming. Any mode of virtualization of communications or transactions is discouraged.

In a globalized setting, characterized by the ongoing process of opening out national markets to international flows, information infrastructure adds a new layer of direct communication that can be used for direct interaction between domicile and international entities. As shown in the second part of Figure 1, the significance and role of national borders is changed greatly. Globalization effects within the domicile society are activated by direct communication with international entities. Limitations imposed on production factors of an isolated economy in the pre-globalization era are diminished or cancelled. Namely, virtualization allows for upgrades of production factors potential, e. g. labor can be outsourced internationally in both directions (i.e. domestic labor in international companies or international labor in domestic companies), capital is upgraded through increase of international capital, or changes in terms of fi-

Figure 1: Interactions of social stakeholders in a) traditional (non-ICT enabled) economy and b) ICT-intensive e-Society



nancing etc. The most revolutionary effects can be seen on the land as a traditional production factor and its role in high-technology industries. The significance of land in terms of real estate cost, or even production or distribution space can be largely minimized or even entirely neutralized by virtualization. i.e. software production, online entertainment and online services, etc. Conducting entire business processes within a virtualized space emphasizes the fact that virtual business space is practically unlimited. If the potential of virtual business space is well managed and organized, it can be used to expand production capacities beyond the capabilities of tangible production factors.

4. Five basic interaction types in an advanced e-Society

G2C and typical transactions

This interaction type refers to dealings between governmental and public institutions or services with citizens. Establishing and maintaining communication channels that grant access to governmental and public administration services online for all domestic citizens makes functioning of the government significantly more transparent while simultaneously reducing the operational costs. Additionally, savings in time for citizens are achieved both directly and indirectly. Direct savings in time are achieved by eliminating the need to wait in queues or visit multiple institutions for one administrative process. Indirect savings in time are achieved through more efficient retrieval and processing of citizen needs and feedback, allowing the administrative apparatus to respond more promptly to changes and citizen needs. Some of transactions that fit this type of interaction are the issuing of statements and certificates from a variety of public registers, regulation of citizen obligations, such as tax payments and tax returns, other contributions or levies, regulation of social status and social rights (like medical insurance, social security provisions and receipts, unemployment insurance, etc.), issuing of licenses and permits (e. g. building and construction permits, driving licenses, and similar personal documents), regulation of permissions and obligations towards local government bodies including infrastructural, municipal and communal services, etc.

All of the above listed dealings of citizens with governmental and public institutions are administrative processes which have been developed to generate, authorize or notarize a particular document and thereby grant certain a right to the holder or serve as evidence of holder's status or settled payments. Material goods are rarely objects of these transactions, save from hardcopies of finalized issued documents that are processed electronically in a contemporary public administration but still require physical form.

Research of e-Government implementation in EU coun-

tries shows that only 7 countries have reached the highest level of e-Government development according to methodology described by Cap Gemini (2005). High level of e-Government implies a high number of services made available online, as well as their sophistication. Best results, in terms of both of these criteria, have been achieved by Sweden, Austria, UK, Ireland, Finland, Norway and Denmark (CapGemini, 2005).

G2B and typical transactions

Relations between governmental and public institutions and businesses are described by the G2B type of interactions. By investing in non-commercial communications channels the government improves economic conditions for business operations, decreases operative and administrative costs and promotes electronic models of business and communication in everyday activities. All of the above encourages businesses and new entrepreneurs. The role of government is similar to that in G2C interactions but it also includes exchange, distribution and sharing of public business information with businesses. Topical repositories of public knowledge can thus be established and made accessible to registered businesses, enabling dissemination of the most recent information about regulations and practices. In this way government encourages synergic effects for all businesses, making their start-up operations more efficient in comparison to other national economies (Brodhag, 2000). Transactions that are a part of this type of interactions can be divided into two groups. The first group of transactions relates to administrative dealings, including issuing of different certificates and business permits, regulation of permissions and obligations towards governmental and public institutions (e.g. VAT and corporation taxes and other levies), regulation of legal status and privileges, etc. A number of transactions enables exchange of information for statistical purposes and transactions related to international trade and exchange, e.g. obtaining customs declarations, registration of cargo manifests etc. The second group of transactions includes the exchange of information about legislation, directives, regulations and norms or standards for various industries and business activities. It also includes feedback from businesses that can help estimate effects of regulation changes and discover good and bad practices in any of economic industries. This knowledge can then be made available in the form of publicly available knowledge repositories, which means that all businesses can benefit from it.

The European Union has recognized the importance of the role of government in establishing public knowledge databases in the European guide to good practices in knowledge management in 2004 (CEN, 2004). It is not surprising that the research on availability of G2B services (CEN, 2004) yielded results that are similar and correlated to the earlier mentioned findings for G2C services. Croatia has also created a strategy and a framework for

implementation of the required infrastructure to create this type of knowledge repositories.

B2C and typical transactions

This type of interactions is achieved between businesses that offer their finalized products and services to end-users or consumers. We must emphasize that end users denoted by C can belong to any social stakeholder group as long as they do not add new value or create new products for further trade but use products and services for final consumption. This kind of interconnection generates a whole range of advantages both for businesses and customers. Customers benefit the most from savings in time and a better, comparative overview of products or models offered by different producers.. On top of benefiting from reduced time of interaction, businesses realize a significant decrease in operating costs as a result of the shortening of distribution chains. Companies that embrace any of business models based on electronic B2C interactions can benefit from described savings, which will allow them to offer their products and services to end customers at lower prices and better terms than their market rivals. Transactions that belong to this type of interactions are selection, ordering and payment of products and services. For dematerialized goods and services, however, B2C also includes distribution of e-products or distribution of outcomes (e.g. reports or receipts) of preformed e-services. Delivery of products and services is the most important transaction in this group as it represents economic activity that is realized in virtual form, which makes virtual processes parallel with the traditional, "real" or tangible, system. An example of e-product delivery is the delivery of digital multimedia content as soon as it has been paid, e.g. music tracks, movies, electronic plane tickets or codes that guarantee flight service for the customer on a selected flight. An example of e-service in this context is service that can be performed electronically even in traditional business, e.g. conversion of file formats, over-Internet services such as VoIP, facsimile services, etc.

B2B and typical transactions

This type of interactions refers to interactions between businesses, where each of business companies takes on the role of either supplier or consumer of raw materials, components, semi-products or services for its own production. This type of interaction can take on a highly complex form as some of the businesses can simultaneously engage in a cooperative and competitive relationship (sometimes referred to as co-opetition (Brandenburger & Nalebuff, 1997)). This is the reason why this type of interactions typically involve extensive security mechanisms and mechanisms for the protection of information privacy and its integrity. Companies even upgrade their information systems via shared intranet that guarantees confidentiality of exchanged content. These

investments in IS can be justified by advantages they provide in establishing supply chains that lead to a significant increase of efficiency of business operations with unremitting business partners. Most transactions typical of B2B interactions can be roughly grouped into four categories: (1) semi-product repositories with high fragmentation that allow for fixed prices of predetermined quality levels (2) excess goods auctions, especially for perishable goods, that can lower opportunity costs and financial losses, (3) generic products markets, such as gas, electricity, but also financial derivatives, where transactions of high volumes can be conducted, and (4) professional virtual communities for different industries that allow for better organization of economic industries and its segments, but can also serve as a basis for social networks for locating business partners and business opportunities.

C2C and typical transactions

In an e-society, interactions between customers fall into C2C type of interactions. Customers can take on traditional roles of buyers and sellers of used goods, but more often and more important for an e-Society, they can act as providers, editors and consumers of information. The infrastructure is provided by information providers pertaining to businesses (B), but their role within interactions remains passive. The incentive for businesses to provide this type of interaction infrastructure for customers (C) is the possibility of charging fees for using their service, but more often taking advantage of the marketing potential either for their own products or for providing marketing services to other companies. Whatever the incentive of the businesses, in this type of interaction customers are focused on other customers and the information they provide. This information usually represents feedback or impressions and experiences with different products or service providers and it can be used by other customers when making decisions about purchases. Some of transactions that belong to this group of interactions are private sale of used goods using online auctions, inter-connecting with customer communities using multimedia, blogs, internet communities, social networking, recommendation systems and similar services.

5. Discussion

5.1. Modeling Virtual Business Environment

For each type of interaction the infrastructure should meet some specific conditions in order to create additional improvements in efficiency. Interactions that include G as a participant require a high level of formality. Furthermore, specific electronic counterparts of legal documents, forms and receipts are required to make each interaction or business operation complete, from its initiation to its resolution. In contrast, interactions that involve B are more relaxed as the terms of communica-

tion are first negotiated to establish a framework for repetitive interactions which take place between business partners, or producers and their customers. In terms of formal aspects, the infrastructure for interactions with B should provide mechanisms for making contracts. During the contract validity period the infrastructure should ensure trustworthiness of communication and protect privacy of exchanged information. Another requirement is the ability to support delivery of electronic counterparts of the products and services traded. The most relaxed interactions are those among customers (C) where formal aspects are the least pronounced. Formal aspects are only relevant for auctions and trade of used goods. Furthermore, it is service providers that take responsibility for most of the legal and formal aspects of these interactions.

Provided that interactions in an e-Society are supported over the same information infrastructure it is possible to collect depersonalized information about practices in economic and social dealings between different social agents. The most important strength of a shared information infrastructure is that it enables the creation of knowledge bases that can be used on different levels: 1) for better decision making in making new regulations (G); 2) as a basis for better strategic, tactical and operational decisions (B) and 3) for creating more reliable services for end users (C) through better dissemination of public information. Transactions can thus be interconnected. Business processes can be monitored and managed from the point of initiation of demand for a certain product or service to the last stage of the product life cycle, i.e. we can monitor and manage the process spanning over a number of institutions that are involved in the economic processes these products and services go through.

Business environment that should allow for this extended view over inter-institutional business processes should be unique for the entire economy and supported by the public sector, i.e. government. Virtual business environment should be based on e-services for all administrative dealings with electronic forms and documents that are recognized as valid by the legislation. Unique identification of all eligible participants should also exist (such as social or ID numbers for any economic factor, either business or individual).

Dematerialized forms of businesses within a virtualized business environment create industries that are practically unlimited while their activities create relevant new value for the economy of the "real" world. Virtually intensive work has some disadvantages. Some of the most relevant are possible increase of social costs in terms of medical care costs (due to occupational diseases related to work at the computer or intensive work with virtual entities, etc). In order to minimize these disadvantages it is crucial to adjust all the segments of a society to prepare

all individuals and entities for the virtual environment (e.g. legal system, educational system, etc).

5.2. Virtual Business processes

Conducting business operations within a virtual environment should be organized in a way that cancels out procedural mistakes. This can be achieved through the use of business process specifications that can be used as roadmaps by all of the participants for each product or service. If these specifications are used in order to initiate actions, transformations and transactions solely within the boundaries of the virtual business environment they can be considered as virtual business processes.

Unlike business process virtualization, which denotes effective implementation of ICT in an actual business environment with the purpose of making business processes more efficient (Young & Jude, 2004), creation of virtual business processes is based on actual business processes which are adjusted for the virtual business environment where all of the production factors (or even consumption factors) are dematerialized. Virtual business processes are parallel to business processes of the "real world" but their role in the virtual business environment is more operational since each product or service being developed is accompanied by an instance of the virtual business process that holds the information about the status of the production process itself. This important requirement ensures validity and allows for better management of the overall infrastructure.

6. Conclusion

In this paper we have presented the emergence of inter-institutional business processes within a well-organized e-Society. As businesses embrace BPO, and as government encourages integration and transparency of business conducts and services, a new type of infrastructure is required. This type of infrastructure allows for managing and taking advantage of potentials of, what businesses see as, external factors of business organization.

This information infrastructure creates additional incentive for: businesses to establish lasting partnerships and mutual information systems; public institutions to be more efficient; while citizens (that make up the majority of customers of all the produced goods and services) take a more active role in economic activities.

The creation of publicly available repositories of business practices and feedback of all the social entities that have the opportunity to influence overall social organization and government legislative provides synergic benefits for all the participants of the economy. These synergic effects can be achieved through a unified and virtualized infrastructure for communication, document exchange and conduct of business transactions.

In this paper we considered e-Society and analyzed its business environment properties that can be further developed to enhance the integration between organizations and public institutions, which in turn can be used to create and manage inter-institutional business processes. A suitable virtual business environment was defined on basis of the five main types of interaction. Based on the properties of the transactions that occur in these dealings, we established and described the properties of the infrastructure and the prerequisites for its implementation. If inter-institutional business process can be conducted within this virtual infrastructure, the virtual business environment can be established. Managing of interactions within this virtual business environment can be organized by the introduction of virtual business processes. This type of processes can promote e-business and e-business models to a new level of efficiency, making a whole industry or national economy comparatively more competitive in international markets.

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