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Guest Editorial Preface

E-Government Integration and Interoperability Services

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E-government has gained considerable attention and the number of research studies and academics conducting research in the field has increased particularly in the last five years while basic e-government services have been in place for over ten years, the attention has now shifted towards more comprehensive services. These comprehensive services require more advanced and intelligent mechanisms and often require that public organizations collaborate with each other. With the introduction of the European Service directive, cross-border collaboration and services have gained considerable attention. All these efforts demand high-levels of integration and interoperability.

Since the late 1990s, most countries have released their e-government strategies and defined various approaches resulting in significant progress on e-government at all levels of public administration. Current e-government efforts are often complicated by a lack of interoperability and integration of systems. Creating interoperability and integration is a complex endeavor (Scholl & Klischewski, 2007; Weerakkody, Janssen, & Hjort-Madsen, 2007). Service provisioning in networks is likely to fail if the systems of the public agencies are not properly integrated. The integration of activities extends to greater collaboration and integration between agencies (Kamal, Weerakkody, & Jones, 2009) and can provide substantial benefits (Irani, Themistocleous, & Love, 2003).

Within most governments the basic infrastructure and components are in place and interoperability frameworks further support their development. Yet, although many technology standards are available, many other problems hamper the development of these services. For example, knowledge might be available but not easily made accessible and complex ontologies are necessary to enable information finding and retrieval. The investments and benefits of these efforts are often unclear and thus need to be detailed and highlighted clearly as blurred benefits might not result in the investment necessary to progress. On the other hand, the concentrating of services in a shared service center can result in all types of benefits (Janssen & Joha, 2006). These types of projects are often large-scale and many stakeholders are involved, each providing their own perspective. As such, technical, economical as well as organizational and strategic problems need to be tackled.

This special issue aims to capture some of the issues and complexities of e-government integration and interoperability in the public sector and includes papers showing various angles on this issue. Interoperability is defined by the IEEE as the ability of two or more systems or components to exchange informa-

tion and to use the information that has been exchanged (Institute of Electrical and Electronics Engineers (IEEE), 1990). In the context of e-government, interoperability is a property referring to the ability of diverse systems and organizations to work together (Scholl & Klischewski, 2007). Interoperation takes place if information systems operate in a coordinated and meaningful fashion. Enterprise Application Integration (EAI) is an approach to architecture design linking systems (Themistocleous, 2004). Organizations face the challenge to integrate applications that were inherently designed to operated standalone (Lam, 2005).

SPECIAL ISSUE PAPERS

This issue contains five papers on various aspects of integration and interoperability services.

In the paper "Activity-Based Costing in Public Administrations – a Business Process Modeling Approach" authored by Jörg Becker, Philipp Bergener and Michael Räckers a costing approach is used as an efficiency measurement for public administrations. Especially through the introduction of New Public Management and double-entry accounting Public Administrations get the opportunity to use cost-centered accounting mechanisms to assess process performance and evaluate their activities in a holistic concept. The authors show how process modeling can be a useful instrument to help the public administrations to capture relevant process knowledge and thus create the data basis for activity-based costing.

In the second paper 'Public Policies Knowledge Interoperability among Parliaments and Government' Loukis Euripides and Alexander Xenakis focus on extracting value knowledge from information from parliament. Knowledge is hidden in numerous text documents, so it cannot be efficiently exchanged and exploited. It is therefore highly important to extend the concept of interoperability among the information systems (IS) of Parliaments and Government Agencies, so that it covers not only the 'operational level', but also the 'knowledge level' as well, in order to enable the efficient exchange of not only data and functionality, but also of public policy related knowledge. It is based on the use of the complex problems representation ontology provided by the 'Issue-Based Information Systems' (IBIS) framework for codifying the public policy related knowledge created in the various stages of legislation formulation in Parliaments. An application of the proposed methodology is presented for the case of the Law on the 'Contracts of Voluntary Cohabitation' which has been recently passed by the Greek Parliament.

Yannis Charalabidis, Fenareti Lampathaki and Dimitris Askounis compare and outline the current landscape of frameworks in the paper "Investigating the Landscape in National Interoperability Frameworks" in the third paper of this special issue. National Interoperability Frameworks are continually revised and expanded across the globe in an effort to support the increasing need for seamless exchange of information. They found that most frameworks have a certain degree of maturity and provide recommendations for countries to develop their frameworks. This paper intention is to contribute to discussions about the interoperability progress.

The role of key stakeholders in integration project is discussed in the paper 'Examining the Role of Stakeholder's in Adopting Enterprise Application Integration Technologies in Local Government Domain' authored by Muhammad Kamal and Vishanth Weerakkody. Stakeholder management has been given much attention in e-government and can make or break a project. It would therefore be judicious to give greater contemplation to the research on examining the role of a number of stakeholders in EAI adoption process in Local Government Authorities (LGAs). The authors apply the concept of stakeholder theory to analyse the importance of stakeholders during the EAI adoption process. In particular, the paper explores the perception of different stakeholders on the factors influencing

EAI adoption in LGAs and their involvement in the adoption lifecycle phases. The authors highlight that each stakeholder involved in the EAI adoption process has a significant role by utilising their knowledge and expertise, contributing towards the success of the EAI projects and improving organisational performance.

Shared Services have been extensively adopted in practice as one means for improving organizational performance. Suraya Miskon, Wasana Bandara, Erwin Fielt and Guy Gable provide an overview of this field in their paper 'Understanding Shared Services: An Exploration of the IS Literature'. Yet, archival analysis of IS the academic literature reveals that Shared Services, though mentioned in more than 100 articles, has received little in depth attention. The paper presents detailed review of literature from main IS journals and conferences, findings evidencing a lack of focus and definitions and objectives lacking conceptual rigour. The paper concludes with a tentative operational definition, a list of perceived main objectives of Shared Services, and an agenda for related future research.

As highlighted the five papers presented in the special issue, interoperability is posing some of the biggest challenges for ensuring progress in e-government. This special issue contributes to the various aspects of interoperability and shows that the research emphasis is now shifting from enhancing interoperability and integration at the data exchange level towards higher and strategic levels. Obstacles are not merely technological in nature. In fact, the technological aspects may turn out to be far less of a challenge than the strategic, organizational, legal, political and social aspects (Scholl & Klischewski, 2007) and are complicated by the diverse interest of stakeholders that need to trust each other to cooperate (Feenstra, Janssen, & Wagenaar, 2007; Kamal et al., 2009).

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Activity-Based Costing in Public Administrations
A Business Process Modeling Approach

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ABSTRACT

The traditional way of budgeting in public administrations is input-oriented; however, this system does not meet actual methods of efficient budget controlling as a mapping of output parameters. Due to challenges, such as the need for cost reduction because of decreasing tax revenues, pressure for controlling mechanisms is rising. Furthermore, Europe Pan-European directives foster process harmonization and introduction of IT-supported and optimized business processes in the public sector. In this regard, activity-based costing can be a useful instrument for efficiency measurement of public administrations output. Through the introduction of new public management and double-entry accounting public administrations, the opportunity to use cost-centered accounting mechanisms to assess process performance while evaluating their activities in a holistic concept is accomplished. Process modeling can be a useful instrument to help public administrations to capture relevant process knowledge and thus create the data basis for activity-based costing.

Keywords: *Activity-Based Costing, Business Process Assessment, Domain Specific Process Modeling, E-Government, Public Administrations*

INTRODUCTION

Actually, the Public Sector is facing many changes. Initiatives like the EU Service Directive (European Commission, 2006), or the EU e-Procurement Directive (European Commission, 2004) demands for increasing service delivery. Furthermore, the customers attitude changes, he expects more and more transparency of public administrations processes (Janssen, 2005). At the same time the pressure for reducing the costs for daily work grows. Against the background of declining tax revenues, cities and municipalities in Europe in particular have to deal with improving and redesigning their work routines (Becker, Niehaves, Algermissen, Delfmann, & Falk, 2004; Gronlund, 2002). Therefore, the support of the business process through IT like specialized procedures and workflow management systems plays a crucial role. However, this also represents a further cost factor. The cost-benefit ration for those IT investments often remains opaque to the administrations, limiting the intent to invest.

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Through New Public Management (NPM) new possibilities of cost control for public administrations arise. With NPM, the way of accounting in public administrations, e. g., in Germany, changes from the classical fiscal accounting to double-entry accounting as known from the private sector (Hood, 1995). Based on this new accounting approach, administrations have the possibility to introduce an almost complete resource usage concept (Jackson & Lapsley, 2003). Elements like target agreements concerning products and a contract management with the employees are essential constituents of this reformation.

Activity-based costing is a useful instrument for public administrations. Public administrations, as an overhead intensive service sector, are suited particularly well in this case. NPM offers relevant data basis for activity-based costing. It allows for assessing administration processes from a cost perspective in different overhead areas (Brown, Myring, & Gard, 1999; Jackson & Lapsley, 2003). The obtained cost rates can be used for cost control as well as for comparing administrations and for comparing as-is and to-be costs.

Process models are an appropriate measure for supporting activity-based costing. Process models are used for transparency issues concerning the knowledge of activity flows and for documenting the often implicit process knowledge of the employees. Thus, process modeling provides a qualitative description of activities, providing in depth-understanding and thereby a starting point for the quantitative analysis with activity-based costing (Tornberg, Jämsen, & Parakno, 2002). However, with business process modeling public administrations face specific challenges because their highly diversified product portfolio often contains more than 1,000 processes (Algermissen, Delfmann, & Niehaves, 2005). Using generic modeling languages like event-driven process chains (Scheer, 2000) or BPMN (Object Management Group, 2008) often turns out to be very difficult due to the large amount of processes (Becker, Algermissen, & Falk, 2007). The modeling method PICTURE, which has exclusively been developed for the needs of public administrations, has proved to be adequate for this field of application. It has been used for modeling and analyzing by now more than 1,000 processes in public administrations successfully (Pfeiffer, 2008).

The contribution of this article is the combination of the domain-specific modeling method PICTURE and the concept of activity-based costing. This integration enables public administrations to model their processes fast and easily, to asses them from a cost perspective and based on this to carry out a process assessment and evaluation of reorganization activities.

In the following chapter explains the basic concepts of activity-based costing and its applicability to public administrations. Afterwards the PICTURE method is presented as a modeling method especially developed for public administrations. In the fourth chapter both concepts are compared, their connection is set up and illustrated using an example. This article concludes with a summary and an outlook to future research areas.

ACTIVITY-BASED COSTING IN PUBLIC ADMINISTRATIONS

The central idea of activity-based costing is to change the way how overhead costs are broken down on outputs like products or services. Instead of distributing the overhead as a fixed percentage of direct costs, activity-based costing assigns costs according to the resources used, e. g., personnel resources, for producing the outputs. The resource consumption by the outputs is measured through their usage of certain activities or processes. Activities are tasks performed by an organization's employees

consuming resources and in turn are creating the outputs. The frequency of execution for an activity is determined by the cost driver, an "event associated with an activity that results in the consumption of […] resources" (Babad & Balachandran, 1993), e.g., an order. To calculate the activity's cost driver rate – the cost rate for a single execution of an activity – the total costs for caused by the activity are divided by the cost driver. The total costs of an activity result from the share of the activity to the overall capacity of the resources used by it. Sometimes, the factor allocation resources costs to activities are called resource drivers (Cokins, Stratton, & Hebling, 1993; Gupta & Galloway, 2003).

Due to these properties activity-based costing is especially suitable for application areas with a high overhead fraction. That is mainly the case in personnel intensive areas like the service sector. In service companies basically all benefit processes can be included in the activity-based costing. Activity-based costing is therefore a well suited and useful costing instrument for the service sector (Ruhl & Hartman, 1998). Public administrations mainly provide services, too. Therefore, personnel costs often are the dominating cost factor in this sector. At the same time, departments often offer multiple services at once in an administration and often several departments are involved in providing a service. Activity-based costing can help to better allocate the large amount of overhead costs to the services of the public administrations than simple measures like the number of employees of a organizational unit or their share of budget (Brown et al., 1999).

The execution of activity-based costing requires identification, structuring and recording of the relevant activities or processes. A method that has turned out to be very useful for recording, documenting and also analyzing processes is process modeling (Green & Rosemann, 2000; Shanks, Tansley, & Weber, 2003). Hence, it is not surprising that also in literature respective approaches to integrate the two instruments have been discussed (Tatsiopoulos & Panayioto, 2000; Tornberg et al., 2002). However, a more detailed examination of the conceptual fit between modeling approaches and acitivty-based costing is still missing.

PICTURE METHOD

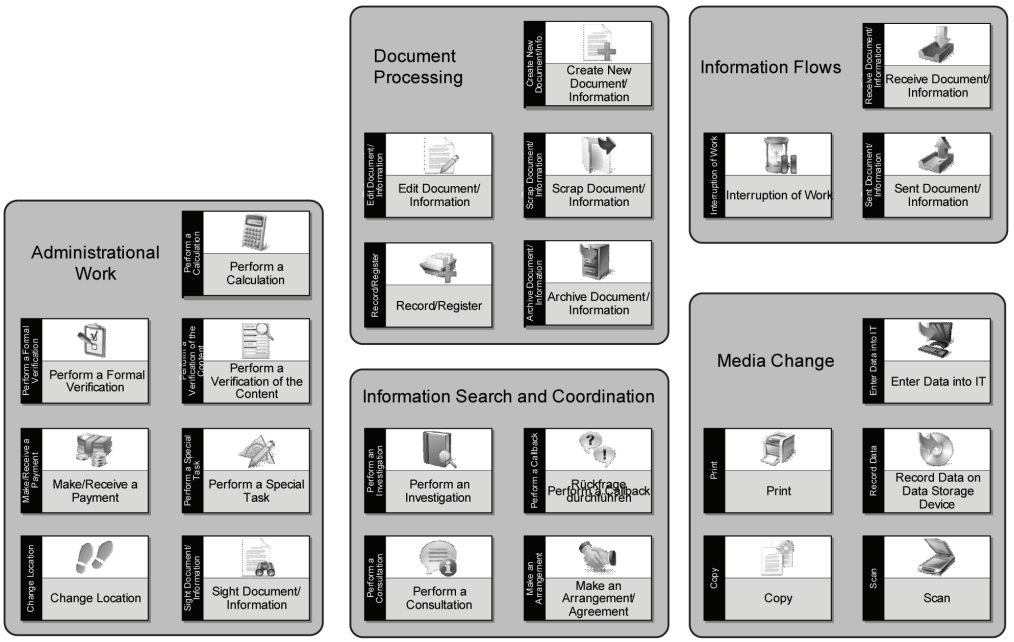
PICTURE is a domain specific modeling method (Guizzardi, Pires, & Sinderen, 2002; Luoma, Kelly, & Tolvanen, 2004; van Deursen, Klint, & Visser, 2000) which has been developed specifically for public administrations. The target when developing the PICTURE method was on the one hand to represent preferably the complete process landscape of an administration with justifiable effort and on the other hand to create process models which can be used for further semi-automatic analysis. For a more profound introduction to PICTURE cf (Becker, Bergener, Kleist, Pfeiffer, & Räckers, 2008; Becker, Pfeiffer, & Räckers, 2007). Like many other modeling approaches PICTURE differentiates several views on the modeling object for reducing complexity when modeling. PICTURE distinguishes four views:

Process View

The process view describes the operations of the administration in the form of single activities put together to processes. At the same time the process view integrates all other views by recording "who" carries out single activities, "with what" they are carried out and "what" is edited respectively produced. The central element of the PICTURE method and thus also of the process view are process building blocks. Each process building block represents a typical activity in the sequence of work of public administrations. This strictly defined language construct simplifies and quickens modeling because it refers to the known vocabulary of the domain. An overview of the building blocks is presented in Figure 1.

To describe the details of an activity execution in more detail and to record properties which are necessary for subsequent evaluations the PICTURE building blocks are specified in more detail by specific set of attributes for each

Figure 1. PICTURE process building blocks



building block type. For example, for the building block Receive *Document/Information* attributes like *Input Channels*, *Received Document* or *Used Information Systems* and the *Sending Organizational Unit* are recorded. The attribute *Input Channels* is an example for an attribute which requires multiple entries which have to be weighted. In PICTURE this is presented by a percentage distribution. Another important attribute also with regard to supporting activity-based costing is the *required processing time* which can be found in many building blocks like, e.g., *Enter data into IT*.

At the next higher structural level building blocks are composed to sub processes. Thereby a sub process is understood as a sequence of activities (process building blocks) which are carried out within one organization unit by one administrative employee and which contribute to the performance of a task of the complete process. Sub processes contain attributes, too. Here it is for instance recorded how often the sub process is carried out per year (*number of cases*) and who is responsible for its execution.

Within sub processes the modeling of process building blocks is done strictly sequential. This is due to the reason that one sub process only comprises those activities which one single administrative employee carries out. Therefore, it is assumed that he can only do one task at a time. However, it is possible that for one sub process several alternative operational variants exist, e.g. due to a decision (acceptance respectively rejection). For representing such a situation PICTURE offers two different constructs. One the one hand, attributes can be used, like the above described attribute *Input Channels*, where different cases can be represented by entering percentages. On the other hand, it is possible to define sub process variants. Such a sub process variant describes the alternative execution of the sub process from start to finish.

Sub processes are composed to processes. A process is characterised by providing exactly one service to the customers of an administration. Examples for such processes are *Moving an identity card* or *Extending the parking permit*. In the simplest case a process consists

of exactly one sub process; processes passing through several organisation units to deliver a service consist of more than one sub process.

Besides the differentiation regarding the refinement of the modelling levels to processes, sub processes, variants and finally process building blocks, aggregating processes to products is also possible by combining processes to groups or superior groups. These groups represent products, product groups etc. The procedure leads to a hierarchy of services which opens out into a comprehensive product catalogue. For example, the processes for applying for, extending and giving notice of the loss of a passport can be combined into the group *passport affairs*. A potential superior group for processes concerning identity cards would be *pass documents*.

Organisation View

In the organisation view the organisational structure of the administration is represented in a hierarchical composition of the different organisational units and positions. The organisation units are the basic elements of the organisation view. The organisational units are responsible for the execution of certain parts within the processes. That is why in PICTURE sub processes are assigned to organisational units.

Besides the organisational units, positions and administrative employees are also to be maintained in this view. This is of special importance regarding the determination of personnel costs. Different position types and according properties like cost rates and capacities are specified for the positions. This allows for recording the relevant costs for employees as they are assigned during the modelling with PICTURE to the respective position. This is relevant for a subsequent automated analysis. Besides the mere storage of cost rates it is also important to state here to which process building block attributes these cost rates will be assigned (i.e., specifying the resource drivers for the cost rates). In the field of personnel cost this are mainly time attributes like processing time.

Business Object View

The business object view contains information concerning the necessary input (e.g., applications) and the corresponding produced output or possible intermediate products (e.g., statements or notifications) of an administrative process. It does not matter from a modelling perspective whether the input was created within the administration or whether it was given from the outside. An internal input has to be the output of another sector and thus can be quantified. This can be internal order documents or information. An external input normally does not cause costs until it arrives. These costs are measured and operationalized via the process view.

Resource View

The resource view shows which work equipment is needed for providing an administrative service. That is, for example, software applications like MS Office or specialised procedures as well as hardware (printer, scanner) or judicial information like laws. The resource view contains element types for representing these non-organisational work supporters as well as *sources* and *targets* of the business objects. In their roles as work supporters resources can be compared to the already mentioned element types of the organisation view. In their roles as *sources* or *targets* of business objects they determine where business objects – especially documents and information – come from and where they are stored like, e.g., in specialised procedures. In the context of activity-based costing the resource modelling serves for adding cost types like printing or archiving costs to the activities in which they are used. Thus, a product-centred addition of the respective costs will be possible if the required cost rates are stored with the resources in the PICTURE method. Thereby the corresponding attributes from the method have to be assigned as drivers to the resources like, e.g., the attribute "printed pages" to a printer.

INTEGRATION OF ACTIVITY-BASED COSTING AND PICTURE

Comparison of Method Elements

To integrate activity-based costing and the PICTURE method, the different constructs of both instruments have to be compared and assigned to each other.

Activity-based costing is applied to allocate costs to outputs. In general these outputs could be for example products or services. In the context of public administrations as a information processing organisation, the suitable output are the administration's services as they do normally not produce material goods. This corresponds to the concept of a product in PICTURE.

PICTURE uses different levels to structure the activities needed to deliver a service. The top level - the processes -encapsulates all activities needed to deliver a process while a sub-process depicts activities within a certain organizational unit. Process building blocks finally are the atomic level to describe activities in PICTURE. In contrast, activity-based costing does only have the concept of activities which are not further structured. The examples in the literature show activities on a quite high level of abstraction like "process orders"(Anderson & Kaplan, 2003) or "disbursing Materials" (Cooper & Kaplan, 1998). These examples seem to be similar to a sub-process in PICTURE, as activities in activity-based costing are used to distribute resources costs which are normally associated with single organisational units. However, the concepts of processes and process building blocks can be easily integrated in activity-based costing. Processes allow for an accumulation of the cost of several activities conducted while delivering a service, while the detailed level of process building can help to break down activities further and therefore makes it easier to capture the resources used by an activity through the attributes of the building blocks.

Cost drivers in activity-based costing denote the determining factors (e.g., amount of building applications) that are responsible for the execution frequency of a main process. Such inputs or outputs can be represented in PICTURE by means of the processed object view. The respective amount of process and sub-process executions per year is recorded in form of an attribute on the process level and sub-process level, respectively.

The resources, respectively the resource consumptions, determine which costs are produced by activities. The most important resource in this context is the labour utilisation. The resource labour is modelled with the aid of the organisation view. In this view it is possible to deposit the payment and the (annual) labour time of a certain position. On the basis of these data the minute-by-minute wage rate can be calculated. The other resources are recorded in the resource model. The allocation of resources to activities occurs by annotating the resources to the according building block.

Table 1 summarizes the above mentioned considerations in tabular form.

Activity-Based Costing with PICTURE – An Example

To conduct activity-based costing with PICTURE the relevant services and activities have to be identified in accordance to the activity-based costing approach. For this purpose the definition of a process in PICTURE, which is geared to the external services of the public administration, can provide assistance. In the presented example this is the process "Modification of an income tax card" which in turn consists of the sub process "Modify income tax card".

The identified processes have to be modelled subsequently with the PICTURE method. Thereby the attributes which are relevant for the activity-based costing, especially the used resources and the personnel in charge, have to be recorded. The sub process "Modify income tax card" is depicted in Figure 2.

The respective partial cost rate can be calculated if the corresponding cost information is deposited in the organisation model and in the resource model. In the example of Figure

Table 1. Comparison of elements of activity-based-costing/PICTURE

Activity-Based Costing	***Picture***
output	*product*
primary process	*process*
sub-process	*sub-process*
activity	*process building block*
	building block attribute
cost driver	*business object*
resource	*resource*
	position

2 the deposited cost rate of an employee of the Local Public Office amounts to 30€ per hour. The second activity, the inspection of the submitted documents, therefore results in labour costs of 5.00€. The first activity incorporates also the attribute values of the input channel to the calculation. The labour costs only occur if the application is submitted in person by a citizen. In case of a postal submission, the deposited cost rate for the used resource *post room - incoming mail* comes into operation. Hence, PICTURE does not only allow the ascertainment of costs for the resource labour, but also for arbitrary other resources. Another example is provided by the fourth activity and the annotated resource *Printer*. The costs can be calculated on the basis of the amount of printed pages (resource driver) and the stored cost rate.

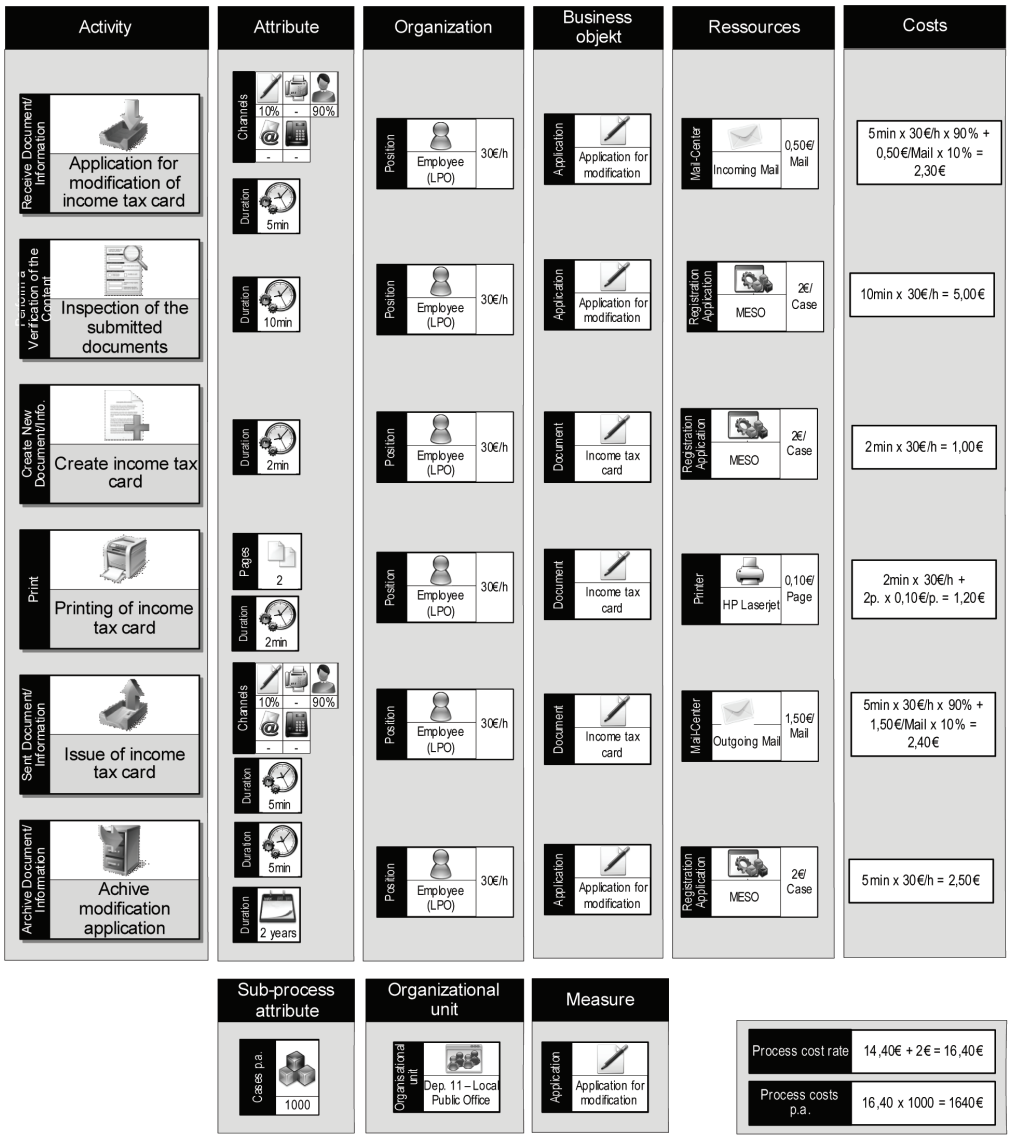
The cost rate for the sub process can be calculated on the basis of the cost rates of the single activities. The costs incurred by the use of the software Meso form a special case in the presented example. Here, a cost rate per (sub) process execution is calculated, which is consequently incorporated in addition to the activity cost rates into the sub process cost rate. The product of this rate and the respective resource cost driver, in this case the amount of modification applications, results in the annual sub process costs. The sub process cost rates can be further aggregated to main process costs.

CONCLUSION AND OUTLOOK

Process reorganization and optimization through activity-based costing bears great potential for public administrations in Europe. Due to missing transparency, much potential of cost reduction and process optimization are not explored yet. Especially municipal administrations are not able to face the huge challenges forced by European Union or Federal States. So they are often not aware about the structure of their business processes including often more than 1,000 processes, depending of the size of the organization.

Activity-based costing is one proven concept measure the performance of newly created or reorganized processes. Furthermore, intra- and inter-municipal benchmarking can be applied and a comparison of as-is and to-be processes is possible. Process modelling has proven itself to be a useful tool to generate the data pool needed for activity-based costing. Particularly the application of modelling approach that is especially tailored to a certain domain leads to a quicker and easier acquisition and analysis of information. The possibility to capture processes and process-related information in a efficient way is especially important for the application of activity-based costing as the main criticism on this instrument are the enormous costs for interviewing and surveying people to gather the relevant information (Anderson & Kaplan, 2003).

Figure 2. Exemplary process "Modify income tax card"



The present article underlines how the domain-oriented modelling approach PICTURE and the concept of activity-based costing can be combined to support public administrations and give them an easy and simple instrument to face the challenge. The example shows that the information gained during the phase of modelling suffice to make consolidated statements about the process costs accounting for personnel costs as well as other types of resource consumption. We used PICTURE in a case study in a small city (Becker et al., 2008) and showed that process costs can be measured in a very efficient way and recommendations for process optimization can be given with the PICTURE approach. The example also indicates that the aggregation of weaknesses in the process landscape can lead to the identification of additional reorganiza-

tion potentials without cost items in the fore. Thus, PICTURE enables decision makers in deciding, e.g., on IT-investments or organisational changes. Based on that, further research activities should particularly concentrate on the development of a procedure model that standardizes the application of activity-based costing in the area of public administrations and on the empirical evaluation of activity-based costing with the use of the PICTURE method.

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Public Policies Knowledge Interoperability among Parliaments and Government

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ABSTRACT

Parliaments possess huge amounts of valuable knowledge on public policies which concerns social needs, problems, and interventions for addressing them. This knowledge is highly useful to other parliaments and also to government agencies of various layers. However, this valuable knowledge is hidden in numerous text documents so that it cannot be efficiently exchanged and exploited. In this regard, it is highly important to extend the concept of interoperability among information systems (IS) of Parliaments and Government Agencies so that it covers not only the 'operational level', but also the 'knowledge level'. This paper presents a methodology for achieving higher level interoperability among IS of parliaments and government agencies with respect to the exchange of public policy related knowledge. It is based on the use of the complex problems representation ontology provided by the 'Issue-Based Information Systems' (IBIS) framework for codifying public policy related knowledge. An application of the proposed methodology is presented for the case of the law on the 'Contracts of Voluntary Cohabitation', which has been recently passed by the Greek Parliament. The evaluation of this application gave encouraging conclusions as to the usefulness of this methodology and resulted in the development of a refinement of the IBIS ontology.

Keywords: *Government, Interoperability, Issue-Based Information Systems (IBIS), Knowledge, Ontology, Parliament, Public Policy*

INTRODUCTION

Parliaments are core institutions of modern democracies and possess huge amounts of valuable knowledge on public policies, which concerns the needs and problems of modern societies, possible interventions for addressing them (e.g., policies, measures, regulations) and also the advantages and disadvantages of each. This knowledge is highly useful to other Parliaments (e.g., of federal, state or local level, in the same country or even in a different country), in order to formulate their own policies, measures and regulations for various social needs and problems. It is also useful to Government Agencies of various layers: to Ministries, as it can assist them in designing and formulating their future policies, measures and legislation, and to lower layers of administration (e.g., Regional, Prefectural and Local Administrations),

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as it can assist them in enforcing the legislation effectively and proposing future improvements of it. However, this valuable public policy related knowledge of the Parliaments is hidden in numerous lengthy text documents, so it cannot be efficiently exchanged and exploited by other Parliaments and Government Agencies; this requires extensive mental processing, which includes reading numerous Parliamentary documents, filtering out the legalistic details and focusing on the public policy related content of them, identifying the social needs and problems addressed and the solutions provided for them, which make difficult and reduce the exchange and exploitation of knowledge. Recently Parliaments in many countries have started making big investments for developing large information systems (IS) for creating, storing and managing electronically various types of Parliamentary documents, and also for disseminating them to the general public through portals, enhancing transparency and public participation (Coleman, 2006; United Nations - Global Center for ICT in Parliament, 2008). In order to increase the effectiveness of these big investments it is necessary to exploit and disseminate better and more efficiently the valuable public policy related knowledge these documents contain. For this purpose it would be very useful to extend the concept of interoperability among the IS of Parliaments and Government Agencies, so that it covers not only the 'operational level', but also the 'knowledge level' as well, in order to enable the efficient exchange of not only data and functionality, but also of public policy related knowledge.

The achievement of IS interoperability, defined as the ability of IS and of the business processes they support to exchange data and to enable the sharing of information and knowledge (European Commission, 2004), has attracted much interest by both researchers and practitioners. However, most of the IS interoperability research and practice in government has been focused on the operational level (Guijaro, 2007; Charalabidis et al., 2008; Sourouni et al., 2008; Charalabidis et al., 2009; European Commission, 2004). Its main objective has been to enable the efficient delivery of complex integrated e-government services, which require the involvement of several Government Agencies, based on the 'electronic one-stop shop' model, and also to support inter-organizational exchange of data among Government Agencies at the operational level. The growing international administrative cooperation, as a result of growing internationalization of economic activity, has been an additional driver for the development of IS cross-border interoperability, aiming mainly to support the efficient cross-border exchange of data among similar Government Agencies of different countries, e.g., for the delivery of pan-European e-government services, or for the implementation of various European Union policies. On the contrary, there has been limited research and practice concerning the 'knowledge-level' interoperability among IS of Government Agencies, even though the capability to share not only data, but also knowledge as well, has been a major objective of IS interoperability, as shown by its abovementioned definition adopted by the European Union.

However, this is highly important because Government Agencies realize more and more the need of systematically managing and exploiting their knowledge capital, as a means of formulating better policies and regulations for addressing social needs and problems, delivering better services to citizens and enterprise and finally achieving higher efficiency and effectiveness (Wiig, 2002; Sourouni et al., 2008). For this purpose it is necessary to use more intensively and strategically methods and practices from the knowledge management domain (e.g., Nonaka, 1994; Nonaka & Takeuchi, 1995; Cohendet & Steinmueller, 2000; Tiwana, 2002) with appropriate technological support. In particular, it is important through appropriate information and communication technologies (ICT) to support and facilitate the four basic knowledge creation and exploitation processes proposed by Nonaka and Takeuchi (1995): knowledge externalization, combination, internalization and socialization. In this direction it is highly important to achieve higher

levels of interoperability between the IS of different Government Agencies, allowing them to exchange not only data but also knowledge as well. According to the model of interoperability maturity levels in digital government proposed by Gottschalk (2007) the initial levels of 'computer interoperability' (level 1) and 'process interoperability' (level 2) should be followed by 'knowledge interoperability' (level 3), which is necessary for achieving the higher levels of 'value interoperability' (level 4) and 'goals interoperability' (level 5).

Focusing now on Parliaments, most of the previous research and practice concerning the achievement of interoperability between Parliaments' IS, and also with IS of other public organizations (e.g., Ministries and other Administrations), focuses on the development of XML-based standards for storing textual legislative documents (Biasiotti et al., 2008; Boer et al., 2008), aiming to provide open access to these documents (without relying on proprietary standards), enhanced search capabilities and various additional functionalities (such as 'point-in-time' legislation). The most widely cited of these standards is the MetaLex (Boer et al., 2008), which has already become a CEN Prenorm; it has been based on the experience gained from a number of previous similar standards, such as the NORME-IN-RETE, an XML standard for the structured storage and exchange of Italian legislation (Lupo & Batini, 2003) and the AKOMA NTOSO (Architecture for Knowledge-Oriented Management of African Normative Texts using Open Standards and Ontology)) (Vitali & Zeni, 2007). However, much less research has been conducted on the codified representation of the knowledge contained in legislative documents concerning the fundamental problem of what interventions (e.g., policies, measures, regulations) governments should make in order to address needs and problems of society. Some legal ontologies have been developed, but they are focusing on the legalistic details of the legislative documents, and not on the public policy related knowledge they contain.

In this direction this paper presents a methodology for filling the abovementioned gap and achieving higher level interoperability among IS of Parliaments and Government Agencies with respect to the exchange of public policies related knowledge. Its basic objective is to enable a user of a Parliament's IS to search and access in an a directly usable form the public policy related knowledge on a particular question (e.g., concerning a social need or problem, the policies, measures and regulations for addressing it, the advantages and disadvantages of each of them, etc.) stored on their IS, and also on IS of other Parliaments (e.g., of federal, state or local level, in the same country or even in different countries). Also, it aims to enable employees of Government Agencies to search and access the public policy related knowledge on a particular question, which is stored in the IS of one or more Parliaments. The proposed methodology is based on the codification and structured representation of the public policy related knowledge produced in all the stages of legislation formulation process in the Parliaments and stored in many Parliamentary documents, using the complex problems representation ontology provided by the 'Issue-Based Information Systems' (IBIS) framework (Conklin & Begeman, 1989; Conclin, 2003). Furthermore, an application of this methodology is presented for the Law concerning the 'Contracts of Voluntary Cohabitation', which has been recently passed by the Greek Parliament, and then evaluated resulting in interesting conclusions.

The paper is structured in seven sections. The following section investigates knowledge creation during the legislation formulation process in Parliaments, while the next reviews briefly the relevant ontologies which can be used for a structured representation (codification) of this knowledge. Then the proposed methodology for achieving such a knowledge-level interoperability among IS of Parliaments is presented. It is followed by the description of its abovementioned application of this methodology and its evaluation. Finally conclusions are outlined.

KNOWLEDGE CREATION IN PARLIAMENTS

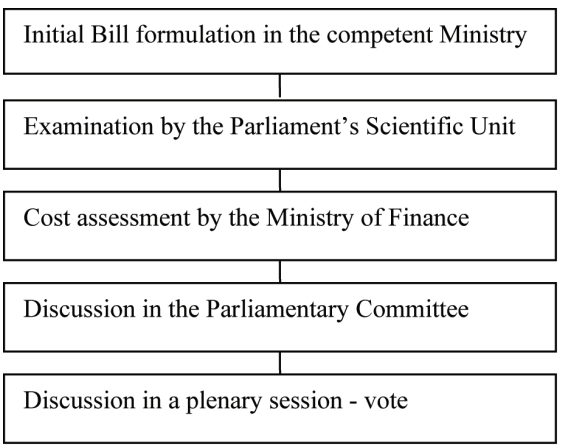
Initially we investigated the creation of knowledge on public policies during the legislation formulation process in Parliaments. For this purpose we conducted interviews with three experienced officials of the Greek Parliament, who described to us the stages of the legislation formulation process and the main documents produced. Additionally we studied carefully and analyzed the justification reports and the main texts (articles) of five Laws from five different ministries, which have been proposed to us by the above three officials of the Greek Parliament as being representative ones, and are shown in the Appendix A. Furthermore, we studied carefully and analyzed the minutes of the sessions of the competent Parliamentary committees and also of the plenary sessions conducted for discussing these Laws.

From the above interviews it was concluded that the Law formulation process in Greece consists of five stages (Figure 1):

i) Initial formulation of the Bill in the competent Ministry; the justification report and the content (articles) of the first version of the Bill are formulated and then sent to the Parliament.
ii) The Scientific Unit of the Parliament proceeds to an initial examination of the Bill; it examines mainly whether it violates any of the articles of the Constitutional Law, and whether it has any problems from a legal viewpoint.
iii) The Ministry of Finance assesses the costs that the application of this Bill will create to the government.
iv) The Bill is then discussed in the competent Parliamentary committee (usually in several sessions), in which initially invited representatives of the main stakeholders and experts, and then Members of Parliament (MP) from all parties, express their positions and opinions on it.
v) Finally the Bill is discussed in one or more plenary sessions of Parliament, and at the end of this discussion the MP vote whether the Bill will be approved (passed) and become a Law or rejected.

From our analysis it was concluded significant amounts of public policy related knowledge is created in stages i), iv) and v). In particular, in the first stage of the initial Bill formulation in the competent Ministry participate experienced public servants, mainly of higher hierarchical levels, and also experts and representatives of the main stakeholders (e.g., trade unions, as-

Figure 1. Stages of the Law formulation process



sociations, municipalities, etc.), who contribute significant amounts of such knowledge they possess on the theme of the Bill (i.e., issues, proposed interventions, etc.); this knowledge is recorded in the justification report and in the content (articles) of the Bill. From the analysis of the justification reports of the abovementioned five examined Laws a common structure has been identified. Initially, in the first paragraphs they include and clarify a number of reasons (e.g., social problems and needs, new realities and trends at the national or/and international level, economic events, evolutions in the values and habits of society and in general various contextual factors) which necessitate the creation and application of the proposed Law; then, in the following paragraphs are briefly mentioned the general directions of the Law and the interventions/solutions it provides concerning its basic theme (e.g., it settles rights and obligations to one or more groups, it protects the environment, it increases employment opportunities for some groups, etc.). Similarly from the analysis of the content (articles) of these five Laws we saw that they are also characterized by a common structure. They are all structured as sequences of articles, each of them settling a particular issue/dimension of the main theme of the Bill; each article includes a number of settlements on the corresponding issue (i.e., solutions or ways of addressing it), and also further clarifications for some of these settlements.

In the fourth stage of the discussion of the Bill in the competent Parliamentary committee there is an extensive discussion between MPs of all parties appointed to participate in it, who have a good experience in the corresponding public policy domain; also, are invited representatives of the main stakeholders (e.g., trade unions, associations, municipalities, etc.), which are affected by the bill under discussion, and domain experts, in order to express their opinions and positions on the bill. This knowledge is recorded in the minutes of the corresponding sessions of this Parliamentary committee. From the analysis of these minutes we remarked that though they have a much lower degree of structure than the justification reports and the content (articles) of the Laws, some common structure can be identified. In particular, all participants mention mainly some disadvantages of the Bill under discussion, or some advantages of it (to a smaller extent - mainly the MPs of the governing party). Additionally some participants make proposals for additional settlements or changes of existing settlements included in the Bill; it should be noted that most of these proposals are associated to disadvantages that the particular participant has previously mentioned. Finally in the fifth stage of the discussion of the Bill in a number of plenary sessions of the Parliament there is an extensive discussion between MPs of all parties. The position of each party is initially expressed by one MP, who is responsible for this Bill on behalf of the party, and then follows speeches of several MPs from all parties on the Bill. These speeches of the MPs in the plenary sessions have a similar structure with the ones in the Parliamentary committees: they include disadvantages and advantages of the bill, and proposals for additional settlements or changes.

REVIEW OF RELEVANT ONTOLOGIES

The 'quality' of knowledge-level interoperability, which aims at enabling the efficient exchange of knowledge contained in lengthy legislative textual documents, relies critically on the quality of the representation/codification of this knowledge; if this knowledge representation/codification has weaknesses and deficiencies (i.e., either omits substantial knowledge elements, or includes unnecessary details) then the 'quality' of knowledge interoperability will be poor. For this reason the knowledge interoperability problem is mainly a knowledge representation problem, so it is necessary to perform it in a rational manner based on sound foundations which define what elements this representation should include. Therefore it is highly important to use an appropriate ontology for this purpose. Ontologies constitute abstract conceptual models of particular domains, which identify the kinds of

entities existing in a particular domain and the kinds of relations among them, being acceptable a group of people dealing with this domain (Fensel, 2004; Visser & Bench-Capon, 1998). According to Uschold and Grunninger (1996), ontologies are of critical importance for knowledge acquisition, representation and exchange. For this reason we reviewed relevant literature in order to identify an ontology to be used as a basis for codifying the public policy related knowledge produced in the various stages of legislation formulation in the Parliaments and stored in numerous lengthy documents, which has the form and characteristics analyzed in the previous section.

Previous research has been developed some legal ontologies. McCarty (1989) developed the 'Language for Legal Discourse' in order to be used as a general representation language for legal knowledge; the basic components of this language are 'atomic formulae' (predicate relations used to express factual assertions), 'rules' (connections of atomic formulae with logical connectives) and 'modalities' (time, events, actions and deontic expressions). A formalism for the representation of legal knowledge has been proposed by Stamper (1991, 1996), which includes three main ontological concepts: the 'agents' (organisms who gain knowledge, regulate and modify the world by means of actions), the 'behavioural invariants' (features remaining invariant over some time) and the 'realizations' (agents realise situations, which are denoted by behavioural invariants, by performing actions). Valente (1995) developed a 'Functional Ontology of Law', which distinguishes six types of legal knowledge necessary for legal reasoning: 'normative knowledge' (defining standards of social behaviour), 'world knowledge' (describing the world being regulated), 'responsibility knowledge' (concerning extension or restriction of responsibilities of agents), 'reactive knowledge' (concerning sanctions for actions violating norms), 'meta-legal knowledge' (concerning legal knowledge) and 'creative knowledge' (concerning the creation of previously non-existent legal entities). Van Kralingen (1995) and Visser (1995) dealt with the use of legal ontologies for developing legal knowledge systems and in this direction they developed a legal domain ontology, which consists of i) a 'legal ontology' (with generic components usable in any legal sub-domain); it includes three basic entities: 'norms' (general rules, standards and principles of behaviour that subjects of Law have to comply with), 'acts' (dynamic aspects which effect changes in the state of the world) and 'concept descriptions' (meanings of the concepts found in the domain); and ii) a 'statute-specific ontology' (with components that concern a particular legal sub-domain). Also, in the Estrella Project of the European Union (www.estrellaproject.org) has been developed the 'Legal Knowledge Interchange Format' (LKIF) legal ontology (Hoekstra et al, 2007; Boer et al 2008), which consists of a number of 'modules', each of them including a cluster of related concepts; its main modules are 'norm', 'expression,, 'process', 'action', 'role', 'place', 'time' and 'mereology'. By examining these ontologies we concluded that they are characterized by a purely legal perspective, focusing on the legal elements and details of legal texts, since they have been created mainly for supporting the development of legal knowledge systems and legal reasoning, in order to be used by persons with legal education; however, they lack public policy perspective (problems/solutions-oriented), so they are not suitable to be used for the representation and exchange of public policy related knowledge of Parliaments, e.g., concerning a social need or problem, the policies, measures and regulations for addressing it and also the advantages and disadvantages of them, which is the main target of this paper.

For this reason we also reviewed previous research that has been conducted concerning the representation of 'wicked' problems, which are characterised by high complexity, multiple perspectives, many stakeholders with different concerns and also different views and perceptions of the problem, lack of clear methods for finding the best solution and stopping rules, and only 'better' and 'worse' solutions, the former having more advantages and less disadvan-

tages than the latter (Rittel & Weber, 1973). Considerable research has been conducted in the area of 'Issue-Based Information Systems' (IBIS) (Conklin & Begeman, 1989; Conklin, 2003; Gordon & Richter, 2002) for addressing wicked problems, which has resulted in the development of a framework for the representation of such high complexity wicked problems, potential solutions and arguments in favour and against them. This IBIS framework is based on a simple ontology for the representation of such problems, whose main elements are 'questions' (issues or problems to be addresses), 'ideas' (possible answers/solutions to questions/problems) and 'arguments' (evidence, facts or viewpoints that support or object to ideas). It has been successfully applied for the creation and representation of knowledge concerning complex problems in both the public and the private sector (Kirschner et al., 2003; Karacapilidis et al., 2005; Loukis, 2007). This ontology is characterised by a public policy perspective and seems more appropriate to be used for codifying (modelling) the public policy related knowledge possessed by Parliaments.

A METHODOLOGY FOR KNOWLEDGE-LEVEL INTEROPERABILITY

The proposed methodology for achieving interoperability among IS of Parliaments and Government Organizations with respect to public policies related knowledge is based on the codification in each Parliament of the knowledge created for each Bill it processes and discusses, which is recorded, as concluded from the analysis described, in the following four official Parliamentary documents:

i) The justification report of the Bill,
ii) The content of the Bill (articles),
iii) The minutes of the discussion of the Bill in the competent Parliamentary committee,
iv) The minutes of the final discussion on the Bill in plenary sessions,

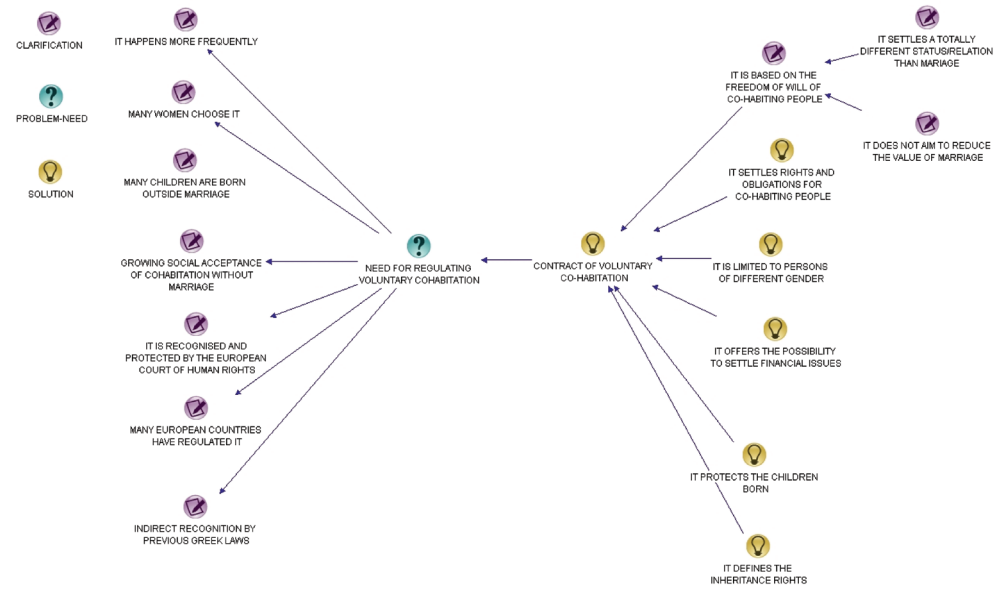
based on the ontology of the IBIS framework, in the form of one set (map) of interconnected questions (issues, problems), ideas (solutions, settlements) and arguments (positive ones corresponding to advantages, and negative ones corresponding to disadvantages) for each document. This can be done using one of the existing tools for representing knowledge on complex problems using the IBIS framework and ontology, such as the 'Compendium' tool we have used for the present study (http://compendium.open.ac.uk/institute/); this tool has been extensively used for various purposes (e.g., see Kirschner et al., 2003), is mature, and also offers the capability of easily creating such a map graphically, which is then stored in a database as a set of records.

The databases of cooperating Parliaments that store their knowledge can be interconnected (e.g., through Internet) in a 'star architecture' to central server, so that a query submitted by a user in one of the Parliaments (e.g., concerning solutions for a particular social problem, such as policies, measures and regulations, or advantages and disadvantages of a particular solution), or in a Government Agency, can be sent not only to their own database, but also to the databases of all the other Parliaments; the results from all these queries will be sent through the central server to the user who submitted the initial query. The proposed methodology is illustrated in Figure 2.

The above methodology enables a much better and more efficient exchange and exploitation of the valuable public policies related knowledge that Parliaments possess. Also, it supports and facilitates the abovementioned four knowledge creation and exploitation processes (Nonaka & Takeuchi, 1995):

- Knowledge externalization (enabling much higher degree of conversion of tacit knowledge on public policies into explicit, structured and directly usable knowledge),
- Knowledge combination (having codified knowledge in this structured form it is much easier to combine knowledge

Figure 2. Knowledge-level interoperability methodology



from different sources and stages of the legislation formulation process, and also from different Parliaments),
- Knowledge internalization (this codified form of knowledge is much easier to be embodied into the tacit knowledge of interested persons, such as MPs, employees of the Parliament and Government Agencies, etc.),
- And knowledge socialization (tacit knowledge of different persons is converted in into explicit, structured and directly understandable form, so it is easier to become tacit knowledge of other persons).

The main preconditions for the application of the above methodology are:

a) It is necessary that knowledge codifications/representations constructed by different Parliaments to have similar level of detail; if some Parliaments construct knowledge codifications/representations of their Bills with high level of detail, while some others include much less detail, then the exchange of knowledge, and also the combination of knowledge from different Parliaments, will be less efficient. This might necessitate the establishment of rules that should be followed by all participating Parliaments in codifying their Bills.
b) Since in each Parliament all the above documents and discussions are in its national language, in order to achieve a substantial cross-border knowledge-level interoperability and exchange (e.g., among European Union member states) it is necessary the above knowledge codifications/representations to be both in the national language and in another language understandable by all (e.g., English).

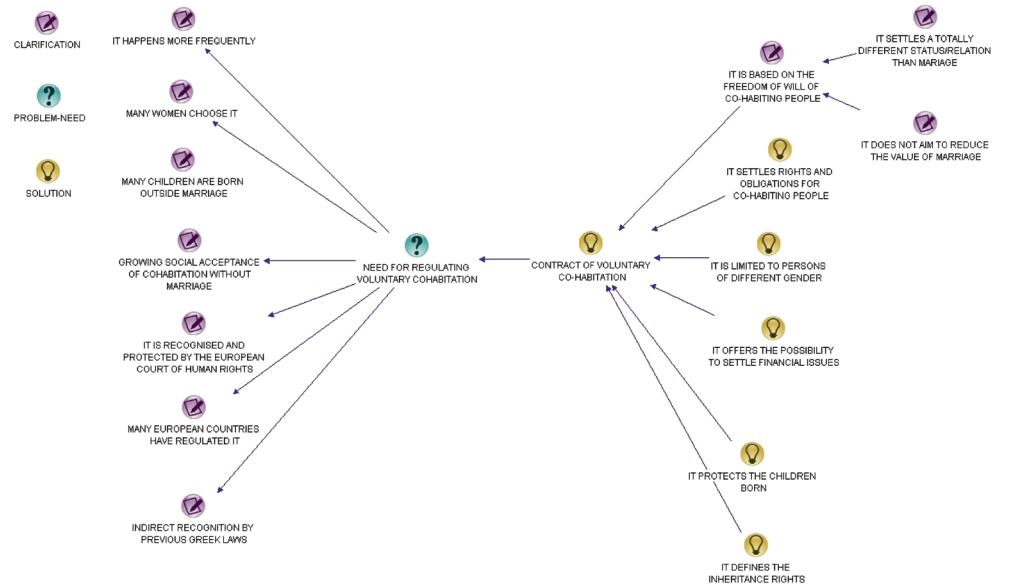
AN APPLICATION OF THE METHODOLOGY

An application of the proposed methodology has been made for the case of the Law concerning 'Contracts of Voluntary Cohabitation', which has been recently passed by the Greek Parliament, having caused extensive debates with

quite strong positions both in favor and against it. The main text of the Law consists of 13 articles, whose titles are shown in Appendix B. Initially we codified the knowledge contained in the justification report of this Law based on the IBIS ontology using the Compendium tool; the corresponding codification/map is shown in Figure 3. We can see that we have used three of the types of nodes supported by the tool with an adaptation of their meaning: note/information nodes (adapted as 'clarification' nodes), question nodes (adapted as 'problem-need' nodes) and idea nodes (adapted as 'solution' nodes). We remark that this codification/map consists of three layers. The first layer includes, as clarification nodes, the seven basic reasons creating, according to the justification report, the need to legally regulate the voluntary cohabitation, modeled through a problem-need node in the second layer, which is addressed by the Law concerning the 'Contract of Voluntary Cohabitation', modeled as a solution node in the third layer. The fourth layer includes, as solution nodes, the five broad particular solutions this Law provides; furthermore, it includes, as a clarification node, the basic principle this Law is based on, while there are also two clarifications on it, modeled as two clarification nodes in the fifth layer.

Then we codified in a similar manner the knowledge recorded in the content of the Law. The codification/map we constructed was quite lengthy, so we decided to break it into one high level codification/map for the content of the Law, shown in Figure 4, and also one lower level (detailed) codification/map for the content of each of the 13 article; since the Law includes 13 articles (Appendix B), we constructed 13 corresponding codification/maps for them. In Figure 5 is shown the one for the content of article 4 which regulates the dissolvement of a contract of voluntary cohabitation. In these two codifications/maps of the content of the Law were used three of the types of nodes supported by the tool with an adaptation of their meaning: idea nodes (adapted as 'settlement' nodes), question nodes (adapted as 'issue' nodes) and note/information nodes (adapted as 'clarification' nodes). We remark that the high level codification/map of the content of the Law

Figure 3. Codification/Map of the justification report



shown in Figure 4 consists of three layers: in the first layer is represented the Law as a solution node, while the second layer includes the 13 articles of the Law that regulate particular issues concerning the contracts of voluntary cohabitation, as issue nodes; each of them is connected with a link to its detailed codification/map in the third layer.

The codification/map of article 4 shown in Figure 5 is also structured in three layers: the first layer includes the main topic of the article, as an issue node, and a clarification on it; the second layer includes the three settlements that this article includes (corresponding to the three ways of dissolving a contract of voluntary cohabitation), connected with corresponding clarifications placed in the third layer. Similar are the codifications/maps of all the other articles.

Finally we codified the knowledge contained in the minutes of the discussions that took place on this Law in the competent Parliamentary committee and then in Parliament plenary sessions. In Figure 6 we can see the codification/map for the opinions expressed by one of the experts invited in the competent Parliamentary committee, while in Figure 7 we can see the codification/map for the position of one party in the plenary session.

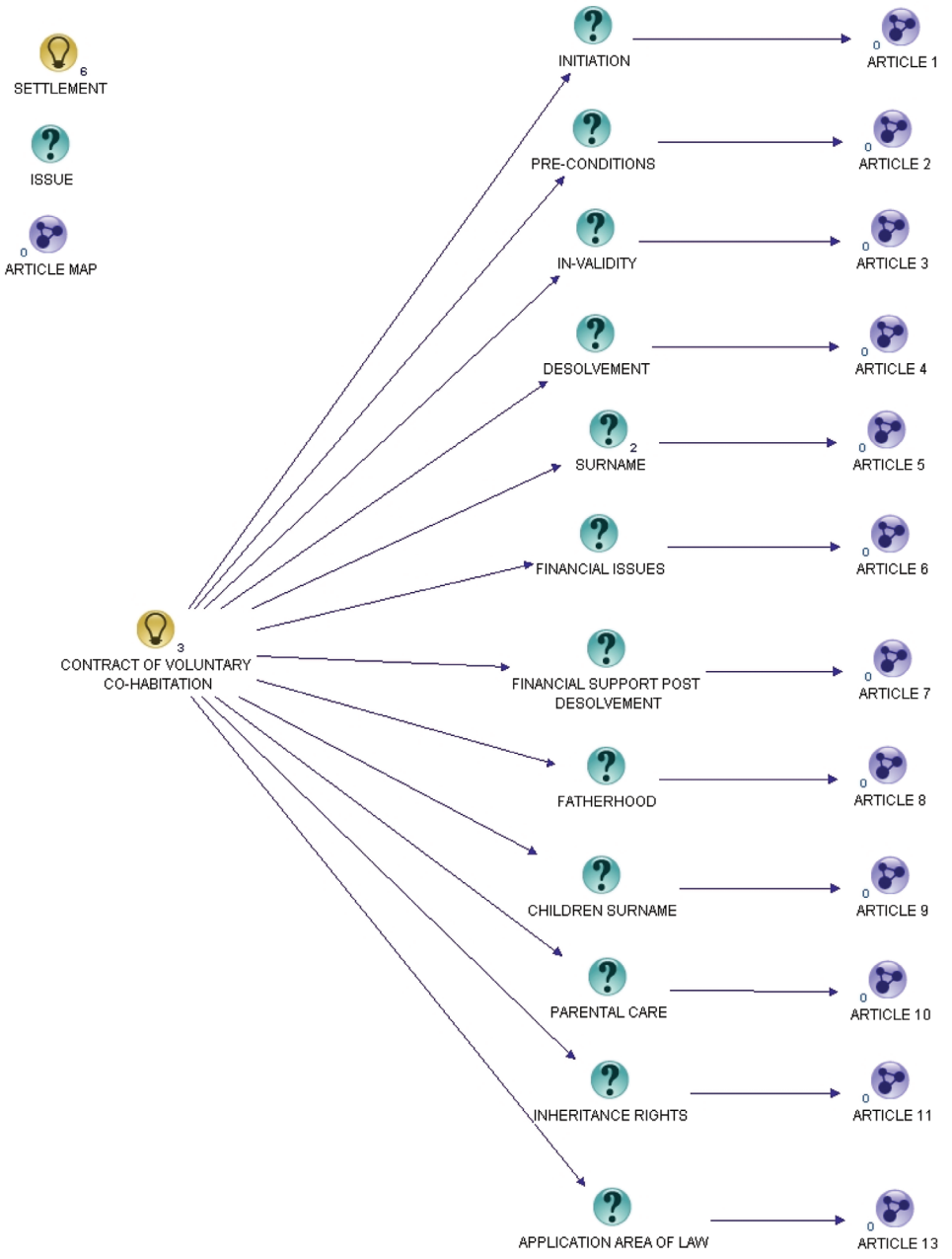
In these two codifications/maps of the discussion of the Law in the Parliament were used four of the types of nodes supported by the tool with an adaptation of their meaning: idea nodes (adapted as 'settlement' or 'suggestion' nodes), question nodes (adapted as 'issue' nodes), negative argument nodes (adapted as 'negative point' nodes) and note/information nodes (adapted as 'clarification' nodes). We remark that in both codifications/maps in the center is represented the Law as a solution node, while around it there is an 'inner circle' consisting of negative points of the Law raised by an expert of party, which are represented as negative argument nodes, suggestions for modifications/improvements represented as solution nodes and also comments represented as clarification. Around this 'inner circle' there is an 'outer circle' consisting mainly on clarifications on some of these negative points of suggestions. Similar are the codifications/maps for the opinions of all experts and parties (including some positive points of the Law as well, represented as positive argument nodes).

EVALUATION

As mentioned previously, the 'quality' of this knowledge-level interoperability (i.e., of the exchange of this knowledge on public policies) relies critically on the quality of the representation/codification of the knowledge contained in the initial Parliamentary documents; if this knowledge representation/codification has weaknesses and deficiencies (i.e., either omits substantial knowledge elements, or includes unnecessary details) then the 'quality' of knowledge interoperability will be poor. For this reason in order to make a first evaluation of the proposed knowledge-level interoperability methodology the representations/mappings of the justification report and the main text (articles) of the law for the 'Contracts of Voluntary Cohabitation', and also of the minutes of the discussions about it in the competent Parliamentary Committee and in plenary sessions, were given, together with the corresponding textual documents, to two lawyers of the Greek Parliament, who had long experience in legislation formulation processing and discussion. We asked them to evaluate:

- To what extent they are understandable (i.e., one can understand what they say, without having to read the corresponding textual documents),
- And to what extent they represent and correctly characterize (annotate) the main substantial points of the public policy related knowledge these documents contain (i.e., particular social needs and problems, interventions for addressing them, e.g., possible policies, measures, regulations, and also the advantages and disadvantages of each according to MPs and experts).

Figure 4. High level codification/map of the content of the law



These two Greek Parliament lawyers were in general positive. They found that the codifications/mappings are understandable and include the main elements of public policy related knowledge that the corresponding documents contain. They remarked that the small number of types of elements/nodes provided by the IBIS framework and the Compendium tool

Figure 5. Codification/Map of the content of the fourth article of the law

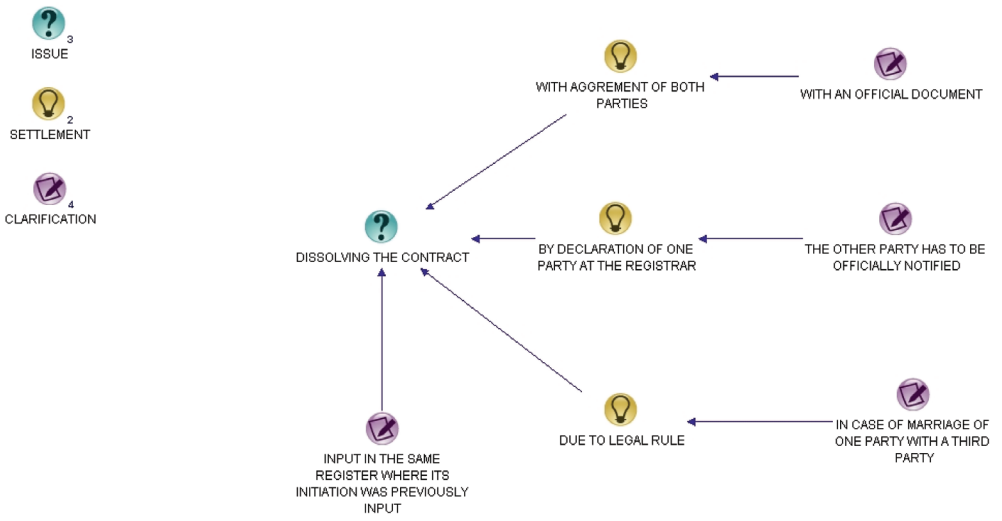
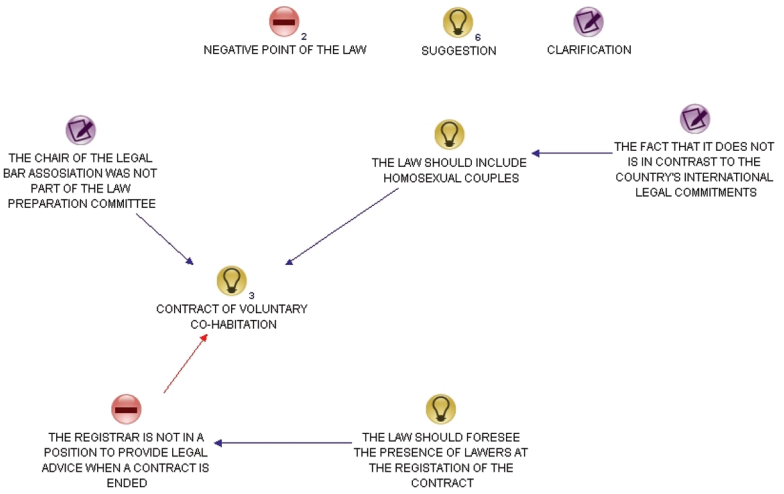
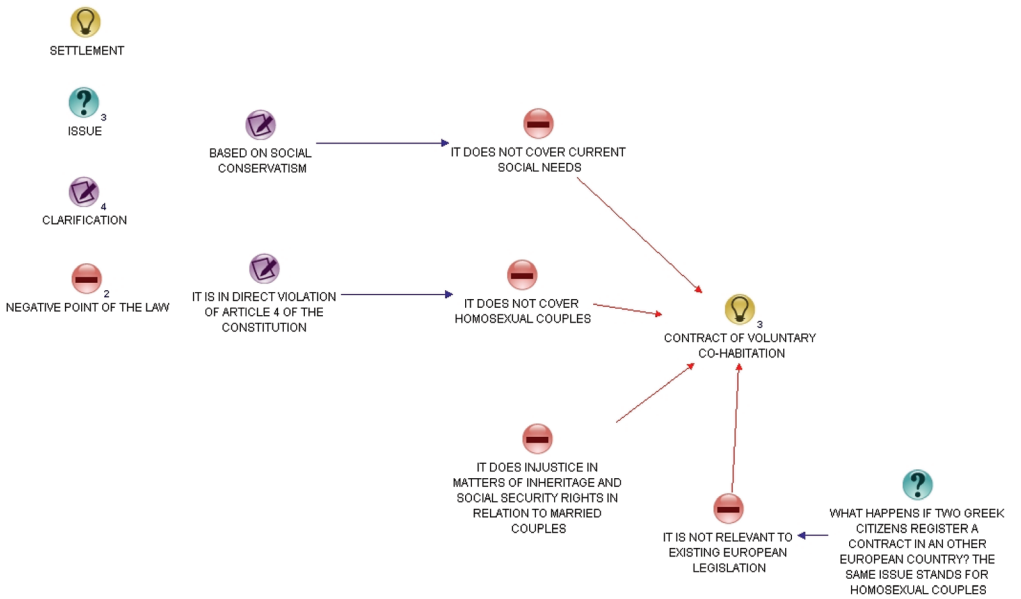


Figure 6. Codification/Map for the opinion expressed by one of the experts invited in the competent Parliamentary committee



respectively are to a satisfactory extent sufficient for expressing the knowledge that these documents contain concerning social needs and problems, policies, measures and regulations for addressing them and also advantages and disadvantages. The only substantial weakness they mentioned is that in the codifications/maps of the articles of the Law the 'settlement' type of node was a too broad semantic annotation, which was insufficient for the representation of the different kinds of legal rules that Laws include, each of them representing a public intervention and regulation of different nature. In particular, they told us that according to the legal literature (e.g., Georgiadis, 1997) there are five kinds of legal rules, prohibitive, impera-

Figure 7. Codification/Map for the position of one party in the Parliament plenary session



tive, permitting, sanctions and presumptions, and this fundamental categorization should be incorporated in our knowledge representation and exchange/interoperability methodology. This remark lead us to the conclusion that in order to achieve a better codification of the public policy related knowledge that the main content (articles) of Laws contains it is necessary to refine the ontology of the IBIS framework. In particular, the settlement type should be refined into the following types: i) prohibition, ii) obligation, iii) permission, iv) presumption, v) sanction and vi) settlement (for elements not belonging to any of the first five types).

CONCLUSION

In the previous sections of this paper has been presented an methodology for achieving knowledge-level interoperability among IS of Parliaments, which allows a better and more efficient exchange and exploitation of the knowledge that Parliaments create on public policies (e.g., about social needs and problems, possible interventions for addressing them, such as policies, measures and regulations, and also advantages and disadvantages of them). It is based on the codification/ representation of the public policy related knowledge produced in Parliaments during the various stages of legislation formulation and recorded for each Law in its justification report, main text (articles) and also in the minutes of the relevant discussion in the competent Parliamentary committee and in plenary sessions of Parliament. This knowledge codification is based on a common ontology for all Parliaments, which functions as a common language for expressing and storing the public policy related knowledge they produce. For this purpose we initially selected the complex problems representation ontology of the 'Issue-Based Information Systems' (IBIS) framework, which provides a compact, expressive and mature language.

The proposed methodology has been applied for the Law concerning 'Contracts of Voluntary Cohabitation' which has been recently passed by the Greek Parliament. Then it was evaluated by two experienced lawyers

of the Greek Parliament. Their assessment was in general positive. Both of them found that the knowledge representations/mappings are understandable and include the substantial points of the public policy related knowledge contained in the corresponding textual documents. Also, they found that the types of elements/nodes provided by the IBIS framework are to a satisfactory extent sufficient for the representation of this knowledge, with the only exception of the settlement node, which was found insufficient to represent the different kinds of legal rules that Laws include. This useful remark lead us to develop a refinement of the IBIS ontology, which enables a better codification and representation of the valuable public policy related knowledge contained in the main content (articles) of Laws.

Further research is required for a more detailed evaluation of the proposed methodology for different types of Laws, using both quantitative techniques (based on questionnaires filled by larger user groups) and qualitative techniques (based on in-depth discussions in small focus groups). Also, it is necessary to conduct similar research in Parliaments of other countries having different Law formulation processes (e.g., in federal ones) and different legal systems, and based of them develop adaptations or generalizations of this methodology. Furthermore, for the practical application of this methodology it would be quite useful if the extraction of knowledge representations/maps could be performed automatically by processing the initial Parliamentary documents (justification reports and main texts (articles) of all Bills and the minutes of the relevant discussions). This presents serious problems, since the abovementioned types of knowledge elements (questions, ideas, positive and negative arguments, etc.) are rarely associated with particular words or phrases (in this case thematic ontologies and vocabularies could be possibly used for their automatic recognition). An alternative approach would be to integrate the manual production of this knowledge representations/map in the production process of each of the above documents. We expect that this will not add too much extra workload: the public servants who write the justification report and the main text (articles) of each new Bill usually think of their main points first and then start writing the full text of them, so it will not be difficult for them to produce such knowledge representations/maps as 'visual summaries'; also, in all the discussions taking place in the Parliament, both in the competent Parliamentary committee and in plenary sessions of Parliament, there is some kind of summarization as an assistance to the proposing Ministry and the MP, so this can be combined with the production of these knowledge representations/maps, as 'visualizations' of these summaries. Therefore we expect it will be feasible to proceed to a large scale implementation of the proposed methodology in Parliaments.

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APPENDIX A:

Analyzed laws

- Contracts of Voluntary Cohabitation
- Reinforcement of Security of Ships, Ports and Port Installations
- Measures for the Protection of Cultural Goods
- Consolidation and Licensing of Media Enterprises
- Regulation of Public Opinion Polls Issues

APPENDIX B:

Articles of the law on the contracts of voluntary co-habitation

1. Establishment
2. Pre-conditions
3. Invalidity
4. Dissolution
5. Surname
6. Possessions
7. Palimony
8. Fatherhood Presumption
9. Children Surname
10. Parental Care
11. Inheritance Rights
12. Suspension of Cancellation
13. Application Scope

Investigating the Landscape in National Interoperability Frameworks

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ABSTRACT

Openness, accountability, and transparency have attracted researchers' and practitioners' interest as open data and citizen engagement initiatives try to capitalize the wisdom of crowds for better governance, policy making, or even service provision. In this context, interoperability between public organizations, citizens, and enterprises seems to remain the center of interest in the public sector and national interoperability frameworks are continually revised and expanded across the globe in an effort to support the increasing need for seamless exchange of information. This paper outlines the current landscape in eGovernment interoperability, analyzing and comparing frameworks that have reached a certain degree of maturity. Their strengths and weaknesses at conceptual and implementation level are discussed together with directions for reaching consensus and aligning interoperability guidelines at a country and cross-country level.

Keywords: *Comparative eGovernment, e-Government Interoperability Framework, eGIF, Guidelines on e-Government Interoperability, NIF Contents*

INTRODUCTION

Today, public administrations are striving to leverage modern information and communications technologies to improve the quality of their services to citizens and businesses (Scholl & Klischewski, 2007; Osimo, 2007), to provide multiple communication channels and to make their internal and cross-organization operations more efficient, even if this requires changing their modus operandi (Janssen, 2005; Niehaves, 2007). Since late 90s, most countries have released their eGovernment strategies defining their milestones and action plans and have thereafter made significant progress on eGovernment at all levels of public administration (Capgemini, 2009). However, it soon became apparent that absence of common technological standards and interoperability guidelines yielded considerable leeway to governmental authorities and let them be focused on their own requirements and define inflexible information systems according to their own assumptions and interpretations (Hovy, 2008).

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Interoperability has thus become the key issue in the agenda of the public sector (CEC, 2006b) since providing one-stop services calls for collaboration within and across public authorities, while i2010 (CEC, 2006a, 2006b) explicitly addresses interoperability as a prerequisite for "devices and platforms that 'talk to one another' and services that are portable from platform to platform" and identified it as one of the main building blocks for the single European information space of eservices (SEIS). In fact, the achievement of pan-European, cross-border interoperability is a key element and prerequisite of all the EU's ambitious e-government initiatives while new challenges (such as the EU services directive 2006/123/EC) appear that need novel approaches in solving long-standing cross-country interoperability issues. E-government interoperability is also becoming an increasingly crucial issue, especially for developing countries that have committed to the achievement of the millennium development goals by 2015 (UNDP, 2007).

Today, with 2010 targets nearing, many countries are revisiting their e-Government strategies. The political priorities that determine the way forward beyond 2010 as regards e-Government have been further outlined in preparatory orientation papers (eGovernment Sub-group, 2009): Support to the Single Market, Empowerment of businesses and citizens, Administrative efficiency and effectiveness, and Provision of key enablers, with interoperability being characterized as a core precondition.

Achieving interoperability requires resolution at various distinct interoperability levels: political context, legal, organizational, semantic and technical, as argued by (IDABC, 2004, 2008; Gottschalk, 2008; Panetto, 2007; Papazoglou & Ribbers, 2006; Modinis, 2007; Scholl & Klischewski, 2007). In this context, e-government interoperability frameworks (e-gifs) pose today as the cornerstone for the resolution of interoperability issues in the public sector and the provision of one-stop, fully electronic services to businesses and citizens. Such interoperability frameworks aim at outlining the essential prerequisites for joined-up and web-enabled pan-European e-government services (pegs), covering their definition and deployment over thousands of front-office and back-office systems in an ever extending set of public administration organizations (Charalabidis et al., 2007b). They further provide the necessary methodological support to an increasing number of projects related to the interoperability of information systems in order to better manage their complexity and risk and ensure that they deliver the promised added value (Ralyte et al., 2008).

In this direction, the present paper presents the baseline of the national e-government interoperability frameworks (nifs) that Australia, Belgium, Denmark, Estonia, Germany, Greece, New Zealand, United Kingdom and United States of America have released and conducts a comparative analysis among their findings in compliance with the guidelines of the European interoperability framework (EIF). The scope of the analysis is to indicate the similarities and differences in the nifs philosophy and implementation and to produce a set of recommendations for countries that either have already published or currently develop such guidelines.

Comparative Analysis Framework

According to the EIF (IDABC, 2008), an interoperability framework describes the way in which organizations have agreed, or should agree, to interact with each other, and how standards should be used. In other words, it provides policies and guidelines that form the basis for selection of standards and may be contextualized (i.e., Adapted) according to the socio-economic, political, cultural, linguistic, historical and geographical situation of its scope of applicability in a specific circumstance/situation (a constituency, a country, a set of countries, etc). Typically, an e-gif includes the context, the technical content, the management processes and the tools (UNDP, 2007).

Extending the EIF in terms of providing a comparative analysis framework for nifs that remains in compliance with its underlying principles, the levels of analysis upon which

the national nifs will be compared in this paper are as following:

1. The "Systems" Level on the basis of deploying the following supporting infrastructures which store and manage the artifacts of the "Standards & Specifications Level":
   - 1.1 Certification Tools for examining compliance with the Framework and providing specific guidelines for amendments when a certification of a public site or information system fails
   - 1.2 Services & Processes Directory containing services and processes descriptions
   - 1.3 XML Schemas & Core Components Repository
   - 1.4 Web Services Repository and Registry
   - 1.5 Systems Reference Repository with explicit definitions for systems and their topology
   - 1.6 Access & Collaboration Tools for seeking and retrieving the eGIF specifications and posting change requests and comments in a bi-directional communication.
2. The "Standards & Specifications" Level, which includes the paper-based specifications in alignment with the three levels of interoperability: organizational, semantic and technical.
   - 2.1 Organizational Interoperability Guidelines for Service Documentation, Business Process Alignment, Business Process Re-engineering and Legal Issues
   - 2.2 Organizational Interoperability Assets containing: Service Descriptions and Metadata, Service Workflow Diagrams and Web Services Definitions, as well as Transformation and Re-Engineering Patterns
   - 2.3 Semantic Interoperability Guidelines
   - 2.4 Semantic Interoperability Assets (IDABC, 2005) including Dictionaries / Codelists; Thesauri and nomenclatures; Taxonomy that includes constant and enumeration definitions; Mapping tables for defining intersections, correspondences, and gaps between constants and enumerations together with guidelines for mapping types onto each other syntactically and semantically; Global or Local Ontologies for describing e-Government knowledge
   - 2.5 Syntactic Interoperability Assets with XML Schemas Libraries, Core Components Libraries and Metadata Standards
   - 2.6 Technical Interoperability Guidelines and Standards
   - 2.7 Guidelines and specifications for Designing and Implementing Integration Mechanisms (Web Services)
   - 2.8 Guidelines for Authentication and Security Mechanisms
   - 2.9 Guidelines for Web Sites Design
   - 2.10 Certification Framework for organizations, systems, data and people
3. The "Coordination" Level, which mainly deals with long-term envisioning, raising awareness and ensuring maintenance:
   - 3.1 Co-ordination Strategy that includes: Vision and Strategy for Interoperability and e-Government, Goals & Metrics and Guidelines (Maturity Matrix & Roadmap for PA)
   - 3.2 Co-ordination Activities with Marketing & Communication Plan and Co-ordination & Acceptance Mechanisms
   - 3.3 Training Activities which embrace Skills Management & Training Process as well as the Training Material
   - 3.4 Maintenance Procedure referring to the Change Management - Versioning Processes

In the present work, the methodological approach for the analysis of the e-gifs bears the following steps:

- The contents of the e-Government Interoperability Frameworks are retrieved and studied.
- A detailed comparison of the e-GIFs is conducted on the basis of the aforementioned

levels: Systems, Standards & Specifications, Coordination.
- A discussion around similarities and differences of the various approaches, as well as best practices and lessons learnt, follows on the comparison matrix.

As far as the egovernment interoperability frameworks research is concerned, it must be noted that apart from the information published in the EGIFs official web sites (until August 2009), the findings of relevant work undertaken by Luis Guijarro (2007), Yannis Charalabidis et al. (2007a, 2007b, 2008a), the Modinis study on interoperability (2007) and the UNDP study (2007) have also been taken into account.

Finally, the national interoperability frameworks observatory, NIFO, an online observatory allowing a comparison of different national interoperability frameworks (nifs) that reaches a targeted number of 34 countries (27 member states, 3 candidate countries and 4 EFTA countries) to be covered, is a project running in parallel with the current work. Together with the European interoperability framework v2.0 and the architecture guidelines, the overall goal of the nifo project is to improve interoperability of public services delivery in Europe by raising awareness about rules of collaboration and different layers of interoperability for both public administrations and EU institutions (Malotaux et al., 2009).

Overall EU Interoperability Landscape

In the realm of time, a plethora of interoperability initiatives originating either from the public sector, the standardization organizations or the industry has emerged. As depicted in Figure 1, there is a diversity of initiatives specifying standards and developing solutions that address particular interoperability requirements at legal, organizational, semantic and technical level, but are designed on such a different basis that make the choice of a specific standard to be adopted a new challenge for organizations, which is further undermined by the fact that they are constantly changing.

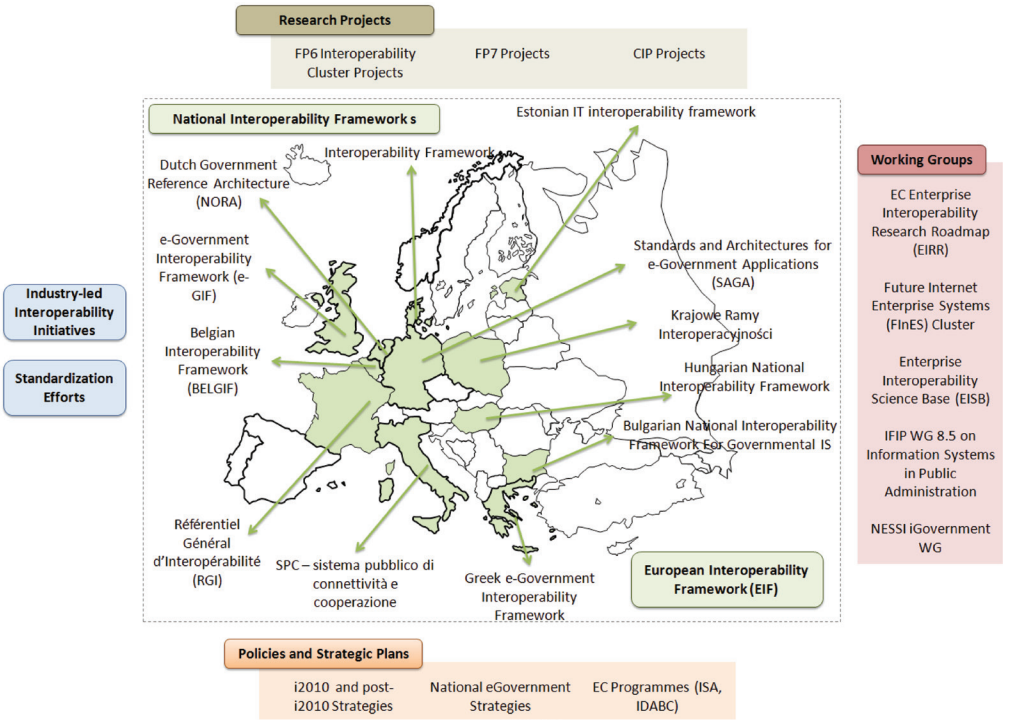
In this paper, interoperability progress in electronic government is examined under the prism of national interoperability frameworks. Current frameworks in this direction have been published and adopted across the European union as mentioned in the national interoperability frameworks observatory (nifo) (malotaux et al., 2009) and indicatively presented in Figure 1. Generally, the initiators of these frameworks have been practitioners or public administrations which are pursuing the goal of standardizing across distributed organizations and avoiding technology vendor lock-in.

Interoperability, though, is also promoted in e-government policies and strategic plans at national or cross-country (i.e., pan-European) level and research results emerging from academia and industry that have been disseminated as academic publications or projects deliverables. For example, IDABC (interoperable delivery of European e-government services to public administrations, businesses and citizens), was established as a European programme for 2005-2009 in order to use the opportunities offered by information and communication technologies, to encourage and support the delivery of cross-border public sector services to citizens and enterprises in Europe, and to improve efficiency and collaboration between European public administrations. Its follow-on programme ISA (interoperability solutions for European public administrations) is anticipated to run for the period 2010-2015, focusing on back-office solutions supporting the interaction between European public administrations and the implementation of community policies and activities.

Further initiatives indicated in Figure 1 include:

Vertical standards that may conflict or move in parallel with e-government, such as e-health, e-defense and e-payments.
Working groups and committees, such as ifip wg 8.5 on information systems in public

Figure 1. eGovernment interoperability initiatives in the EU



administration and nessi igovernment working group.

Future internet envisioning initiatives, such as the ec enterprise interoperability research roadmap (eirr) and the future internet enterprise systems (fines) cluster.

Finally, as far as most international software, hardware and service vendors are concerned, they have already created their own strategies for achieving the goal of open, collaborative, loosely coupled systems and components with IBM, Microsoft, oracle and sap being the typical examples following this path.

Significant National Interoperability Frameworks

This section enumerates major initiatives being carried out by e-government agencies in the interoperability arena, which have produced corresponding interoperability frameworks per country internationally, i.e., Australia, Belgium, Denmark, Estonia, Germany, Greece, New Zealand, UK and USA. The specific span of countries has been selected on the basis that their specifications are available in english, are adopted at national level and have reached a certain level of maturity.

In Australia, the Australian Government Interoperability Framework (AGIF) issued and maintained by the Australian Government Information Management Office (AGIMO, 2010) addresses interoperability in three dimensions:

- The business layer comprises legal, commercial, business and political concerns. The *National Service Improvement Framework* and the *Business Process Interoperability Framework* operate in this layer.
- The information layer comprises information and process elements that convey

business meaning. The *Information Interoperability Framework* and *GovDex* appear in this layer.
- The technical layer with the *Technical Interoperability Framework* comprises technology standards such as transport protocols, messaging protocols, security standards, registry and discovery standards, XML (Extensible Markup Language) syntax libraries and service and process description languages.

In Belgium, the *Belgian interoperability framework* (BELGIF) is built on a wiki collaborative environment and has released recommendations on web accessibility and on the realization of xml schemas, apart from a list of approved standards. It is a result of the collaboration between several belgian institutional levels and is compatible with the european interoperability framework (EIF).

In Denmark, the *interoperability framework* (version 1.2.14) (kiu, 2010) includes recommendations and status assessments for selected standards, specifications and technologies used in e-government solutions. It is governed by a subcommittee of KIU - the IT architecture committee and is compiled in collaboration with KIU (a committee that facilitates coordination of initiatives related to it in the Danish public sector). Since april 2009, the danish national it and telecom agency has established digitalisér.dk as the new, common, web 2.0-enabled entrance to public it architecture and open standards and provides the potential to debate common public digitization by using intuitive web based interaction rather than traditional standards catalogue. *Infostructurebase* (ISB) "is a collaboration tool" that supports "exchange and reuse of data related to public and private service delivery, including cooperation, business re-engineering and alignment of related services. The ISB is also intended to be of value to users outside the Danish public sector and is open for use for all, both public and private as well as Danish and non-Danish users."

The *Estonian IT interoperability Framework* (Estonian Ministry of Economic Affairs and Communications, 2010) led by the Department of State Information Systems of the Ministry of Economic Affairs and Communications is a set of standards and guidelines aimed at ensuring the provision of services for public administration institutions, enterprises and citizens both in the national and the European context. An *Administration system for the state information system* (*RIHA*) has also been deployed with the objective to ensure the interoperability of public sector information systems and the reuse of technical, organizational and semantic resources.

In Germany the Co-ordinating and Advisory Agency of the Federal Government for Information Technology in the Federal Administration (KBSt) pursues a comprehensive standardization approach for Germany's administrations in order to define technical Standards and Architectures for eGovernment Applications and to standardize processes and data in administrations. It has issued the *Standards and Architectures for e-Government Applications* (*SAGA*) Version 4.0 (2008) which identifies the necessary standards, formats and specifications, sets forth conformity rules and updates them in line with technological progress, the "*V-Model*", the "*Migration Guide*" and the "*DOMEA concept*", while the *eGovernment manual* prepared under the leadership of the German Federal Office for Information Security is designed as a reference manual and central information exchange for issues related to eGovernment.

In Greece, the e-Government Interoperability Framework is maintained by the Greek Ministry of Interior (May 2009, Version 4.0) (Greek Ministry of Interior, 2009) and consists of the following building blocks:

- The *Certification Framework for Public Administration Sites and Portals* (including the proposed Government Category List), which specifies the directions and standards to be followed by the public

agencies at central or local level, when designing, developing and deploying e-government portals and supporting e-government services.
- The *Interoperability and Electronic Services Provision Framework* which defines the basic principles, guidelines for all interoperability levels and the general strategy to be followed by the public agencies, when developing e-government Information Systems.
- The *Digital Authentication Framework* (DAF) which sets the standards, the procedures and the technologies required for the registration, identification and authentication of the e-government services users.
- The *Documentation Model for Public Administration Processes and Data*, a practical guide which defines the notation, the rules and the specifications for the design, implementation and documentation of the Public Administration processes, documents and electronic data exchange messages, together with a methodology for designing and implementing web services compliant with the e-GIF.
- The *Interoperability Registry Prototype* (Sourouni et al., 2008), a web-based repository of service and document metadata, services process models, standardized XML Schemas for mostly used governmental documents, as well as codelists for the most common information elements within governmental service provision.

In New Zealand, the *E-government Interoperability Framework* (e-GIF) is issued by the State Services Commission and draws from other jurisdictions, most notably the United Kingdom and Australia. New Zealand has also published the *Government Web Standards and Recommendations v1.0* (March 2007) applying to any web site that is intended for the public and financed by the public through the crown or through public agencies. The *NZ Authentication Standards* outline current accepted good practice for the design (or re-design) of the authentication component for online services that require confidence in the identity of parties transacting with government agencies. The *New Zealand Government Locator Service (NZGLS) Metadata Element Set* provides a set of metadata elements designed to improve the discovery, visibility, accessibility and interoperability of online information and services. The NZ e-GIF is accompanied by an *Agency Checklist* that defines two sets of requirements imposed on agencies by e-government – mandatory and discretionary.

In United Kingdom, the e-Government Unit in the Cabinet Office has issued and maintains the following specifications:

- The *e-Government Interoperability Framework (e-GIF)* Version 6.1 (March 2005) setting out the government's technical policies and specifications for achieving interoperability and Information and Communication Technology (ICT) systems coherence across the public sector.
- The *e-Government Metadata Standard* Version 3.1 (August 2006) accompanied by the *Integrated Public Sector* Vocabulary lists the elements and refinements that will be used by the public sector to create metadata for information resources.
- The *Technical Standards Catalogue* Version 6.2 (September 2005) containing the e-GIF technical policies, tables of specifications, a glossary and abbreviations list.
- The *Security - e-Government Strategy Framework Policy and Guidelines* Version 4.0 (November 2002) regarding security requirements for the procurement and acceptance of e-Government services and their implementation.
- The *e-Government Schema Guidelines for XML* Version 3.1 (February 2004) containing guidelines for developing XML Schemas for e-GIF compliant systems.
- The *Schema Library* with adopted, under consultation and draft XML Schemas.
- The *Guidelines for UK government websites*, the *Quality Framework for UK government website design* and *the Guidelines on .gov.uk* and *.EU domain*

registration setting out key guidelines that should underpin the design of all current government websites.

At a pan-European level, the *European Interoperability Framework* issued by the Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens (IDABC) in 2004 (EIF v1.0) defines a set of recommendations and guidelines for e-Government services so that public administrations, enterprises and citizens can interact across borders, in a pan-European context. Today a draft second version of the European Interoperability Framework (EIF draft v2.0) has been released by the IDABC (IDABC, 2008) and attaches a more holistic view to interoperability, incorporates two additional dimensions: Political Context and Legal Interoperability on top of the existing layers of Organizational, Semantic and Technical Interoperability and provides a blueprint for the design of future Public services with interoperability and the pan-European dimension built in from the very beginning.

In United States of America, the Office of Management and Budget's (OMB) Office of E-Government (E-Gov) and Information Technology (IT), with the support of the General Services Administration (GSA) and the Federal Chief Information Officers (CIO) Council, established the *Federal Enterprise Architecture (FEA)* Program which builds a comprehensive business-driven blueprint of the entire Federal government. The Consolidated Reference Model (Version 2.3) (U.S. Office of Management and Budget, 2007) introduces five FEA reference models: *Performance Reference Model (PRM)*, *Business Reference Model (BRM)*, *Service Component Reference Model (SRM)*, *Technical Reference Model (TRM)* and *Data Reference Model (DRM)*. The *National Information Exchange Model* (NIEM), with its corresponding tools for navigating, building and sharing data models, is also is a Federal, State, Local and Tribal interagency initiative providing a foundation for seamless information exchange (U.S. Department of Justice and the Department of Homeland Security, 2010).

COMPARISON RESULTS

The results emerging from the eGIFs comparison on the basis of the levels: Systems, Standards & Specifications, Coordination are presented in the following Table 1. The indications that accompany each criterion refer to the particular aspects of the analysis levels and the coverage provided by the particular e-GIF, i.e.:

- "√" indicates that the e-GIF has adopted an approach for this criterion, without judging whether this approach provides full or partial coverage for the issue.
- "X" refers to the lack of a tangible approach in any aspect related to this issue.
- "?" characterizes a criterion when the information gathered by the publicly available sites and specifications is not sufficient to evaluate it.

DISCUSSION

The analysis of multiple National Interoperability Frameworks reveals the existence of different approaches for interoperability, bearing different perspectives, focus points, and levels of detail. National efforts aiming at setting-up an interoperability framework have usually devoted efforts to produce standards and guidelines addressing the three levels of interoperability: organizational, semantic and technical levels. In the European Union, the NIFs are generally in alignment with the principles and the recommendations of the European Interoperability Framework version 1.0. Common principles, such as scalability, reusability, flexibility, preference for open standards, preference for standards with wide market support and security have been adopted, while the scope of the NIFs mainly extends over G2G, G2B, G2C national transactions. Most NIFs are also accompanied by relevant

Table 1. eGIFs comparison matrix

	Australia	Belgium	Denmark	Estonia	Germany	Greece	New Zealand	UK	US
System Level									
eGIF-Supporting Systems Infrastructure	? (1.1) √ (1.2-1.6)	√ (1.6)	√ (1.3, 1.4, 1.6)	? (1.2, 1.4) √ (1.6)	? (1.1, 1.5) √ (1.2-1.4, 1.6)	√ (1.2-1.4, 1.6)	√ (1.6)	√ (1.1, 1.3, 1.6)	√ (1.3-1.5) ? (1.1, 1.2) X (1.6)
Standards and Specifications Level									
Organizational Interoperability	√ (2.1-2.2)	X	√ (2.2)	X (2.1) ? (2.2)	√ (2.1-2.2)	√ (2.1-2.2)	X	X	√ (2.1) ? (2.2)
Semantic Interoperability	√ (2.3-2.5)	X	√ (2.4-2.5)	√ (2.3)	√ (2.3-2.5)	√ (2.3-2.5)	√ (2.4-2.5)	√ (2.4-2.5)	√ (2.3-2.5)
Technical Interoperability	√ (2.6)	√ (2.6)	√ (2.6)	√ (2.6)	√ (2.6)	√ (2.6)	√ (2.6)	√ (2.6)	√ (2.6)
Integration Mechanisms Guidelines	? (2.7)	X	√ (2.7)	? (2.7)	√ (2.7)	√ (2.7)	? (2.7)	X	? (2.7)
Authentication & Security Specifications	√ (2.8)	X	? (2.8)	? (2.8)	√ (2.8)	√ (2.8)	√ (2.8)	√ (2.8)	? (2.8)
Web Portals Design Specification	√ (2.9)	√ (2.9)	√ (2.9)	? (2.9)	? (2.9)	√ (2.9)	√ (2.9)	√ (2.9)	√ (2.9)
Certification Framework	? (2.10)	X	? (2.10)	? (2.10)	? (2.10)	? (2.10)	? (2.10)	√ (2.10)	X
Coordination Level									
Co-ordination Strategy, Activities and Maintenance	√ (3.1-3.2) ? (3.3-3.4)	? (3.1)	? (3.1-3.3) √ (3.4)	? (3.1-3.4)	√ (3.1,3.4) ? (3.2-3.3)	√ (3.1-3.4)	√ (3.1,3.4) ? (3.2-3.3)	√ (3.1, 3.3, 3.4) ? (3.2)	√ (3.1) ? (3.2-3.4)

specifications that elaborate, for example, on web sites, security and authentication issues.

The most mature results appear to relate to technical and syntactic interoperability through:

- Adoption of common open technical standards which are maintained by international standardization organizations
- Definition of shared core components and structured XML schemas to facilitate data exchange among administrations
- Definition of metadata systems for information indexing and retrieval

Despite the similarities observed among many countries, there are no NIFs identical to each other. Different approaches for interoperability that try to look for consensus on some aspects co-exist and the fact that they vary from country to country can be mainly attributed to cultural differences and specific needs of the national public administrations.

Each country has established a governmental agency that maintains and regularly updates the NIF content, while the procedures it follows for its management do not vary significantly from country to country. The methodology and the procedure that has led to the formulation and the release of the NIF are usually explained in detail.

All NIFs define maturity and obsolete levels for the standards and compliance levels

for the recommendations, according to specific life cycle transitions. In this way, the standards life-cycle is effectively managed: retirement of standards that are no longer useful and/or have become obsolete and incorporation of new ones.

In certain cases, the adoption of the NIFs by the public authorities is not mandatory and the NIF serves as guidelines that are recommended to be followed. In other cases, however, compliance with the NIF is mandatory for a set of public organizations and penalties for non-compliance with the NIF are imposed.

In this direction, the lessons from the experience of the aforementioned countries reviewed in this paper for others embarking on creating an NIF can be summarized as: e-Government Interoperability cannot be realized by addressing technical issues only. To truly enable interoperability across government, a bottom-up approach starting with technology must be avoided despite the fact that a common standard modelling framework, architecture and general technological paradigm to be followed shall be proposed and best practice guides for public administrations needs to be documented. The starting point is situated on the top with the government's strategic framework, vision and goals of its leaders. In this context, articulating organizational and semantic interoperability issues deserves more priority and effort than the technical interoperability layer that has already mechanisms and standards in place. Organizational interoperability issues should be further supported by a more concrete methodology of how to reengineer and transform traditional services to electronic flows.

The adoption of a service-oriented approach is indeed a crucial factor for implementing one-stop interoperable e-government. The NIFs must focus on the service, not on the standards which must be business needs-driven and not technology opportunity and advancement-driven.

Registries must also play a key role. The paper-based NIF specifications should give way to system-based representations, incorporating service descriptions, data definitions, standard codelists, certification schemes and application metrics in a common repository. Significant effort has to be devoted to the development of such registries as no commercial, ready to apply tools are generally available. Furthermore, integration of enterprise modelling tools and XML authoring tools with the core registry should be performed with caution and supported by high-level technical support from the vendors. The use of eParticipation and eCollaboration tools, on top of the internet-based registry system has proven to be a worthwhile track in the direction of agreement and adoption of the NIF. Importance and adequate effort should be put in defining standard electronic services for businesses and citizens, thus providing clear examples to administrations and service portal developers.

A clearly defined NIF Governance Model needs to be envisioned and put in place, as well, by:

- Determining observance mechanisms: understanding linkages to processes and policies, such as procurement policies, to ensure that agencies must adhere to these.
- Measuring effectiveness: defining metrics of success (such as 'reuse' of systems and improved service delivery), and using metrics to evaluate progress. Time frames for measurable change though need actually to stretch out into years.
- Stimulating growth of successful projects by breeding initiatives that might become successful and result in best practices while projects targeting similar areas and not likely resulting in success should not be supported and discouraged

No matter how well prepared a government is, it is illusionary to believe that it can achieve interoperability at once in one big step. The starting position of the public sector should be well understood and benchmarked so that the gap between the 'as is' and the 'to be' states are well defined. Securing interoperability is a process that includes many incremental activities over time which are constantly monitored

and where the long haul - quick wins will seem to be small wins in the grand scheme of things.

Winning 'hearts and minds' is crucial and mechanisms for increasing awareness must be foreseen. Bringing together officials from across government agencies to discussing the framework, with the participation of businesses and citizens, may go a long way, but it will ensure acceptance in the long term. The supplier community must be in partnership with the government community, with a shared understanding of the means of delivery and the ends sought while coalitions having participants with different backgrounds and from multiple organizations at a national and local level can bring new ideas on the table.

Competencies of the public servants shall be cultivated with the help of appropriate education schemes since knowledge and capabilities are necessary to understand and apply the NIF in its full spectrum. The investment on appropriate certification infrastructure is also crucial for ensuring compliance with the NIF.

CONCLUSION AND FUTURE STEPS

Interoperability reaches all governmental organizations at national and international level and constitutes a thriving research domain from all aspects – scientific, entrepreneurial, societal and political. Today, most countries have created an interoperability framework, a strategic document containing specifications and standards to be followed in order to ensure interoperability among public administrations and their beneficiaries citizens and businesses. It provides guidance to practitioners what to consider and to do in order to enable seamless interaction within their public administration as well as with other public authorities. However, in most cases the scope of the NIFs needs to be extended applying best practices drawn from other NIFs in order to provide a thorough set of specifications covering the Comparative Analysis Framework proposed in this paper.

As far as the completeness of the frameworks examined is concerned, Australia together with Greece appear to have a more complete set of specifications together with appropriate system infrastructures on eGovernment interoperability. Germany has a clear vision and methodology on how to achieve interoperability through specifications and systems which are under way and tangible results come to validate its approach. UK, although a pioneer some years ago, today seems to have lost pace with the advancements on interoperability and attention is now paid on the "process" and the "people" dimensions, ensuring that everything from governance to technical standards selection and mandate is business needs driven. Denmark has critical achievements around systems, like its UDDI registry, and technical standards, as well as on co-ordination efforts on top of Web 2.0 tools, but should look more to organizational aspects. Estonia and New Zealand need to emphasize more on their missing parts of organizational and semantic interoperability, as well as the systems infrastructures. Belgium is very technical standards-oriented and should obtain a more holistic view of interoperability. The collaboration among these NIFs should be pursued, since on the one hand it ensures that lessons from the pioneers' experience are learnt and that the same mistakes will not be repeated, while on the other hand it eventually leads to facilitating cross-country interoperability.

Following on the findings of this study and the directions provided by relevant literature (Charalabidis et al., 2008a, 2008b; Dawes, 2008), future perspectives on e-Government Interoperability Frameworks cover two areas:

- Practical Research that focuses on issues for which scientific research has proposed a solution but the results have not been yet applied effectively in the e-GIFs, such as Interoperability Registries that support service transformation and re-engineering (apart from modelling) and on-the-fly service execution with the help of content federation mechanisms with central gov-

ernmental portals; Interoperability impact analysis and monitoring mechanisms.

- Scientific Research concerning new application areas of interoperability: Creating methodologies and solutions that provide end-to-end interoperability, usually in the form of a service utility, and incorporating capabilities for semantically enriched service composition, brokering, negotiation, mediation and evolution on-the-fly. Semantic and cultural interoperability of cross-country public services, empowerment and initial deployment of Web 2.0 technologies in the public domain, utilization of cloud computing and social networks for interoperable digital public services are also new directions for interoperability standardisation and guidance.

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Examining the Role of Stakeholder's in Adopting Enterprise Application Integration Technologies in Local Government Domain

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ABSTRACT

The realisation of innovative technological transformation in providing electronic services (e-Services) has often been associated with the presence of a number of prime stakeholders who perform their requisite functions in the organisation. In context of this research, the authors examine the potential role of key stakeholders involved in the Enterprise Application Integration (EAI) adoption process. Literature exemplifies that EAI technologies are large, comprehensive solutions that are complex to adopt and manage. Similar to adopting other technologies, there are several stakeholders involved with adopting EAI solutions, each with specific domain knowledge and expertise that are crucial to the success of EAI projects. In this regard, it would be judicious to give greater contemplation to research examining the role of stakeholders in the EAI adoption process in Local Government Authorities (LGAs). This paper applies concepts of the stakeholder theory to analyse the importance of stakeholders during the EAI adoption process with regards to EAI adoption factors. To conduct this research, the authors follow a qualitative multiple case study approach. Empirical findings highlight that each stakeholder involved in the EAI adoption process has a significant role utilising their expertise by contributing towards the success of EAI projects.

Keywords: Adoption Lifecycle Phases, e-Services, EAI, Factors, LGAs, Stakeholder Theory, Stakeholders

INTRODUCTION

Enterprise application integration has emerged to overcome integration problems at all levels, e.g., data, object and process (Lam, 2005; Linthicum, 2000). EAI provides substantial benefits, such as assisting with business process integration, facilitating e-Service based transformation, supporting collaborative decision-making, reduced integration cost and delivering flexible, and maintainable integrated Information Technology (IT) infrastructures (Irani et al.,

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2003). Regardless of EAI vendors promoting their products as 'plug and play' (Linthicum, 2000), there are no 'off-the-self' EAI solutions that offer 'out-of-the-box' (automated) integration (Zahavi, 1999). In addition, there is no single EAI technology efficiently supporting all integration levels (Ring & Ward-Dutton, 1999). Some EAI technologies are more effective at one level of integration, whereas others are at another level of integration. Therefore, permutations of EAI technologies are needed to overcome integration problems (Duke et al., 1999). There is much confusion regarding the permutations of integration technologies that can be used to piece together Information Systems (IS) (Themistocleous, 2004). The reason for this is that there are integration technologies that overlap in functionality but differ in the quality (e.g., portability, flexibility, scalability) and efficiency of their solutions (Themistocleous, 2004).

Moreover, the majority of applications that are pieced together differs in integration requirements, which means that the permutations of EAI technologies are not only based on their functionality, but also on integration requirements and constrains. Despite representing large and comprehensive solutions, EAI is often considered high-risk and complex to adopt and manage, involving several stakeholders and resources (Janssen & Cresswell, 2005; Ruhe & Du, 2004; Themistocleous et al., 2004). Chatterjee (2008) also highlights that complexities of technologies and distributed nature of EAI projects make EAI solution development, deployment and trouble-shooting more challenging than any other application development. These conceptions exemplify that from a technical perspective, EAI projects have many significant differences (e.g., from adoption to implementation to managing) comparing to other IT projects (Lam, 2005; Janssen & Cresswell, 2005).

Particularly, research studies on the stakeholders involved in EAI projects, such as (a) top management and decision makers, i.e., head of IT, who take decisions to invest in EAI, (b) project managers and project champions, i.e., who lead the EAI projects, (c) development support engineers and service delivery managers, i.e., who are actively involved in the implementation of EAI projects, and (d) system integrators i.e. who apply their technical expertise etc, have been advocated in recent local government literature (Kamal et al., 2009a; Kamal & Themistocleous, 2009; Themistocleous et al., 2005; Pardo & Scholl, 2002). However, past research on this area of research has been on a small scale with each group considered individually (Sathish et al., 2004). Janssen and Cresswell (2005) and Schneider (2002) highlight that in reality such projects involve many different stakeholders, both from within (directly) and outside (indirectly) the organisation, who possess knowledge and expertise, which facilitates their roles during the projects and interactions with one another. Massey et al. (2001) also supports that the knowledge and expertise of stakeholders consists of relevant information that is actionable and based on experience on different projects. Given their importance as sources of knowledge and expertise, any EAI project model should thus include them, so LGAs can consolidate and reconcile their intellectual capital, or knowledge assets, for organisational advantage (Kamal et al., 2009a; Kamal & Themistocleous, 2009). In the context of integrated e-Service delivery, several researchers have highlighted the importance of involving stakeholders (Evans & Yen, 2006; Carter & Belanger, 2005). The authors argue that although such stakeholder studies may seem obvious, there has been little application of stakeholder analysis concepts, particularly in the context of understanding the significance of stakeholders in EAI adoption process in LGAs (Themistocleous & Irani, 2006).

This study aims to contribute towards bridging this gap in EAI adoption literature by proposing a stakeholder perspective of investigating and understanding the role of stakeholders in EAI adoption process. In doing so, conducting an in-depth study of relevant stakeholders and how they utilise their knowledge and expertise during EAI adoption process can provide greater insight into their impact on

the project and each other, and how they should be managed to maximize their contributions. This study proposes stakeholder theory as a lens to look at stakeholder knowledge and expertise utilisation during EAI adoption process. Stakeholder theory focuses on the people factor instead of the technical factors of EAI projects (Sharif et al., 2004). It looks at who (or what) are the stakeholders of an organisation, to whom (or what) should organisations pay attention (Freeman, 1984), and advocates the study of the important yet under-researched area of comprehending the role of stakeholders in the EAI adoption process in LGAs. Scholl (2001) reports here that though the stakeholder theory roots in and pertains to the private-sector organisation of the firm, there is tremendous interest in applying at least parts of the theory's findings to the managerial decision-making in public-sector organisations. Scholl (2001) further states that while some advocates of stakeholder theory are exceptionally dubious vis-à-vis this undertaking, nevertheless, inter and intra-governmental decision processes may benefit from the application of stakeholder doctrines. This seems principally to be the case regarding large-scale investments in IT where the risk of failure is remarkably high (Scholl, 2001).

This paper commences with a look at the need to focus on the stakeholders during their EAI adoption process. It then looks at who the stakeholder of EAI adoption are and their dynamic role and nature during these projects. Thereafter, this research presents the research methodology and case data from four case studies. Based on the case organisations, the authors illustrate the lessons learned and finally summarising the conclusions.

THE NEED TO FOCUS ON THE ROLE OF STAKEHOLDERS

Due to the size, complexity and implementation time taken by EAI projects, it has been noted that LGAs have generally focused on joint or outsourcing their developments or procured pre-packaged solutions to their integration problems (Themistocleous et al., 2004; Khalifa et al., 2001). One of the motivations for using joint and outsourced approaches was the increasing shortage of in-house EAI specialists as the private sector proved increasingly attractive to them (Brown, 2001). Similarly, decision makers and top management in many IT infrastructure integration projects in LGAs relied on joint approaches with external stakeholder expertise (Themistocleous et al., 2005). Since EAI adoption (and implementation) and management require different set of tasks, skills and expertise (Lam, 2005; Janssen & Cresswell, 2005), this is a way of getting the necessary knowledge from experienced experts (internal and external stakeholders) to plug this gap (Chan et al., 2003). The authors argue that this is because EAI projects are the start of long-term relationship between LGAs and their stakeholders. LGAs thus need to focus and understand the impact of stakeholders and the acquisition of knowledge and their expertise (Chan et al., 2003). This indicates that the roles and responsibilities of the stakeholders vary, and LGAs need to focus on identifying new ways of involving them and managing their knowledge and expertise in different EAI projects.

Efficient and effective integration of applications has been one of the core objectives for LGAs (Beynon-Davies & Williams, 2003). It involves the integration of modules, organisational functions, or information across these functional units. EAI is a complex process (Lam, 2005), which can influence the entire operational activities of LGAs or even the inter-organisational supply chain. Since EAI can potentially affect numerous stakeholders both internal and external to LGAs, each with their own domain knowledge and expertise, logically, EAI adoption should involve all these diverse stakeholders, and LGAs should facilitate knowledge sharing between them with regards to EAI adoption. The authors argue that involvement of stakeholders and the potential for integration emphasize the need to focus on stakeholders with different domain knowledge and expertise during EAI adoption. This is

particularly so since most of the knowledge required for the project that people really care about is not on computers but comes from them (Davenport, 1998). As this knowledge is generally personalised and based on the individual experiences, before one stakeholder's knowledge is useful to another stakeholder, it must be communicated from where it was created or captured to where it is needed and should be used in such a manner as to be interpretable and accessible to the others (Massey et al., 2001). LGAs should thus identify the stakeholders who possess the required knowledge and expertise, prioritise whose knowledge and expertise, and thus which stakeholder, is more important at different phases of the EAI adoption process, and facilitate the sharing of knowledge and expertise amongst all their stakeholders (Kamal et al., 2009a; Kamal et al., 2008a).

STAKEHOLDERS INVOLVED IN THE EAI ADOPTION PROCESS

Early research into stakeholder identification generally centred on dividing stakeholders into primary and secondary categories (Nutt & Backo, 1992). Primary stakeholders are those crucial for survival where a failure to retain their participation would result in dire consequences (Clarkson, 1995). Reflecting the strategic significance of primary stakeholders, terms like 'critical stakeholders' and 'strategic stakeholders' are often used synonymously (Turnbull, 1997). On the other hand, secondary stakeholders are those who can influence or affect, or are influenced or affected by the actions of the organisation (Chan et al., 2003; Sathish et al., 2003; Freeman 1984), which in this case is EAI adoption. However, there is an absence of direct transactions and thus they are not essential for survival. To further develop the concept of stakeholder identification, Mitchell et al. (1997) focused on the attributes of stakeholders and proposed a framework where the identification of salient stakeholders is based on facets such as the moral legitimacy of a stakeholder's claim, the stakeholder's power to influence the organisation, and the urgency of the stakeholder's claim. Thus, any stakeholder who scores highly on all three facets possesses higher saliency than those with lower scores.

In addition, Mitchell et al. (1997) also suggested that stakeholder saliency is a dynamic, time-sensitive social construct. Conversely, Mantzana et al. (2007) proposed a category of public sector (i.e., healthcare) stakeholders and focused on four categories. Their research highlighted that public sector stakeholders involved in IS adoption are defined as any human/organisations that accepts, provides, supports or controls public sector services. Stakeholders previously identified include customers, employees, suppliers, competitors, shareholders, government organisations (Adelakun & Jennex, 2002), board members (Scott & Lane, 2000), and top management (Davenport, 1998; Clarkson, 1995). This study focuses on three main categories of EAI project stakeholders, namely decision makers, managers, and IT/IS staff as illustrated in Table 1. These categories of stakeholders are all those that are specifically involved in the EAI adoption process in LGAs (Kamal et al., 2009a; Kamal et al., 2008a).

Literature highlights that decision makers in several EAI projects have been mainly the Head of IT/ICT (Kamal et al., 2009a; Kamal et al., 2008b), who are responsible in providing support and for taking decision whether to invest in EAI projects or not (Themistocleous et al., 2004; Irani et al., 2003). The second category of management includes top organisational managers, EAI project managers, the project champion and web managers. Their active, strong and committed support of the project reinforces their backing of the project (Themistocleous et al., 2005), which is crucial, given its complex and comprehensive enterprise-wide nature. They utilise their strategic knowledge to set the EAI vision, establish strategic priorities, and facilitate a suitable culture to move the organisation in the direction of that vision (Khalifah et al., 2001). The third category is the internal IT/IS staff, which includes permanent and contract IT/IS staff (Service Delivery Managers, Development

Table 1. Categories of stakeholders involved in EAI adoption process

Stakeholder Categories	Stakeholders	Role (Domain Knowledge and Expertise)
Decision Makers	Head of IT/ICT, Board of Directors, Chief Executive Officers, Chief Information Officers	EAI Investment Decision Makers and Supporters
Management	Top Organisational Managers, Project Managers, Project Champions, Web Managers	Leading EAI Projects, Business Systems Strategy, EAI Investment Supporters
IT/IS Staff	Service Delivery Managers, Development Support Engineers, System Integrators	EAI implementation, Organisational IT/IS

Support Engineers, System Integrators) in the organisation working on the technical implementation of the system.

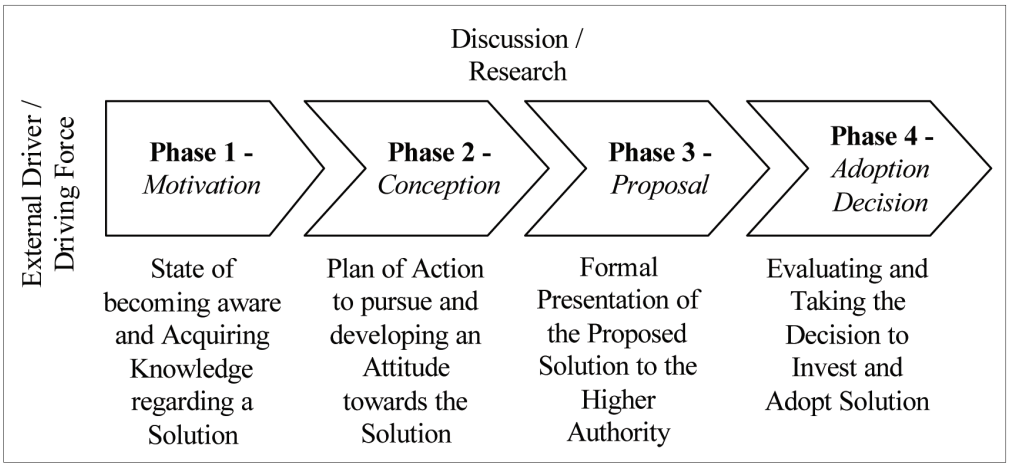
Baskerville et al. (2000) highlighted that the IT/IS staff require skills oriented towards combining systems, or packages, and business knowledge. They are thus involved with gathering knowledge from external stakeholders (such as joint partners, etc) on EAI, from end-users on business requirements, and sharing their own knowledge on the internal systems with other stakeholders. Literature also indicates that it is unlikely that a homogeneous team has all the relevant knowledge and expertise (Newell et al., 2002), as much of the knowledge needed for integration projects is split between multiple stakeholders (Thomas-Hunt et al., 2003). Hence, the team should be well-balanced and involve all three categories to ensure a good mix of knowledge, skills and experience (Sathish et al., 2003). It should also include both internal and external personnel to enable internal staff to "grow" the necessary skills for future integration projects (Sumner, 2000). For these teams to reach their performance potential, the organisation needs to capitalise on its member resources by accurately discerning, weighting and incorporating their task-relevant knowledge (Thomas-Hunt et al., 2003).

THE DYNAMIC ROLE OF STAKEHOLDERS

Although the identification and management of relevant stakeholders of EAI projects and their domain knowledge and expertise may appear straightforward, it is actually rather complex as EAI adoption is not a static process. Instead, they iteratively traverse through several phases (Kamal et al., 2008a), each of which is characterised by its own stakeholders, activities and outcomes (Markus and Tanis, 2000). In particular, stakeholders, their roles and interactions vary according to the phase in which they are (Pouloudi, 1999). A theoretical and validated EAI adoption lifecycle model that highlights this fact (Kamal & Themistocleous, 2009) (see Figure 1) consists of four phases: motivation, conception, proposal and adoption decision, however, motivation phases it is argued that there are some external drivers or a driving force that lead to motivation phase, whereas, a discussion or research after conception phase leads to proposal phase.

It should be noted that the intensity of different stakeholders' involvement in a particular phase may vary. For example, during the motivation phase, although decision makers, management, IT/IS staff are involved, management is probably a more important participant as they identify potential opportunities and make the strategic decisions to move further. At the conception phase, it is probable that along with management, the IT/IS staff also play their role, e.g., in further supplying the business knowledge and developing an in-depth understanding of the solution and identifying possible action of plan to pursue the solution. In the proposal phase, it is more to do with the management as based on the work carried out

Figure 1. Phases of EAI Adoption Process (adapted from Kamal & Themistocleous, 2009)



in the previous phase; they may come up with their formalised proposal to put forward to the decision makers. However, IT/IS staff is also consulted to conducted initial research and evaluation. Finally, the adoption phases highlights the involvement of decision makers and management in conducting mutual discussions and some assessment of the proposed solution and thereafter, taking the decision for investment. Table 2 summarises the activities conducted by the stakeholders at each phase.

STAKEHOLDER ANALYSIS: APPLYING THE STAKEHOLDER THEORY IN THE LOCAL GOVERNMENT CONTEXT

Scholl (2001) argues here that albeit many public-sector managers perform their responsibilities for different motives (such as public interest) as opposed to their private-sector counterparts (such as survival, thriving, or profit making), their decisions have the same capacity

Table 2. Key activities by stakeholder categories on the EAI adoption lifecycle

Phase	Possible Key Stakeholder Activities	Key Stakeholder Categories
Motivation	• Conduct feasibility study regarding the solution. • Acquire in-depth knowledge regarding the solution. • Identify and finalise the project manager. • Decide on the EAI project team.	• Management.
Conception	• Decide on the initial budget and plan of action. • Involving other stakeholders to conduct initial discussions. • Requirement gathering.	• Management. • IT/IS staff.
Proposal	• Conducting initial research and evaluation. • Organising a formal proposal for proposed solution.	• Management. • IT/IS staff.
Adoption Decision	• Formal discussions between decision makers/management. • Highlighting the analysis of the proposed solution. • Investment decision.	• Decision Makers • Management.

of influencing staff members and other groups while pursuing their organisation's objective. Just as in the private sector the public managers and their governmental organisations can be affected themselves by others as a consequence of their own decision-making process. From the abovementioned conceptions, it is obvious that Freeman's stakeholder definition also applies to managerial decision-making in a governmental context. This study now looks to apply stakeholder theory to analyse the stakeholder's involvement in the EAI adoption process i.e. identification of stakeholders, their perception on EAI adoption factors and involvement on different phases of the EAI adoption lifecycle.

Stakeholders Identification

In line with existing stakeholder theory models, the first step of stakeholder analysis during the EAI adoption process is the identification of the stakeholders involved in the project (Frooman, 1999) and their domain knowledge and expertise. All relevant stakeholders should be identified in order for LGAs to have a holistic picture of different participants who can contribute their knowledge and expertise required for the EAI project. Based on this argument, the authors propose the following research issue:

Research Issue 1: The role and responsibilities of relevant LGA stakeholders who can contribute their knowledge and expertise during EAI adoption process can be identified based on the activities during the project.

Stakeholders Perception on EAI Adoption Factors

Having identified the relevant stakeholders of EAI adoption process and their domain knowledge and expertise, the next issue is to identify the stakeholder's perception on the EAI adoption factors. Since each stakeholder has a different role to play in the EAI adoption process with distinct domain knowledge and expertise to contribute, each stakeholder may also have different perception regarding EAI adoption factors. Based on this argument, this study proposes the following research issue:

Research Issue 2: The role and responsibilities of relevant LGA stakeholders who can contribute their knowledge and expertise during EAI adoption process can have different perceptions regarding the EAI adoption factors.

Stakeholders Involvement on the Adoption Lifecycle Phases

Knowing the stakeholders who possess the desired knowledge and expertise for EAI projects is one thing. Doing something about it is another. The emphasis of stakeholder theorists has thus far been on stakeholder identification and their perception on EAI adoption factors. The authors now assert that there is a need to go beyond this and identify the involvement of stakeholders on different phases of the EAI adoption lifecycle. This is crucial as by identifying and understanding their involvement on different phases, can LGAs better utilise their stakeholders' knowledge and expertise during EAI projects.

Research Issue 3: The role and responsibilities of relevant LGA stakeholders who can contribute their knowledge and expertise during EAI adoption process can be involved on different phases of the EAI adoption lifecycle.

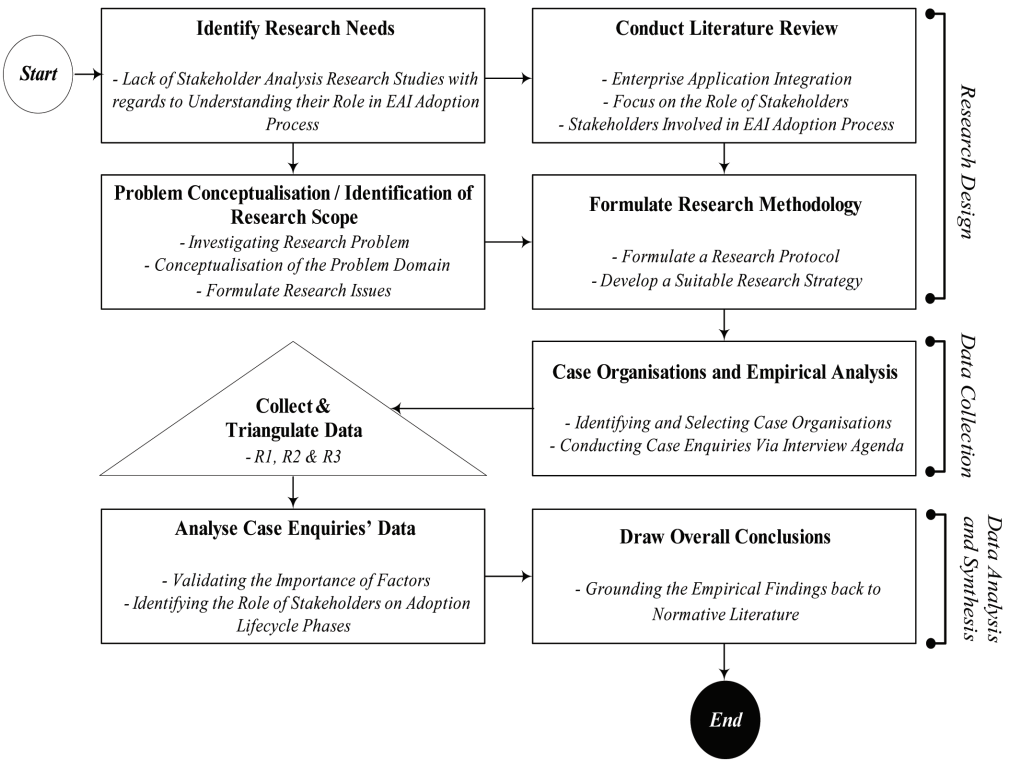
RESEARCH METHODOLOGY

An appropriate research methodology that acts a blue print for the research process has been developed. This research methodology is based on three phases (Jankowicz, 2000) namely: (a) research design, (b) data collection and (c) data analysis and synthesis and highlighted in Figure 2. The research design is the foremost part of the empirical research methodology. Essentially, it starts with acquiring background knowledge of the area under research, review-

ing the normative literature and identifying the problem area. As the current research work attempts to explore the role of stakeholders in EAI adoption process in LGAs, i.e., exploring the perception of different stakeholders on the factors influencing EAI adoption in LGAs and their involvement on the adoption lifecycle phases, therefore, based on the needs of the empirical study, the authors decided that the research design would utilise an interpretive, qualitative case study approach to test their research. This qualitative based research approach utilises structured and semi-structured interviews and document reviews in a multiple case study setting (Kaplan & Duchon, 1988). The advantages of using qualitative research are that it provides in-depth insight, provides flexibility and the results obtained are in real life like and rich with ideas (Creswell, 2003).

Furthermore, case studies are useful in providing a multidimensional picture of a situation (Whitman & Woszczynski, 2004). Case studies also offer the potential for generating alternative explanations from different stakeholder perspectives, thereby allowing the researchers to highlight contradictions and misunderstandings (Flick, 2006). Conversely, Yin (2003) suggests that case studies are appropriate where the purpose is to study current events, and where it is not necessary to control behavioural events or variables. Interview agenda based structured interviews and open-ended semi-structured interviews were conducted with key figures involved in the EAI adoption process in four United Kingdom based LGAs (hereafter referred to as LGA_A, LGA_B, LGA_C, LGA_D from the region of England – for confidentiality reasons the authors employ

Figure 2. Empirical research framework



these coded-name to refer to these entities) during the period July to December 2008. These LGAs were initially contacted using personal connections. Emails and telephone conversations were exchanged at the beginning which then led to the identification of relevant people to interview in these LGAs. The actual interviews were then conducted by the authors visiting these LGA's premises during the aforementioned periods. The interviews were conducted with three staff members from each LGA, including decision makers, management, IT/IS staff.

All these interviewees were collectively responsible for delivering public services. Since the focus of this research was to explore the role of stakeholders in the EAI adoption process based on four themes (factors, adoption lifecycle phases, mapping and prioritisation), the questions were fairly focused. Notes were taken during the interviews in a logbook and later transcribed into the computer. The participants were given a consent form to read through regarding ethical considerations and their rights to withdraw from the study anytime without any prior notice or explanation. The formal interviews lasted approximately one to two hours, and were undertaken in a meeting room of the LGA buildings. This allowed the authors and respondents to build the necessary rapport and privacy for the required questions. Data triangulation was used by comparing and contrasting the interview findings with document reviews as it was necessary to validate and verify the findings of the primary data with secondary information (Saunders et al., 2002). This ensured that no bias emerged from either the participants or the authors, thus the findings and conclusion made from the cases are valid (Yin, 2003).

CASE ORGANISATIONS

The selected case organisations provide services through various departments including among others: social and environmental services, benefits, property, housing, education, health etc. The analysis of the empirical research conducted illustrate that the departments within each case organisation had developed their own IT infrastructures. As a result, they consisted of numerous heterogeneous information systems that were based on a diversity of platforms, operating systems, data structures and computer languages. Most of these systems were legacy applications that still today run on mainframe environments. Since there was a lack of common IT infrastructure, and a lack of central coordination of IT, the majority of departments within these case organisations adopted their own applications to support their business activities. Due to this, these case organisations faced a number of challenges in meeting their internal performance targets whilst also addressing the modernising government agenda. The way these case organisations were conducting their business with their partners and other stakeholders was costing too much, due to which there was no productivity and performance is degrading. There was no control over the systems from data security point of view. It was clear that a single, integrated solution was required within these case organisations if these LGAs were to achieve the major business transformation involved in modernising their service delivery. In doing so, these case organisations adopted EAI technological solutions based on their requirements and nature of project undertaken.

For example, LGA_A embarked on a demonstration EAI pilot project was based on a hub and spoke architecture, to provide multi-LGA access and sharing of information. LGA_B carried out an e-Forms and Customer Relationship Management (CRM) integration project, to provide electronic end-to-end processes that ensure referential data integrity. LGA_C set out to work on Document Imaging System (DIS) and SAP integration project, to enhance their existing SAP human resource system and provide additional functionality for use by managers and employees by introducing the human capital management system module within the SAP series of information systems, whereas, the project implemented in the environment department at LGA_D was based on

integrating their CRM system and software vendor system in order to provide citizens with better services and respond to their waste collection queries quickly. All these projects carried out in the aforesaid LGAs included a number of stakeholders that were directly involved in the integration projects, had an impact on the EAI adoption process. In the following, the authors present the empirical findings based on the stakeholder analysis i.e. stakeholder identification, stakeholders perception on EAI adoption factors and stakeholders involvement in the adoption lifecycle phases, in the case organisations.

Stakeholders Identification

For the purpose of this research only those stakeholders were identified and deemed important that was specifically involved in EAI adoption process, as it was not possible to interview all the stakeholders. The authors contacted the Personal Assistant (PA) to the heads of the IT departments within these case organisations and arranged to meet at a scheduled time. The authors acquired a written permission from their department explaining the purpose to visit the case organisations that was shown to the heads of IT before commencing the interview. The interviews that lasted between 1 and 2hrs constituted the main data source from the case organisations. The stakeholders identified from the case organisations are in line with the categories as defined in Table 1. For example, from LGA_A, the stakeholders that were interviewed included: Head of ICT (HICT), Senior Development Engineer (SDE) and Service Delivery Manager (SDM); stakeholders from LGA_B included: Head of IT (HIT), Web Manager (WM) and the Project Manager (PM); stakeholders from LGA_C included: HIT, Project Manager and Senior Systems Developer (SSD), and stakeholders from LGA_D included: HICT, Development Service Manager (DSM) and Principle Systems Developer (PSD).

Such stakeholders based on their position in the case organisation had different roles and responsibilities to perform during the EAI projects. The stakeholders involved in the aforesaid EAI adoption projects were selected based on the domain knowledge and expertise required for the EAI project implementation. For example, the heads of department had major influence on the EAI projects in each case organisation as they were involved in the decision making to invest in EAI. Therefore, questions asked from the head of IT/ICT mainly focused on, e.g., *Who initiated the idea of investing in EAI? What was the need to integrate their organisational IT infrastructure?* Managers such as the web manager and project manager in the case organisations were directly involved in leading the EAI projects. This category of stakeholders was asked, e.g., *what are the main motivations for EAI adoption, what are the factors negatively and positively affecting the EAI adoption process?* Whereas, the IT/IS staff such senior systems developer were those that were practically involved in the aforementioned integration projects. These stakeholders were asked questions, e.g., *What was the process towards integration? What are the limitations in their IT infrastructure?* Therefore, it was considered important to select a cross section of roles in the EAI projects to obtain the views of stakeholders at different levels in the case organisations. The authors argue that this supported in providing better understanding of EAI adoption process in the case organisations from the stakeholders' viewpoint. The identification of relevant stakeholders from the case organisations fulfils the requirements of *research issue 1*. These stakeholders were also asked about their perception on different EAI adoption factors.

Stakeholders Perception on EAI Adoption Factors

The stakeholders (i.e., the interviewees) were provided with a list of influential factors as proposed by Kamal et al., (2009b). These factors are *cost*, *benefits*, *barriers*, *internal pressures*, *external pressures*, *IT infrastructure*, *IT sophistication, IT support*, *evaluation frameworks, formalisation*, *centralisation*, *managerial*

capabilities, *project championship*, *personnel IT knowledge*, *technological risks*, *data privacy and security*, *higher administrative authority support*, *return on investments*, *critical mass*, *market knowledge*, *citizen satisfaction*, *size*, *top management support, data consistency*, *project delivery timescale*, *stakeholder's pressure*, *competition*, *stakeholder's support* and *central government grant*. These factors have been categorised according to Pressure Factors (PF), Technological Factors (TF), Support Factors (SF), Financial Factors (FF) and Organisational Factors (OF). The interviewees were asked questions related to each factor (e.g., all questions related to these factors were phrased such as – in your perspective, how has 'cost' influenced your decision to invest in EAI, similarly, for other factors as well). However, such questions were specifically asked from head of IT/ICT from the case organisations as these were related with investment decision for EAI. These questions were rephrased when they were asked from managers and IS/IT staff based on their position, domain knowledge and expertise. These questions provided rich data and detailed explanation regarding the perception of each factor from each stakeholder in their respective EAI projects.

However, the interviewees were also provided with a scale of less important (□), medium important (▣) and most important (■) and where the interviewees did not respond, the authors used "✗" symbol to illustrate as no response (Miles & Huberman, 1994). The interviewees were asked to comment on the aforesaid factors. The results as illustrated in Table 3 demonstrate that each stakeholder has its own perception regarding the EAI adoption process. For example, some factors had similar views from all the interviewees, e.g., project champion was reported as important personnel for all the case organisations for taking lead in their respective projects. Similarly, full support from top management in the case organisations, interviewees ranked this factors as most important and similarly for barriers, the interviewees considered it as most important factor, whereas, other factors had dissimilar views. These stakeholder perceptions are the result of their domain knowledge and expertise with regards to the EAI projects they were involved in. With the conformity of the aforesaid factors with mostly high and moderate importance from different stakeholders, the authors assert that this fulfils the *research issue 2*. The analysis of the interview session also highlight that different stakeholders are involved in on different adoption lifecycle phases.

Stakeholders Involvement on the Adoption Lifecycle Phases

After conducting interviews with the stakeholders, the authors specifically asked each stakeholder for their involvement on the adoption lifecycle phases. The stakeholders' involvement on each phase of the adoption lifecycle is based on their domain knowledge and utilisation of their expertise and is highlighted in Table 4. The symbol '□' illustrates where the stakeholders were involved in the phases whereas '–' indicates no involvement in the adoption process. Taking into consideration and interpreting the results in the first phase, e.g., in LGA_A case organisation, SDE and SDM are involved in the motivation phase, whereas HICT is not involved. Similar results can be seen in other three case organisations where the head of IT/ICT is not involved in the motivation phase. This can be attributed to the reason that these stakeholders i.e., head of IT/ICT, are the decision makers and anticipate that the preliminary works related to EAI technological solution recognition and formal proposal formation be performed by those stakeholders who either lead the EAI projects, i.e., the project managers or who operate under the supervision of management level stakeholders, i.e., IS/IT staff.

Relatively, similar results can be seen at the conception phase, however, the involvement of head of IT/ICT initiates from the proposal and adoption decision phases, where the decision makers are acknowledged and formally presented with the proposal for investment decision. In the adoption decision phase, it is specifically the decision makers that have the

Table 3. Stakeholders and their perception on EAI adoption factors

		LOCAL GOVERNMENT AUTHORITY STAKEHOLDERS														
		LGA_A				LGA_B				LGA_C				LGA_D		
		EAI Adoption Factors	HICT	SDE	SDM	HIT	WM	PM	HIT	PM	SSD	HICT	DSM	PSD
PF	Internal	Project Champion	■	■	■	■	■	■	■	■	■	■	■	■
		Data Consistency	■	■	▣	■	■	■	■	■	■	■	■	■
		Project Delivery Timescale	■	■	■	■	■	■	■	■	■	■	■	■
	External	Citizen's Satisfaction	■	▣	▣	■	■	▣	□	□	□	▣	▣	■
		Critical Mass	▣	▣	■	▣	▣	■	□	□	▣	■	▣	▣
		Market knowledge	▣	■	▣	▣	▣	▣	■	■	■	▣	■	▣
		Competition	■	■	▣	▣	▣	▣	▣	■	■	■	■	■
		Stakeholder's Pressure	■	■	■	▣	▣	■	■	■	▣	▣	■	■
TF		Evaluation Frameworks	■	■	▣	▣	▣	■	▣	▣	▣	▣	▣	■
		Technological Risks	▣	▣	■	■	▣	■	□	□	✗	■	■	■
		IT Infrastructure	■	▣	■	■	■	□	■	■	■	■	■	■
		Personnel IT Knowledge	■	■	■	■	▣	▣	■	■	■	■	■	■
		IT Sophistication	▣	■	▣	▣	■	▣	▣	■	■	▣	▣	■
		Data Security and Privacy	■	■	■	■	▣	■	■	■	■	▣	▣	■
SF		Top Management Support	■	■	■	■	■	■	■	■	■	■	■	■
		IT Support	▣	□	▣	■	▣	▣	■	■	■	▣	■	■
		Higher Administrative Authority	■	■	■	■	■	■	■	▣	■	■	▣	▣
		Stakeholder's Support	■	■	■	■	■	■	■	▣	▣	▣	■	■
FF		ROI	■	▣	▣	□	▣	□	■	■	▣	■	■	■
		Cost	■	■	■	■	▣	■	■	■	■	■	■	■
		Central Government Grants	■	■	■	■	■	■	■	■	■	■	■	■

continued on following page

Table 3. Continued

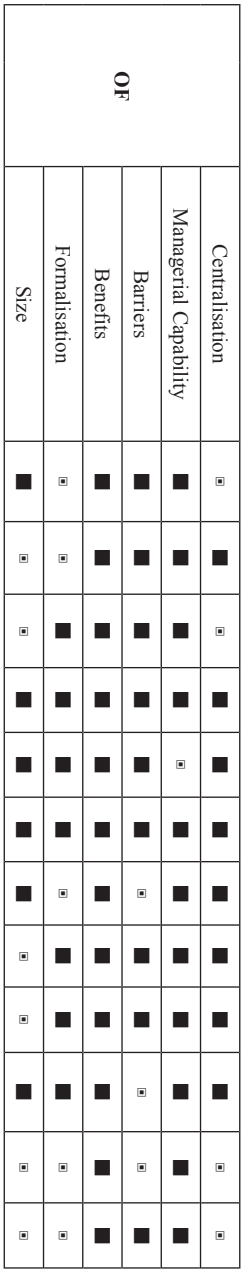


Table 4. Involvement of stakeholders on the adoption lifecycle phases

LOCAL GOVERNMENT AUTHORITY STAKEHOLDERS												
LGA_A				LGA_B			LGA_C			LGA_D		
Adoption Lifecycle Phases	**HICT**	**SDE**	**SDM**	**HIT**	**WM**	**PM**	**HIT**	**PM**	**SSD**	**HICT**	**DSM**	**PSD**
Motivation	–	✶	✶	–	✶	✶	–	✶	–	–	✶	–
Conception	–	✶	✶	–	✶	✶	–	✶	✶	–	✶	✶
Proposal	✶	✶	✶	✶	✶	✶	✶	✶	✶	✶	✶	✶
Adoption Decision	✶	–	–	✶	–	✶	✶	✶	–	✶	✶	–

major influence over other management level stakeholders, merely because the decision to invest rests upon the higher authority in these LGAs. Results highlighted in Table 4 illustrate the importance of stakeholders on different phases of the adoption lifecycle. However, these results cannot be generalised as these cases are conducted in the local government domain and this sector represents significant dissimilarities even within the same sector organisations as well as in the private sector (Ward & Mitchell, 2004), yet these results can allow others to relate their views with the ones reported in Table 4 with regards to the importance of different stakeholders on the adoption lifecycle phases. The analysis of different stakeholders involved in on different adoption lifecycle phases, thus, fulfils the requirements of the *research issue 3*.

CONCLUSION

In investigating the role of stakeholders in the EAI adoption process, this study identified three research issues which seem to indicate that LGAs EAI adoption practices have to understand and utilise the knowledge and expertise of numerous stakeholders involved in the EAI adoption process. To facilitate this, the present study suggests the use of stakeholder theory. This study offered a brief look at this theory and how it relates to utilisation of knowledge and expertise, particularly in the three areas of stakeholder analysis, namely stakeholder's identification, stakeholders perception on EAI adoption factors and stakeholders involvement on the adoption lifecycle phases. No claim(s) for generalisation is made for interpretive research of this type. It is not the intention of this paper to offer prescriptive guidelines for investigating the role of stakeholders in EAI adoption process in LGAs, but rather to describe case organisations' perspectives that allow others to relate their experiences to those reported.

Hence, this paper offers a broader understanding of the phenomenon of investigating the role and involvement of stakeholders' in EAI adoption process in LGAs. EAI is an emerging area within LGAs, there remains an absence of theoretical models, which means there is still a case for the detailed identification internal and external (other than studied in this paper) stakeholders involved in the EAI adoption process in LGAs. The authors sought to address the established voids by proposing a stakeholder theory for investigating the role of stakeholders in EAI adoption process in LGAs. This research takes into consideration two of the four dimensions, i.e., factors and adoption lifecycle phases from the EAI adoption model proposed by Kamal et al., (2009). An interpretive, qualitative multiple case study approach was selected to conduct this research. The proposed stakeholder theory in this paper in the context of EAI adoption process makes a novel

contribution at both the practical and conceptual level. At a practical level, the stakeholder theory contributes towards a deeper understanding of the stakeholders involved in the EAI adoption process in LGAs. At the conceptual level, it proposes a systematic process of identifying, exploring their perceptions on factors and their involvement on the adoption lifecycle phases.

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Understanding Shared Services:
An Exploration of the IS Literature

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ABSTRACT

In a competitive environment, companies continuously innovate to offer superior services at lower costs. 'Shared Services' have been extensively adopted in practice as a means for improving organizational performance. Shared Services are considered most appropriate for support functions and are widely adopted in human resource management, finance and accounting, and more recently employed as an information systems (IS) function. As computer-based corporate information systems have become de facto and the backbone of administrative systems, the technical impediments to sharing have come down dramatically. As this trend continues, CIOs and IT professionals need a deeper understanding of the Shared Services phenomenon. Yet, analysis of IS academic literature reveals that Shared Services, though mentioned in more than 100 articles, has received little in depth attention. This paper investigates the current status of Shared Services in IS literature. The authors present a detailed review of literature from main IS journals and conferences. The paper concludes with a tentative operational definition, a list of perceived main objectives of Shared Services, and an agenda for related future research.

Keywords: Archival Analysis, Information Systems, Literature Review, NVIVO Analysis, Shared Services

INTRODUCTION AND BACKGROUND

Organizations constantly face challenges to innovate their customer offering, improve the quality of their business processes and operate at lower cost. The current global financial crisis has amplified this need. Managers are looking to 'Shared Services' as one means of improving organizational performance (Wagenaar, 2006).

While the notion of Shared Services is still under debate, it is broadly referred to as "*the concentration of company resources performing like activities, typically spread across the organization, in order to service multiple internal partners at lower cost and with higher service levels, with the common goal of delighting external customers and enhancing corporate value*" (Schulman et al., 1999). Shared Services has become increasingly popular within both public and private sector organizations[1] (Bergeron, 2003; Borman, 2008; Janssen & Joha, 2006b;

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Wagenaar, 2006), where it is mostly deployed in large organizations, with a predominant focus on support processes (Ulbrich, 2006). "*Since the late-1990s, the fast-spreading shared service concept has increasingly become popular as an organizational change approach, focusing on the theoretical potential for extensive improvements in support processes*" (Kagelmann, 2000; Schulman et al., 1999, cited in Ulbrich, 2006, p. 191).

Potential benefits of Shared Services have been extensively discussed in the commercial press e.g., "*promote efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation*" (Bergeron, 2003). Cecil (2000), reports that 16 of the top 20 Fortune 500 companies have Shared Services Centres. Shared Services success stories such as General Electric (Lacity & Fox, 2008), DEC (Lacity & Fox, 2008), Reuters Asia (Lacity & Fox, 2008; Businessintelligence, 2005), Allianz (Lodestone, n. d), and Queensland Government (Queensland-Government, 2008), are many. Leading research firms such as Gartner provide a range of reports that describe the application of Shared Services in different industries, stating that "*Many enterprises are looking to shared services to support efficiency goals and to enhance business integration and agility*" (Gartner, 2008, p. 2).

Shared Services is considered most appropriate for support functions, and is widely adopted in Human Resource Management, Finance and Accounting (Cooke, 2006; King, 1998; McIvor et al., 2002; Peters & Silver, 2005; Webster, 2007). More recently Shared Services is being employed for the Information Systems (IS) function, and although not adopted as widely as by other functions, recent reports (Lacity & Fox, 2008; Peters & Silver, 2005) indicate that IS Shared Services is growing at a fast rate.

IS applications and infrastructure are an important enabler and driver of Shared Services in all functional areas. As computer based corporate information systems have become de facto and the internet pervasive and increasingly the backbone of administrative systems, the technical impediments to sharing have come down dramatically. As this trend continues, CIOs and IT professionals will need a deeper understanding of the Shared Services phenomenon and its implications; *"successful management of IT shared services was recently listed as one of the seven habits of effective CIOs"*(Lacity & Fox, 2008, p. 17).

As a *"discipline that is driven by rigour and relevance"* (Benbasat & Zmud, 1999; Davenport & Markus, 1999; Lee, 1999), IS academia has a vested interest in the growing phenomenon of Shared Services; a domain that warrants research in relation to the IS function, IS applications and IS infrastructure in organizations. In particular, IS as a discipline should be interested in Shared Services because they can drive radical change to the IS infrastructure and architecture (Curley, 2006; Ross & Beath, 2006; Weill & Vitale, 2002); IS can play a major role in identifying opportunities for Shared Services in other functional areas and in preparing the business case, as well as the IS strategy; IS can either internally or through an external service provider, play a major role in transitioning to, and ongoing operation and evolution of the Shared Services environment. However, until now there has been no systematic study of Shared Services in the IS academic literature.

Therefore, a structured approached was devised and applied to systematically review the status of Shared Services literature in the IS domain. The driving research question being 'How is the notion of Shared Services perceived and reported by IS researchers?' This paper is specifically aims to report on how IS academia have defined the Shared Services notion and what objectives they have reported on. A better understanding of what Shared Services really are and why organizations deploy them, are important for the progression and success of Shared Services in practice and academia. Such results will, for example, help build a better understanding on what drives the interest for Shared Services (Hewlett-Packard, 2006) and form the foundation for deriving performance measures related to Shared Services (Boessenkool et al., 2006). It can also support the design

and deployment of shared service structure and governance (Firecone, 2007); and help better understand the nature of Shared Services organizations (Kearny, 2004).

The contributions of this paper are threefold. First, we demonstrate the lack of academic IS literature on Shared Services; that same literature evidencing a need for better understanding Shared Services. Second, drawing from the limited existing IS literature on Shared Services, we provide preliminary definitions and objectives of Shared Services and present a potential research agenda for future research in the domain. Third, we detail a pilot literature analysis approach, developed and tested for the study of Shared Services in IS literature; to be extended to a broader range of academic disciplines, the results of the extended study expected to contribute to a stronger conceptualisation of Shared Services.

The remainder of this paper proceeds as follows. The next section presents the research strategy. Discussion of findings is in the following section. The paper concludes with a summary of the findings and recommendations for future research.

RESEARCH METHOD

This study is specifically devoted to searching and reviewing the literature on the Shared Services concept; predominantly the focus here is on how, the nature of shared service is perceived and reported by other researchers in Information Systems. Following Levy and Ellis (2006), the researchers followed a three staged method to extract, analyse and report the literature based findings. The first stage involved identifying the articles to be included in this review. The second stage comprised of designing and implementing an appropriate classification scheme to match with the study objectives. Finally, the third stage consists of synthesizing the coded details and analysing the literature to respond to the research objectives of this study. The following sections describe each phase in detail.

Extraction of Relevant Papers

In defining the research method for a comprehensive review of the IS literature on Shared Services, two main criteria have to be identified and clarified: (1) the sources, and (2) the search strategy (Cooper, 1998). The sources refer to which outlets are to be targeted, and the search strategy refers to what search terms to utilize during the article extraction process. The aim was to characterize Shared Services from an IS perspective and to review and depict the nature of Shared Services publications in IS. Thus, the primary search was limited to the IS domain.

Journals and academic conferences were considered. It was resolved to canvass the 40 IS journals listed at the 'ISWorld NET' web site[2]. These journals were identified after a comparison of 9 published papers on IS academic journal rankings (as reported in the 'ISWorld NET' web site). To ensure that the literature reviewed was as current and inclusive as possible, the proceedings from major conferences were also examined. The IS conferences to target were determined based on those that were supported by the Association of Information Systems (AIS)[3]. Thus, the following IS Conferences were included within the scope; the proceedings of International Conference on Information Systems (ICIS), European Conference on Information Systems (ECIS), Pacific Asia Conference on Information Systems (PACIS), Australasian Conference on Information Systems (ACIS), and Americas Conference on Information Systems (AMCIS). Articles published from their inception to present (May 2009) were accessed.

The article extraction was conducted in multiple iterations. In terms of the search strategy, first, the key word 'shared service' was searched for, in the title, abstract, and key words of all papers in the target source list, through a database search. This yielded 4 from the IS journals and 4 from conferences (hereon, we refer to these 8 as the "principal" set of papers).

As this search only yielded very few articles, we extended the study to search for the key word 'shared service' in the body-text

field as the next step. Ten selected IS journals[4] (based from those that yielded results in the high-level search, and a selected set from the 'IS world net' journal ranking list - based on topic alignment to Shared Services), and all 5 AIS conferences mentioned earlier were included in this second-staged search. The 10 journals were selected after eliminating those IS journals from the IS world net journal ranking list, that seemed less aligned with the notion of Shared Services (i.e., Artificial Intelligence). These were excluded from this full-text search, to sustain efficiency and feasibility. All papers in these sources were downloaded as full text pdf files. They were systematically indexed (by year and source) using the Adobe Acrobat professional tool. Adobe Acrobat professional's 'advance-search' facility was used to search the indexed papers. 99 papers (after removing duplications with the principal paper set) were identified through this effort, where they had mentioned Shared Services meaningfully, somewhere in the text of the paper (hereon, we refer to these as the "secondary" set of papers). Thus, the sample paper pool having a total of 107 papers (99 secondary and 8 principal) as we entered the pre-analysis planning phase.

Preparing for the Analysis

Two key aspects are of importance to mention when describing the preparatory phase for the analysis; the a-priori coding scheme and tool(s) used. They go hand- in-hand and are described below.

The goal of this paper was to derive a synthesized definition and identify the most commonly reported goals for Shared Services, based on literature. As mentioned earlier, what is reported herein is a sub-set of a larger study which had broader intensions. NVIVO 8.0 was used as a qualitative data management and analysis tool; to systematically code and analyse the data within one single repository. NVIVO has effectively been applied for analysing prior literature (Bandara, 2006; Gregorio, 2000), and this study adapted the coding and analysis strategies based on these prior studies.

Key areas of interest, in this case; 'Shared Services definitions' and 'objectives of Shared Services' (amongst others) were placed as main tree-level nodes within the NVIVO data-base that was created for this project. A tree-level node is a physical location within the tool, where you store the groups of ideas that would be coded. All the articles extracted were entered and saved within NVIVO as 'documents,' which are simply data that one analysis in the study. The aim was to conduct the analysis in two levels. The goal of the first-level-analysis was to capture the main details that related to each main theme – at a high level. In the second-level-analysis, these extracted details will be analysed deeper to derive the intended findings. A detailed coding-protocol was devised by the researchers, to confirm the coding plan and scheme. A sample (3) of the papers (from amongst the primary papers) were coded by two of the researchers and the coding protocol was strictly followed, proving to assist in maintaining rigor and inter-coder reliability. The overall research findings and the analytical activities that supported these findings are presented in detail in the next section.

DATA ANALYSIS AND FINDINGS

This section presents the results of the literature-based analysis. First the extent of the academic IS literature on Shared Services is discussed and it is argued that more research is warranted. Next is presented a synthesis of definitions and objectives of Shared Services, as identified from the IS literature. This section concludes with a research agenda.

Need for Academic IS Literature on Shared Services

Our literature study shows that there is a lack of academic IS literature on Shared Services. Shared Services is an interesting area of research because of its impact on the IS function in organizations and the driving and enabling role of IS applications and infrastructure. It is also a very relevant area of research because of its

growing importance in practice. We, therefore, argue that more academic IS research and publications are required discussing Shared Services in organizations, in particular in relation to the IS function.

Our literature study showed that only 8 papers are dedicated to Shared Services from a large pool of papers across 45 main IS outlets (this included all outlets as listed in the 'ISWorld NET' journal ranking and all the 5 AIS sponsored IS conferences - after searching them since their inception). Shared Services literature in IS is still very 'young', where the first main IS papers on Shared Services were those of (Ulbrich); (Veersteeg and Bouwman); and (Janssen and Joha) which appeared in Business Process Modelling Journal, Information Systems Frontier and Americas Conference on Information Systems in year 2006. However about a hundred papers (published since 1995) mention Shared Services in their articles, thus indicating a growing interest in and prevalence of Shared Services in IS, especially in relation to interest areas such as Sourcing (Accenture, 2006a; HRfocus, 2007; Kakabadse & Kakabadse, 2000), ICT Governance (e.g., Goh et al., 2007); E-Government (e.g., Janssen & Joha, 2006b; Janssen & Wagenaar, 2003; Janssen & Wagenaar, 2004); Public and Private Sector (e.g., Janssen & Joha, 2006b; Walsh et al., 2006); and University (e.g., Deloitte, Touche, & Tohmatsu, 2001). Therefore, to advance the academic IS body of knowledge with respect to Shared Services as a research topic and context factor, more academic IS research and publications are required.

The relevance of Shared Services is illustrated by extensive discussion of potential related benefits in the commercial press (e.g., reduce cost, accumulate intellectual and capital assets, provide services with customer and process focus, and deploy new technology) (Casiraya, 2001; Shah, 1998). Despite its apparent benefits, anecdotal evidence (Craike & Singh, 2006; Janssen & Joha, 2006b; Lawson, 2007; Shah, 1998) suggests that many organizations have difficulty understanding the context and details of Shared Services. Thus, evidence from Shared Services initiatives has been mixed, suggesting value from further investigation of the phenomena. While there have been industry-based research reports, these are typically limited to trend analysis (Accenture, 2005; Deloitte, 2007a; Deloitte, 2007b) or narrative description of the journey from Shared Services concept-to-implementation (Accenture, 2006b; Gartner, 2008).

Concluding, as an overall discipline, IS lacks academic research in Shared Services. This is supported by other researchers in the field (Borman, 2008; Craike & Singh, 2006; Ulbrich, 2006). This paper calls for addressing this gap; there is a need for better understanding the phenomena of Shared Services, its relation to the organization of the IS function, and its relation with other IT interests areas such as governance or enterprise systems. The next sections present an analytical review of the definitions and objectives of Shared Services as reported within the limited pool of IS literature. This section concludes with a set of propositions derived for this analysis that is the first formulation of a detailed research agenda for Shared Services in IS.

Defining Shared Services: A Review of IS Literature

This section reviews how IS research defines Shared Services. As mentioned earlier, a separate node was dedicated in the coding scheme of the NVIVO database to capture any 'definitions' introduced or referred to by the papers included in this analysis. Table 1 provides a summary of this analysis. Six papers offer some unique attempt to define Shared Services, at least partially, if not completely. Amongst these, 3 papers refer to the definitions provided by Schulman et al. (1999) and 2 papers refer to Bergeron (2003) which are from the management discipline. This could mean that shared service is a common terms that needs little explanation. However, as the phenomenon is very recent, it cannot be assumed that the broader IS community is that familiar with it. Alternatively, it could mean that while Shared Services are mentioned, it is not

considered as important enough. This seems also hardly the case, as there are many direct statements in literature that refer to objectives of Shared Services in relation to the performance and organization of the IS function. Therefore, we argue that there has been a lack of attention and research of what Shared Services is and how familiar or different it is from other forms of the organization and sourcing of the IS function.

Shared Services can be perceived as a form of sourcing, and thus a clear description of what Shared Services is, and in particular how it differs to other sourcing arrangements should be made in order to define and clearly understand the scope of the notion. *"There is a need to*

Table 1. Summary of all definitions of shared services found within IS literature

	Paper	Definition made
IS papers specifically defining Shared Services		
1	Lacity and Fox (2008)	*"the consolidation of support functions (such as human resources, finance, information technology, and procurement) from several departments into a standalone organizational entity whose only mission is to provide services as efficiently and effectively as possible."* (Accenture, 2005, cited in Lacity & Fox, 2008, p. 17)
2	Borman (2008)	*"…retains the core concept of concentration while avoiding prescriptive requirements to achieve specific objectives or operate in set ways."* (Longwood & Harris, 2007, cited in Borman, 2008). Other definitions referred by this author are Schulman et al. (1999, p. 9) and Bergeron (2003, p. 3).
3	Sedera and Dey (2007)	*"The concept is simple bring-together functions that are frequently duplicated across divisions, subsidiaries or operating units and offer these services more efficiently and at a lower cost."* (Sedera & Dey, 2007, p. 1). Another definition referred by the authors is Schulman et al. (1999, p. 9).
4	Ulbrich (2006)	*"… shared services gather a selection of common and well-defined services to provide these services to an organization's units, acting independently."* (Ulbrich, 2006, p. 197) Other citations referred by this author are Schulman et al. (1999, p. 9), Bergeron (2003, p. 3), Moller (1997), and Quinn et al. (2000).
5	Whitaker et al. (2006)	*"…consolidating IT and business processes throughout the firm into a single or small number of centers owned and run by the firm."* (Shah, 1999; Ulrich 1995, cited in Whitaker et al., 2006, p. 3249)
6	Gibson and Arnott (2005)	*"A shared service is the standardisation and consolidation of business functions, in order to reduce process duplication and at the same time centralise controls and processes."* (Gibson & Arnott, 2005, p. 9)
Other common definitions cited by IS authors		
Schulman et al. (1999) defines Shared Services as "*The concentration of company resources performing like activities, typically spread across the organization, in order to service multiple internal partners at lower cost and with higher service levels, with the common goal of delighting external customers and enhancing corporate value*" Bergeron (2003) defines Shared Services as "*Shared services is a collaborative strategy in which a subset of existing business functions are concentrated into a new semi-autonomous business unit that has a management structure designed to promoted efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation*" Moller (1997) defines Shared Services as *". . . a shared service centre (SSC) is an independent organisational entity which provides well defined services for more than one unit (which may be a division or business unit) within an organisation. The SSC is responsible for managing its costs and the quality and timeliness of the services it provides to its internal customers. It has its own dedicated resources and typically will have informal or formal contractual arrangements, often called service level agreements, with its customers."* Quinn et al. (2000) defines Shared Services as *". . . shared services at a simple level refers to the practice of business units, operating companies and organizations deciding to share a common set of services rather than have a series of duplicate staff functions."*		

integrate these concepts for a comprehensive view" (Whitaker et al., 2006, p. 3249). "*Looking to the future, the large-scale changes to the business environment... are likely to tip the balance of factors associated with outsourcing toward... shared services*" (Davenport, 2000, p. 175). Thus, it is important to clearly understand what sourcing model is used and when it is best to change from one form to another. This is especially valid for Shared Services in the IS domain, as one needs to clearly position ICT related Shared Services amongst other ICT outsourcing options when considering Shared Services strategies and adoptions. However, only Ulbrich (2006) made any attempt to compare and contrast Shared Services to other sourcing arrangements. The author states that Shared Services is somewhat similar to outsourcing, and that *"the main difference is where the service provider is located organizationally and that internal resources are used rather than those of a contractual partner"* (Ulbrich, 2006, p. 197). Furthermore, Shared Services can be seen as *"...an enabler that helps to create a platform for business growth, flatten organizational structure, and support of general group strategy. It is often a step towards globalization, an enabler for cultural organizational change, or a step towards external outsourcing"* (Kagelmann, 2000, p. 79-81, cited in Ulbrich, 2006, p. 199).

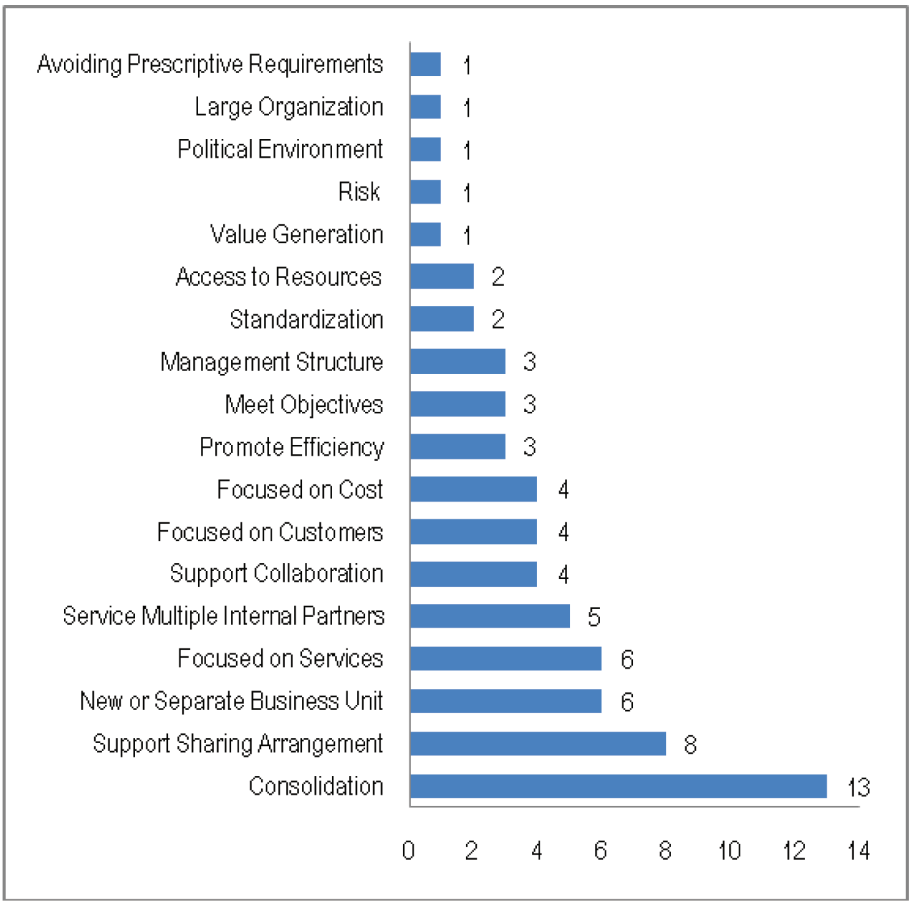
In an attempt to analyse how IS academia has deemed to define Shared Services in several ways; the key words provided in the few definitions used in the pool of IS literature extracted (as explained earlier) were analysed. Both direct definitions (as presented in Table 1, and indirect attempts to describe Shared Services, were used here from the principal and secondary set of papers). Figure 1 depicts these key words, graphed from least to most mentioned themes from 107 papers (indicated by the number of sources that have stated this as a key element when defining Shared Services).

While the data pool is very limited (as only a very few papers define Shared Services), it can be observed that 1) consolidation, 2) support sharing arrangement, 3) new or separate business unit, 4) focused on services and 5) service multiple internal partners are the most common themes used to define Shared Services within the IS literature. Deriving a clear definition for Shared Services within the IS context is a gap that has to be filled and this analysis provides a starting-point for proceeding with this. Within the context of the currently available academic IS literature, we define Shared Services as the internal provisioning of services by a semi-autonomous organizational unit to multiple organizational units involving the consolidation of business functions supported by a sharing arrangement.

Objectives of Shared Services: A Critical Review of IS Literature

An in-depth understanding of why an organization should consider shared-services is critical for its success; "*Make sure you know why you're implementing shared services*" (Gartner, 2008, p.1). Thorough understandings of its objectives are vital for the progression of the field and will be the foundation for its advancement in practice and research. For example, Shared Services objectives form the key input when designing a Shared Services decision-support framework or for benefits-realization and evaluation of Shared Services initiatives. This analysis systematically coded the different objectives of Shared Services as mentioned in the IS literature from 107 papers (8 principal and 99 secondary). Any direct or in-direct mention of an objective was captured in the higher level node in the first round of analysis. The content captured in this node was then analysed to build a set of objectives bottom-up from the coded data. Figure 2 depicts the high level summary of the objectives identified through the literature (based on the number of sources that have stated each).

Figure 1. Key themes identified from the shared services definitions provided in IS literature



It can be observed from Figures 2 that the top three objectives of Shared Services that IS literature have reported on are; support consolidation and integration, cost effectiveness and support standardization.

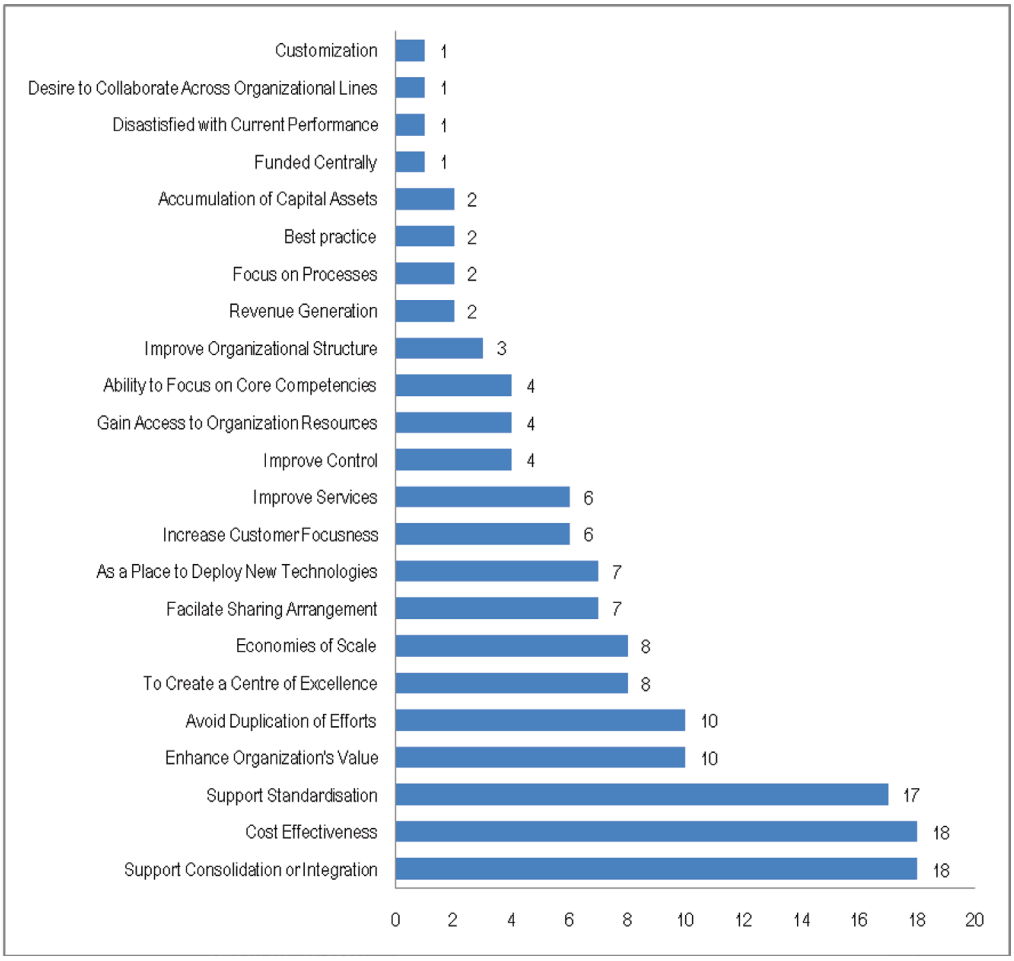
When taking a closer look at the top five objectives, one can argue that there are two relatively more strategic objectives (enhance value and decrease costs), and three organizational objectives. Therefore, within the context of the currently available academic IS literature, the main objectives of Shared Services are enhancing the organization's value and decreasing its costs by supporting consolidation and integration, supporting standardisation, and avoiding duplication.

A Potential Research Agenda for Shared Services Identified From a Critical Review of IS Literature

This section is dedicated to deriving a high level research agenda that has been motivated by this study on Shared Services definitions and objectives. The coded data was analysed further to identify potential propositions for future research. NVIVO's query functions were used to identify potential relationships and implied causality amongst the coded objectives. These are presented (with evidence from data) below.

The first observation is that IS academics must make a stronger attempt to define Shared Services, especially for the IS context. Research

Figure 2. Shared services objectives as reported by the IS literature



propositions to pursue are: 'What elements constitutes Shared Services (within the ICT context)?' and 'How does Shared Services in IS, differ in other sourcing arrangements related to ICT?' Of course this also requires addressing the underlying methodological question of 'How can one best derive and validate a Shared Services definition?'

Secondly, while Shared Services is deployed with the expectation of various benefits, a deeper review of what the actual intensions of Shared Services are (especially in relation to IS), is an area requiring further investigation. The data coded in the NVIVO database under 'objectives' was analysed further to identify such potential relations. A set of research questions (inspired by current literature), has been derived as a starting point for future research on Shared Services. Table 2 presents these propositions, together with supporting literature.

CONCLUSION AND OUTLOOK

Many organizations are adopting Shared Services and there has been a significant presence of Shared Services in the recent trade press. Shared Services are promoted in the commercial press as a powerful model for reducing cost,

Table 2. Potential research to pursue in relation to Shared Services objectives

Research proposition	Motivating evidence from literature
1. Should organizations invest in technology first when deploying Shared Services? a. Is technology a key enabler for progressing with Shared Services initiative? b. Can organizations gain cost effectiveness through technology investments, when deploying Shared Services initiatives? If so, how? c. Is integration capability a key enabler for sharing within Shared Services initiatives? If yes, how can IT support integration capabilities?	"*Reuters found that technology was a critical enabler of its regional shared services*" ... and "*This is worth investing in before anything else*" (Lacity & Fox, 2008, p. 22) *"The global ERP system drove process standardization and was the "engine" of the regional shared services."* (Lacity & Fox, 2008, p. 22) Cost effectiveness can be achieved by the organization through technology investment when deploying Shared Services. *"In 2001, the corporate CFO decided to significantly reduce finance costs by standardizing finance policies for global delivery (BPR), implementing standard, global enterprise resource planning (ERP) and workflow systems (technology enablement),..."* (Lacity & Fox, 2008, p. 19) In the literature, one of the goals adopting Shared Services is to deploy new information technology. Integration capabilities have been seen as an enabler for sharing arrangement in the Shared Services initiative. *"The ICTU processes are primarily aimed at creating coordination and integration capabilities to enable the sharing of services among as many agencies as possible in order to gain economies of scale".* (Janssen & Joha, 2006a, p. 2309)
2. Are organizations able to improve customer foci by centralizing all the similar activities or business functions in a Shared Services initiative? a. How/Can Shared Services improve the services to a company's internal customer?	The Shared Services approach has a focus on putting the customer first. *"According to them, business units inevitably become more comparable, when drawing together activities that have been performed similarly in various locations before. Furthermore, work can be handled quicker and more precisely, putting the customer in focus."* (Forst, 2001; Norling, 2001, cited in Ulbrich, 2006, p. 198) Shared services have been designed to improve the customer foci in the organizations. *"... designed to promoted efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation"* (Bergeron, 2003, cited in Borman, 2008, p. 2)
3. How can organizations generate cost effectiveness through Shared Services initiative? a. Can organizations generate cost effectiveness by implementing Shared Services arrangement? b. What types of Shared Services arrangement can be utilized within the organizations in order to gain cost effectiveness? c. Can organizations realize the economies of scales when deploying Shared Services initiative? 4. How can organizations avoid duplication of efforts by implementing Shared Services?	Reuters found that financial cost can be reduce by *"standardizing finance policies for global delivery (BPR), implementing standard, ..."* (Lacity & Fox, 2008, p. 19) *"Services are more and more shared among public agencies to gain efficiency benefits."* (Janssen & Joha, 2006a, p. 1) *"Hospitals and physicians are also able to share the use of the systems for ancillary services such as payroll, budgeting, and general accounting. These types of shared services arrangements provide cost efficiencies for both the hospitals and physicians (Guiney, 1994)."* (Lockamy III & Smith, 2009, p. 7) *"Cost reduction is often a primary benefit and driving force for companies to implement shared services (Norling, 2001; Triplett & Scheumann, 2000).Shah (1998)and Triplett and Scheumann (2000) argue that shared services realize economies of scale, and thereby gain efficiencies that are normally reserved to centralized organizations. The main goal is to provide optimal solutions for the lowest possible cost (Funk, 2000; Joachim, 2001)."* (Ulbrich, 2006, p. 198) Reuters was able to reduce financial costs by *"...moving a significant amount of work from decentralized business units to six new regional services centers (organizational design)".* (Lacity & Fox, 2008, p. 19) *"Economies of scale through centralisation, the removal of duplication and being better positioned to secure funds to invest in the latest technology were the most common reasons given for establishing SSCs."* (Borman, 2008, p. 8)

continued on following page

Table 2. continued

5. What are the benefits of standardization within Shared Services and how can these be best arranged?	Shared Services benefits can be realize through standardization process. *"Cecil (2000)and Triplett and Scheumann (2000) see benefits in a standardization process. According to them, business units inevitably become more comparable, when drawing together activities that have been performed similarly in various locations before."* (Ulbrich, 2006, p. 198)
6. Are Shared Services able to improve an organization's structure through consolidating processes? a. How/Can the consolidating process facilitates the shared service arrangement within the organizations? b. Are organizations able to generate cost effectiveness through the consolidation process within Shared Services initiative? c. Are organizations able to avoid duplication of efforts through consolidating processes? If so, how?	*"…, many firms have turned to a shared service model, consolidating IT and business processes throughout the firm into a single or small number of centers owned and run by the firm (Shah, 1999; Ulrich, 1995)."* (Whitaker et al., 2006, p. 3249) *"…taking the concept of consolidation and shared services beyond the organization's four walls by sharing applications, hardware or core business processes with other firms to further reduce costs."* (Davenport et al., 2004, p. 20) *"From a business and organizational perspective, the most obvious route to consolidation- related cost savings is the adoption of shared services."* (Davenport et al., 2004, p. 20) Organizations are able to avoid duplication in efforts when deploying Shared Services. *"By cutting out duplicate support processes and non-strategic activities, and organizing them as so-called shared services."* (Ulbrich, 1996, p. 196) *"… bring-together functions that are frequently duplicated across divisions, subsidiaries or operating units… "* (Sedera & Dey, 2007, p. 1)
7. Are Shared Services able assist organizations build a Centre of Excellence to gain access to organizational resources? a. Should organizations establish a Centre of Excellent to improve organization's control in Shared Services initiative?	Shared Services have several goals, which one of the goal is establishing Centre of Excellence. *"Establishing a centre of expertise is another goal that has been mentioned. Employees are more satisfied and their competencies can be better utilized and anchored in the organization, which contributes to improved knowledge management"* (Kagelmann, 2000, p. 77-8, cited in Ulbrich, 2006, p. 199) *"In this way, experts can be utilized by all business units for a comparable low cost."* (Ulbrich, 2006, p. 198). *""Expertise was scattered around the organizations and the departments were often not able to gain access to the expertise needed and to consolidate experiences." and "The municipalities decided to concentrate their ICT departments within one SSC, as they had similar objectives and ambitions."* (Janssen & Joha, 2006a, p. 2309) A centre of excellence (combination of Shared Services centre and a group of expertise) are able to improve organization's control. *"Since these SAP developments were performed by diverse groups of developers with different knowledge domains and specializations, a shared service center, together with an application management team was created to coordinate and monitor modifications to the SAP system. Through a systematic procedure of authorization and internalized payment for software modifications, the application management team was able to sift out unnecessary changes to the ERP system and reduce the impact of implemented changes across the organization."* (Lim et al., 2005, p. 142)

increasing quality and creating new capabilities. The potential to leverage ICT related benefits through Shared Services has been recognised and more and more IT related Shared Services solutions are predicted to take place, to address calls for efficiency, reduced costs, quality improvement and innovation. While Shared Services in practice has been excelling, it has not gained enough attention and momentum from academia. From an IS academic perspective, our goal should be to: a) do strong, relevant research that informs the practice of Shared Services and related curriculum; and b) anticipate important roles our IS graduates might assume in relation to Shared Services, and insure we are preparing them to be preferred for these roles. Such roles

might be in the business areas of Shared Services using organizations, in the IS function of Shared Services using organizations, with software or service providers involved in Shared Services.

This paper is the first attempt to investigate and report on the current status of Shared Services literature in IS academia. It consisted of a very detailed review of IS literature from all main IS outlets – which consisted of the 40 IS journals listed in the 'ISWorld Net' and all the 5 AIS sponsored IS conferences. All sources were searched for, since their inception. The resulting set of papers showed that the current body of knowledge is still very limited while there is a need for a better understanding of Shared Services. This paper provided a preliminary understanding of definitions and objectives of Shared Services as reported in the academic IS literature, and derived a set of research propositions that can be investigated further.

Within the context of the currently available academic IS literature, we defined Shared Services as the internal provisioning of services by a semi-autonomous organizational unit to multiple organizational units involving the consolidation of business functions supported by a sharing arrangement. We identified as the main objectives of Shared Services; enhancing the organization's value and decreasing its costs by supporting consolidiation and integration, supporting standardisation, and avoiding duplication. Definitions and objectives are critical for the progression of the field, for example; to understand what drives the interest for Shared Services, to form the foundation for deriving performance measures related to Shared Services, to support the design and deployment of Shared Services structure and governance; hence providing a strong foundation for further research in Shared Services.

The content presented here was a segment of a larger study that attempts to characterise Shared Services via published literature. A three-staged systematic approach; for literature extraction, preparing for analysis and conducting detailed literature analysis, utilising the functionality of a range of tools (i.e. Adobe Acrobat professional, NVIVO and EndNote) was devised and applied here. This paper essentially pilot tested the methodology. This approach can be re-used to cover a broader range of academic outlets to derive a detailed characterization of Shared Services beyond the IS domain and to obtain a more in-depth understanding of Shared Services beyond definitions and objectives.

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ENDNOTES

1 for example, Borman (2008) who conducted a case study of shared services in the public and private sector; Janssen and Joha (2006b) and Wagenaar (2006) who conducted a case study of shared services in the public sector.

2 Available at: http://ais.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=432, last accessed March 6th, 2009.

3 The Association for Information Systems (AIS) founded in 1994, is a professional organization whose purpose is to serve as the premier global organization for academics specializing in Information Systems (see http://home.aisnet.org/ for further details).

4 These 10 journals were: MIS Quarterly (MISQ), IS Research (ISR), Journal of MIS (JMIS), European Journal of IS (EJIS), Information & Management (I&M), Communication of AIS (CAIS), Journal of AIS (JAIS), Information Systems Frontier (ISF), MIS Quarterly Executive (MISQE), and Business Process Modelling Journal (BPMJ).

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