Title

Case Study: Services Dedicated to the Algerian Health Insurance

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Abstract

The provision and the improvement of services by the public administrations is a fundamental issue of e-government in terms of

quality, efficiency and transparency. However, citizens and enterprises in Algeria as in other emergent countries suffer from the bad quality, the not accessibility and the not transparency of

the services provided by the public institutions. Face up to this problem, it appears necessary to adopt methods and models allowing to identify and to construct e-government services in

compliance with the legal framework. In this paper, we propose two process models for identification and construction of e-government services formalized by using MAP formalism. We apply the

model's strategies to construct the services provided by the Algerian health insurance.

1. Introduction

In the classical approaches, the Information System designers take into account the legal framework manually what sometimes involve

incoherence into institutions. This incoherence influences directly on the quality of the services[1] provided by these

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[1] We adopt this definition of service, gave

by Zeithaml and Bitner (1996):" In business science, service is defined as any business action or business activity that has added value result for a person or a system, this action or activity is offered by another person, entities or a system that make benefits from providing this action".

institutions. That's why, it proved indispensible to realize and apply models and approaches integrating the legal framework content as a base to construct e-government services in order

to enable institutions to provide services in compliance with the legal framework. The guarantee of the compliance of e-government services with the legal framework guarantees

us the transparency and the efficiency of the delivered services.

Before describing our model, we discuss some research works dedicated to the e-government field. Several

research works already realized in this field are interested to propose methods and techniques to the e-government services provision and their compliance with the legal

framework. Simon and Olbrich (2005) addressed the problem of the integration of the legal framework on the activities models of the institution and its influence on the quality of e-government

services by proposing a method based on Petri nets to demonstrate the impact of the legal regulation on the definition and the implementation of public and private business processes.

Alpar and Olbrich (2005) proposed an extension of a method driven process by integrating legal framework in the constructed models. However, in these methods, compliance with legal sources

typically rely on experiences and the reference to laws is manually done by business stakeholders and e-government IS designers. Moreover, in government the services provision must be

online i.e. services must be accessible via Internet or other means of communication. Several e-government projects interested to address this aspect. Terrgov and OntoGov

projects are launched by a consortium of European countries. These projects took an interest to find the best means to model e-government services so as to give them accessible via internet and at

the same time interoperable, comply with the legal framework. The proposed solution of these projects based on the ontologies offered by OWL-S so that modeling services. Adding to

this, they also proposed to model the texts of laws by using ontologies, and to resolve the issue of the propagation of law amendment they proposed

the means of legal ontology versioning. These works have not defined strategies or mechanisms to establish an explicit link between services and the legal framework. Terrgov and the

approach for the re-engineering of the public administration's proposed by Tarabanis et al (2005) did not specify a means allowing the identification of services from the legal sources. An approach

for the identification and construction of e-government services in compliance with the legal framework is proposed by Khadraoui et al (2008).

The details of our model will be described at the remainder of this paper as well as the application of the directives of our model in one of institutional domain in the Algerian context.

In this paper, we present, in section 2, the framework of the approach proposed by Khadraoui et al (2008). In section 3, we present our proposed process models. In Section 4, we present our case

study. In section 5, we conclude and we give some perspectives for the future work.

2. The framework of the proposed approach

In the approach for identification and construction of e-government

services in compliance with legal framework, the services are constructed on two steps, (i) Construction of law based ontology and (ii) Identification of e-government services.

Ontology is defined in the information system (IS) engineering context as a conceptual model which describes the field characteristics. Law based ontology proposed by

Khadraoui and Leonard (2007) is constructed from texts of laws which are considered as universe of discourse for IS engineering. We construct this ontology by carrying out these tasks: (i)

selection of the legal sources governing the activities of the public administration, (ii) identification of the roles from legal sources, (iii) extraction of the business rules, and (iv)

extraction of the concepts from the legal sources. The results are a set of validated hyperconcepts. A hyperconcet is defined by khadraoui and Leonard (2007) as a space of

ontological knowledge, elaborated from texts of laws, relating to an ontological role within an institution. It forms a relevant semantic unit for a group of actors within an

institution. The definition of the concepts Ontological role, business rule, and activity is given by Khadraoui and Leonard (2007); an ontological role is defined as a

particular organizational role that is not be in question during the IS development. A business rules define one of business aspects within institution. They describe the

constraints governing the execution, by business actors, of one or more activities as well as they can be specified in formal manner. An activity is considered as a set of tasks

producing and using information assumed by persons within institution. The section 4 is dedicated to our case study. We illustrate the procedure of ontology

construction by an example of a law fragment.

Law based ontology comprises all regulation information describing e-

government services. This feature made it a capital source allowing identification of e-government services in compliance with the legal framework. Mainly, services are identified based on the

extracted ontology by means of hyperconcepts. Khadraoui et al (2008) proposed an object model where they represented the concepts used in the identification and construction of e-government

services as well as the relation between these concepts. The key concept in this model is the concept service. E-government services are defined and built based on the constructed hyperconcepts.

This task is carried out by analyzing the semantics of the constructed hyperconcepts. Particularly, in the e-government field, services are governed by a set of business rules described in the text of

laws. Consequently, we find
the concepts ontological
business rule (OBR), law
fragment (LF), and law in the
object model. According to
Khadraoui et al (2008),
business rules are used to

enable the administration to better achieve goals, communicate between principals and agents, between the organization and the interested third parties, demonstrate the fulfillment of

legal obligations, operate more efficiently, perform analysis on current practices. Consequently, business rules are very significant because they guarantee the conformity with the legal framework.

The public administrations are responsible to provide services to the enterprises, the citizen, and itself internally. In the proposed model, public administrations, citizen and enterprises are

represented by the entity stakeholders. A part of defined stakeholders can be found in an ontological role described in laws thus ontological role is represented by an entity alone.

Moreover, it is very important to specify how services are descried in IS. Khadraoui et al (2008) proposed the concept Information System Component (ISC) to enable to work with a part of an IS as a

component. In their proposed approach ISC content is constituted of three aspects: static aspects which specify the data structure of the IS, the dynamic aspects which express the behavior of

different elements of the IS, and the integrity constraints aspects which specify the rule governing the behavior of the IS elements. The integrity constraints of an IS generally represent the business rules

of an organization. An integrity constraint is a logical condition defined over classes and verified by transactions or methods, thus transactions are represented as an entity in the proposed object model.

The step of the identification of e-government services in compliance with the legal framework is realized by carrying out a set of tasks showed in the framework proposed by Khadraoui et al

(2008):(i) the identification of e-government services based on extracted ontology as showed previously, (ii) the specification of links between the e-government services and the legal sources, (iii) the

specification of resources and information necessary for a e-government services, (iv) the specification of stakeholder concerned by the e-government services, and (v) the specification of

transactions associated to e-government services. These tasks use the information expressed by the concepts represented in the object model of the approach while the strategies leading to fulfill

these tasks are given through our proposed process models which we will detail at the next section.

3. **Process model for the identification and construction of e-government services**

Map formalism allows us to represent process models called strategic models in a graphical representation. Therefore, this modeling allows representing processes expecting many possible ways

leading to elaborate the intended product or goal. In our work, we use Map formalism introduced in Rolland et al (1999) in the perspective of representing strategies allowing us to reach

our principal intentions which are the identification and the construction of e-government services.

In the method engineering field, a method is composed of one or several product models

and one or several of process models. In Raylté (2006) "*The product model specifies the concepts used by the method, the relation between these concepts as well as the constraints to satisfy. The*

process model prescribes a manner to do, a methodological demarche for reaching the intended goals. It describes, at an abstract level, the way to organize the production of the product: the

steps, the activities which they include, their scheduling and sometimes the criteria to pass from a step to another step. It plays the role of a mold in the process engineering ".

In the approach for identification and construction of e-government services, the second step is described by her product model. With that in mind, we propose two formalizations

for the process model of the approach using the Map formalism. The map formalism is founded on two concepts, intention and strategy. An intention is a goal to reach; a strategy is the

manner by what reaching an intention. A same intention can be reached by several strategies. The map is represented in the form of an oriented and labeled graph where the nodes represent

the intentions and the edges represent the strategies.

3.1 Process model for the identification and construction of e-government services

This map contains four intentions named: (i) Validated hyperconcept came from the first step construction of ontology, (ii) Services identification, (iii)

Services construction and (iv)Services validation.

See fig 1 on PDF online

We describe the strategies, also named directives, of this method as follow:

➢ *Directive for the identification of e-government services*: After the elaboration of the laws based ontology, we get the set of validated

hyperconcepts. The identification of services is fulfilled by the analysis of the semantic of each validated hyperconcept.

➢ *Directive for the construction of e-government services*: The services are identified and constructed on four steps:

- *Specification of the link between services and legal framework*: This step is realized by the extraction of law fragments describing each hyperconcept and by

analyzing of the business rule contained in these law fragments.

- *Specification of the link between the services, the information and resources*

and the necessary information for a service: This step is realized by grouping of business rules governing each service. These rules represent the

pre-conditions and post-conditions of the transactions that have to be fulfilled in each service.

- *Specification of the link between services and*

stakeholders: The stakeholders are the public administrations, the enterprises and the citizens. The link between services and stakeholders is

established by extracting the roles concerning each service.

- *Specification of the link between services and transactions*: The

transactions are associated
to the information system
components (ISC) which are
derived from the
constructed hyperconcepts.
This link is established by

extracting of transactions executed in each service.

➢ ***Directive for the service validation***: The services validation is

carried out by checking the completeness of all elements contributing to the construction of each service. The validation of the identified services is carried

out by applying the criteria specified by the IS designer on collaboration with business actors, and if necessary also with a lawyers or specialists in

legislation. A service can be revalued by introducing new elements or by removing elements contributing to the service construction.

a. *Detailed Process model for the identification and construction of e-government services*

In the map described in the Figure 2, we present the intentions in detailed manner. This map contains nine intentions named: (i) *Validated hyperconcept*, (ii) *Identification of services*, (iii)

Specification of the link between the services and the legal framework, (iv) *Specification of the link between the services, the information and resources and the necessary information for*

each service, (v) Specification of the link between services and stakeholders, (vi) Specification of the link between services and transactions, (vii)Services

construction and (viii) *Services validation*.

See fig 2 in PDF online

We describe the directives of this map as follows:

➢ *Directive for the identification of e-government services and the directive for the services validation are*

the same as the first map's (Figure 1).

➢ *Directive for the specification of the link between services and*

legal framework: This step is realized by extraction of law fragments describing each hyperconcept and by analyzing of the business

rule contained in these law fragments.

➢ *Directive for the specification of the link between the services, the*

information resources and the necessary information for a service: This step is realized by grouping of business rules governing

each service. These rules represent the pre-conditions and post-conditions of the transactions that have to

be fulfilled in each service.

➢ *Directive for the specification of the link between services and*

stakeholders: The stakeholders are the public administrations, the enterprises and the citizens. The link between services and stakeholders

is established by extracting of the roles concerning each service.

➢ *Directive for the specification of the link*

between services and transactions: The transactions are associated to the information system components (ISC) which

are derived from the constructed hypercpncepts. This link is established by extracting of transactions executed in each service.

➢ *Directive for the services construction*: The services construction is carried out by one of these three ways: by realization of the

intentions 2 and 3 after that the intention 1 has been realized, by realization of the intentions 1 and 3 after that the intention 2 has

been realized or by realization of the intentions 1 and 2 after that the intention 3 has been realized.

4. Case study

Algeria as other emergent countries suffers from the bad quality of e-government services and sometimes the needed services are not

proposed. Recently, some projects of introduction of ICT (Information and Communication Technology) in Algerian public institution had realized as the creation of web portals to some

institutions. However, these projects concern only both information and communication level and don't reply to the main citizen wish which is the best quality and transparency of services.

In our work, we have applied the approach described in this paper in the context of the social insurance domain in Algeria. Through this study, we have constructed a referential of services of the

health insurance, which will be used in the perspective of constructing an IS of the Algerian social insuranceorganism. The text of laws used in this study is the law n^0 83-11 of 2 July

1983[2] relating to the social insurance. In the remainder of

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[2]

http://www.casnos.com.dz/documents/Loi\%2083-11.pdf

this section we will show the different steps of the approach for the identification and construction of e-government services by using an example took from our case study presented in

master thesis elaborated by Allouache (2009).

4.1 Ontology construction step

4.1.1 Hyperconcepts identification

The process model for the ontology construction from the texts of laws is described by Khadraoui and Leonard (2007). According to this model, we identify the hyperconcepts on the basis of

the information regarding the extracted ontological roles. For example, basing on the law the hyperconcepts "*Specification of the beneficiary type*" is associated to the roles, "*Beneficiary on*

nature" and "*Social insurance organism (SIO)*".

4.1.2 Hyperconcepts construction

Each identified hyperconcept is constructed in form of map

named concept map[3]. In our
example (figure 3) we present

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[3] A concept map allows modeling the domain
knowledge by means of concepts and
semantic relations. It is represented in form of
graph, where the nodes represent the concepts

and the edges represent the link between these concepts. There are three kinds of links, (i) existential dependency link, (ii) specialization/generalization link and, (iii) instantiation link.

a part of the hyperconcept "*Specification of the beneficiary type*". We model this law fragment describing a type of beneficiaries of the social insurance:

Art 4. "Benefit from the **provision on nature**, the physical **persons not salaried** who practice for their own self account, an **industrial activity**, **commercial**, **liberal**, **hand-made**, **agricultural** or

any other **activity**, in the conditions fixed by the regulation on vigor".

This law fragment describes the not salaried as a person who practices an activity for

her own self account. The activity for the own self account of the not salaried is described by the set of activities, industrial, liberal, commercial, hand-make, agricultural and other. The

extracted concepts are showed in the law fragment

text in bold; and we read in the schema, a person is said

not salaried if she practices an activity for her own self account. The liberal activity is an activity for the own self account of the person.

See fig 3 on PDF online

In the same manner, we have constructed all hyperconcepts identified from our opted text of laws.

4.2   Identification and construction of services step

4.2.1 Specification of the link between hyperconcepts and services

The specification of the link between services and hyperconcepts is the first sub step of the e-government services identification step. The hyperconcepts present a means to define and to

construct the set of e-government services from the legal framework. This task is realized by analyzing of the identified hyperconcepts semantic.

After the analysis of each hyperconcept, we obtain the set of services of the social insurance organism. For our example, we have identified the service "*Specification of the beneficiary type*" from the

hyperconcept "*Specification of the beneficiary type*". The analysis of the set of the hyperconcepts permitted us to identify a set of services "front office" and a set of services "back office".

The set of front office services of our case study are the following:

1. Deposit of provision on nature request;

2. Deposit of work stoppage;
3. Grantee of the provision on nature;
4. Grantee of daily indemnity;

5. Continuation of the indemnification;
6. Prescription of the treatment during the grantee of the provision;

7. Reduction of the daily indemnity;
8. Removal of the daily indemnity.

The back office services of our case study are the following:

1. Medical examination;
2. Calculation of the daily indemnity;
3. Verification of the rights to provisions;

4. Specification of the beneficiary type;
5. Specification of the provisions type

4.2.2 Specification of the link between service, role and stakeholder

In this step we will specify the link between the services, the ontological roles and the

stakeholders. In our example, the roles associated to the hyperconcept "*Specification of the beneficiary type*" are the social insurance organism, the beneficiary on nature and the beneficiary on specie. The

social insurance organism is the public administration responsible for the provision of all services that we have identified.

4.2.3 Specification of the link between service, resources and information

Resources and information represent the preconditions to satisfy in order to provide a

service. The service in our example is governed by the set of preconditions and business rules described in the law fragments Art 3, Art 4 and Art 5 (law 83-11).

4.2.4 Specification of the link between e-government service and information system components (ISC)

The specification of the link between e-government

service, ISC and transactions permits us to describe directly how the services are linked to the IS.

In our study each hyperconcept is transformed into an ISC and each ISC

comprises a set of transactions. The ISC are represented through the integrated model proposed in a research study by Pham (2005), where the concepts

are transformed into class, attribute or transaction. In the hyperconcept "*Specification of the beneficiary type*" we identify four transactions, "*Verification of the not*

salaried","*Verification of the salaried*", "*Verification of the handicapped*", *"Verification of the having rights"*. In the figure 7 we show the transaction "*Verification of the not salaried*". We constructed

this transaction by applying two different situations of transformation. The first one is represented as this schema:

See fig 4 on PDF online

The case of the concepts "Liberal", "Commercial", "Industrial", "Agricultural", "Other activity", "Activity AOA practiced", "Activity AOA not practiced", we collected them in a one attribute

"ActivityNoun" in the class "Activity for the own self account of the person (AOA)".

And the second situation is represented as follow:

See fig 5 on PDF online

We applied it in the case of the concepts "Not salaried" and "Activity for the own self account of the person (AOA)".

See fig 6 on PDF online

See table 1 on PDF online

5. Conclusion and perspectives

In this paper, we described how to identify and to construct e-government services in compliance with legal framework. This compliance guarantees us the transparency and the

accessibility of the services toward citizens. We have chosen to apply the approach described by khadraoui et al (2008). In first, we have formalized the process of identification and

construction of e-government services using the MAP formalism, and then we have applied the different steps of the approach for constructing a referential of services provided by the social

insurance organism in Algeria in the framework of the health insurance.
Perspectives emanate from this work concern the consolidation of the approach for the identification and

construction of e-government services from legal sources. In this method, the services are identified through the hyperconcepts. This operation is subjective and requires other means and other

strategies for its realization. Another question is to identify how to enrich the canvas of services identified and constructed from the texts of laws by institution characteristics added during

the establishment of the organizational aspects. The analysis of the organizational aspects describe how to capture the specificities of the organizations, what are the new services provided by the

organization and how to elaborate the best practices of the organization and their conformity with the legal framework.

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