Information Systems, Business and Law – Lessons Learnt

Anna Bobkowska

Gdańsk University of Technology Narutowicza, 11/12, 80-952 Gdańsk, Poland
annab@eti.pg.gda.pl

Abstract. This paper aims at exploring issues on the edge of information systems development, business process and decision making as well as related law and legal regulations. It describes several lessons learnt based on author's experience when applying a method of integrated legal and technical analysis in the development of an information system in the area of intellectual property protection. They contribute to the taxonomy of possible impacts of law on information systems as well as to the design of efficient methods which facilitate collaboration between analysts, lawyers and business decision makers.

1 Introduction

Information systems are deployed in almost every area of human endeavour. When they support business processes in industry or administration, they must conform to several business rules and procedures. Additionally, when the work of organizations or the areas of their activity are regulated by law, they must conform to relevant legal acts and regulations. Since the number of legal regulations increases and the legal regulations adhere often also to information systems, the support for the area on the edge of information systems, business and law becomes increasingly important.

Our research focuses on practitioner's perspective. From the perspectives of business analyst or software process engineer, there is a need for methods which allow to perform this interdisciplinary analysis effectively and efficiently. The methods should allow to overcome typical to interdisciplinary activities problems related to the fact that experts from different disciplines speak different professional language and that the same terms might have different meanings. Professionals have to collaborate in order to achieve common goals, thus coordination of actions performed by independent experts is another challenge. In our previous research, we have developed a method for integrated legal and technical analysis which was based on detailed analysis of requirements resulting from law in both lawyer and software engineer perspectives [2]. We have also performed case studies in which we have shown concrete examples of the impact of law on several kinds of requirements to information systems [3].

The goal of this paper is to present lessons learnt when applying the method of integrated legal and technical analysis in real research project. The system for plagiarism detection was chosen because intellectual property rights area has a great

M. Bajec and J. Eder (Eds.): CAiSE 2012 Workshops, LNBIP 112, pp. 470–477, 2012.

potential for legal analysis. The lessons learnt contribute to better understanding of the phenomena on the edge of information systems, business and law. With this knowledge, one can design more mature methods, formalisms and tools.

Related work is discussed at Requirements Engineering and Law (RELAW) workshops [1] which attempt to identify challenges [6], to design representations of legal regulations [4] and to increase collaboration between lawyers and engineers by the means of standardizing terminology between law, engineering and business.

The paper is structured as follows. Section 2 presents methodological remarks and case description. Sections 3-8 present lessons learnt together with observations on the basis of which they were formulated and discussion of their novelty and limitations in generalization. Section 9 draws conclusions.

2 Methodological Remarks and Case Description

The method of study is a case study of application of integrated legal and technical analysis in the real complex research project. The lessons learnt were collected on the basis of observation, reflection and reaction to anomalies. This section describes shortly the following:

- The method of integrated legal and technical analysis;
- The case which was studied;
- Remarks on collecting and describing lessons learnt.

According to the method of integrated legal and technical analysis, on the basis of a vision of the system, legal analysis is performed by a lawyer in parallel with technical (business and functional) analysis performed by an analyst. In the next step, the transformation of legal regulations to systems requirements is made in collaboration between the lawyer and the analyst. Specification of requirements is the duty of the analyst. Finally, the requirements specifications is validated from business, technical and legal perspectives.

The case of the system is Intellectual Property Protection System developed at the university as a research project. The goal of the system is to support detection of plagiarism on the basis of similarity report produced after running advanced and innovative algorithms for document similarity detection. There are no constrains on documents to be checked for plagiarism. They can be Master Thesis, assessment works by students, or research papers to be published in conference proceedings or in journals. There are no constraints on the users, so one can assume anyone will have access to the system: students, university employees, deans, editors of conference proceedings or journals and authors.

The lessons learnt were collected when performing integrated legal and technical analysis in the case of Intellectual Property Protection System. Reflections on the application consistent with presumptions as well as reflections on anomalies and reactions to them were described. The descriptions of lessons learnt are structured as follows: a statement of a lesson learnt, observations which were the background for

formulating the lesson, and discussion of novelty of findings, confirmation to known facts, limitations in generalization as well as comparison to knowledge gained in our previous case studies.

3 Multiple Kinds of Relevant Legal Acts and Regulations

3.1 Lesson Learnt

Need to consider fragments from multiple legal acts and regulations with several kinds of relationships between information systems, business and law.

3.2 Observations

In this case, the lawyer has identified five relevant legal acts and three related executive regulations. Two of the acts with related executive regulation adhere to organization of higher education systems as well as the rules and procedures of granting degrees at universities. Thus, they can be classified as regulation of the organization in the domain. The next act is related to intellectual property rights to pieces of work. Master Thesis, books and papers are pieces of work according to this act. This type of impact can be called regulation of area of data under processing. Other legal acts and regulations were related to Privacy Policy and Database Protection. They apply to all information systems which process personal data.

3.3 Discussion

This case shows that the impact of law on the system via the domain can be differentiated e.g. organization of domain, business processes in organization, or area of data under processing. This finding contributes to the taxonomy of possible impacts of law on business and information systems.

The limitation in generalization is adherence to Polish law only. Although higher education and intellectual property rights are universal areas, the number and type of regulations in each country can be different. Especially, when acting in Anglo-Saxon tradition of case law, one might rather collect precedents than analyze legal acts. However, the fact of having several sources and possible kinds of legal constraints generalizes also to other systems in this domain and systems in other domains.

4 Deployment Dependent on Legal Context of Application

4.1 Lesson Learnt

Relevance of legal acts strongly depends on the context of application of information systems - even when scope of required functionality in several application areas seems the same, the context of application might set legal constraints on deployment.

4.2 Observations

The legal acts and regulations listed in section 3, were identified for application of the information system for the use at the university in computer science area. According to Polish law, patents are not granted in this area. Patent agents claim that when applying it in different branch of engineering, the appropriate legal regulations related to patent systems should be analyzed as well. Additionally, when using this system in research commercialization area, the law adhering to industrial property and unfair competition should be taken into account.

Similar system could be used in a publisher's house, where the legal acts related to higher education are not in force, but legal regulations related to publishing are in force instead. Finally, there is a question about commercial vs. non-commercial use of the system.

4.3 Discussion

It's a strange phenomena from software engineer's point of view that the system which implements advanced algorithms and which has passed all tests might have limits in deployment resulting from legal constraints.

When attempting to answer the question of whether it generalizes to other projects, it seems that it depends on the type of system. In case of a system for the single application area, the problem will not appear. However, when a system might be applied in several diversified areas, there is a need for management of the impact of the legal context on the scope of allowed application of the system.

5 Extensive Impact of Law on Several Kinds of Artifacts

5.1 Lesson Learnt

Law has impact on several artifacts of business, information system and its development process. It can be more extensive than expected.

5.2 Observations

This part summarizes the impact of law on business, information system and process. In this case, legal analysis had impact on the following artifacts:

- Vision - Legal analysis results suggest that a general system for plagiarism detection has a high risk of conflicting with abiding law; Situation is very different when one treats the system as a non-commercial tool available only to authorities of the university responsible for academic degrees which allows them to fulfill their legal obligation (see also section 4);
- Functionality - The most interesting example of the impact of law on functionality of the system is the requirement to collect, store and check

permissions of authors of copyright owners for using their piece of work on several fields of operation;
- Business process - There is a need to define internal business processes leading to statement of plagiarism suspicion which are consistent with legal rules of conduct in case of plagiarism suspicion and proper evaluation of the results of similarity detection by the information system (see also section 6);
- Software development and exploitation processes - Laws adhering to Database Protection and Privacy Policy with related executive regulations set up constraints on exploitation, e.g. formal requirements to administrators or the way of database administration; as well as software development process, e.g. requirements on documentation, necessity to register databases which contain personal data to General Privacy Inspector during the deployment of the system.

5.3 Discussion

The extensive scope of impact of law on the artifacts confirms the importance of legal analysis during the development of information systems.

The limitations in generalization are related to analysis of this single case in highly legalistic area. Comparing to our previous case studies, no explicit impact of law on scope of functionality, data stored in the system, algorithms of processing data, quality requirements or other legal requirements has been discovered. On the other hand, the impact on vision, functionality and business processes, is more significant than minor constraints or corrections.

6 Misunderstandings Resulting from Different Backgrounds

6.1 Lesson Learnt

Misunderstandings between lawyers and software developers are caused by discrepancy in viewing phenomena or using the same terms with different connotations by experts with different background.

6.2 Observations

Legal analysis of information systems is an interdisciplinary phenomenon and several misunderstandings and discrepancies may result from different views of the professionals. In this case, we have observed this effect in the following dimensions:

- parties and roles performing their duties vs. users manipulating objects,
- a document vs. a piece of work, and
- legal rules and procedures vs. internal business rules and procedures.

Software engineers focus mainly on the construction of systems and providing functionality for users while many administrative legal regulations describe organizations in terms of parties and roles as well as related duties and procedures of document circulation.

There is a difference between a document (object in a system, item for processing) and a piece of work (*pl. utwór*, in legal sense item for intellectual property right protection). Independently of the type of document (Master Thesis, book, paper etc.) or copyright owner and related permissions, documents are stored in the system in the same way and they are effectively processed with the same algorithms. From the legal perspective, they constitute several cases which must be considered separately and sometimes might disable processing or even deployment of the system.

Both legal acts and university regulations use terms of rules and procedures. However, they might be not exactly the same rules and procedures. Sometimes law defines a kind of framework for internal rules and procedures in organization. In this case, legal regulations describe rules of conduct in case of plagiarism suspicion such as explanatory proceeding, possible consequences of terminating employment with university staff, or statement of invalidity of conduct leading to granting a degree. They can be applied when suspicion of plagiarism has been already stated. On the other hand, a similarity detection report itself cannot be proof of plagiarism. There is a need to define roles responsible for evaluating the similarity detection report from the semantic perspective and to define for them the rules of conduct.

6.3 Discussion

In our opinion, these are only examples of possible implicit problems caused by the use of similar terms by professionals in law, business and information systems. There is a large potential in exploring them in details in order to achieve maturity in dealing with the issues on the edge of them. The roots of the problem are in missing the fundamentals of other disciplines by the experts. Thus, the solution is in training interdisciplinary experts who are sensitive to specifics of all the involved areas.

7 Comments on Methods of Interdisciplinary Analysis

7.1 Lesson Learnt

Methods of integrated legal, business, and information system analysis facilitate the work and decrease complexity when they fit to the circumstances of application. As these circumstances can be diversified, the best solution can be provided by several methodological patterns with the guidelines on their application.

7.2 Observations

It has appeared that the lawyer met difficulties with performing entire legal analysis. Thus, the phase of legal analysis was divided into two sub-phases: identification of legal issues made by the analyst and lawyer's explanations. The analyst has prepared thirty nine questions and the lawyer prepared thirteen pages of explanations with comments on relationship between answers and related legal acts and regulations [5]. The number of pages of the relevant legal acts and regulations is two hundreds ninety one. The method has really facilitated the work and the resulting report was a good artifact for communicating the results and following discussions.

7.3 Discussion

The primary version of the method can be recommended to collaboration with lawyers having the knowledge of fundamentals of software engineering as well as some experience in working on the edge of law and information systems. When the lawyers have little experience in working in this area, a second variant of the method (with questions to lawyers) is more appropriate.

The method was useful and it is likely that it will be useful also in similar cases. The first limitation in generalization is the fact that it applied to a single project in contrast to software product lines which must meet other challenges and they require a more advanced infrastructure. The second limitation is the fact that system was developed for an organization with running business processes. When starting a new business a more advanced and more flexible analysis would be required.

8 Need to Change Approach to Multi-variant Analysis?

8.1 Lesson Learnt

In complicated cases, multi-variant analysis made in interaction between decision makers, business analysts, lawyers and information system experts is recommended instead of legal analysis of the impact of law on information systems

8.2 Observations

Decision makers have shown discontent when hearing about suggested changes in vision. They claimed that lawyers exaggerate and that such law is against the progress. They have suggested that lawyers should search for possible solutions instead of discovering constraints.

8.3 Discussion

The root of this problem is in the misfit between law which was established before information technology era and new possibilities of innovative application of this technology. Some regulations although formally in force may belong to, so called, dead law. Secondary problem is in differences of positions of decision makers tending to achieve an innovative product and lawyers responsible for conformance with law in the project.

It can be resolved on two ways. First, legislators adjust the law for the use of information technology. In fact, it already takes place in several legislative areas, e.g. regulations related to accounting, banking, administration. Second, lawyers involved in software projects may search for interpretation to legislators or branch committees. The consequence for the project is the replacement of legal analysis with multi-variant interdisciplinary analysis similar to feasibility studies in project management practice.

9 Conclusions

Real project cases usually exceed neat theories and methods. They provide a more diversified view on the phenomenon under exploration. On the other hand, theories and methods structure the goals and actions, enable efficient performance and provide framework for improvement. So it was in this case. The applied method facilitated work of performing the analysis. However, in action one could see also its limitations and additional phenomena which we have described as lessons learnt. They are related to the multiple kinds of impact of the relevant legal regulations on information systems, the dependence of the deployment on the legal context of applications, the extensive impact of law on several kinds of system artifacts, the sources of misunderstandings between analysts and lawyers resulting from different viewing of the same phenomena, the methods of interdisciplinary analysis and considerations about the right approach depending on circumstances of application.

These lessons learnt contribute both conceptually and methodologically to the base of knowledge about the phenomena on the edge of information systems, business and law. The understanding of fundamentals increases awareness of issues when performing activities related to legal analysis and the methods guide the process of legal analysis. Both of them support practitioners in their actions. Together with other original lessons learnt, they can facilitate development of the taxonomies of related issues and the design of mature methods which allow for effective and efficient conduct of this interdisciplinary analysis.

Acknowledgements. The work was partially supported by MAYDAY EURO 2012 project, Operational Program Innovative Economy 2007-2013, Priority 2 "Infrastructure area R&D".

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