Towards a financial fraud ontology: A legal modelling approach

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Abstract. This document discusses the status of research on detection and prevention of financial fraud undertaken as part of the IST European Commission funded FF POIROT (Financial Fraud Prevention Oriented Information Resources Using Ontology Technology) project. A first task has been the specification of the user requirements that define the functionality of the financial fraud ontology to be designed by the FF POIROT partners. It is claimed here that modeling fraudulent activity involves a mixture of law and facts as well as inferences about facts present, facts presumed or facts missing. The purpose of this paper is to explain this abstract model and to specify the set of user requirements.

Key words: evidence, financial fraud, knowledge modeling, law, legal ontology, user requirement analysis, World Wide Web

1. Introduction

It is estimated that the EU loses hundreds of millions euro per year due to financial fraud. Therefore it should not come as a surprise that prevention and early detection of fraudulent activity is an increasingly important goal for the EU and its Member States.¹ To this end, the FF POIROT (Financial Fraud Prevention Oriented Information Resources Using Ontology Technology) project follows in the star detective Hercule Poirot’s footsteps to provide law enforcement agencies with a novel approach to solve the financial fraud problem.² The goal of the project is to build a detailed ontology in the financial fraud domain of European Law, preventive practices and knowledge of the processes of financial fraud within the European Union.

The objective of this paper is to set out the user requirements for the ontology to be developed.³ First, though, it situates FF POIROT in ongoing
ontology research and development. Then, it discusses the fraud problem in general terms and outlines the approaches being taken by the FF POIROT project to developing relevant and useful solutions. In the final part, it compares the performance of a selection of existing core ontologies against the specifications developed in the first two parts.

Global markets and the ubiquitous interconnectivity of systems and information processes in cyberspace that they bring with them have dramatically increased our awareness of the problems created by conceptual mismatches and failing system interoperability. For the question of crime investigation and prevention, this poses both a challenge and an opportunity. Global markets provide new opportunities for criminals. VAT fraud, one of the applications investigated in the project, is essentially a cross-border crime. Internet-based investment fraud, the other application, allows criminals to hide behind jurisdictional boundaries. Efficient investigation of these crimes requires interoperability of police databases across state boundaries (Sheptycki 2000). At the same time, both private and public sector initiatives have dramatically increased the amount of commercial information available in principle online, information that can play a vital role in crime investigation and prevention. When in the past, fraudulent companies claimed to be registered and regulated in exotic and far away places, they counted on the prohibitively high transaction costs for their victims to verify these claims. These days, the necessary information is often only a mouse-click away. A British investor or police investigator could for instance ascertain if a suspicious company is really registered in Germany by searching a website like the one provided by the Swiss–German Chamber of Commerce – provided s/he speaks sufficient German, and has a basic grasp of German law and business culture. A German investor conversely will soon be able to check online if business premises in Edinburgh which are offered as security are really owned by the prospective business partner. However, to make appropriate use of this facility, he needs to have, in addition to English, a rather profound understanding of the “ontology” or conceptualization of Scots property law, many aspects of which only match imperfectly his own legal categories. He would need to understand e.g. the difference between Sasine and Land register, how to combine information from both of them, or the different approaches to the concept of “publicity” of the register in Germany and Scotland. Ontology driven skills management systems like the one envisaged here are being developed as part of the semantic web initiative to develop machines that can interpret and appropriately combine this information.

The idea to agree on explicit and unambiguous subject taxonomies resonates particularly well with lawyers. Much of European Union legislation can be understood as the legal equivalent to ontology integration; most problems of private international law as partial responses to the problem of ontology