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**Ontologies for Legal Relevance and Consumer
Complaints. A Case Study in the Air Transport
Passenger Domain**

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CONSUMER COMPLAINTS. A CASE STUDY IN THE AIR
TRANSPORT PASSENGER DOMAIN**

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Certifico que he llegit aquesta tesi, que és adequada i compleix tots els requeriments de qualitat per obtenir el grau de Doctor en Dret, Ciència i Tecnologia.

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ONTOLOGIES FOR LEGAL RELEVANCE AND
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Abstract

Applying relevant legal information to settle complaints and disputes is a common challenge for all legal practitioners and laymen. However, the analysis of the concept of relevance itself has thus far attracted only sporadic attention. This thesis bridges this gap by understanding the components of complaints, and by defining relevant legal information, and makes use of computational ontologies and design patterns to represent this relevant knowledge in an explicit and structured way. This work uses as a case-study a real situation of consumer disputes in the Air Transport Passenger domain.

Two artifacts were built: the Relevant Legal Information in Consumer Disputes Ontology, and its specialization, the Air Transport Passenger Incidents Ontology, aimed at modelling relevant legal information; and the Complaint Design Pattern proposed to conceptualize complaints.

In order to demonstrate the ability of the ontologies to serve as a knowledge base for a computer program providing relevant legal information, a demonstrative application was developed.

Keywords. relevance, legal ontology, ontology design pattern, complaint, consumer law, ODR, air transport passenger, semantic web

Resum

L'aplicació de la informació legal rellevant per resoldre les queixes i disputes és un desafiament comú per a tots els professionals de la justícia i llecs. No obstant això, l'anàlisi del concepte de rellevància en si ha atret fins al moment només una atenció esporàdica. Aquesta tesi ofereix ajuda per a comprendre els components de queixes, definint la informació legal pertinent, i fent ús d'ontologies computacionals i patrons de disseny per a representar aquest coneixement rellevant d'una manera explícita i estructurada. En aquest treball s'utilitza com un estudi de cas una situació real dels conflictes de consum en el domini de passatgers de transport aeri.

Dos artefactes van ser construïts: dues ontologies i un patró de disseny. Una des ontologies recull la pertinent informació legal en disputes de consum, i l'altra és la seva especialització, aplicada al transport aeri de passatgers. El patró de disseny d'ontologies cobreix la demanda de patrons de disseny proposat per conceptualitzar les queixes.

Per tal de demostrar la capacitat de les ontologies per servir com una base de coneixements per a un programa d'ordinador que proporciona informació legal corresponent, es va desenvolupar una aplicació demostrativa.

Keywords. relevance, legal ontology, ontology design pattern, complaint, consumer law, ODR, air transport passenger, semantic web

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List of Acronyms

ADR	Alternative Dispute Resolution
ATP	Air Transport Passenger
ATPI	Air Transport Passenger Incident ontology
B2B	Business to Business
B2C	Business to Consumer
BEUC	Bureau Europeen des Unions de Consommateurs
BIR	Boolean Information Retrieval
CCA	Consumer Catalan Agency
CDR	Consumer Dispute Resolution
CJEU	Court of Justice of the European Union
CPs	Content Pattern
CWA	Closed-World assumption
DK	Domain Knowledge
DSR	Design Science Research
EC	Extraordinary Circumstances
ECC-Net	European Consumer Centres Network
ECLI	European Case Law Identifier
ELFAA	European Low Fares Airline Association
ELI	European Legislation Identifier
EU	European Union
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IR	Information Retrieval
IS	Information Systems
JUST	EU Commission Directorate-General for Justice and Consumers
KE	Knowledge Engineering
LCO	Legal Core Ontology
LIS	Legal Information System
LP	Legal Provision
MeLOn	Methodology for Legal Ontologies
NEB	National Enforcement Bodies
NOR	Non Ontological Resources
ODP	Ontology Design Pattern
ODR	Online Dispute Resolution
OR	Ontological Resources
ORSD	Ontology Requirement Specification Document
OWL	Ontology Web Language
POA	Power of Attorney
RDF	Resource Description Framework
RIC	Relevant Legal Information (ontology)
RQ	Research Question
SPARQL	SPARQL Protocol and RDF Query Language
UCP	Unfair Commercial Practices
URI	Uniform Resource Identifiers

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Chapter 1. Introduction

This introductory chapter outlines the background knowledge of the research and the organization of the thesis. Section 1 explains the problem-space of the research. Section 2 describes the objective of the thesis and the research questions. Section 3 motivates the use-case of consumer disputes in the air transport passenger domain. Section 4 delimitates the scope of the research. Section 5 clarifies the methodology adopted along the thesis. Section 6 addresses the interdisciplinary aspects of the research. Section 7 defines the structure and the constitutive parts of the thesis.

1 Background

This section provides the contextual background defining the problem space of the research. Subsection 1.1 explains the need to have a relevance framework when determining the legal merit/non-merit of disputes. Subsection 1.2 expounds the chosen knowledge representation model, a legal ontology, to model the relevant legal information. Subsection 1.3 states the need to model a complaint design pattern. Subsection 1.4 ends with an account of how the provision of relevant legal information fosters online dispute resolution.

1.1 Need for a Relevance Framework

Complaints, considered as the first stage of disputes, are classified as litigable or non-litigable, according to their legal merit/ non-merit:

- *litigable*: lead to a formal complaint, and have objective determination of the legal merits, which means that they have a legal cause of action. E.g. a complaint based on a flight cancellation due to a technical failure of the aircraft;
- *non-litigable* [Rabinovich-Einy, 2011]: disputes that lead to a formal complaint, but consist in small-scale problems, rarely litigated at court, non-negligible, but legally unfounded, lacking on a legal cause of action. Normally are elusive, less tangible, difficult to get redress, for being evidenced-based. In most instances, the complaints are usually not the subject matter of litigation. This is because, in many cases, the ensuing conflict does not constitute a legal cause of action, as passengers cannot point to a breach of their legal rights. Examples depicted in the complaints are: legitimate concerns about conduct, miscommunication issues or lack thereof, staff demeanour, long waits for answers, and the like.

It is a premise of this thesis that accessing relevant legal information, whenever a dispute occurs, in one hand helps consumers assessing the legal merit/non-merit of the complained dispute, enhancing their decision-making; and, on the other hand, discourages unmeritorious or frivolous complaints. Relevant legal information in consumer disputes consists in an amenable way to determine their legal positioning, to know about the eligibility for further legal aid, etc. For example, a passenger may better identify if the flight delay incident of 1 hour, to which he has been subjected to, is legally motivated and if he is eligible for redress; accordingly, the relevant delay at departure is considered only from two hours or more. The air carrier also can better manage dispute avoidance and dispute containment and complaints thereof.

The online availability of the text of the law does not solve the practical problems of the disputes between citizens and business. If the mere possession of legal information does not give knowledge in a sufficient way, how to derive from a large and heterogeneous collection of sources the needed legal knowledge to address complaints and solve disputes?

A relevance framework is needed when dealing with the selection of legal information for a legal case/task at hand, mitigating the current information overload suffered by the legal community.

Saracevic presents a five-dimensional notion of relevance [Saracevic, 2007], that is tailored to legal domain and briefly mentioned below, comprising:

- system or algorithmic relevance, referring to the way the information need (query or request) is represented within a system;
- situational relevance or utility, referring to the situation / work task at hand of the user, normally translated to a taxonomy of disputed cases;
- topical or subject relevance, referring to the topic of the legal information need;
- cognitive relevance or pertinence, referring to the cognitive needs of the user;
- domain relevance, referring to the most important legal sources recognized by the legal community.

This quadrant of various interplaying relevance's is useful:

- for avoiding ambiguities on which kind of relevance is to be considered to decide a legal case;
- each specific dimension is made explicit;
- each specific dimension provides assessment criteria to understand how relevance is inferred;
- each dimension covers an information need of the user: the topic at hand, the cognitive need, the problem at hand, the domain authoritative sources, etc., which are important to the legal decision making process;

- each dimension is equally important.

To assess the legal merit/non-merit of a complained dispute, accessing relevant legal information encompassing these dimensions can provide an early determination. In any case, for a casuistic analysis, a second level of relevance is considered, and requires a collection of the documents, facts for the problem at hand. This deep analysis may confirm or reject the initial assessment regarding the merit/non-merit of a complained dispute. Fig. 1.1 depicts the phases of such the relevance levels.

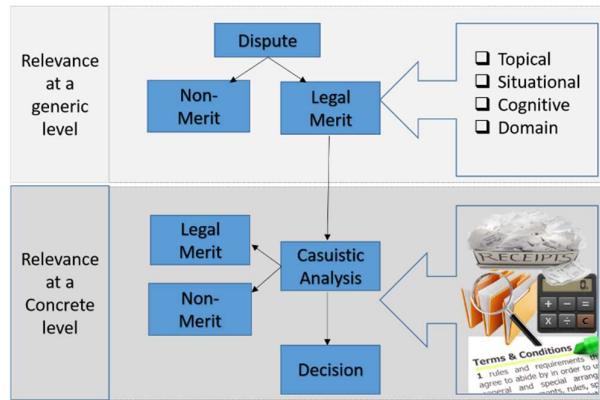


Figure 1.1 The concept of relevance analysed at a generic and concrete levels

1.2 Ontologies to Model Relevant Legal Information

The chosen knowledge representation model, a legal ontology, is a valuable way to model the subtleties of expert knowledge and relevant legal information, structuring this information in a machine readable form. Several anthropological and psycholinguistic studies support the intuitive design of ontologies as an efficient way for people to understand the relations between concepts and resources [Boella et al., 2013]. By using an ontology as a conceptual schema, the knowledge of a resource is described through the relations between one information resource and other resources.

In computer science, the term *ontology* refers to a “formal, explicit specification of a shared conceptualization” [Studer, Benjamins et al, 1998]. Ontologies consist of a set of concepts, relations, and axioms that formalize a field of interest, with detail and structure that enable computers to process its content. The main motives for ontology employment include capturing, sharing and reutilizing knowledge within the certain area. This definition requires an explanation of its three components:

- *Conceptualization* refers to an abstract model that allows describing something relevant in the world, for which entities are described explicitly, so that it is covered as much as possible of the world phenomenon that it is

aimed to represent; normally concepts, properties and constraints on their application are used; for instance, the Unified Modeling Language [UML] class diagrams, the entity-relationship models are used for such conceptualizations of entities;

- *Formal* refers to the ontology being machine readable, which means that are available in some language such as the Resource Description Framework Schema (RDFS) or the Web Ontology Language (OWL), which can be easily processed;
- *Shared* reflects the notion that an ontology captures consensual knowledge; that is, it is not private to some individual, but accepted by a community.

A rising trend to exploit ontologies to exchange and interconnect legal knowledge across Web has been recognized and accepted within the semantic web community. It has been suggested that ontologies can provide benefits for Legal Information Systems (LIS) [Breuker, Valente et al. 2004], [Benjamins, Casanovas et al, 2005], [Casanovas, Palmirani, et al., 2016], such as:

- used to explicitly represent conceptualizations and to enable data interoperability [D'Aquin, Motta et al, 2008]. Ontologies are a powerful mean to make Web data machine understandable, therefore it is important that these are reliable enough to be used by software applications.
- ability to make domain conceptualizations and assumptions explicit. Ontology modelling possess unlimited relational expressiveness between entities (attributes with cardinality and restricted values);
- ontologies provide a representation of domain knowledge which can be shared/incorporated/reused in any legal information system (LIS), i.e., enabling the reuse of domain knowledge [Bench-Capon, 2001];
- permits the integration of resources selected at design time, combining data from multiple, heterogeneous sources;
- facilitates the separation of the domain knowledge from the operational knowledge;
- allows drawing inferences;
- enables the analysis of domain knowledge;
- facilitates communication and understanding between knowledge engineers and domain experts thanks to the unambiguous specification of terms;
- fulfils Closed-World Assumptions (CWA);

On the one hand, ontologies can help people share and reference knowledge about concepts, structured and navigable knowledge about entities and their inter-relations. On the other hand, it can also serve as a useful tool in legal search, information retrieval, automatic translation, automated reasoning and regulatory compliance verification.

As a remark, the topic of relevance was already formalized in OWL by Bobillo et al. in an ontology design pattern for representing relevance [Bobillo, Delgado et al., 2007]. The pattern consists in two sets of axioms in an ontology, one representing the domain and another representing the context. The domain ontology should be a comprehensive representation of the domain knowledge, being as complete as possible, and the context ontology should be a catalogue of circumstances that may take place. Concepts in the domain ontology and concepts in the context ontologies are related through the instances of a “relevance” class, reification of the relevance relation between relevant information and context. This pattern, even though covering the relevance subject, remains too abstract as to understand what is relevant in the domain and in the contextual profiles; knowledge engineers would need criteria to discern and extend, use a case-study to provide data and populate this pattern. This analysis served as a motivation to build an ontology of relevant information within a contextual use-case, which can be reused to other domains.

1.3 From Complaints to a Complaint Design Pattern

Complaints and complaint behaviour have been receiving a lot of attention in business, management, and dispute studies, as:

- they convey the description of a topic, the motivation, the content of the disputes, and declare an information need of the complainant; this means they convey, in an abstract way, topical, situational and cognitive types of relevance - the topic or subject of a dispute, the cognitive informational needs, and the situational problem at hand;
- handling them properly might contribute to minimize the rate of complaints, users’ dissatisfaction, increase users’ loyalty, and generate trust both in business and public administration [Faed, 2013].

Fig. 1.2 depicts the dimensions of relevance that complaints have: topical, situational and cognitive.

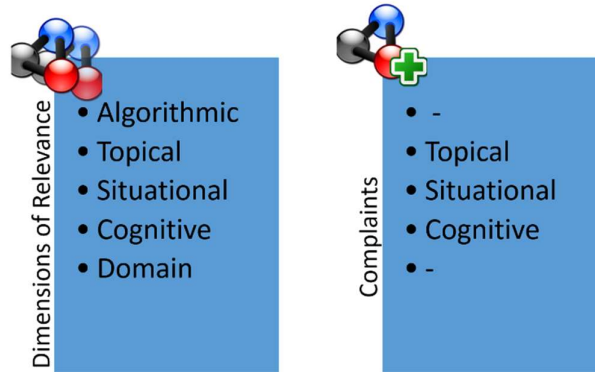


Figure 1.2 Dimensions of relevance that complaints encompass

Complaints occur in many different domains, such consumer, criminal, and health complaints, received by diverse handling systems, from public administration, to companies or consumer centre handling bodies. However, handling systems record complaints in their own formats, reducing machine readability and even systems interoperability.

Several complaint datasets¹ consist of free text documents expressed in natural language, without a formal organization; this hampers its understanding by computers and complexity to implement data analysis [Fernandez-Barrera, Casanovas, 2011a]. However, the increasing interest for transparency in business, the wider adoption of Linked Open Data (LOD) to publish data, and the online availability of complaint datasets reflects the need for these datasets to be more interoperable.

Moreover, professional mediators and ODR schemes highlight the importance to better address complaints and the necessity to have ICT solutions to support their tasks [Casanovas, Díaz, et al, 2009], as observed in other domains, like health, economy, etc. They justify this need by emphasizing that complaints constitute *the first stage of disputes*, prone to scale to higher conflictual levels, as litigation.

To enable a better understanding of complaints, e.g., for dispute avoidance, containment and dispute resolution, two main requirements should be contented, relating both disputants [Jelali, Fersini, 2015]:

- (i) the understanding of a typology of similar complaints, which can be achieved by complaints analysis, court decisions and related literature; and
- (ii) the understanding of the natural language discourse of the complaints and its components, for instance, the motivation, the facts, the evidence, etc.

¹ The EU Complaint database, the dataset from the Consumer Financial Protection Bureau (CFPB), the Toyota complaint dataset, the complaint database from the UK Department for Work and Pension, amongst several other complaint datasets from disparate domains.

It was observed in this work that the requirements to describe a complaint can slightly change according to the application domain, but a subset of information is present in all studied domains. In practical cases, the omission of such information or constituents, for e.g. evidence and motivation may entail a refusal or the misunderstanding of a complaint by the receiver of a complaint. By contemplating relevant components of complaints enables the complaint agents in articulating their position/case in a more grounded rule-oriented manner² in the online textual environment. The combination of these entities requires a separated modelling solution with a more granular approach towards the inherent components of a complaint, explicitly declaring the complaint components.

Content or domain ontology design patterns are modelling solutions to solve recurrent domain ontology problems [Presutti, Daga et al, 2009]. These design patterns help in transforming use cases, as complaints, into design solutions, supporting knowledge engineers in their modelling and interoperability whenever this concept arises.

1.4 Relevant Information in Online Dispute Resolution

This work joins recent attempts to provide to the disputant's relevant legal information regarding their consumer dispute. This work fosters online dispute resolution.³ This intent is mirrored in different strategies:

i) Studies conducted by the European Commission and by the Council of Europe about out-of-court disputes, emphasized the pertinence of ICT tools and alternative and online dispute resolution schemes (ADR and ODR) to promote the resolution of disputes and the predictability of dispute outcomes.

The Committee on Legal Affairs and Human Rights underscores the importance of overcoming existing barriers to individuals' access to justice. It recognises that innovative use of modern information and communications technology (ICT) within courts on the one hand, and online dispute resolution (ODR) procedures on the other, can play a role in

² A rule-oriented manner is the manner in which, for instance, judges often view cases, as opposed to presenting a case in a relational manner, where potential biases are emphasized, as the information asymmetries and underlying relationships between parties.

³ Procedures occurring with no formal court hearing, such as negotiation, conciliation, arbitration and mediation are becoming a methodology for encouraging agreements among disputants. ODR, arising from the synergy between ADR and ICT, is a method of dispute resolution comprising technology and the Internet to help and expedite the resolution of out-of-court disputes [Rule, 2002]. However, ODR also comprises the use of ICT tools in the management of disputes, such as electronic case files, intranet portals, videoconferencing, case management systems, filing of digital documents, automated calculation modules for cases pertaining to the provision of titles, databases facilitating information sharing – which not only have the potential of simplifying and expediting procedures, but also of enhancing consistency and predictability of outcomes, as it is depicted in the Council of Europe Resolution [CoE Resolution, 2015].

this endeavor. The committee acknowledges that the use of ICT tools can simplify and expedite judicial proceedings and contribute to enhancing the consistency and predictability of outcomes. It also recognises the potential of online dispute resolution to facilitate individuals' access to justice, by helping to settle disputes more rapidly, at a lower cost and in a less conflictual manner than conventional litigation, whilst potentially affording more flexibility in the choice of procedures used and solutions offered. Member States are thus encouraged to promote and further develop ODR mechanisms. [CoE Resolution, 2015]

ii) The imminent Regulation on consumer ODR in force in 2016 [ODR Regulation], deals with consumer disputes arising from e-commerce, whether domestic or cross-border, to be channelled through the European ODR platform recently launched⁴ and operational.

iii) The ODR Advisory Group issued a Report on "Online Dispute Resolution for Low Value Civil Claims" recommending the HM Courts & Tribunals Service (HMCTS) to establish a new online court⁵, named HM Online Court service (HMOC), to work in parallel with the current court system [ODR Advisory Group Report, 2015].

Richard Susskind, the chair of this ODR Advisory Group, asserts that the "online court" is defined as an "*interim concept as well as a pragmatic first step in online dispute resolution*" [ODR Group Response, 2016].

The online court aims to increase access to justice and resolve low value disputes quickly and cheaply. Pursuing this objective, the advisory group advocates greater emphasis on dispute avoidance and dispute containment. Their assumption is that better containment and avoidance of disputes will reduce the number of disputes coming before courts.

The group suggests the new online court should follow a three-tier service structure, as explained below. As depicted in Fig. 1.3, tier one of the online court should provide online evaluation, tier two should provide online facilitation and tier three should provide online judges. The inverted triangle is a funnel or filter, with only a relatively few cases proceeding through to the online judges. The broad base of the triangle represents greater access to justice with many more citizens being helped through online evaluation.

⁴ <https://webgate.ec.europa.eu/odr/main/index.cfm?event=main.home.chooseLanguage>

⁵ The Advisory group are calling for HMOC system will be rolled out in 2017.

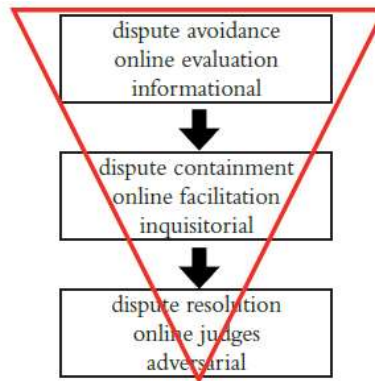


Figure 1.3 Three tier service structure of HMOC, from [ODR Advisory Group Report, 2015].

- Online evaluation, also called online triage, is sought to support dispute avoidance. Complaints are to be evaluated, and information given for the best way to resolve them. It is assumed that by evaluation of their legal position, the parties are able to correct any unfounded expectations about their rights, to understand the options and remedies available to them, and helps to achieve early settlement. This up-front online information is partly automated by using textual building blocks and decision trees;
- Online facilitation to support dispute containment. Trained online facilitators will mediate and negotiate with parties to reach an agreement; it is also envisioned automated negotiation. Communicating via the Internet, they will review papers and statements and help parties through mediation and negotiation. They will be supported where necessary, by telephone conferencing facilities;
- Online judges to support dispute resolution. If the above stages are inconclusive, a judge will decide on the basis of electronically received documents. Their decision will be imposed as court judgements.

The objective of this thesis aligns with tier one service of online evaluation envisioned by this ODR court.

iv) The European Commission for the Efficiency of Justice (CEPEJ), in its report on “European judicial systems” [CEPEJ Report, 2014], has highlighted the connection between legal aid and equal access to justice; the CEPEJ defined legal aid broadly, as including not only traditional elements of legal aid such as representation during a trial, but also legal information, legal advice, and aid for alternatives to judicial proceedings (such as ADR, ODR). Furthermore, the Committee of Ministers has adopted a number of texts on the topic of legal aid in civil matters.

v) The Recommendation on “Effective access to the law and to justice for the very poor” expands the definition of legal aid to include “quasi-judicial methods of conflict resolution”, such as mediation, and calls for increased support for such methods of dispute resolution [Recommendation Committee of Ministers, 1993].

vi) The Resolution of the Committee of Ministers on “Legal Aid and Advice” highlights the connection between legal aid and access to justice for the poor [Resolution Committee of Ministers, 1978].

2 Thesis Objective

Defining the relevant legal information to settle complaints and disputes is a common challenge for all legal practitioners and laymen. However, the analysis of the concept of relevance itself has thus far attracted only sporadic attention. This thesis bridges this gap by understanding the components of complaints, and by defining relevant legal information, and makes use of computational ontologies and design patterns to represent this relevant knowledge in an explicit and structured way.

This thesis has a double objective, as depicted in Fig. 1.4.

- tailors and models relevant legal information within consumer disputes in a computational ontology. This may enhance the decision-making of disputants (consumer and trader), concerning their consumer dispute;
- builds a complaint design pattern to conceptualize complaints;

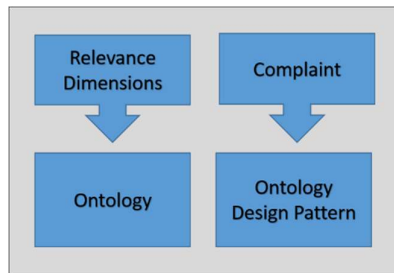


Figure 1.4 Ontology covering legal relevant information and a complaint design pattern

The research presented in this dissertation assesses the interrelated research questions:

RQ 1: Which information is relevant for the merit/non-merit of a consumer dispute?

To answer this research question, it is important to consider what is relevant information at a *generic level* and at a *concrete level*. In this research, the focus is given to the first level.

At a *generic level*, it is possible to provide an initial assessment of the merit/non-merit of a dispute, which is important for any legal decision-making. To provide an initial determination of the legal positioning, or the merit/non-merit of case, the dimensions of relevance: situational, cognitive, topical and domain have to be accounted within a case. To assess such initial determination, a use case of consumer disputes in the ATP was selected.

To ascertain the relevant information of a dispute in a finer grained, *concrete level*, it is required a casuistic analysis of the relevant facts, documents and evidences of a case, which corresponds to a lawyer task and hardly made machine processable.

RQ 2: How can the dimensions of relevance be modelled in an ontology?

The modelling of the dimensions of relevance within the case-study should correspond to a consensuated vocabulary, modelled in a structured and explicit way through classes, relations and axioms, where the answers to the queries match the competency questions.

RQ 3: How to define an Ontology Design Pattern on Complaints?

Several complaint datasets consist of free text, which hampers its understanding by computers, and complicate the implementation of complaint-data analysis or systems interoperability. Sub-questions of this research question focus on the definition of the core of this ontology design pattern in the following way:

- What is the set of concepts and relations that are observed in any complaint?
- What is the minimal set of conceptualised information that allows interpreting and taking a decision about a complaint?

Regarding the assumptions supporting this work, it is assumed along the thesis that:

- Accessing relevant legal information discourages unmeritorious or frivolous complaints and facilitates voluntary compliance of settled agreements, and encourage traders to tackle causes of complaints; this scenario may be of added value to ODR systems;
- Relevant legal information in consumer disputes consists in an amenable way to determine the legal positioning whenever a dispute occurs; the

eligibility for further legal aid; and to enhance the decision-making of the disputants. As an example, a passenger may better identify if the incident to which he has been subjected to is legally motivated and if he is eligible for redress. The air carrier also can better manage incident prevention/containment and complaint thereof;

- This information is envisioned to be disclosed in an early stage of a dispute, before seeking professional assistance⁶, to allow a built-in advantage in dealing with incidents as a means for pre-empting disputes and litigation, in an ex ante perspective (looking forward from the point just before a dispute begun), back in the stylized chronology of the lifecycle of a dispute, to the point in time that precedes the conduct that gave rise to the dispute. If the parties were knowledgeable about the applicable law and the possible rights and exceptions of their situation, there would be no place to complaint, or a dispute would emerge with substantial cause;
- An ontology-based system could potentially be allocated into the ODR realm and/or used within an In-House Customer Care or Internal Complaint Systems of a business dealing with complaints;

3 Use-Case: Consumer Disputes in the Air Transport Passenger Domain

According to Design science research, a research often begins by identifying and representing opportunities and problems in an actual application environment [Hevner, 2007]. In this section, the application environment, or use-case is briefly explained within two approaches: consumer disputes; and consumer disputes in the ATP domain.

3.1 Features of Consumer Dispute Resolution

Consumer dispute resolution (CDR) relates to out-of-court resolution of contractual disputes between consumers and businesses (B2C). CDR has emerged as a dominant and distinct form of dispute processing with its own unique architecture [Hodges, 2012], providing a parallel system of justice for B2C disputes, with courts relegated to a peripheral role in many areas. Diverting consumer cases from courts is due mostly to B2C disputes features, making them ill-suited to court procedures. Focusing in the CDR features, it is pertinent to assert that consumer disputes have impacted interest because of the typical high-volume, low-cost value of most claims. Often are categorized by time-consumption, cost-disproportionality and are convoluted into complex procedures. They comprise acrimonious, since prolonged, legal wrangling which

⁶ In Europe, CDR studies refer that laymen often resolve their disputes in an informal way, firstly resorting to settling between parties themselves; secondly resorting to more formal procedures, such as mediation, negotiation; at last resort they turn to legal professionals to determine their legal position and finally to court [ECC-Net, 2015].

epitomizes long-term damage. Hence, consumer disputes require an accessible, low-cost and high-convenience forum for resolving disputes [Barral I Viñals, 2009]. There is broad consensus that alternative dispute resolution systems provide the best answer to the problem of dealing with the high-volume, low-value disputes that characterise the consumer-business relationship, where information asymmetry and unequal bargaining power is at stake [Hodges, 2012] [Barral I Viñals, 2009].

3.2 Consumer Disputes in the ATP Domain

Within consumer disputes, the selected use-case is based on disputes in the air transport passenger (ATP) domain.

A culture of disputing is noticeable in this area, a sector triggering the top ranking complaint EU-wide, in detriment of one of the most important consumer rights [ECC-Net, 2015]. Figures 1.5a and 1.5b depict the top areas of complaints, where the ATP domain is the distinguishable one.

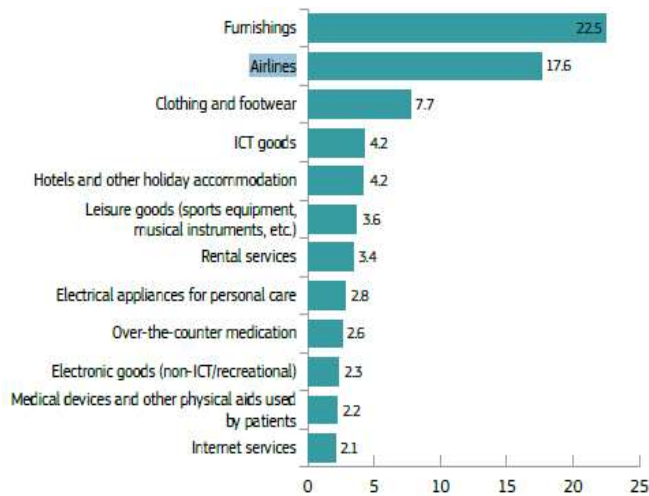


Fig. 1.5a Cross-border e-commerce complaints received by the ECCs, by economic sector, 2014 (%) [ECC Network, 2014]

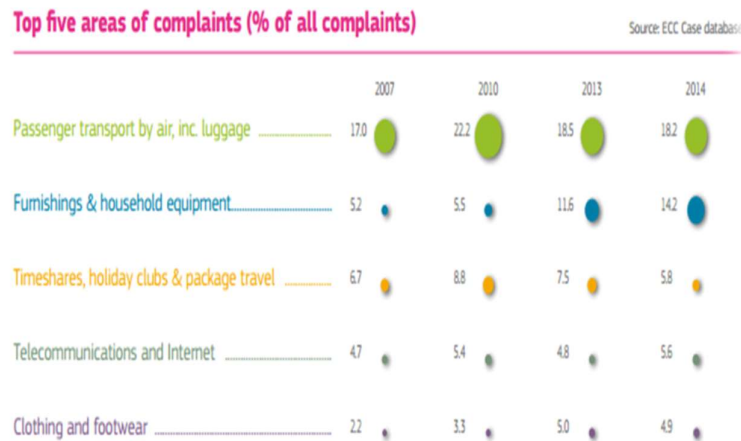


Fig. 1.5b Top five areas of complaints, [ECC Network, 2014]

The complaining rate, or as it is known, the “claim rate”, is explained by two factors:

- the low awareness of passengers about their rights, and the perceived failure of airlines to fully inform their entitlements, and the accrued lack of compliance; indeed, consumers are non-experts whilst acting in “mass contracts” [Barral I Viñals, 2009];
- the inadequate airline complaint handling procedures discourage many passengers from pursuing a complaint [Commission Impact Assessment, 2013]. The target user group are the passengers, which are laymen users, situated in their contractual relationship with their counterparts, the air carriers, wishing to get an insight into the legal aspects of their dispute.

It is asserted that lack of framed information is a root-cause of disputes [Cortes, 2012], and in this thesis it is assumed that enabling the modelling of legal relevant information enhances the decision-making of disputants in this domain. A passenger may better identify if the incident to which he has been subjected to is legally motivated, and if he is eligible for remedial measures.

As an example, in one complained case, several aspects listed below can be triggered, making the ATP scenario an appropriated case to contextualize relevant information:

“Delayed flight at arrival of 3h due to extraordinary circumstances and damaged baggage. No voucher for essential goods was delivered.”

- heterogeneous sources of hard and soft law applied concomitantly to an incident reported in a complaint, such as case-law, doctrine, different legislations, Communications from the EU Commission, stakeholder guidelines, terms and conditions of the companies;
- accumulation of incidents, e.g. delayed flight and damaged baggage.
- the rights are linked to further interpretations, exceptions, constraints and requisites, which in turn are refracted in different normative sources, in an explicit and implicit form;
- open textured concepts, such as extraordinary circumstances;
- free choice of rights;
- epistemic issue raised by the right to be informed about the rights of the passengers, by the airline, whenever an incident occurs, without a corresponding sanction for its breach;
- different temporal frames: for the complaint procedure and for legal actions; determination of the length of the delay at arrival and its relation with the time of arrival⁷; delineation of each of the delay incidents: which may amount from 2 until more than 24 hours;
- different compensation values according to each incident;

A choice for the disclosure of information deemed relevant regarding an incident related to baggage, flight delay or cancellation, carry significant implications for the decision-making of the end-user, as it is easy for passengers to fail to notice some of what matters. In particular, the first three points are envisioned in this study.

4 Scope of the Research

This section explains the scope of the work of the thesis. The scope of the study relies on the subject of relevant legal information contextualized in consumer disputes, and its engineering within semantic web techniques, enabling the machine readability and interoperability of this information. Two types of legal engineering are distinguished here to define the quadrant that was proceeded: the legal operational engineering; and the legal cognitive engineering, linked to institutional pragmatics [Bourcier, Rosnay, 2005], as explained below:

(i) "Legal operational engineering can be considered as closed and static. It proceeds from a bottom-up extraction from the textual corpus after a

⁷ The Court has concluded that the concept of 'time of arrival', which is used to determine the length of the delay to which passengers on a flight have been subject if arrival is delayed, corresponds to the time at which at least one of the doors of the aircraft is opened, the assumption being that, at that moment, the passengers are permitted to leave the aircraft, Case C-452/13, Germanwings, ECLI:EU:C:2014:2141, paragraph 27.

linguistic parsing. The representation process smooths and rubs out the evolutionary and open characteristics of the law;

(ii) Legal cognitive engineering tends to include a dynamic representation, adding three dimensions to the previous figure: time, context and goals. First, a legal ontology is able to act upon the standard evolution, reinforcement or questioning. Second, context may specify the available coded information while potential circumstances can be recorded. Third, a legal ontology is mirroring the legislator teleological aspects: its use has to take the implicit goals into account while the explicit goals must be coded into the information. "

In the presented work, the dynamic issues of time and context are not mirrored in the ontologies, but mainly the legal operational engineering facet (i). Moreover, relevant legal information covers the updated, contextual information according to the situational problem of the user – situational relevance; user-needs – cognitive relevance; and domain relevance: the most important legal documents, which also correspond ultimately to their updated version.

The rest of the section is organized as follows. Subsection 4.1 discusses the hybrid nature of the legal ontology. Subsection 4.2 clarifies the subject of the study, whilst subsection 4.3 elucidates the topics out of scope of this thesis.

4.1 IR-based Legal Ontology

Types of legal information systems can be distinguished in broad terms, as to encompass its variety: legal expert systems, and legal information retrieval systems. Arguably one can consider on an equal footing legal ontology-based systems with expert or retrieval systems. Legal ontologies offer a solid support for legal information systems, as they permit to make explicit the underlying assumptions, as well as the formal definition of the components of legal knowledge [Gangemi, Sagri et al., 2005]. Legal ontologies are usually *hybridized* with other components in order to build semantically-explicit applications. When used jointly with:

- *"theorem provers, consistency checking can be performed to logically validate the set of assumptions encoded in an ontology;*
- *subsumption and instance classifiers with OWL, inferences can be derived from taxonomical reasoning as well as for the classification of instances and facts;*
- *computational lexicons, NLP tools, and machine-learning algorithms, legal ontologies can enhance information extraction from semi-structured and non-structured data, adding a new dimension to knowledge management and discovery in Law;*

- *planning algorithms, ontologies can assist or automatize negotiation or execution e.g. for contracts, regulations, services, etc.;*
- *case-based reasoners, ontologies can formalize case abstractions within more general frameworks, or can classify cases according to pre-designed descriptions;*
- *rule-based engines, facts can be inferred e.g. for causal responsibility assessment, conformity checking, conflict detection and in general for fact composition.” [Gangemi, 2007].*

To support to legal information systems, legal ontology-based systems features are listed in Table 1.1, together with the expert and retrieval systems. Examples of each are given below.

Table 1.1 A comparison between Legal Expert Systems (LES), Legal Information Retrieval (LIR) and Legal Ontology-based System (LOS). Adapted from [Van Opijnen, Santos, 2016]

<i>Aspect</i>	<i>LES</i>	<i>LIR</i>	<i>LOS</i>
Goal	Establishes a legal position on specific case	Provides relevant legal information	Organizes legal information
Input	Facts	Request	Query
Content	Legal rules encoding the domain expertise	Documents	Structured legal information
Method	Inference	Querying	Reasoning and querying (OWL Reasoner, SPARQL endpoint)
Output	Decision, advice, forecast.	Set of documents	Pieces of legal information
Principal Use	Answering ‘happy flow’ questions within a specific and limited domain	Finding information objects in huge repositories	Modelling information objects
Advantage	Can provide straightforward answers	Unlimited content, input and output	Information is framed within a conceptual model
Drawback	What has not been modelled, cannot be answered	User always has to read, interpret and decide for himself	What has not been modelled, cannot be answered
Basic notion	Uncertainty	Relevance	Semantically structured information
Examples	Iuriserve	Eur-lex ⁸ , OpenLaws.eu	European Legal Taxonomy Syllabus

A definition of each is given to scope the work.

- LES are addressed to judges or lawyers as a support-tool; are gifted to present legal advice according to a case, entailing an analysis of each of the elements embedded in a complaint (therefore applying NLP techniques) and render a final decision;

⁸ <http://eur-lex.europa.eu/>

- LIR are able to enhance the speed and efficiency of legal search by retrieving relevant sources. Such systems are generally connected to some form of database from which the information is recovered. This retrieval is normally carried out by way of a search engine that accepts queries (inputted keywords/phrases/concepts). The search engine matches the queries with information stored in the database for the purpose of presenting users with the desired results;

It is acknowledged in AI&Law research that these figures are blurred. Consider, for instance, IR-oriented legal ontologies, discussed in chapter 3, reflected in several works [Saravan, Ravindran et al., 2009], [Lame, 2001], Best ontologies [Van Laarschot, Van Steenberg et al., 2005] and [Schweighofer, Geist, 2007], where research on semantic web technologies serve as support to legal retrieval.

In this thesis, it is not envisioned the construction of a LES nor a LIR; it is aimed to organize legal information in a structured way, amenable to be queried on relevant legal information which may leverage the decision-making of the disputants. This study evokes the relevance conceptualization, typical of LIR, into LOS, therefore, it is a legal ontology hybridized with IR components.

4.2 Within the Scope of the Research

The following narrative of a complaint, associated with the type of incidents and supporting figures illustrate further the scope of this work. Consider the translated complaint narrative number 81 of the Catalan Consumer Association dataset.⁹

“Delay of 7 hours in the plane that had to leave from Tenerife Norte on the 28th to go to Barcelona JK5253. I denounce there is a breach in the contract of transportation, claiming what is stated by the European Law, plus the 80€ that the taxi costed from the airport to home, as there was no other public transportation means at 2 in the night.”

This narrative declares a type of conflict, which is a delay of 7 hours and additional taxi expenses of 80 euros. The ontology models the incident as a flight delay, in specific, a long delay at departure, as a delay of 5 hours or more. It also displays the relevant legal information applied to the case: right to reimbursement, together with a return flight; it also displays the constraints,

⁹ In the original version, the Complaint is rendered as: “Retard de 7 hores en l’avió que havia de sortir de Tenerife Norte el dia 28 per anar cap a Barcelona JK5253. Denúncia incompliment del contracte de transport, reclamo el que assenyala la legislació europea al respecte, més els 80 euros que em va costar el taxi per anar de l’aeroport a casa perquè no hi havia altra transport a les 2 de la matinada”.

the exceptions, the requisites and enforcement procedure of this right, allied to the corresponding legal sources. To make visible such a correspondence, an ontology-based system, named Ricontology,¹⁰ illustrates this rendering in Fig. 1.6a. It is out of its scope the provision of a final decision (Fig. 1.6b).

Figure 1.6a Screenshot of the ontology-based system depicting the rights according to a long delay at departure.

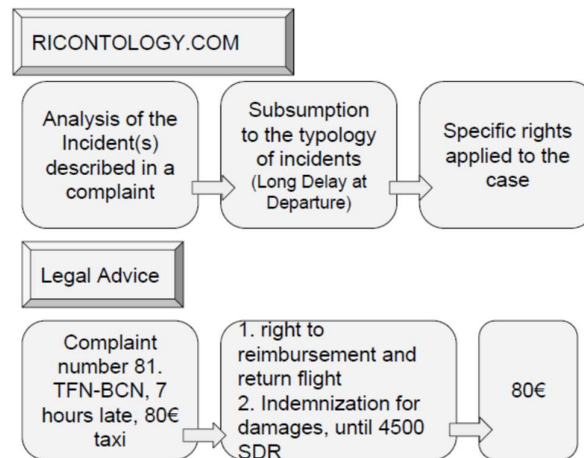


Figure 1.6b Comparing the scope of Ricontology and legal advice.

In reference to relevance, the effort is concerted on retrieving not the full text of a document, but the pieces of information therein contained supporting the case. This means that a user's query is matched against the depicted taxonomy of cases, here denominated as incidents.

¹⁰ www.ricontology.com

4.3 Out of the Scope of the Research

It is out of the scope of this study ATP accidents, death or any other bodily injury suffered by a passenger. Incidents related to package tours and contractual problems between online bookings are also excluded. It is out of scope also rights for disabled passengers and persons with reduced mobility.

For the purpose of this research, the provision of a relevant legal cover is concerned; undoubtedly, principles such as impartiality and independence are allocated, but not pursued at this stage. Moreover, inequalities in individuals' access to online resources, privacy issues and problems regarding enforcement of decisions are not addressed.

It is worth to note that in this thesis, it is not discussed any legal theory of relevance, nor of legal validity; it is not aimed to determine what is legally valid. Relevance and the salience of legal information in the ATP domain is allocated here, within an applicative perspective of the law, or a realistic perspective to law, to inform the end-users in their decision-making process, therefore, means-end oriented.

Legal reasoning is out of scope. It is out of the scope modelling mechanisms for supporting deontic logic reasoning (for example, conflicts, remedies, etc.).

Quantifying relevance is also out of scope of this work.

It is not discussed the problem of connecting a legal ontology with foundational ontologies, although it is acknowledged the desirability of such alignments, crossing all the domains [Breuker, Valente, 2004], [Casellas, Blázquez et al, 2005], [Isabella, D'Aquin et al, 2016], [Ceci, Gangemi, 2016], [Bhatia, Kumar et al, 2016].

5 Thesis Methodology

This section presents the research methodology pursued in this work. Firstly, subsection 5.1 defines the methodology aligned to the research questions; secondly, subsection 5.2 introduces the Design Science Research (DSR) approach of Information Systems, proposed by [Hevner, March et al., 2004], [Oates, 2006], used in this thesis; then it reflects how the DSR supports the delineation of the dissertation. Finally, subsection 5.3 motivates the ontological approach taken.

5.1 Methodology Aligned with the Research Questions

The RQs frame and substantiate the methodology pursued in this thesis, according to the junctures enumerated below:

Table 1.2 Research Questions aligned to the methodology pursued along the dissertation.

<i>RQs</i>	<i>Pursued Methodology</i>
RQ 1 Which information is relevant for the merit/non-merit of a consumer dispute?	<ul style="list-style-type: none"> · Conceptualization of relevance framework in the ATP domain (topical relevance); · Analysis of complaints in order to build a taxonomy of cases (situational relevance); · Legal analysis: identification of the rights and its exceptions, constraints, further interpretation, legal source and enforcement procedure according to the most important sources of the domain (cognitive and domain relevance) (Chapter 2 and 3)
RQ 2 How can the dimensions of relevance be modelled in an ontology?	<p>Modelling of RIC and RIC-ATPI ontologies (systemic relevance) (Chapter 4)</p> <ul style="list-style-type: none"> · The modelling of the dimensions of relevance within the case-study should correspond to a consensuated vocabulary, modelled in a structured and explicit way through classes, relations and axioms, where the answers to the queries match the competency questions formulated.
RQ 3 How to define an Ontology Design Pattern on Complaints?	<p>Modelling the Complaint Design Pattern (Chapter 5)</p> <ul style="list-style-type: none"> · The CDP needs to express complaints in one or more domains; the CDP shall be linked to other ontology resources and data models; the CDP needs to answer the competency questions formulated.

5.2 Design Science Research Approach

Design Science Research is applied in this thesis as it presents guidelines for the design and execution of quality design science research projects and is *means-end oriented* [Iivari, 2007]. Design science research has been practiced in Computer Science, Software Engineering and Information Systems for decades. It is predicated on a solid knowledge base of scientific theories and engineering methods that provides the foundations for a design science research.

Communicating the design science research process is essential not only to support acceptance among IS professionals but also to establish the credibility of IS design science research among the larger body of design

science researchers in the various engineering fields, architecture, the arts, and other design-oriented communities. Design science research is poised to take its rightful place as an equal companion to natural science research in the Information Systems (IS) field [Hevner, 2007].

A design-oriented approach usually comprises the subsequent iteration: identification of the problem-space and the business needs; design the research; identification of the current state-of-the-art; twofold research activities: the development of the artifact, and evaluating its framework via case-studies, field studies, analytical studies, etc.; improvement and re-evaluating the framework.

The conceptual framework for understanding, executing, and evaluating the research is based on the Information Systems Research Framework described below and followed in this dissertation (Fig. 1.7).

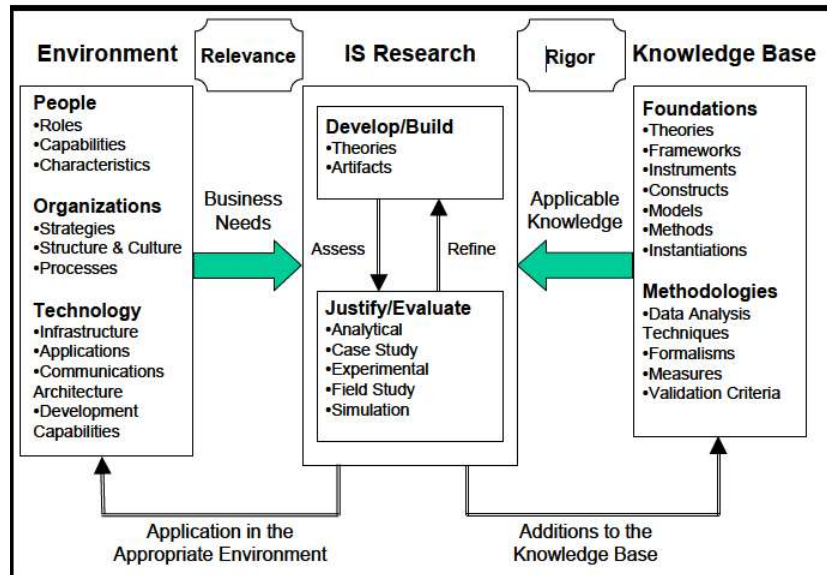


Fig. 1.7 Information Systems Research Framework. Reproduced from [Hevner, March et al., 2004]

The *Environment* defines the problem space. It is composed of *People*, *Organizations*, and their existing or planned *Technologies*. In it are the goals, problems, and opportunities that define *business needs* as they are perceived by people within the organization. *Business needs* are assessed and evaluated within the context of organizational strategies, structure, and existing business processes. They are positioned relative to existing technology infrastructure, applications, communication architectures, and development capabilities. Together, these define the business need or problem as perceived by the researcher. Framing research activities to address business needs assures "*research relevance*".

The *Knowledge Base* provides the materials from and through which IS research is accomplished. The "*knowledge base*" is composed of *Foundations* and *Methodologies*:

· *Foundations*: state of the art research and results from reference disciplines provide foundational: *theories, frameworks, instruments, constructs, models, methods, and instantiations* used in the develop/build phase of a research study.

· *Methodologies* provide guidelines used in the justify/evaluate phase. Computational and mathematical methods are used to evaluate the quality and effectiveness of artifacts; however, empirical techniques may also be employed. *Rigor* is achieved by appropriately applying existing foundations and methodologies.

Purposeful *Artifacts* are built to address heretofore unsolved problems or solving a known problem in a more effective or efficient manner. [March, Smith, 1995] define four types of prescriptive knowledge, or research outputs: constructs, models, methods, and instantiations:

· *Constructs* provide the vocabulary (language, concepts) of a domain and symbols in which problems and solutions are defined and communicated. Constructs or concepts form the vocabulary of a domain. They constitute a conceptualization used to describe problems within the domain and to specify their solutions. They form the specialized language and shared knowledge of a discipline or sub-discipline. Such constructs may be highly formalized as in semantic data modelling formalisms (having constructs such as entities, attributes, relationships, identifiers, constraints; for example, the constructs of “entities” and “relationships” in the field of information modelling, languages in legal ontologies, such as LegalRuleML, Open Digital Rights Language (ODRL), an open standard for expressing machine-readable licenses for digital objects.

· *Models* are representations or descriptions of a real world situation/problem domain; defined also as a set of propositions or statements expressing relationships among constructs. In design activities, models represent situations as problem and solution statements. For example, mathematical, diagrammatical or logic models (semantics/syntax) are widely used in the IS field. FOLaw ontology, OPLK ontology, LKIF-Core ontology, CLO ontology, LegalRuleML-core ontology are examples in the legal realm.

· *Methods* provide instructions, steps on how to solve problems, that is, how to search the solution space (goal-driven activity). These can range from formal, guidelines, mathematical algorithms or techniques that explicitly define the search process, to informal, textual descriptions of best practices, approaches, or some combination. Known examples in legal ontologies are: DILIGENT, TERMINAE.

· *Instantiations* are the physical realizations of constructs, models, or methods implemented in a working system. These can be instantiated in specific products, physical implementations intended to perform certain tasks. They demonstrate feasibility, enabling concrete assessment of an artefact's suitability to its intended purpose. Examples are software products or implemented processes, tools, applications, systems, frameworks, such as FrameNet Repository, ONTOMEDIA, decision support systems, like Best Ontology, LIME, EUNOMOS, IURISERVICE, LOIS project, etc.

· *Design Theory* describes the principles of form and function, methods, and justificatory theory that are used to develop an artifact or accomplish some end and can include the other forms of design knowledge: constructs, models, methods, and instantiations that convey knowledge.

(Synthesis adapted from [Iivari, 2007], [Hevner, March et al., 2004], [Gregor, Hevner, 2013] and from [March, Smith, 1995].

According to the Information Systems Research Framework applied in this work, the Environment, the Artifact and the Knowledge Base are herewith identified.¹¹

¹¹ In the conclusion chapter, in the section of critical issues, a critical analysis is made regarding the applicability of this framework.

- The *Environment*, defining the problem space, is defined in section 1 of this chapter and further described in Chapter 2, where the use-case, or an application domain is exemplified – the ATP domain.
- The *Artifact* consists in two *models* representing two ontologies: the Relevant Legal Information in Consumer Disputes Ontology (RIC) and its specialization, the Air Transport Passenger Incidents Ontology (RIC-ATPI) described in Chapter 4; and the Complaint Design Pattern;
- The *Knowledge Base* refers to the knowledge provided by the *foundations* and *methodologies* consulted and analysed to build both artifacts, delved in Chapter 3 and mentioned in a brief overview below.

For comprehensiveness purposes, Table 1.3 presents an overview of the foundations used in the development of the artifacts.

Table 1.3 Overview of the knowledge base used in the thesis

<i>Foundations</i>	<i>Description</i>
Constructs	<p>Constructs used to formalize the artifact presented in chapter 4:</p> <ul style="list-style-type: none"> • Ontology Web Language (OWL) is Semantic Web language designed to represent information through ontologies; • Resource Description Framework (RDF) is a standard model for data interchange on the Web, which enables to make statements in the form of subject–predicate–object expressions. The subject denotes the resource, the predicate expresses a relationship between the subject and the object. The RDF statements are mainly a uniform resource identifier (URI) or literals; • RDF Schema (RDFS) provides a data-modelling vocabulary for RDF data; it provides mechanisms for describing groups of related resources and the relationships between these resources; • Simple Knowledge Organization System (SKOS) provides a standard way to represent knowledge organization systems (taxonomies, ontologies, etc.) using the resource Description Framework, allowing interoperability; • Protégé is used as the ontology editor and user interface for building the ontologies; • SPARQL is an RDF query language.
Models	<p>Ontology-based approaches discussed in chapter 3:</p> <ul style="list-style-type: none"> • ODR ontologies: Mediation Core Ontology (COM), Ontology-driven Data Acquisition system (ODA), ODR processes ontology; • Consumer law ontologies: Consumer Mediation Ontology (COM), Consumer Protection Ontology (CPO), European Legal Taxonomy Syllabus (ELTS); • Complaint ontologies: Customer Complaint ontology (CCO), Customer Complaint Ontology, Ontology-based reasoning for the intelligent handling of customer complaints handling (i-CCH); • Information Retrieval: Saravan ontological approach, Lame’s ontology of French law, Best ontology, Query expansion using lexical ontologies and user feedback; Stojanovic’ IR-based ontology; • Core legal ontologies: LKIF-Core, Core Legal Ontology (CLO); • Ontology Design Pattern on relevance.
Theories	<ul style="list-style-type: none"> • Theory of behavioural economics applied to consumer policy is discussed and applied in the case-study (described in chapter 2).
Frameworks	<ul style="list-style-type: none"> • Conceptual framework of relevance and its manifestations, which is explained and adapted to the legal ontology artifact presented in chapter 3.

Instruments	<ul style="list-style-type: none"> · Interpreted as the available knowledge resources used to build the artifact: · Non-ontological resources (NORs), such as: textual corpora, standards, glossaries, classification schemas, thesauri, taxonomies, dictionaries, legal sources; and · ontological resources (OR): ontology design patterns and ontologies (chapter 4).
Methods	<ul style="list-style-type: none"> · NeOn and Melon ontology development methodologies were used to build both ontologies (chapters 3 and 4).
Instantiations	<ul style="list-style-type: none"> · Online Service Providers in the Air Transport Passenger (ATP) domain (chapter 2)
<i>Methodologies</i>	<i>Description</i>
Evaluative Criteria	
<ul style="list-style-type: none"> · Epistemological adequacy, operationability and reusability, proposed by [Visser, Bench-Capon, 1998], are used to assess and evaluate the ontologies (chapter 6). <p>Evaluation of the technical quality, good practices and completeness of the ontologies</p> <ul style="list-style-type: none"> · OOPS! (OntOlogy Pitfall Scanner!); · OntoClean; · Competency questions were formalized in SPARQL queries to query both ontologies (chapter 6). 	

5.3 Domain Lightweight Ontology

In this subsection, different categorizations of ontologies are analysed in order to choose the applicable one according to the purpose of this study.

Applying Guarino's classification of ontologies to the legal domain, one finds the following categories of legal ontologies: core ontologies; domain ontologies; task ontologies; and application ontologies [Guarino, 1998].

A comprehensive categorization of ontologies based on Software Engineering is also proposed and shown in Figure 1.8 [Bhatia, Kumar et al, 2016]. Accordingly, an Application Domain Ontology represents the knowledge of a particular domain and the business information required for developing software applications in a particular domain. This ontology also defines the various relationships that exist between different concepts related to the domain.

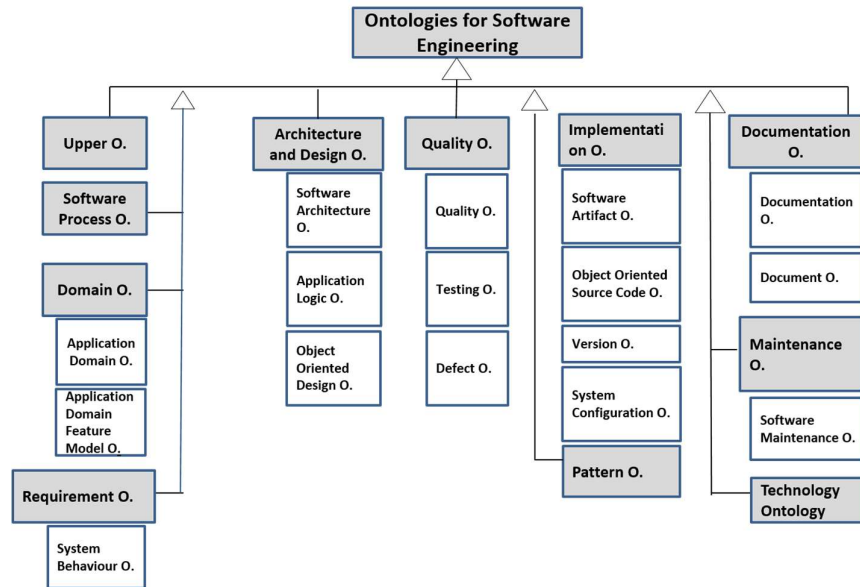


Figure 1.8 Types of ontologies for software engineering. Adapted from [Bhatia, Kumar et al, 2016]

Two main dimensions have been traditionally used for the classification of ontologies, as depicted in Fig. 1.9 [Heijst, Schreiber et al., 1997]:

- (i) Lightweight vs. heavyweight; and
- (ii) Application vs. domain vs. generic vs. upper-level.

Developer Profile	Area	Ontology Formality	Ontology Consensus	Ontology Language
Upper-level ontology engineers	Philosophy	High	High	First-order logic OBO OWL
Heavyweight ontology engineer	Computer science	High	Medium	OWL (DL)
Lightweight ontology engineers	Domain experts and computer scientists	Medium	Low	RDFS OWL (Lite)

Figure 1.9 Summary of relationships among profiles, skills and objectives of types of ontologies. Reproduced from [Corcho, Poveda-Villalón et al, 2015].

(i) *Lightweight vs. heavyweight ontologies.* The differentiation between them is mostly based on the amount and characteristics of the axioms included in the ontology. However, this differentiation may encompass several degrees, as referred by Lassila and McGuinness, [Lassila, McGuinness, 2001]. *Lightweight ontologies* are mostly defined with concept and property definitions, as well as simple concept taxonomies supporting simple taxonomic inferences, e.g., UML

class diagrams, entity-relationship models, SKOS, Schema.org., vocabularies to be used in the linked data context (usually written in RDF Schema or in OWL profiles with little expressivity). *Heavyweight ontologies* include the previous constructs, plus other types of restrictions and axioms that allow performing richer inferences with the underlying data. In traditional ontology engineering, the generation of heavyweight ontologies was viewed with favor, in general, because it demonstrates a deep understanding of the domain being modeled. The OWL-based domain and application types of ontologies developed under this profile may reuse axioms, properties and concepts from upper-level ontologies [Corcho, Poveda-Villalón et al, 2015].

(ii) *Application-focused vs. domain vs. generic vs. upper-level.*

Upper-level and generic ontologies are reusable across domains, since they cover concepts that are applicable for various and multiple domains, for example, units of measure, time and space. Schema.org is an example of a generic ontology. The *upper-level ontology* engineers have deep knowledge about formal logic and philosophy. The legal upper ontologies try to reflect theories of law, but hardly applicable by legal practitioners. They are usually built from a conceptual point of view, for heuristic purposes, and follow a top-down process from concepts to texts. *Foundational and core* ontologies are types of generic and upper ontologies. Hereby examples are provided. A *foundational ontology* defines a set of domain-independent ontological categories, e.g. DOLCE, BFO, GFO or SUMO. *Legal core ontologies* represent legal domain-independent concepts in Law and can be used as a basic structure in legal domain ontologies, frameworks, and application ontologies. Here are the most famous legal domain ontologies:

- Frame-Based Ontology (FBO) by van Kralingen, is based on legal positivism and written in ONTOLingua; the core of this ontology is the concept of norm and concepts related to it, such as norm subject, legal modality, and description of the act;
- Functional Ontology of Law (FOLAW) by Valente, written in ONTOLingua, is based on Kelsen, Hart and Bentham theories, and has a functional perspective and knowledge-oriented (normative knowledge, responsibility knowledge, reactive knowledge, creative knowledge, and meta-level knowledge);
- Core Legal Ontology (CLO) by Gangemi, is written in OWL and grounded in a foundational ontology (DOLCE);
- LRI-CORE built by Leibniz Center for Law Research Group is written in OWL+DL, it is grounded in different foundational ontologies (DOLCE, SUO, John Sowa's ontology). It has later evolved to LKIF-CORE;

Domain ontologies are reusable inside a specific domain such as the legal domain, or finance since they cover concepts, properties and axioms that are well known inside that specific field.

Application-focused ontologies are the least reusable, as they provide support for a specific type of application in a specific domain (for example, hotel booking for a specific type of provider), answering to end-users needs. The Legal Application ontologies reduce legal language complexity, often miss the specificity of legal knowledge, but are efficient for legal information retrieval: they favour storage and access to legal documents; they are extracted bottom-up from very large textual corpus [Bourcier, Rousnay, 2005].

In this thesis, a legal domain lightweight ontology was pursued, describing concepts extracted from several legal sources and from datasets of complaints in specific domains.

In this segment, a recent study of Ontology Engineering Skills in the Era of Linked Data,¹² it is asserted that Linked data has brought with it the challenge of developing or reusing ontologies that so far fall into the lightweight ontology category. These practices are followed in order to maximize the reusability and interoperability of the data that is being exposed as linked data.

“There is a preference, in general, for ontologies (commonly known in this context as vocabularies) that only provide simple classifications of concepts and where some of the properties do not have domains or ranges associated with them. Two examples of widely used vocabularies are the Friend of a Friend vocabulary (<http://xmlns.com/foaf/spec/>) or the W3C Organization Ontology (www.w3.org/TR/vocab-org/). These ontologies are simple enough to be used by many linked data practitioners when generating the data to be published and are normally implemented in RDF Schema or in OWL profiles with little expressivity” [Corcho, Poveda-Villalón et al, 2015].

Even if being a domain lightweight ontology, emphasis is placed in its practicability in real life scenarios. Important elements in this model are:

- (i) common formats: open standard that can be freely used by everyone;
- (ii) real data: legislation and empirical data;
- (iii) a language in which data has to be expressed in such a digital way that computers and humans understand each other, *i.e.* in machine readable way.

¹² Linked data has emerged as a publishing paradigm that allows exposing data on the web in a structured manner, following a set of clear principles that exploit the characteristics of the HTTP protocol and make extensive use of the W3C RDF specification [Bizer, Heath et al, 2009].

6 Interdisciplinary Aspects

The accomplishment of this thesis required an interdisciplinary approach between Law, Semantic web, and AI&Law. This research addresses several constituencies operating at the meeting point of legal knowledge, composed herewith of the knowledge sources used to analyse what is the relevant information in the ATP domain: consumer law, legal doctrine, case-law, jurisprudence, and online dispute resolution.

The legal discipline is combined with knowledge representation, using semantic web techniques, enabling the construction of the artifact: legal ontologies. Thus, legal knowledge representation was enabled through ontologies, enhanced by technologies such as RDF, RDFs, SPARQL, OWL, and SKOS.

Legal informatics is, by essence, interdisciplinary and strives to complement the traditional legal perspective with insights from the field of informatics, where information processing is designed and modelled for legal purposes or in a legal context.

In order to discern the interconnection of fields it is provided an example: legal concepts are embedded in different legal sources, such as legislation, case-law, legal doctrine. In particular, legal doctrine analyses what are the sufficient or necessary preconditions for the application of a certain concept, for instance, “extraordinary circumstances”, and which consequences (inferences) stems from its qualification and subsumption among facts of a case. This analysis is therefore evaluative, but justified in the reified empirical analysis. It decomposes legal concepts in their constituent elements, for instance, extraordinary circumstances (EC) are events not inherent to the normal exercise of the activity of the air carrier, beyond its actual control, as strikes, bad weather, excluding technical failures. This analysis is intended to help end-users in their case-by-case application of the law, qualifying cases according to concepts.

Developing systems of legal concepts involves a different approach to legal knowledge and computer science in a complementary way. A collaboration between a knowledge engineer and domain experts was an inevitable part of ontology development [Khan, 2012]. The potential connection between computational legal ontologies and legislation, case-law and legal doctrine is the common concern for the conceptualization of the law [Fernández-Barrera, 2011].

7 Thesis Outline: Structure and Constitutive Parts

This thesis is organized in seven chapters. Each chapter begins with an overview of the research presented therein and it is concluded with a summary and a critical assessment.

Chapter 2 discusses the case study on the Air Transport Passenger domain and presents a legal, market-based and empirical analysis based on domain

literature, case-law and complaints in order to unveil the topical, situational, cognitive and domain dimensions of relevance. Considering the clusters of the most frequent incidents, a case-taxonomy was built.

Chapter 3 presents the knowledge base. In this chapter, is put into perspective the foundational frameworks, models and methods pertinent to build the presented artifacts. Conceptualizations and typologies of relevance are analysed and tailored to legal ontology. As an ontology reflects a shared conceptualization with respect to a modelling problem, it was considered useful an analysis of the ontology-based approaches on consumer, ODR, complaint and IR-based artifacts of note.

Chapter 4 presents the ontology-based modelling of RIC and RIC-ATPI ontologies based on the relevance conceptualization. The development process of the ontologies follows the applied methodologies and the acquired knowledge resources.

Chapter 5 presents an ontology design pattern built to conceptualize complaints, named Complaint Design Pattern (CDP), and to support knowledge engineers to create domain specific complaint ontologies.

Chapter 6 is dedicated to ontology validation and evaluation. The last last chapter of this thesis is composed by the conclusions, the main contributions and limitations, and future work.

Chapter 2 Case Study in the Air Transport Passenger Domain

1 Overview

In section 3 of chapter 1, the use-case was introduced and motivated. This chapter presents the empirical research, the market-based and the legal analysis of consumer disputes in the ATP domain. The objective of this use-case is to discern and concretize what is the relevant legal information in this domain.

This chapter is organized as follows. In section 2 an extensive review of the ATP literature, domain experience and expertise, conformed the legal analysis, is presented, composed mostly by case-law from the European Union Court of Justice, legal doctrine, EU Communications, Guidelines and Recommendations, and ATP institutional expert-generated content.

Section 3 describes the data analysis of a sample of complaints from the Consumer Catalan Agency (CCA) dataset. Drawing upon these surveyed data permitted to gain insight into the frequency patterns and clustered structure of the complaints. Section 4 presents an analysis of the market-based approaches in the ATP domain. Hence, after the legal, market and data analysis, an incident-taxonomy is depicted in Section 5. Section 6 provides an analysis of the characteristics of the legal information in the ATP domain. Section 7 explains the effects of the theory of behavioural economics embedded in consumer policy, and into the ATP domain. Finally, section 8 summarizes the chapter and provides a critical assessment.

2 Legal Analysis of Consumer Disputes in the Air Transport Passenger Domain

Air transport passenger's realm, notwithstanding being one of the most regulated consumer-facing industry, unleashes a high number of disputes due to its non-conforming performance, featured by flight disruptions, such as overbooking, long delays, cancelations, missing baggage's or poor service quality.

The ensuing analysis of the ATP settings portrays some of the reasons underlying the malpractice affecting both passengers and air carriers causes of passenger's detriment; this underperforming dispute market status is affirmed in significant sources.

Passengers' rights in cases of flight disruption or damage/loss of their baggage, despite Regulations 261/2004 and 889/2002, appear to be insufficiently protected. Moreover, they lack information about the disruption and

they are sometimes insufficiently cared about. They find themselves in situations which are not covered by regulatory measures or, when they do, the air carriers often do not respect their rights and the passengers have limited possibilities to enforce their rights and to obtain redress [Public Consultation, 2012].

Air carriers complain about the economic burden and the legal uncertainty resulting from passenger rights' regulations, especially in exceptional circumstances, where the disruption is not the responsibility of the air carrier. Competition in the ATP market may also be distorted if not all the air carriers face the same burden due to divergent interpretations of the rules or divergent enforcement across Member States [Public Consultation, 2012].

The reasons underlying the malpractice and market failure [ATP Revision, 2013], stem from the following reasons which are analysed in detail in the following subsections:

- existent legal grey areas;
- unawareness of passengers' rights;
- enforcement procedures;
- sanctioning;
- missing incidents.

2.1 Sources in the ATP Domain

A list of sources below, illustrated in Table 2.1, was analysed to pursue a legal analysis.

Table 2.1 List of used resources

Legislation¹:

- Regulation 261/2004/EC applied in cases where a flight is cancelled or delayed, or when a passenger is denied boarding [Reg.261/2004/EC]
- Montreal Convention 1999 which establishes the airline's responsibility when the passenger suffers economic loss damage due to a flight delay or when their baggage is lost, damaged or delayed [Montreal Convention 99]. The Convention was ratified by around 130 countries including all the EU Member States is applicable to all flights within the EU, both domestic and international
- Regulation 2027/97/EC, which transposed the Montreal Convention into EU Law, on air carrier liability in the event of accidents, passengers delay and liability for lost, delayed or damaged baggage [Reg. 2027/97/EC]
- Unfair Commercial Practices Directive [UCP Directive]
- Unfair Contract Terms Directive [UCT Directive]
- Council Regulation (EC) No 1346/2000 of 29 May 2000 on insolvency proceedings [Reg.1346/2000/EC]
- Regulation (EC) No 2006/2004 of the European Parliament and of the Council of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (the Regulation on consumer protection cooperation) [Reg. 2006/2004/EC]

Selected Judgments of the Court of Justice of the EU, retrieved from the EU Commission website [CJEU Judgements]

EU Commission acts:

- Communication from the Commission to the European Parliament and the Council on the application of Regulation 261/2004 establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights, (COM (2011)174 final) [COM, 2011];
- Commission Staff Working Paper Accompanying Document to the Communication from the Commission to the European Parliament and to the Council the operation and the results of Regulation (EC) 261/2004 establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights, (SEC (2011) 428) [Commission Paper, 2011];
- Communication from the Commission to the European Parliament and the Council pursuant to Article 17 of the Regulation (EC) No 261/2004 on the operation and the results of this Regulation establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights (COM (2007) 168 final) [COM, 2007];
- Communication from the Commission from to the European Parliament and the Council: A European vision for Passengers: Communication on Passenger Rights in all transport modes, (COM (2011)/0898 final) [COM, 2011];
- Commission Staff Working Document: Complaint Handling and Enforcement by Member States of the Air Passenger Rights Regulations, (SWD (2014) 156) [Commission Document, 2014];

¹ European legal framework (civil law) was considered. The recent legislatives proposals were also regarded, such as [Regulation Proposal, 2013] and [Parliament Proposed Amendments, 2013]

- Recommendation of the European Commission on the use of a harmonized methodology for classifying and reporting consumer complaints and enquiries (SEC (2010)572) [Recommendation, 2010];
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a harmonized methodology for classifying and reporting consumer complaints and enquiries (COM (2009) 346 final) [COM, 2009]
- Public Consultation for the Proposal of revision of the Regulation (EC) No 261/2004 on air passenger rights Results (19/12/2011 - 11/03/2012) [Public Consultation, 2012];
- Interpretative Guidelines on Regulation (EC) No 261/2004 of the European Parliament and of the Council establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights [Interpretative Guidelines, 2016];

Directorate-General for Energy and Transport Information Document [IDDG, 2008]

EU Complaint Form [EU Complaint Form]

European Consumer Centres Network (ECC-Net) Reports in the Air Passenger Rights domain.

- ECC-Net Air Passenger Rights Report 2011[ECC-Net, 2011]
- ECC-Net Alternative Dispute Resolution in the Air Transport Sector, 2012 [ECC-Net, 2013]
- ECC-Net Air Passenger Rights Report 2015 [ECC-Net, 2015]

Studies commissioned by the EU Commission:

Eurobarometer on Air Passengers' Rights:

- Special Eurobarometer 228 (2005) [Special Eurobarometer, 2005];
- Special Eurobarometer 319 (2009) [Special Eurobarometer, 2009];
- Special Eurobarometer 420 (2014) [Special Eurobarometer, 2014];

Studies on the application, evaluation and revision of the 261/2004/EC, commissioned by the EU Commission:

- Evaluation on the application and enforcement of the Regulation on air passengers' rights in the EU Member States, by Steer Davies Gleave, prepared to the European Commission, Directorate-General Energy and Transport, DM28 5/70 [Evaluation Regulation, 2004];
- Exploratory Study on the application and possible revision of the Regulation 261/2004/EC, by Steer Davies Gleave, Final Report July 2012 Prepared to the European Commission DG MOVE [Revision Study, 2012];

European Consumer Organization (BEUC) resources:

- Position Papers

National Enforcement Bodies (NEBs) resources:

- Draft list of Extraordinary Circumstances [NEB's Draft, 2012];

<ul style="list-style-type: none"> • List of National Enforcement Bodies NEBS [NEB's List]; <p>Eurocontrol resources:</p> <ul style="list-style-type: none"> • Statistics [Eurocontrol Statistics]; • Glossary [Eurocontrol Glossary]; • Lexicon [Eurocontrol Lexicon]; <p>International Air Transport Association (IATA) resources:</p> <ul style="list-style-type: none"> • Recommended Practice 1724 General Conditions of Carriage and Baggage [IATA General Conditions] • Glossary [IATA Glossary] • Dictionary of terms [IATA Dictionary] <p>International Civil Aviation Organization (ICAO) Glossary [ICAO Glossary]</p> <p>European Low Fares Airline Association (ELFAA) resources:</p> <ul style="list-style-type: none"> • Statistics [ELFAAA Statistics] • Position Papers <p>Dataset of consumer complaints from the Consumer Catalan Agency (CCA)</p> <p>Terms and conditions of 10 air carriers</p>
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2.2 Existent Legal Grey Areas

The Regulation 261/2004/EC (henceforth Regulation) is convoluted into a group of legal internal cross-references, hampering a laymen's intelligible comprehension. It also lacks on important concepts, such as flight, denied boarding, rerouting, delay at arrival, actual time of arrival, time limits for bringing actions which were enriched by the CJUE. The Regulation does not establish common time-limits for bringing actions for compensation under articles 5 and 7. Time-limits² are therefore to be determined in accordance with the rules of each Member State on the limitation of actions, which create legal uncertainty in cross boarder incidents to enforce rights.

Open textured normative provisions that require further interpretation in a case-by-case assessment still persist; generally, passengers cannot verify the accuracy of *technical failures*, *reasonable measures*, or when airlines routinely cite *extraordinary circumstances-excuse*³ (under those circumstances air companies are released from the obligation to pay compensation). Indeed, both

² C-139/11 (Joan Cuadrench Moré vs. KLM).

³ Events that are beyond the airline's control, such as political instability, meteorological conditions incompatible with the operation of the flight, security risks, unexpected flight safety shortcomings, strikes affecting the operation of an operating air carrier, natural disasters [NEB's Draft, 2012].

Montreal Convention and the Regulation congregate the vague concepts of “extraordinary circumstances”. Within the former, the air carrier is liable for losses suffered by passengers unless the air carrier can prove that “it or its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for them to take such measures.”

Therefore, liability may be avoided if it can be shown that the air carrier took all reasonable measures to avoid the loss suffered by the passenger.

The Regulation does not elaborate on what requirements should be met in order to qualify as EC; Recital 14 of the Regulation provides 5 examples:

- political instability;
- meteorological conditions incompatible with the operation of the flight concerned;
- security risks;
- unexpected flight safety shortcomings;
- strikes that affect the operation of an operating air carrier.

While the majority seems straightforward, unexpected flight safety shortcomings requires further interpretation.

a) CJEU Restrictive Interpretation:

The CJEU delivered its judgment in the Wallentin-Hermann v Alitalia case (ECLI:EU:C:2008:771), after a German national court referred for a preliminary ruling regarding Alitalia’s use of the defence of extraordinary circumstances. The cancellation of the Alitalia flight in question resulted from a complex engine defect in the turbine that had been discovered the day before the scheduled flight, during regular maintenance. The Court ruled that the Regulation must be restrictively interpreted meaning that a technical problem in an aircraft which leads to the cancellation of a flight is not covered by the concept of extraordinary circumstances within the meaning of that provision, unless that problem stems from events which, by their nature or origin, are not inherent in the normal exercise of the activity of the air carrier concerned and are beyond its actual control (§26). However, what qualifies as ‘not inherent in the normal exercise of the activity of the air carrier’ and as ‘beyond its actual control’ remains for the national courts to decide on a case-by-case basis (§27 and 42). On top of this, the Court required that the cancellation or delay could not have been prevented, even if the air carrier had taken ‘all reasonable measures’ (§42). The CJEU provides some guidance for this decision, explaining that the specific conditions of air carriage and the degree of technological sophistication of aircrafts today have made the occurrence of technical problems inherent in the normal course of business of airlines (§24). From this judgment it can be concluded that technical issues can only qualify as unexpected flight safety shortcomings under strict conditions.

As the CJEU already suggests, probably the only situations that can be qualified as unexpected flight safety shortcomings will be confirmed manufacturing defects or acts of sabotage and terrorism (§26).

The Wallentin-Hermann judgment (ECLI:EU:C:2008:771) has clarified the concept of unexpected flight safety shortcomings. The CJEU introduces the three criteria of ‘not inherent in the normal operation’, ‘beyond its actual control’ and ‘all reasonable measures’, which give guidance when to qualify situations as unexpected flight safety shortcomings.

Very recently, the CJEU has confirmed its restrictive interpretation in the Siewert v Condor (ECLI:EU:C:2014:2377) order. A collision between an aircraft and a set of mobile boarding stairs should therefore be seen as inherent in the normal exercise of the activity of the air carrier. As a consequence, the air carrier is not relieved of its payment obligation (§22).

b) NEBS Interpretation

When it comes to explaining the concept of unexpected flight safety shortcomings, the NEBs do not share the CJEU’s restrictive interpretation of the Regulation. This can be concluded primarily from [NEB’s Draft, 2012]. The enforcement bodies conclude that manufacturing defects and damage to the aircraft caused by third parties constitute unexpected flight safety shortcomings. Parts that fail prematurely or failing parts that should not require unscheduled maintenance also receive this qualification. Finally, any other technical defect that becomes apparent immediately prior to departure or in-flight and which requires repair before the aircraft is airworthy for the intended flight qualifies as an unexpected flight safety short coming according to the NEB list (§26).

While the CJEU reasons that the occurrence of technical problems is inherent in the normal operation of airlines, the NEBs dissenting interpretation is opinion that airlines cannot be held accountable for technical issues that they have no influence on.

c) National Courts Interpretation

When the NEB decides the claim was correctly denied by the airline, but the passenger disagrees, or when the NEB decides the claim was incorrectly denied, but the airlines still does not pay, the affected passenger has to turn to the national court proceedings, which involves a lengthy, complex and costly process.

Different courts of the Member States have also struggled with the correct interpretation of the Regulation, which has resulted in many preliminary reference procedures.

There is a double liability regime coexisting in ATP sector that also overlap [Pozzo, 2015]:

(i) contractual liability, international one postulated by the Montreal Convention. It governs the conditions under which, after a flight has been delayed, passengers may bring actions for damages by way of redress on an individual basis against the carrier liable for damage resulting from that delay; and an

(ii) extra-contractual liability, at the level of the European Union, consecrated by the Regulation 261/2004/EC, which, stipulates standardized and immediate compensatory measures.

The successive judgments by the CJEU produced to date,⁴ requests for clarification to the CJEU from national courts, have substantively modified the scope of the regulation further. For instance, the Court has extended the compensation payments for long delays at arrival.

These factors unleash varying biased interpretations of the text of the Regulation by the airline industry, which leave loopholes in the passengers' rights, entailing legal inconsistencies and ambiguities, and loose of standards in the application of the law amongst stakeholders.

Airlines willing to comply with legal prescriptions will be confronted with angry and confused passengers nonetheless, while defaulting airlines can misuse low legal certainty to ward off claims in the first step of the claiming process. Thereby passengers may not receive the intended level of protection and airlines remain unsure about the scope of their liability. Passengers and airlines have the right to experience a transparent, uniform and predictable passenger rights bandwidth process.

When even passengers on the same flight are treated differently throughout the EU, and when different authorities responsible for interpretation of the notion of extraordinary circumstances understand it differently (NEBs and national courts), it can be concluded that currently consumers and airlines have a limited legal certainty with respect to what technical defects will be recognized as an extraordinary circumstance under the Regulation.

Despite of a proposed legislative revision⁵ adopted in 2013 addressing legal uncertainty, only incipient enforcement of ATP in adapting in light of the judgments of the CJEU Justice was perceived [BEUC paper, 2013].

⁴ The most recognized cases brought before the Court of Justice of the European Union (CJEU): case C-549/07 (Wallentin-Hermann) ECLI:EU:C:2008:771, Case C-22/11 (Finnair), C-402/07 and C-432/07 (Sturgeon and Böck) of 19 November 2009, C-581/10 and C-629/10 (Nelson and others vs IATA, KLM, British airways) of 23 October 2012, C-11/11 (Air France vs Folkerts) of 26 February 2013, ECLI:EU:C:2013:106, whose rulings need to be codified by the forthcoming legislation.

⁵ In 2013, the Commission tabled a proposal [Regulation Proposal, 2013] to amend the Regulation 261/2004. The text defines the term "extraordinary circumstances" as events which are beyond the actual control of the air carrier and provides non-exhaustive lists of both extraordinary and non-extraordinary circumstances.

2.3 Missing Incidents

Some incidents are not covered by regulatory measures, for example:

- i) missed connecting flight: passengers that miss a flight connection because their previous flight was delayed);
- ii) advanced rescheduling: passengers of flights rescheduled with a notice of period of less than two weeks in advance of the originally scheduled time;
- iii) assistance in case of delayed or lost luggage, such as the case of the delivery of vouchers. In those instances, (e.g. where luggage is delayed), passengers incur expenses as a result of the absence of their belongings. In these situations, some airlines offer immediate once-off cash payments at a set amount to cover emergency purchases until the delayed bag is delivered. Others will pay a set amount per day, up to a maximum number of days. Other airlines do not make immediate cash payments, but prefer to reimburse a passenger's expenditure on essential purchases, and will often therefore insist on seeing receipts [ECC-Net, 2015]. These matters cover a large proportion of all claims submitted by passengers to airlines, the NEB and the Commission, although it only concerns a limited part of the Regulation.

2.4 Unawareness of Passengers' Rights

The patchwork of legislation, brochures on ATP rights distributed at every major airport of the Community in all official languages, and information on official homepages and in mobile applications, gives the impression that passengers may nowadays enjoy effective protection. The information requirements based on Article 14(1) of the Regulation⁶ regard the rights entitled in case of ATP incidents. In addition, whenever an air carrier gives partial, misleading or wrong information to passengers on their rights, either individually or on a general basis through media advertisements or publications on its website, this should be considered as an infringement of the Regulation, in accordance with Article 15(2) read in conjunction with Recital 20 and may also constitute an unfair or misleading commercial business-to-consumer practice under article 7(4) of the UCP Directive. This is without prejudice to information requirements established by other provisions of Union law, in particular Article 8(2) of the Consumer Rights Directive [Consumer Rights Directive].

⁶ Article 14 of the Regulation depicts it is the duty of the airlines to provide information in two ways: first there must be a legible notice at the check-in counter where to find the text of the rights in case of a long delay, cancellation or denied boarding; second, in case such inconvenience occurs, the air carriers must provide a notice containing the rights to compensation and assistance to the passengers. In addition, the European Commission distributes leaflets concerning air passenger rights at every airport within the Community, alongside its mobile application for free to check their rights immediately and on the spot, <http://ec.europa.eu/transport/passenger-rights/en/mobile.html>.

Within this industrial realm, the Eurobarometer survey [Special Eurobarometer, 2009]⁷ discloses that almost six out of ten Europeans (59%) are unaware of their contractual rights and obligations when buying a ticket from an air transport company. Both airlines, insurance companies and travel agencies are often not sure about the details as well. Nevertheless, it seems from the number of complaints and disputes that many of these requirements or information disclosures are not having their desired effect. Fig. 2.1 shows the percentage of complaints of passengers concerning inadequate or lack of adequate assistance.

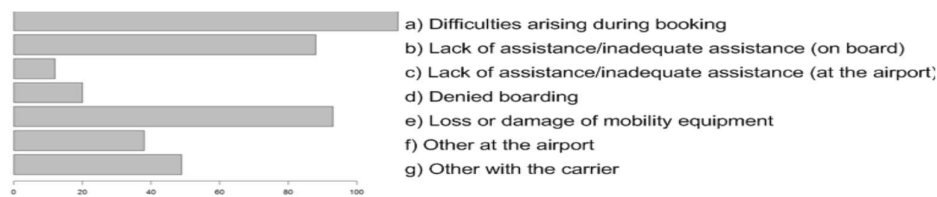


Fig. 2.1 Percentage of complaints concerning inadequate or lack of adequate assistance, ECC Network, 2013.

2.5 Enforcement Procedures

Methods of enforcement procedures vary between EU and within airlines and often the passenger must go to the airlines website to see what designated forms of communication are accepted. If a passenger uses the wrong method of communication, he/she will likely receive no response to their claim [ECC-Net, 2015]. Particularly problematic is the fact that some airlines do not provide any e-mail address and still only offer customer service over the phone or by a web based portal, making it difficult for passengers to keep a written record of their complaint.

It has been observed that passengers encounter difficulties in enforcing their rights as airlines' complaint-handling procedures are ill-defined, contingent and time-consuming, often featured as ping-pong pattern queued cases, which ultimately dissuade consumers from lodging a complaint regarding ATP incidents, or because there is no complaint handling body to turn to in case of irresponsiveness of the air carrier.

The parameterized workflow of the complaint diverges according to the air carrier: some contend that only the web-form, their own tailor-made complaint forms, conforms the acceptable and valid complaint; others embrace a wider perspective of a complaint, such as the ones submitted by fax, email or by

⁷This research also asserts there is a clear correlation between the passenger's level of awareness of his/her rights and the satisfaction with the services received when travelling by air. The data indicates that the higher the degree of awareness, the higher the quality of services received, [Special Eurobarometer, 2009].

letter; most of them require adding of proof documents, e.g. invoices, ticket receipt, photos, inventory forms, amongst other documents often demanded, many of those, laymen cannot comply with, due to lack of on-the-spot information.

2.6 Sanctioning

The Regulation is not enforced uniformly across all Member States, either due to differences in interpretation, lack of resources or legal constraints. The Liability Regulation does not oblige Member States to appoint specific National Enforcement Authorities (NEB) to monitor the legal compliance of air carriers, nor it does provide for sanctions against air carriers that do not comply with the Regulation, as is the case for other air passenger rights [Public Consultation, 2012]. Affected passengers are entirely dependent on the policy and goodwill of air carriers and the legal and out-of-court means of settlement or have to rely on private travel insurance. It follows that, in the absence of a credible and dissuasive enforcement policy, air carriers are not encouraged from granting air passengers their rights especially if their competitors are not doing so [Commission Impact Assessment, 2013].

NEB's responsibility for the application and enforcement of passenger rights are only of limited help: they cannot manage always individual complaints; they apply different sanctioning policies⁸ and differently interpret various parts of the Regulation. NEBs issue non-binding opinions which may not be followed by carriers and not always be recognised by national Courts, notably when the decision is issued by NEBs of another Member State.

Inconsistent or insufficiently enforcement and non-effective sanctioning policies by national authorities do not give sufficient incentives for the industry compliance. In this regard, it should be recalled that the sanctioning process is time consuming and can take several years before sanctions are collected (notably in case of appeals).

2.7 Lack of Integrated Data, Reporting Obligation and Economic Burden on Air Carriers

European air travel is probably unique in the field of retail commerce, in that it is subjected to a regulatory regime affirmed by the industry as burdensome, and/or not taking into account the commercial and operational realities of the business; in particular, due to a denominated:

- punitive compensation for shortfall in service delivery; and

⁸ Which may include may include inspections, audits, warnings, media contacts, monitoring of websites, meetings with airlines and stakeholders, consultations, pecuniary sanctions, continuing information process, monitoring of the ground handling procedures, amongst others) [Commission Impact Assessment, 2013].

- unlimited liability of care to stranded passengers, regardless the reason for the disruption quality [Joint Industry Paper, 2013] regarding the provision of food and drinks, hotel accommodation and transportation when the delay stretches overnight. This right is considered unlimited since there is no period after which this obligation ends to bind the airlines. In this instance, in the light of the specific circumstances of each case, proved necessary, appropriate and reasonable to make up for the shortcomings of the air carrier in the provision of care to that passenger, a matter which is for the national court to assess (See Case C-12/11, McDonagh, ECLI:EU:C:2013:43, paragraph 66).

The aviation industry, suffering losses associated with the grounding of their fleets over an indeterminate period, are faced with what is amounted to an unlimited liability for care. Duty of care provisions are due, irrespective of the reason for the disruption and includes the provision of refreshments, meals, transportation and overnight accommodation. The scale of the burden of the duty of care becomes explicit by the sector whenever exceptional circumstances, defined as “*outside the airline’s control*”, occur, which demonstrate the practical difficulties in providing the statutory care, even without a time limitation,⁹ whenever there are massive disruptions; known examples are: airports closure when ash cloud occur, the Japanese nuclear crisis, the civil disturbances in North Africa and the Middle East, other political upheavals, extreme weather events, and others.

Conversely, by acknowledging this problem may configure a pre-condition to offer more specific and situated information regarding the guidelines prompted by the emergent consumer policy and the new information design. Hence, the relevant legal information will focus not only on the rights, whether if they have grounds to lodge a complaint, but also how to address it and to whom in order to have redress.

Ensuring passengers’ rights can be correctly met by the industry by providing the necessary legal certainty and by ensuring a fair and proportionate economic burden that may result from particular situations for which the air carriers bear no responsibility, such as force majeure, also via a better sharing of the financial costs linked notably to care, amongst the aviation chain and other parties.

⁹ A time limitation on an airline’s obligation to provide care in case of massive disruptions: an airline should not be the insurer of last resort and it should be up to everyone involved (authorities, airlines, airports, hotels and passengers) to accept a shared responsibility to resolve the situation [Joint Industry Paper, 2013].

3 Complaint Analysis of the Air Transport Incidents

This section briefly analyses the complaints in the ATP domain. The adopted definition for the concept complaint consists in *an expression of dissatisfaction issued by a Complainant against a Complaint-Recipient, describing facts, motivations, where a request is explicitly or implicitly made*, as explained in chapter 5.

The research relied on a data analysis composed of real consumer complaints, which are case textual descriptions written in natural language, from the dataset of the Consumer Catalan Agency (CCA) [Suquet, 2013], [Casanovas, Magre et al., 2010]. Even if the CCA dataset (in Table 2.2) represents only regional complaints, they refer to a wide range of international airlines. It was collected and filtered ATP-related data of around 20.000 consumer complaints from 2007 and 2010. Around 10.000 ATP-related complaints were extracted through the “freelink” tool.

Table 2.2 Number of complaints per year in the period of 2007-2010 given by the CCA

<i>Complaints</i>	
Year	Total
2007	1795
2008	4756
2009	7585
2010	5702
Total	19838

From this selection, a sample of five hundred complaints from the year of 2007 were analysed in-depth. The complaints were classified manually; repeated complaints and e-commerce-based complaints were excluded, due to the fact that these complaints were mostly related to intermediary booking problems.

The incidents reported in the complaints were considered to build the typology of incidents. A criteria regarding the disputes was considered:

- “litigable disputes”: disputes that have objective determination of the legal merits, which means they have a legal cause of action. They are identified as flight and baggage incidents, and incidents related to unfair commercial practices and unfair commercial terms.
- “non-litigable disputes” [Rabinovich-Einy, 2011]: disputes that lead to a formal complaint which consist in small-scale problems rarely litigated at court, non-negligible but legally unfounded, lacking sometimes on a legal cause of action. Normally are elusive, less tangible, difficult to get redress, for being evidenced-based. In most instances, the complaints are usually

not the subject matter of litigation. This is because, in many cases, the ensuing conflict does not constitute a legal cause of action, as passengers cannot point to a breach of their legal rights. In this study, they are connected to service-related disputes, such as Irresponsiveness and Customer Service Insatisfaction Incidents. Examples depicted in the complaints are: legitimate concerns about conduct, miscommunication issues or lack thereof, staff demeanour, long waits for answers, and the like. Only in extreme cases (how a dispute is magnified), they could actually present a legal cause of action and hence merit a claim in cost-benefit terms.

The RIC-ATPI ontology entails relevant information referring to passengers, as also “non-litigable disputes” unleash many complaints, and therefore, air carriers could enhance dispute-avoidance and passengers concomitantly address litigable disputes.

The following steps (also depicted in Fig. 2.2) illustrates the typical steps an affected passenger would take when the complaint and its request or claim are rejected:

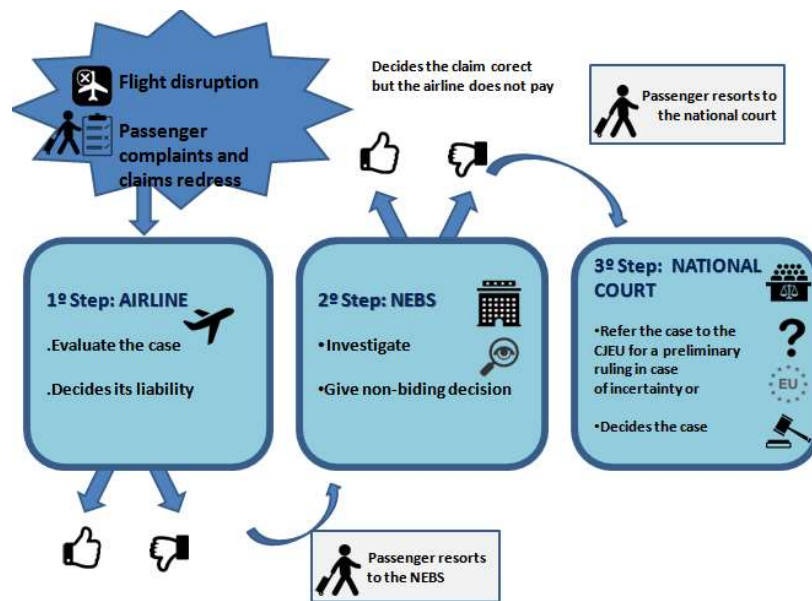


Fig. 2.2 Tracking the typical steps an affected passenger would take when the complaint and its claim are rejected. Source: own elaboration.

1st Step: Resort to the airline

Given a flight disruption, a passenger, in order to assert his rights, has to turn to the airline with his complaint and claim for redress. The airline will then evaluate the circumstances under which the flight was disrupted, after which it will decide whether compensations will be paid or if the airline can for example,

successfully invoke the extraordinary circumstances clause, thereby escaping liability. When the airline rejects this claim relying on the extraordinary circumstances clause, passengers who are convinced this decision is wrong have to contact the relevant NEB.

2nd Step: National enforcement body

This government body will then investigate the corresponding flight's circumstances and give a non-binding decision on whether the claim was correctly denied. When the NEB decides the claim was correctly denied by the airline, but the passenger disagrees, or when the NEB decides the claim was incorrectly denied, but the airlines still does not pay, the affected passenger has to turn to the national court proceedings.

3rd Step: National court

Finally, if the national court is uncertain about the correct interpretation of the applicable EU law (scope of the definition of extraordinary circumstances used in the Regulation), it can refer the case to the CJEU for a preliminary ruling, or the national court solves the dispute as it has the final saying in any individual case.

4 Analysis of the Online Service Providers in the ATP domain

This section analysis how online claiming companies in the field of ATP, provide information according to the incidents reported by the passengers. The lack of awareness of the rights and procedural rules among consumers, and the lack of compliance with the air passenger rights among airlines not resigned to the Regulation (EC) 261/2004 nor court decisions¹⁰ are some reasons why there is a growing industry helping consumers to seek relevant information and redress.¹¹

¹⁰ CAA launches legal action: regulator acts against three major airlines to protect UK passengers. The UK Civil Aviation Authority (CAA) has announced enforcement action against three major airlines, as the regulator steps in to safeguard the rights of millions of passengers. The action follows the CAA's comprehensive six-month review of airline policies in relation to supporting passengers during disruption, including their approaches to paying flight delay compensation and the provision of information about their rights. This review has already resulted in a number of airlines changing their policies, resulting in millions of passengers benefiting from improved support during disruption. <http://www.caa.co.uk/application.aspx?appid=7&mode=detail&nid=2437>

¹¹ <http://www.dinside.no/934197/skal-du-velge-airhelp-eller-transportklagenemnda> (In Norwegian). "These companies have emerged because some saw the opportunity to create an income-generating product, based on that they submit claims they assume - and I emphasize guess - which air passengers are entitled to. So they take a share of the payout and sticking into their own pocket, says the head of Transportklagenemnda (Dispute Resolution Board/ Norwegian NEB) Rolf Forsdahl who is critical of the trend."

According to our best knowledge, there is no ontological representation applied to the ATP sector that can describe ATP incidents and model correlative legal information. Nevertheless, this is not the first initiative in this field; there are other services that cover the terms dealt herein, especially online claiming companies in the field of ATP, denominated as fee-charging claim websites. They incorporate a B2C consumer-related business model dedicated to getting passengers compensation from flight companies when their flights are delayed, denied or cancelled. The majority receive 25% of the compensation from successful claims as their commission.

They require the passengers to sign a Power of Attorney (POA) which also prevents passengers from taking up the case with the airline directly.

The procedure of operation of these companies is quite similar to all: users key-in their flight number and departure date and the high-tech system checks whether they're entitled to compensation according to the EU Regulation 261/2004. The difference between them resides in the geographical coverage (worldwide or regional market). In particular, and as shown in Fig. 2.3 the steps are the following:

- Calculation the potential compensation that a passenger might be entitled to in case of cancellation, denied boarding or long flight delay, based solely on article 7 of the Regulation from the compensation calculator, with a software module based on an automatic logic;
- Manually evaluation the chances of a successful claim collection. If the prospects are promising, thereby they bring the claim forward against the airline, tracking its status;
- When every airline does not respond to the demand for payment or declines to pay, they recommend each user to engage the commissioned lawyers with no further costs, or the passenger has to claim in court, or Small Claims Court.

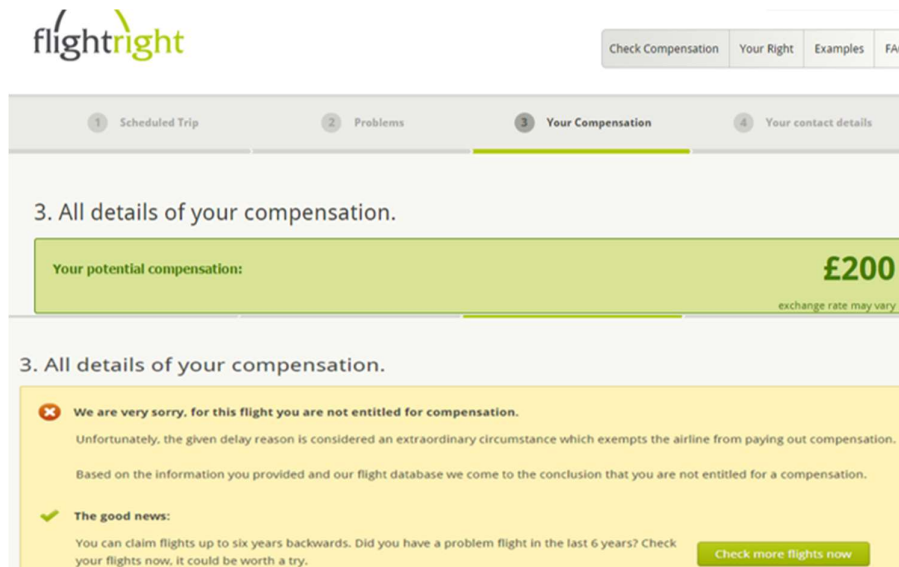


Fig. 2.3. Examples in the ATP domain, from the FlightRight website

Key-players of this market are: Sky Mediator, Claims4flights.com, AirHelp claims have processed about 25,000 claims, successful pay-outs of €400 or more per passenger; Flightright¹² claim have helped more than 400,000 passengers, with success rate of 98%; Resolver; Refund.me; FairPlane claims have won 10.9 million in 2015; EUclaim alleges have helped 216,051 passengers with a success rate of 97% and earned over € 50.6 million for their customers; EUDelay claim have won 98% of claims; Flight-Delayed.co.uk claim having 327, 735 users, with a success rate of 98% in court. However the efficiency of these services is very low: fewer than 2 percent of eligible travellers try to claim the due compensation, and less than 1 percent of travellers receive the money, says Nicolas Michaelsen, co-founder and chief marketing officer of AirHelp.¹³

Overall, these existing companies show coverage drawbacks:

- they do not manage baggage incidents, as delayed, missing and damaged baggage and its corresponding rights, which unleash many complaints;
- they do not manage delay-based incidents. In fact, the carrier is also liable for damage occasioned by delay of passengers and baggage (Art. 19 Montreal Convention). In the case of damage caused by delay in the carriage of passengers, the liability of the airline for each passenger is limited to approximately 5229€ (Art. 22 (1) MC).
- in case of regarding in case of damaged, lost or delayed baggage, either hand luggage or checked-in baggage, the airline liability is approximately 1260€ per passenger (Art. 22 (2) MC). But an airline and its servants or

¹² <http://www.flightright.com/>

¹³ <http://www.reviewjournal.com/travel/tipsdeals/how-get-compensated-air-travel-delays>

agents respectively can be held liable without this financial limit, in case of reckless or intentional acts or omissions causing the damage to the baggage or to the damage in delay caused to passengers. The passenger may claim compensation for checked and unchecked baggage separately, if damage was caused to both at the same time;

- incidents related to service claims, such as irresponsiveness by the airline; bad quality service; misinformation, also unleashes disputes and legitimate grounds of redress and yet are not covered by this market;
- the contextualized information regarding the procedures to claim and involved institutional entities are out of the spectrum of the provision of these services, information which here ascertained a priori welfare-enhancing self-litigation and empowering of the decision-making process;
- they do not comprehend overall legal framework, case law, best practices nor links to official sources. Air Help¹⁴, on the other hand, exposes in its website a link to the EC Regulation and Montreal Convention and lists a summary of some of the “breakthrough rulings” of the CJEU, with a simple narration of the case, without extracting the legal rationale that could be used to ulterior cases;
- the (EC) Regulation establishes *minimum* levels of assistance and compensation for passengers affected by denied boarding or by long delays or cancellations. It states a *minimum standard* of compensation (flat-rate compensation) regardless of the fact of an actual damage. Hence, passengers shall retain the right for *further claims* beyond this minimum standard. In this regard, Article 12 stipulates that passengers are not hindered from further claims, if the damage occurred exceeds the compensation awards as under Art. 7. Whilst, the Montreal Convention (as translated by Regulation (EC) No 2027/972 into EU law) provides for individualized damage to travellers, assessed on a case-by-case basis depending on the individual circumstances of the passenger;
- their course of action, stage of the process, enforcement of the claims, still depends on each airline’s policies and their willingness for settlement: only when air carriers are willing to settle with these service providers, the consumer succeeds.
- Also, it is possible for consumer to go beyond the monetary estimation. The CJEU holds that ‘further compensation’ is intended to supplement the application of the standardized and immediate measures provided for by the Regulation. Therefore, that ‘further compensation’ allows passengers to be compensated for the entirety of the material and non-material damage they suffered due to the failure of the air carrier to fulfil its contractual obligations to assist, reimbursement of ticket or rerouting, and to take care of costs that fall to it pursuant to the regulation, meal, accommodation and communication costs, air passengers are entitled to claim a right to

¹⁴ <https://www.getairhelp.com/en/know-your-rights>

compensation. Only the national judicature goes beyond the compensation rules established by the Regulation.

By offering information inasmuch as these service providers are interested, encompassing a monetary estimation may seem limited. Considering the complexity of the arguments outlined by this powerful industry, the range of extraordinary circumstances, the plethora of initiatives on the legislative agenda on air transport passenger law by the policy-makers, it is inferred that the calculus of the eventual compensation fits only the company's interests.

5 Taxonomy of the Air Transport Incidents

In this section, the steps to build a consensuated taxonomy of the air transport passenger incidents are explained.

5.1 Methodology for Classifying the Incidents

To build the ATP taxonomy, it was considered the clusters of the most frequent incidents in the legal, market and complaint analysis. The incident-based taxonomy produced in this thesis was aligned and contrasted with the EU ATP-based complaint form and with Recommendation of the European Commission on the use of a harmonised methodology for classifying and reporting consumer complaints and enquiries for all European complaint handling bodies [Recommendation, 2010]; it is specified herewith according to this common framework. This Recommendation identifies 12 types of complaints related to goods and services (see Fig. 2.4 and 2.5). The types of complaints are:

1. Quality of services, including 1.1. Defective; 1.2 Not in conformity with the order; 1.3. Not fit for particular purpose;
2. Delivery of goods/Provision of services, including here 2.1 “Not provided”, as we refer in our case to “cancellation”; Delay; “Refusal to provide a service” as we refer to a “denied boarding”; Customer Service;
3. Changes in Price/Tariff, that do not include issues related to misleading indication of prices/tariffs;
4. Invoicing/billing and debt collection;
5. Warranty/statutory guarantee and commercial guarantees;
6. Redress, including in point 6.1. Difficult access to redress, in which the consumer has difficulties in getting information on where to complain and claim redress, e.g. no phone number, no email or all telephone lines busy; 6.2. No redress;
7. Unfair Commercial Practices, including incorrect or misleading indication of prices / tariffs, in which the price indicated does not fully or wholly represent the price e.g. hidden charges;

8. Unfair contractual terms/change of contractual terms, including in 8.2. Lack of Information required in the contract, e.g. information about the trader, the characteristics of the service;
9. Provider Change;
10. Safety;
11. Privacy and Data Protection; and
12. Other issues.

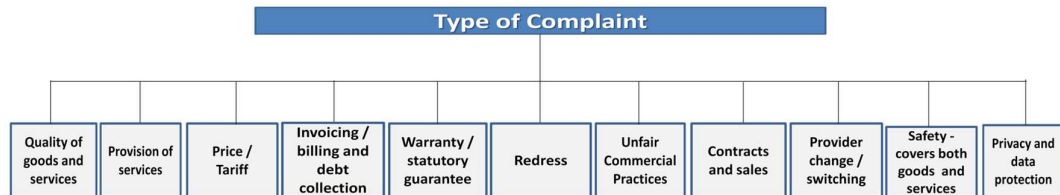


Fig. 2.4 Type of Complaints, adapted from [Recommendation, 2010]

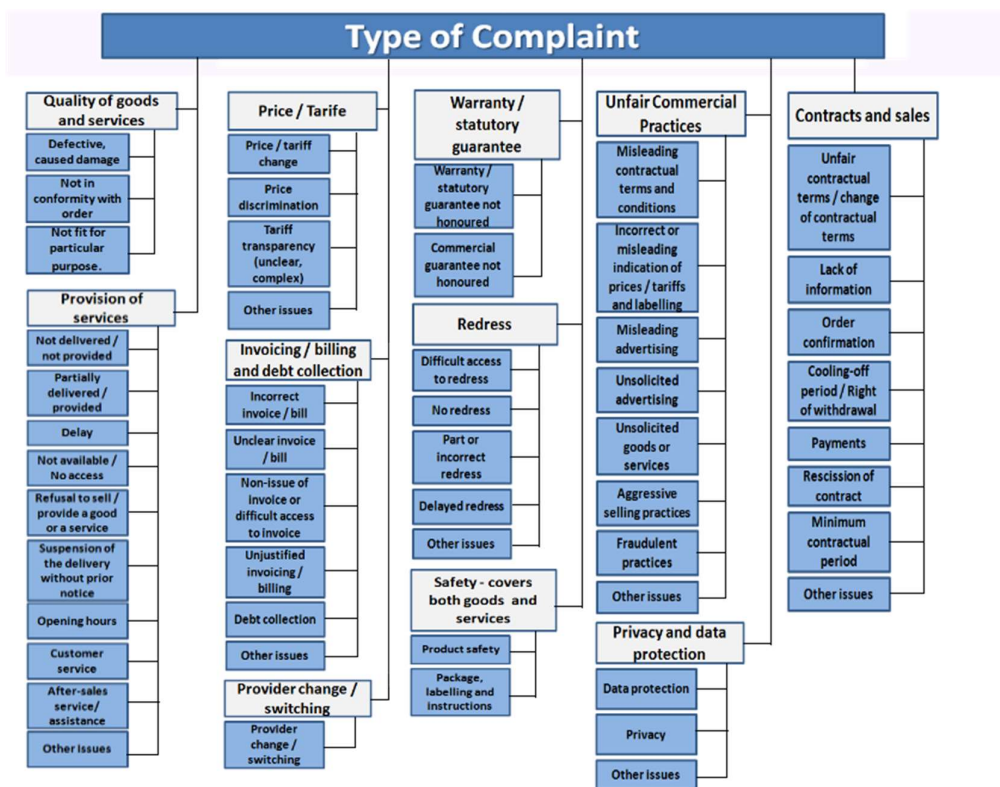


Fig. 2.5 Type and sub-type of Complaints, adapted from [Recommendation, 2010]

Analysing the types of complaints, some adaptations were performed:

- Maintenance of the incidents related to Unfair Commercial Practices (UCP), Unfair Contractual Terms (UCT), and Costumer Service;
- Adaptation of the incidents regarding to cancellation, delay, denied flights and related to baggage, which indeed refers to the provision of a service, due to the fact that these events are already configured and informed within several sources, such as two European Regulations, ECC-Net Reports, case-law, legal doctrine and in the European Commission Communications;
- Autonomization of the incident related to “Lack of information”, refracted in the Recommendation as “Unfair Contractual Term” (8.2) and also in “Difficult access to redress” (6.1), in which “*the consumer has difficulties in getting information on where to complain and claim redress*”, e.g. no phone number, no email or all telephone lines busy“, and renamed it as “Irresponsiveness”.

5.2 Air Transport Passenger Incidents

In this subsection it is provided a definition of each of the incidents and their justifications as to be categorized as an ATP incident.

An ATP Incident can be subsumed in atomic or composite incidents (combining an interplay of more than one incident detected in the same complaint), which means it is conceivable to ascertain in one complaint a combination of incidents.

This ATP case-taxonomy, depicted in Fig. 2.7, was stratified having in mind:

- the perspective of the passengers, enabling the identification of the incident; and of the air carriers; and
- the type of redress passengers might benefit of; it is easier to get redress from flight and baggage incidents, rather than service ones.

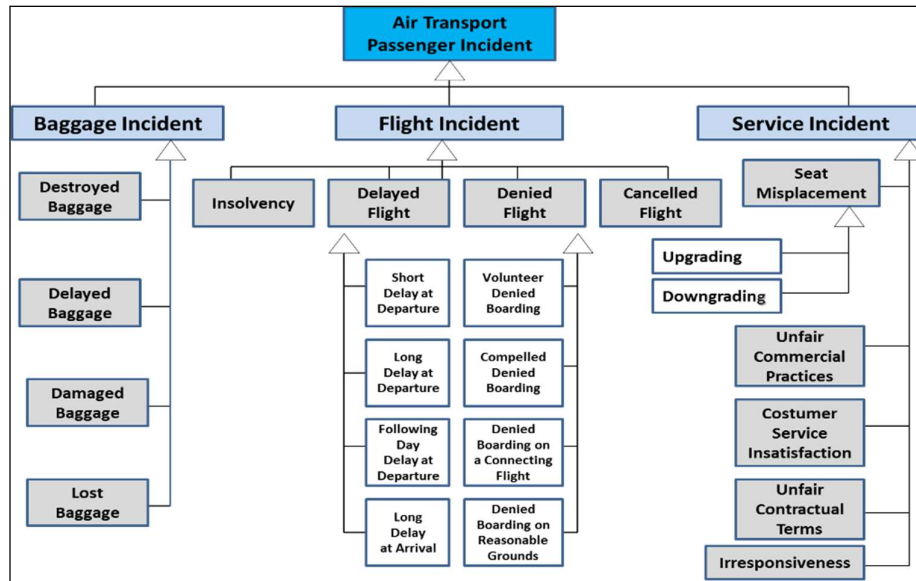


Fig. 2.6 Case-taxonomy of the ATP incidents

5.2.1 Flight Incidents

The majority of flight incidents corresponds to cancelled and delayed flights (Fig. 2.7).

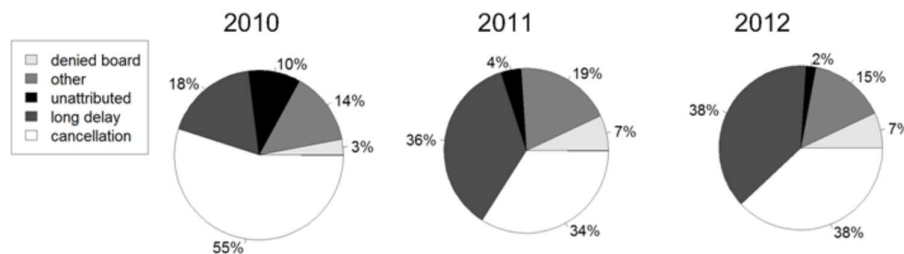


Fig. 2.7 Types and percentages of flight incidents from 2010-2012, ECC Network, 2013.

Cancelled Flight

Means the non-operation of a flight which was previously planned and on which at least one place was reserved, Article(2)(1) (EC) Regulation 261/2004. Article 2(1) does not require an express decision of cancellation by the carrier, Case C-83/10, Aurora Sousa Rodríguez v Air France SA, ECLI:EU:C:2011:652, paragraph 28.

In practice, although a flight may generally tend to be considered as cancelled when its flight number changes, this might not always be a

determinant criterion. The following cases held in the literature and case-law help to discern when it is possible to qualify a cancellation incident:

- Case of an aircraft which returns to its point of departure:

The CJEU provides a broader interpretation of the cancellation incident, asserting that it does not refer exclusively to the situation in which the aeroplane in question fails to take off. That concept also covers the case in which an aeroplane took off but, for whatever reason, was subsequently forced to return to the airport of departure, where its passengers were transferred to other flights; this means that the flight, as initially scheduled, could not be considered as having been operated, as it did not reach its final destination according to its itinerary, Case C-83/10, *Aurora Sousa Rodríguez v Air France SA*, ECLI:EU:C:2011:652, paragraph 28.

- Diverted flight:

A diverted flight by which a passenger finally arrives at an airport which does not correspond to the airport indicated as the final destination in accordance with the passenger's original travel plan, is to be treated in the same way as a cancellation, unless:

- (i) The passenger is proposed re-routing under comparable transport conditions at the earliest opportunity by the air carrier to the airport of original final destination, or to any destination agreed with the passenger and in that case, may finally be considered as delayed;
- (ii) The airport of arrival and the airport of the original final destination serve the same town, city or region, in which case, it may finally be treated as a delay. In such case, by analogy, Article 8(3) applies: the operating air carrier bears the cost of transferring the passenger from an alternative airport, either to that for which the booking was made, or to another close-by destination agreed with the passenger.

Delayed Flight

"Delayed flight at departure" occurs when an operating air carrier reasonably expects a flight to be delayed beyond its scheduled time of departure, Article 6 of the Regulation 261/2004. Accordingly, the rights depend on the duration of the delay and the distance of the flight.

The Regulation defined the following cases of delay at departure:

- Two hours or more, in the case of flights of 1500km or less;
- Three hours or more, in the case of all European flights, of more than 1500km, and non-European, between 1500-3500km;
- Four hours or more, in the case of all flights not falling under the first two;
- Five hours or more;
- Day after the time of departure previously announced.

A “delayed flight at arrival” is not defined in the Regulation 261/2004/EC, only through the case-law of the CJEU, as ruled accordingly:

“When an operating air carrier reach their final destination three hours or more after the scheduled arrival time (originally scheduled by the air carrier)”, Joined cases C-402/07 and C-432/07, Sturgeon vs Condor Flugdienst GmbH e.a. ECLI:EU:C:2009:716, paragraph 69. See also joined Cases C-581/10 and C-629/10, Nelson e.a. ECLI:EU:C:2012:657, paragraph 40, and Case C-413/11, Germanwings, ECLI:EU:C:2013:246, paragraph 19.

Complaint number 855 of the CCA dataset, for example, configures a case of delay at departure and at arrival.

“On the flight: Ibiza (IBZ) to Barcelona (BCN), Thursday, 16 Aug 07, Check Out: 00:40, (Wednesday night to Thursday), Check in: 1:35, Flight number: VY1121. We left Ibiza with a remarkable delay. We arrived in Barcelona 2 hours later than planned (approximately 3:20). Firstly, the airline did not arrive (took over 60 minutes), then the doors of the plane did not close well (over 30 minutes) (meanwhile this was not reported by the crew) ... Finally, there was no staircase in Barcelona (once again terrified) to go out. This is at the threshold of a “long delay”. I generated the alert to the company and to avoid (as much as possible) delayed flights. I want an amount of approximately two hour parking at Barcelona Airport (5 euros). I want a new flight to compensate for the inconvenience. Or a compensation”.

Denied Flight

Denied boarding means a refusal to carry passengers on a flight, although they have presented themselves for boarding on time.

The following situations do not configure as a denied boarding. They are usually based on the terms and conditions linked to the ticket purchased. Such practices might however be prohibited by national law.

- When there are reasonable grounds to deny boarding, such as reasons of health, safety or security, or inadequate travel documentation, Article (2)(j) Regulation (EC) 261/2004;
- When a passenger who holds a reservation including an outbound and a return flight is not allowed to board on the return flight because he did not take the outbound flight, the so-called ‘no-show’;
- When a passenger who holds a reservation including consecutive flights is not allowed to board a flight because he did not take the previous flight(s).

The broader interpretation from the CJEU states that the concept of ‘denied boarding’ relates not only to cases of overbooking, denied boarding covers all circumstances in which an air carrier refuses to carry a passenger, such as those concerning other grounds, such as *operational reasons*, German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Case C-321/11, 04/10/2012, and C-22/11 (Finnair Oyj vs. Timy Lassooy) ECLI:EU:C:2012:609, paragraph 36.

As the CJEU evokes “*all circumstances*”, it is only aimed to categorize two types of what is generally considered denied boarding: Overbooking and Reasonable Grounds.

Overbooking, is therefore an individual measure taken by the air carrier arbitrarily against a passenger who has nevertheless satisfied all the conditions for boarding (not attributable to the passenger himself).

Reasonable grounds, includes:

- insufficient documentation;
- not leaving sufficient time to check in;
- reasons of health;
- safety or
- security, etc.

In a rigorous definition, denied boarding does not encompass reasonable grounds, but due to practical reasons, in this study, it is qualified as such.

It is clearly stated in the terms and conditions of most air carriers that it is entirely the passenger’s responsibility to ensure that they are in possession of the necessary documentation. This includes items such as acceptable forms of photographic ID, passports, visas, transit visas. Passenger should be aware that whilst certain identification documents may be acceptable for public authorities in charge of border control, it is possible that particular forms of ID will not be accepted by the airlines on which they intend to fly. This is because the checks carried out by both differ in their objectives and the technical means available. However not in all cases the refusal of certain ID is justified. Consumers are advised to read the terms and conditions carefully to see what forms of identification are specified by the airline.

Complaint number 1389 of the CCA dataset illustrates this incident of denied flight.

“Date: Aug. 5 2007-09-30 Location: Airport Party Terminal B Facts: Denial boarding flight due to Overbooking- Click Air XG 1057. Approximately twenty people filed the corresponding claim in the offices of Click Air located in Terminal B of the airport. In this claim we requested the refund of the ticket because the option of flying in the next day was not of my interest. We request the refund of the price of the ticket and a

compensation of 400 euros (distance Prague Barna 1736 km) and Sanctions applied to Clickair for not respecting the passenger rights.”

Insolvency Incident

When an air carrier has insufficient assets to meet all debts, or being unable to pay debts as and when they are due [Reg.1346/2000/EC]. More air carriers enter into bankruptcy with potentially severe effects on consumers [Public Consultation, 2012].

Consumers can be affected in two ways:

(i) stranded passengers travelling at the very moment their airline got bankrupt cannot return home without at least some delay and very possibly extra cost; and

(ii) passengers who bought their tickets in advance, and paid the whole amount, should in case of insolvency enrol in the list of creditors, which in practice normally means that they cannot get their money back [COM Insolvency, 2013].

An independent study for the European Commission [Aviation Bankruptcy Study, 2009] shows that there have been a number of bankruptcies during the last decade. Looking at the period 2005-2008, the majority of bankrupt carriers (41%) were relatively small regional scheduled carriers. The total number of bankruptcies since January 2000 is at least 79, a higher rate than that reported in the 1990s. Since the study was issued, moreover, at least 14 more European airlines have ceased to operate.

Under the agreement of “rescue fares” [Agreement Voluntary Repatriation, 2014], in the event of an airline insolvency, IATA member airlines flying to and from the EU will make their best efforts to offer repatriation to passengers stranded away from home. These passengers will be provided access to discounted transport to return home, subject to available capacity. The ‘rescue fares’ of a nominal amount will be available for purchase up to a maximum of two weeks after the event to anyone flying to and from or within Europe who does not already possess insurance covering this eventuality.

5.2.2 Service Incidents

While some of the shortcomings are directly linked to the Regulation 261/2004/CE, like what happens with the incident of Seat Misplacement, the others stem from fragmented consumer protection legislation and the enforcement of such legislation in practice, particularly in cross-border situations, within unfair commercial practises and unfair contract terms. In particular, these legislations correspond to Directives, dependent on transposition into domestic legislation. The corresponding rights or remedies

which Member States must make available to consumers are built upon the civil law systems in continental countries. Civil law remedies may be added to the ones established in the Directives, entailing two remedy routes which use different language, different concepts, causing added difficulty and uncertainty in providing information. Hence, the implementation of the directive-based consumer remedies may vary from country to country.

Service incidents are related to the a) quality of the performed service; b) unfair commercial practises; and c) unfair contractual terms. Quality service incidents comprise:

- customer service insatisfaction;
- irresponsiveness; and
- seat misplacement.

Seat Misplacement

Seat misplacement refers to the fact when an operating air carrier misplaces a passenger in a class different than that for which the ticket was purchased. It includes the following two cases: upgrading and downgrading:

- Upgrading: when an operating air carrier places a passenger in a class higher than that for which the ticket was purchased, Article 10 (1) Regulation 261/2004; and
- Downgrading: when an operating air carrier places a passenger in a class lower than that for which the ticket was purchased, Article 10 (2) Regulation 261/2004].

Irresponsiveness Incident

Incident related to the difficulties in getting information from the air carrier on where and how to complain and on claim redress (e.g. no phone number, no email or all telephone lines busy, no response to the complaint).

Irresponsiveness encloses:

- (i) lack of general information received about the disruption;
- (ii) lack of answerability to the complaints;
- (iii) lack of information about the entitlement of rights [Special Eurobarometer, 2014].

ECC-Network cite the lack of response from the air carrier is an important reason why a case could not be resolved.

“Whilst passengers frequently seek information or have a complaint about their rights as an air passenger (...) some airlines still do not inform about

passenger's rights, and many therefore do not request the compensations they are entitled to”.

The Network registers that:

“[I]n many complaints, consumers refer to long periods of time before they receive any reply or they get a standardized response which does not address the consumers concerns. Often consumers may have contacted an airline several times before receiving a response. In some instances, no response to correspondence will ever be received” [ECC-Net, 2015].

ECC-Net regularly receives contacts from consumers seeking advice as to the manner in which to contact airlines, or the difficulties they are experiencing trying to notify the airline of the problems they experienced. Methods of communication with airlines vary from airline to airline and often one must go to the airlines website to see what designated forms of communication are accepted by customer service. If a consumer uses the wrong method, he will likely receive no response to their claim, as stated in the report:

“(...) Particularly problematic is the fact that some airlines do not provide any e-mail address and still only offer customer service over the phone or by a web based portal, making it difficult for consumers to keep a written record of their complaint. Often consumers will have to wait a long period of time before they receive any reply to their complaint” [ECC-Net, 2015].

Customer Service Insatisfaction

It means the expression of insatisfaction with the level and quality of the service provided, for example, with the booking or the ticket management, such as the modification, booking error due to the website; discriminatory and language issues; quality of food or the behaviour or attitude of some of the employees; long check-in waiting time due to the slow billing process and the long queue in the check-in counter caused the loss of the plane, etc. Complaint 56 of the CCA dataset exemplifies this incident.

“I complain of degrading and humiliating treatment of the two people who attended the check-7 and 8 Reus Airport Zone (low cost zone) on 26 June between 15:00 and 17:00. When approaching to them in Catalan, they ignored me and when I alerted them to that fact, they immediately called security and threatened not to let me board on the plane if I would not address correctly, I suppose that in Spanish- and additionally, had to apologize publicly, because as they said, I had insulted them (...). I asked the presence of a superior and after an hour of discussion I forced them to do the billing. At this time, two people continue inventing reasons to avoid it. The airport staff informed us that possibly the two people in question did not belong to Ryanair if not a company that provides the service. I request you to monitor customer service that this company makes when does the billing, and not just a language issue, because during the time we were there, there were incidents of all kinds.”

Unfair Commercial Practices Incident (UCP)

UCP consists of commercial practices which are dishonest practices; misleading commercial practices, such as false claims, deceiving information or leaving out important information that would affect the consumer decision to buy something; and aggressive sales techniques that harass the consumer into buying something under pressure, Article 5 of the Directive 2005/29/EC concerning unfair B2C commercial practices in the internal market.

Feedback from stakeholders suggests that the obligation to provide clear and complete price information is often neglected in commercial offers, especially in the travel and transport sector [COM, 2011]. In fact, UCP are related to complaints and disputes related to the proliferation of all kind of extra fees that are added to the headline ticket price, like “drip-feeding” prices, during the booking process, making it impossible for passengers to compare different offers or to know from the start what will be the final price to be paid, due to lack of transparency and also misleading information (article 6 (1) d) [BEUC paper, 2012]. Also during online bookings, passengers are frequently exposed to misleading advertising of prices for flight tickets. BEUC emphasized that the application of the UCP Directive combined with specific sector legislation (e.g. Regulation 1008/2008/EC on common rules for the operation of air services in the Community or Directive 2007/64/EC on payment services in the internal market) is sometimes uncertain when it comes to the advertising of prices and the inclusion of costs that consumers cannot avoid (e.g. payment surcharges [BEUC UCP paper, 2013]).

Unfair Contract Terms Incident

A contractual term shall be regarded as unfair if, contrary to the requirement of good faith, it causes a significant imbalance in the parties' rights and obligations arising under the contract, to the detriment of the consumer, Article 3 (1) Directive of Unfair Contract terms 93/13/EC.

Unfair contract terms such as the non-transferability of tickets to other passengers; the “no-show” clause;¹⁵ barring the refund of tickets in case of

¹⁵ When airlines deny boarding for the return flight because a passenger, for whatever reason, does not take the outgoing flight, or ‘no-show’ policy. Article 3.3 of the IATA RP1724 [IATA General Conditions] imposes an obligation on the passenger to strictly respect the order of the flight itinerary so that if the passenger misses or does not take one leg of a return flight the company may automatically, and unilaterally, cancel the remaining leg and rescind the contract. Several judgments in different EU Member States, including Austria, Germany and Spain, have declared the unfairness of this clause in cases against airlines such as Lufthansa, British Airways and Iberia. The obligation of the passenger under the contract is the payment of the price, not the complete use of the service paid. Even if the passenger decides not to or cannot take one of the flights or uses them in a different order, the company cannot prove any damage, as the price has been paid. On the contrary, the no-show policy allows airlines to sell the same ticket twice and thus obtain an unjust

force majeure (of the passenger); or the application of excessive surcharges for the use of credit cards, are but a few examples of clauses that were declared unfair by national courts.

BEUC notes that a significant number of the terms scrutinized and deemed unfair by various courts are based on the IATA RP 1724, which means that the leading international representative body of the airline industry recommends the use of passenger contract terms which are legally unfair in many European countries.

5.2.3 Baggage Incidents

The percentage of information requests and complaints received pertaining to luggage was 12 % and 10 % respectively [ECC-Net,2015]. These difficulties can be mainly categorised into damaged, delayed, destroyed and lost luggage.

Damaged Baggage

Physical damage to baggage and/or its contents, IATA PSCRM, Reso780.

Lost Baggage

A piece(s) of baggage which is irretrievably lost, IATA PSCRM, Reso780.

The following complaint number 2157 of the CCA dataset illustrates this incident of lost baggage.

In the date of 27/06/2007, my suitcase was billed with Ryanair and I did not receive any more the bag in the airport of arrival in Girona. I complained immediately but I did not get an answer. Ryanair ignores me. Five months have been passed and I did not get my bag back nor any compensation in the event of lost luggage.

Delayed Baggage

A piece(s) of baggage which fails to arrive at the airport of destination on the same flight as the passenger, but is subsequently delivered, IATA PSCRM, Reso780. Complaint number 1265 of the CCA dataset¹⁶ exemplifies this incident.

“On August the 26 we made a flight with Air France Oslo Barcelona via Paris and we still have missing one of the three suitcases boarded. We want compensation for all these days without luggage and give us back the

enrichment because the company does not refund the price of the unused ticket to the passenger; to the contrary, the passenger is asked to pay for another ticket.

¹⁶ In the original version: “18/09/2007 - El pasado 26 de agosto realizamos un vuelo con air France Oslo Barcelona via Paris y todavía nos falta una de las tres maletas con que embarcamos. Queremos que nos compensen por todos estos días sin el equipaje y que nos devuelvan la maleta o el valor de todo lo que llevábamos dentro mes las 3100 NKR qu tuvimos que pagar por exceso de equipaje”.

suitcase or the value correspondent to its contents and also the 3100 NKR that we had to pay for excess baggage”.

Destroyed Baggage

A baggage which became unusable and cannot be used as supposed to.

6 Characteristics of Legal Information in the ATP Domain

A thorough understanding of the considered ATP field is necessary to bring out explicit conceptualizations, to shape the design of the ontology and its population, i.e., their engineering process (in chapter 4). The legal information features and ontology interplay in both its theoretical and engineering dimensions are intrinsically connected. The possibility of providing a legal ontological modelling requires a thorough analysis of the features of legal information, its subject or topic of representation.

Legal information, also in this domain, condenses specific features hampering its representation through machine readable ways. Some of these features are recursively evoked within the legal knowledge engineering process, deepened in chapter 4. Examples of the case study in the ATP domain are used accordingly.

1. Deontic legal operators. Deontic legal terms, such as right, obligation, prohibition, permission, sanction a.s.o. occur within legal and other normative texts, dispersedly located.

2. Casuistic analysis. Legal information is inseparable from a casuistic analysis in the domain at stake, or the contextual problem. Also it is often the result of extensive research and practical experience; complex to verify.

3. Exceptions and constraints. In legal cognition, one encounters legal norms that contradict or constrain the scope of a right. This characteristic is seen in particular with the exceptions and constraints that are often present in legal documents, including in the terms and conditions of contracts. *“They are used to limit overgeneralizations of more generic norms (...) exceptions are necessary to “correct” overgeneralized mandatory norms”* [Breuker, Valente et al. 2004]. Exceptions may be intended, as the one depicted in article 5(3) of the Reg.261/2004/EC shown below; and non-intended. These non-intended exceptions, called constraint in this work, *“are often hidden in the implicit normative structure of a regulation”* [Breuker, Valente et al. 2004] and also of soft law. This is observed with the detected constraint exemplified below:

“It should be borne in mind that according to Recital 18 of the Regulation, care may be limited or declined if its provision would itself cause further delay to passengers awaiting an alternative or a delayed flight. In case a flight is delayed late in the evening but can be expected to depart within a few hours and for which the delay could be much longer if passengers had to be dispatched to hotels and brought back to the airport in the middle of the night this carrier should be allowed to decline to provide this care. Similarly, if a carrier is about to give vouchers for food and drinks but is informed that the flight is ready for boarding, it should be allowed to decline providing care. Apart from these cases, the Commission is of the opinion that this limitation is to be applied only in very exceptional cases, as every effort should be made to reduce the inconvenience suffered by passengers” [Interpretative Guidelines, 2016].

“Compensation is due in the event of cancellation, under the conditions set out in Article 5(1)(c) of the Regulation and unless the cancellation is caused by extraordinary circumstances which could not have been avoided even if all reasonable measures had been taken, in accordance with Article 5(3)”.

4. *Heterogeneity of document types and representation formats.* In the legal sphere, and also in this ATP domain, a variety of document-types exist: legislation and court decisions, EU Commission acts, such as Recommendations, Communications, Guidelines, contractual terms, loose-leaf commentaries, a.s.o. Also these documents are often published as plain text without hyperlinks to the cited legal resources, preventing navigation and reasoning among documents. Data are not published in computational formats like RDF or XML for Linked Open Data.

5. *Legal fragmentation of the sources:* legal information is embedded in different and separate sources of soft and hard law, further articulated in case law and legal scholarship, scattered in a complex way in large textual corpuses, depending on the area of law considered. Case law of the CJEU has had a decisive impact on the interpretation of the EU Regulation 261/2004, as its interpretative judgements were requested on many occasions to clarify certain provisions, including key aspects of specific rights, e.g. the right for compensation for delayed flight at arrival. This scenario motivated the use of an ontology that supports the integration of data from multiple, heterogeneous sources.

6. *Authority contained in legal documents.* Documents in the legal domain are not just ‘about’ the domain, they actually contain the domain itself and hence they have specific authority, depending on the type of document. A statute is

not merely a description of what the law is, it constitutes the law itself [Turtle, 1995]. Notwithstanding the notion that, in a bibliographical sense, a document is only a manifestation of an abstract work [IFLAI], the object to be retrieved embodies the object itself. A legislative document is constructed after a process usually regulated in great detail: several persons and institutions may contribute to its text, whose final form may rely on decision processes, such as voting in parliament. The text of a document is offered as a regulatory instrument, to be backed up for instance, by courts, law enforcement agencies, and so on. The text has become an object independent of conveying a message between persons; it has become a resource in itself. Therefore, legal knowledge structures are constructed in a different way than scientific knowledge structures. Whilst the natural sciences only deal with persuasive authority, meaning that the truth of a proposition does not depend on who states it, but only if empirical data supports it and/or is internally consistent, the law deals with binding authority, that is, statements from a particular source whose truth depends on that source, and other formal aspects, such as the law having been promulgated or statement being part of a verdict *ratio decidendi*.

7. *Hierarchy of legal authority.* The legal domain itself defines a hierarchy of authority. Formal hierarchies though depend on the specific jurisdiction, domain, sources, and factual hierarchies often also depend on interpretation. Legal sources are different in terms of the relative weight that they are accorded to:

(i) *Primary sources of law:* include legislation (constitutions, statutes, regulations), case-law, and contracts;

(ii) *Secondary sources of law:* consist in legal commentaries and include legal scholar's handbooks, loose-leaf services, treatises, encyclopaedias, textbooks, monographs and journal articles, operationalizing primary law concepts, in particular, open textured concepts;

(iii) *Tertiary sources of law:* consist in mere finding tools that include no substantive discussion of points of law but have been developed by legal publishers so that users can find information about the law. Examples include digests and indexes, namely the legal citation indexes [Geist, 2009].

8. *Legal language.* Legal language is not always objectively descriptive. It can be characterized by synonymy (baggage, luggage), and polysemy (damaged baggage is often confused with destroyed baggage).

"Terms or concepts found in legal sources refers to common sense, albeit a special and more often restricted version of common sense knowledge"
[Breuker, Valente et al. 2004].

Terms of art consume acquired meanings derived from statutory definitions, scholarly or judicial interpretations that differ from their meaning in natural

language and in legislation, and also are defined in incompatible ways in different legal sources, e.g. Extraordinary circumstances is equivalent the legal concept of “force majeure”. Legal terminology contains also vague or open textured terms, often intentionally, in order to allow for social and technological changes or due to a reluctance to define explicit rules whilst political or social disagreement remains [Liebwald, 2012], such as *extraordinary circumstances*, *technical failure*, *reasonable measures*, or *reasonable waiting time*. Legal information concerning the dispute domain can be misunderstood with popular law [Sherwin, 2000] and popular understanding (polarization between popular law and expert law). Popular law consists in the “popular right beliefs about ethical or legal issues disseminated in the media or network, wish is defined as “hyper-law” [Casanovas, 2010]. And the Web 2.0 and 3.0 have enhanced their scope and effects. And from hyperrealism, we will find “hyper justice” [Casanovas, 2010] due to the dynamic projection and unconsciously and subliminally consolidation of inner general concepts, values, principles, norms that ascribe non-existent obligations and rights. This is what is known as “*confirmation bias*”. Within a rights-based informational architecture, by reconducting popular law into “framed” or relevant legal information might change this perspective. Legal language is not easily understandable to laymen, and this difficulty also replicates in the machine processing of legal text. Building any legal information system requires real understanding of legal research and discrimination in the use of legal informatics technology [Boella, Humphreys et al, 2013].

9. Audience. Legal information is queried by a wide variety of audiences. Laymen with different levels of legal knowledge and jurists with completely different professions (e.g. legal scholars, judges, lawyers, notaries or legal aid workers) have different information search needs.

It is pertinent to note that in B2C contracts, consumers are “one-shooters” while businesses are “repeated players”, dealing with a multitude of cases at any given time. Consumers will often get more involved in the dispute, taking it more personal, and thus requiring a more transformative solution, while the business is mostly interested in resolving the dispute as fast and inexpensively as possible. This feature in consumer disputes, which also occurs in the ATP domain, sustains that any ODR method should be employed first and foremost to avoid consumer complaints (dispute avoidance and containment) in order to convey informed and clarified information.

In the completion of the EU definition of consumer, the premise sets a single prototypical personification of an “average consumer” [Incardona, Poncibó, 2007], which is the benchmark consumer known in the case-law¹⁷ as the reasonably well-informed and reasonably observant and circumspect consumer,

¹⁷ Cfr. *Sentence Gut Springenheide* (1998) C-210/96, 1998, C. I-:4567.

taking into account social, cultural, and linguistic factors, as interpreted by the CJEU. Nevertheless, the average consumer test overlooks the real world of individual consumer behaviour and sets an overly demanding standard for consumers, though it responds to the appreciable intent of offering a useful tool to firms, their consultants, and the judicial authorities in the assessment of unfair commercial practices [Incardona, Poncibó, 2007], dispute resolution and ultimately, the decision making process. In fact,

“consumers do not fall in a consistent unvarying category; choosing the identity of the benchmark consumer-as-victim is clearly of vital importance to the practical implications of a regime designed to control commercial practices which will not have a uniform impact on consumers precisely because consumers themselves do not form a homogenous group” [Weatherill, 2007].

For instance, this “average” definition does not include those consumers who naively allow themselves to be convinced by deceptive exaggerations in advertising. Nor even doesn’t sympathizes with the “hyper justice” notion of consumers. The real consumer, the hypo-sufficient consumer [Landy, 1998] needs consumer protection through its legislation, the whole spectrum of enforcement of the different service directives, but also when facing dispute resolution. Research has shown that lay people, when telling their stories in court or to an ADR body without the aid of lawyers, tend to

“tell them in an inductive everyday manner, failing to comport with the legal requirements for packaging the story in a hypothesized deductive mode that clearly attributes blame. Furthermore, disputants often fail to understand why their accounts do not comport with evidentiary restrictions such as hearsay, opinion and relevance”. [Conley, O’Barr, 1985]

It is unfortunate that this salutary mechanism for promoting a fair and balanced decision between the transacting and disputant parties has been overlooked in the development of the conflict market, also due to the fact that law is still practiced as a reactive discipline.

10. Jurisdiction—a geo-spatial feature. Legal information may vary according to the specific jurisdiction; hence, legal requisites differ accordingly. Also citizens and business operating in multiple jurisdictions are subject to multi-level jurisdictions. In particular, in Europe, due to the subsidiarity principle, laws are applicable from European, national, and regional levels. Harmonisation and subsidiarity within EU law intermingle. The principle of subsidiarity and the flexibility of Member States leads to differences among EU norms and various national norms. For EU Regulations: the implementation is automatically binding, but Directives need to be implemented into national legislation. For instance, the Unfair Commercial Practices Directive has to be

transposed into national law, creating an additional layer of protective information towards consumers.

"binding in its entirety and directly applicable in all Member States", while Directives are 'binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods", Article 249, Treaty of Rome 1957.

7 Behavioural Economics in Information Disclosure

This section explains firstly and briefly the way the information for consumers is disclosed. Secondly, it describes the effects of the theory of behavioural economics embedded in consumer policy, also here adapted to the ATP domain. Behavioural economics has transformed disclosure of information in consumer policy and in particular, in contracts and herewith it is evoked in this thesis.

7.1 Disclosure of Information to Consumers

The informational model to consumers, as the conventional regulatory tool to protect consumers and solve disputes, appears to be a classical overregulated domain, deserving much attention by legal drafters, policy and decision-makers in the consumer realm.

EU legislation highlights the idea that *informational requirements* should shape consumer protection, aimed at complementing the market economy from the perspective of the weaker party – the consumer. This differential treatment is justified by evidence of the imbalance between the two parties, which leads to the need for specific solutions that only favour the "weak" party with three different information requirement tools: pre-contractual information requirements, advertisement as an integral part of the offer, and labelling prescriptions, especially for food products [Barral I Viñals, 2009].

This classical paradigm sustains a pro-consumer disclosure of information. It consists of a mandatory provision of pre-contractual information to the consumer, which implies obligations upon suppliers. The merit of such disclosures is to make the consumer aware and empower him to make better autonomous choices (as the prototypical autonomy enhancing technique), minimizing the imperfect rationality problem of consumers, their asymmetric information bias, their vulnerability (hypo-sufficient laymen), and their biased conceptualization of popular law. To illustrate, mandate disclosures of consumer information forms are an evidence, e.g. the Standard European Consumer Credit Information form, which implies dozens of pages of

information [Sherwin, 2000]. This traditional line mandates the disclosure of any piece of information deemed relevant, without regard to framing. Such disclosure may be ineffective, but it is less susceptible to manipulation. If all this information is disclosed, consumers – even perfectly rational consumers – would ignore (most of) its overload and oversupply; in online settings, consumers typically face large assortments. Complex disclosure requirements, or lengthy forms, can create unexpectedly serious problems, because it is too much work for people to try to understand them.

7.2 Theory of Behavioural Economics Embedded in Consumer Policy

Applied behavioural science [Herrmann, Van Bavel et al, 2013] studies human behaviour and applies its findings to policy analysis. It questions the orthodox economics assumption that people act like rational, independent and selfish agents, making choices that lead to the best possible outcome for them. However, research has shown that empirically this latter assumption does not hold. Behavioural economics applied to consumer policy challenges these assumptions.¹⁸⁻¹⁹ It confirms that people are often altruistic, not fully rational and not independent, but tend to reproduce their peers' choices.

It takes into account some variants, like *hyperbolic discounting*; *over-optimism*; and *framing effects* [Consumer Protection Overview, 2015], [Ramsay, 2007], which are here briefly explained.

i) *Hyperbolic discounting* means that consumer preferences are not consistent over time, suggesting that, when taking decisions, individuals may lack foresight in the short term, but seem more rational in the long term, for instance, failing to make an accurate estimate of the total costs of the product in comparison to its expected benefits [Bar-Gill, 2012];

ii) *Over-optimism* relates to the fact that consumers are in general over-optimistic with regard to their capacities and future, even if they are acquainted to the statistical realities. They may overestimate occurrences, typically discounting and underestimating the likelihood of risks of disappointment or uncertainty of events that may increase costs in the long run. Consumers are likely to be overconfident about their ability to predict future usage, which leads them both to overestimate and to underestimate their use levels. Consumers typically are subject to behavioural biases, misperceptions of self-interest, irrational behaviour, when making purchasing

¹⁸ Behavioural economics has gained wide recognition in the last years, not just in academic circles, but also among the general public, in European institutions, and in national governments. This has led to a steep increase in the demand for behavioural studies ran for policymaking purposes, both at a European level and at national levels.

¹⁹ Behavioural economists make a series of empirical claims. They question the standard economic assumption that human beings are fully rational, and they contend that people's departures from economic rationality are predictable.

decisions, such as booking a flight. Over-optimism mitigates cases in which those risks actually came to fruition (the so called “availability heuristic”). Most consumers show a tendency towards unrealistic optimism and myopia, which reveals they tend to be inert and myopic in the sense that they focus on the short term [Bar-Gill, 2012]. Oran Bar Gill reveals optimism bias shared by many lawyers and litigants and asserts that in legal settings specifically, it is well documented [Bar-Gill, 2006]. In general, in the ATP stance, passengers underestimate the likelihood that things will go wrong for them personally, even if they know the statistical realities of cancellations, delays, denied flights, loss of baggage’s, occurrence of extraordinary circumstances, etc.;

iii) *Framing effects* refers to the way the problem or a situation is presented.

“The difference in ways of framing can produce completely different results. For instance, it seems that labelling a food product 75% non-fat instead of 25% fat substantially increases sales”[Consumer Protection Overview, 2015].

The theory of behavioural economics embedded in consumer policy [Micklitz, Reisch et al., 2011] has been demonstrating that rational decision-making among consumers, when faced with a choice based on *a lot* of information, is not a safe bet. Studies have shown that consumers make poorer decisions when faced with more choice, and it will in that case be more likely to respond, for instance, to price promotions that provide a simple method of justifying their choice. At the same time, consumers will also show greater satisfaction when purchasing from a *smaller choice set*.

Other studies reveal that consumers tend to ignore much of the information on pre-packaged foodstuffs, for example, when they consider it to be too detailed, and that individuals on average cannot deal simultaneously with more than seven pieces of important information [Wesson, 2012].

Therefore, and applying this theory to the present case, disclosure of information by itself is not sufficient to avoid consumer disputes. Mandate disclosures consist in information overload, which are neither read nor used, due to the “non-readership” phenomenon,²⁰ and they are beyond most people’s interest or understanding, notwithstanding the fact that consumers are bestowed with substantive contractual remedies, disclosures, and cumulative interpretations that stems from case law, doctrine and European communications, as mirrored in the present study.

Effective, “information-user-specific design”, or *targeted* information disclosure tools are a new re-conceptualized approach, where information is con-

²⁰ People do not pay attention to standard forms, neither long nor short, in plain language or in legalese, written or oral, separately signed or unified into one document, handed out in advance or *ex post*, [Bar-Gill, Ben-Shahar et al., 2013].

textualized and accounts the informee's interest [Floridi, 2010]. This behaviourally-informed disclosure avoids information overload. It claims instead for effective disclosure rules, where information must be necessarily selective, tailored, designed to influence decisions, framed, and therefore, as it affects outcomes, this selection needs to be scrutinized. Accordingly, information disclosure should be consumer-friendly, and both salient and meaningful: salience of relevant benefits (ex. immediate exercise of rights, money savings, time savings), enabling consumers "*to know before they owe*", as a "*smart disclosure*," detailed information in standard, machine-readable formats [Bar-Gill, 2012].

It is here assumed that these findings are applicable to the ATP domain, dispute resolution and dispute avoidance: framing optimally designed disclosures may enhance decision-making, by helping to overcome (or bypass) consumer biases and misperceptions [Bubb, 2015]. Considering the ATP domain, it is aimed to assess which information is considered targeted, framed; it is appraised which rights are included and which exceptions apply, or which rights are immediately conveyed and which are not.

8 Summary and Critical Assessment

In this chapter, a legal, empirical and a market-based analysis of the ATP domain was attained to ascertain the problems in the field (incidents or legal cases) and the information needs of the end-users.

This case-taxonomy produced became exhausted and consolidated, even after the consultation of the legal literature. Hereby it was asserted a consensuated terminology.

From this analysis it was found that existing claiming-companies do not manage baggage incidents (delayed, missing and damaged baggage) nor explain the correspondent rights. Also incidents related to service complaints, such as irresponsiveness by the airline, bad quality service, misinformation unleashes disputes and legitimate grounds of redress. Therefore, this lack of coverage motivated the taxonomy of the ATP incidents and the corresponding right-based analysis.

Behavioural economics has transformed information disclosure in consumer policy, revealing cognitive informational needs of consumers. Accordingly, consumers need user-specific information that can provide the relevant benefits (ex. immediate exercise of rights, money savings, time savings), enabling consumers "*to know before they owe*", as a "*smart disclosure*," detailed information in standard, machine-readable formats.

An inferential criteria was followed to determine the case-taxonomy: the observation of the aspects of the problem, available information and background knowledge. This case-taxonomy would hold even considering other similar populations (complaints) Europe wide, as it was considered a latitudinarian type of resources.

Dimensions of relevance emerge in the case study: topical, situational, cognitive and domain, respectively, as it is delved in the next chapter. The case-study afforded the domain knowledge and the design for the modelling of RIC and RIC-ATPI ontologies.

It was perceived that incidents correlate from legislation, case-law, complaints, in Practical Professional Knowledge' (PPK), such as public policies: ECC Reports, NEB's decisions. But in concrete, it was studied the correlation of each of the incidents and their sources, depicted in Table 2.2., where heterogeneous sources of hard and soft law are applied concomitantly to an incident reported in a complaint (Table 2.3).

Table 2.3 Types of incidents and their sources

Type of Incidents	Sources depicting the incidents
Cancelled flight	[Reg.261/2004/EC], case-law, [NEB's Draft, 2012], Dataset of consumer complaints from the Consumer Catalan Agency (CCA), [Interpretative Guidelines, 2016]
Delayed flight	[Reg.261/2004/EC], [Montreal Convention 99], case-law, [IDDG, 2008], Dataset of consumer complaints from the Consumer Catalan Agency (CCA), [Interpretative Guidelines, 2016]
Denied flight	[Reg.261/2004/EC], case-law, [Interpretative Guidelines, 2016], [IATA General Conditions], [ECC-Net, 2015], [COM, 2007], [COM, 2011], Dataset of consumer complaints from the Consumer Catalan Agency (CCA)
Insolvency	[Public Consultation, 2012], [COM Insolvency, 2013], [Aviation Bankruptcy Study, 2009], [Agreement Voluntary Repatriation, 2014], [Reg.1346/2000/EC]
Damaged, Delayed Destroyed, Lost Baggage	[Montreal Convention 99], [ECC-Net,2015], [IATA Glossary], [IATA Dictionary], Dataset of consumer complaints from the Consumer Catalan Agency (CCA), Terms and conditions of air carriers
Unfair Contract Terms Incident (UCT)	Dataset of consumer complaints from the Consumer Catalan Agency (CCA), [UCTD], BEUC Position Papers
Unfair Commercial Practices Incident (UCP)	Dataset of consumer complaints from the Consumer Catalan Agency (CCA), [UCPD], BEUC Position Papers
Customer Service Insatisfaction	Dataset of consumer complaints from the Consumer Catalan Agency (CCA)
Irresponsiveness Incident	[Special Eurobarometer, 2014], [ECC-Net, 2015], Dataset of consumer complaints from the Consumer Catalan Agency (CCA)
Seat Misplacement	[Reg.261/2004/EC]

Chapter 3 – The Knowledge Base

1. Overview

The knowledge base, according to design science research, provides the materials, the scientific foundations, experience, and expertise that informs the research project from and through which the research and the modelling of the ontological artifacts are accomplished. Hereby, the knowledge base described in this chapter, puts into perspective the pertinent related research and background materials that are relevant to build RIC and RIC-ATPI ontologies and the Complaint Design Pattern artifacts: they are foundational frameworks, models and methods.¹

This chapter provides an analysis of the paradigmatic relevance conceptual **framework** developed by Saracevic, conducive to tailor relevance in the legal domain and to finally make this information tangible through legal computational ontologies. The ability to represent relevant information is an intrinsic feature of every ontology as an ontology, by definition, includes relevant aspects of a domain. But acknowledging that relevance is a mutable relational property of information, and that axioms may become relevant or irrelevant depending on the contexts, is a rarer concern among ontologists. As an ontology reflects a shared conceptualization with respect to a modelling problem, it is useful to describe the **models**, here regarded as the ontology-based approaches, towards the considered use-case, following the ontology classical **methods** to build them.

In concrete, within subsection 2.1, the conceptual framework of relevance in the legal domain is analysed, and then complemented with the relevance dimensions assembled from information retrieval in order to collect the pertinent elements to be translated into an ontology; then, in subsection 2.2, these dimensions are tailored to legal ontologies. Section 3 describes the related ontology-based approaches towards modelling online dispute resolution, consumer, complaint and IR-based artifacts of note; the similarities and differences amongst these models are compared with the approach taken in the thesis. Referenced legal core ontologies and ontology content patterns are considered. The methodologies for the ontology

¹ Constructs used to formalize the artifacts, such as OWL, RDF, RDFs, SPARQL, Protégé, SKOS etc., are explained in chapter 4.

development are described in Section 4. The chapter ends with a summary and a critical assessment in section 5. For a more systematic reading of the chapter, Table 3.1 presents a summary of the framework, models and methods analysed and used to build the artifacts.

Table 3.1 Summary of the framework, models and methods used in the knowledge base

Foundations	Description
Framework	Conceptual framework of relevance and its manifestations, which is explained and adapted to the legal ontology artifact.
Models	Ontology-based approaches: <ul style="list-style-type: none"> · ODR ontologies: Mediation Core Ontology (COM), Ontology-driven Data Acquisition system (ODA), ODR processes ontology; · Consumer law ontologies: Consumer Mediation Ontology (COM), Consumer Protection Ontology (CPO), European Legal Taxonomy Syllabus (ELTS); · Complaint ontologies: Customer Complaint ontology (CCO), Customer Complaint Ontology, Ontology-based reasoning for the intelligent handling of customer complaints handling (i-CCH); · Information Retrieval ontologies: Saravan ontological approach, Lame’s ontology of French law, Best ontology, Query expansion using lexical ontologies and user feedback; Stojanovic’ IR-based ontology; · Core legal ontologies: LKIF-Core, Core Legal Ontology (CLO); · Ontology Design Pattern on relevance.
Methods	· NeOn and Melon ontology development methodologies were used to build both ontologies

2 Conceptual Framework of Relevance and its Dimensions

2.1 Relevance in Law and in Information Retrieval

How to derive what is relevant information for a case at hand? In the legal decision process, there is a need to represent and retrieve the information that is most salient for a legal case/task at hand, mitigating the current information overload for legal professionals and laymen.

Theoretical frameworks exist about relevance². In a juridical perspective³, conceptualizations on legal relevance rely on the delimitation

² In this thesis, it is put aside other approaches in which relevance has played a major role, as in *computational linguistics*: to summarise texts; identifying and clustering information, or discovering synonyms [Yates, Goharian, 2014], [Alonso, 2013], [Teufel, Moens, 2002]; *logic*: to solve deontic paradoxes [Weingartner, Schurz,

of the relevant legal sources applied to a case. Malmgren defines relevance in the law in terms of the “*doctrine of legal sources*” to ponder whilst constructing a legal argument [Malmgren, 2011]. Bing’s definition states that relevance of information in relation to a question stems from the influence to contribute to an answer to that question. His definition also contains auxiliary categories that allows for legal sources to be evaluated and dismissed, while still counting as relevant.

“A legal source is relevant if: 1. The argument of the user would have been different if the user did not have any knowledge of the source, i.e. at least one argument must be derived from the source; or 2. legal meta-norms require that the user considers whether the source belongs to category (1); or 3. the user himself deems it appropriate to consider whether the source belongs to category (1)” [Bing, 1984].’

For example, within the case below, retrieved from the CCA dataset:

But within this boundary delimitation, one encounters differences between the sources [Bing, 1984]; even though two or more different sources may apply to a case at hand, they may differ on variant features that should be accounted in any information modelling process, such as:

- levels of the sources: resource, source, document, content levels;
- subject of the sources: general or domain topicality;
- type of end-user and corresponding end-user information needs;
- the cases the sources apply to;
- importance of the sources, e.g. a court decision issued by a superior court;
- types of hard and soft law, primary and secondary sources of law;

1986]; *discourse analysis*: semantic and pragmatic markers [Levinson, 1989]; *cognitive* approach: “(...) *an assumption is relevant in a context if and only if it has some contextual effect in that context*”, and that assumption “*connects in a context to yield a contextual implication and further contextual effects: for example, strengthening or weakening various assumptions on the hearer, thus ensuring the relevance of the reply in a wider context (...)*” [Sperber, Wilson, 1986].

³ In a different cognition, legal relevance corresponds to the notion of worth-hearing or practical relevance and it is perceived as the expression of the law’s conception of a just trial [Woods, Gabbay, 2010].

Information Retrieval, a major branch of information science, has as central notion relevance of information because of the extensive theoretical and practical concerns and commitments to searching relevant documents and information, and not only to organization of information [Saracevic, 2007]. Saracevic defined relevance as “*pertaining to the matter at hand*”, or, more extended:

“relevance involves an interactive, dynamic establishment of a relation by inference, with intentions toward a context.” [Saracevic, 2007].

This relation-based is manifested through two entities:

(i) the representation of the user’s information need, manifested through a request, expressed by the user, or through a query, which is a representation of the request in a system language;

(ii) the information resource, such as a document, a bibliographical representation or information object which is retrieved by a system;

Saracevic presents a five-dimensional notion of relevance [Saracevic, 2007], explained briefly below, comprising:

- system or algorithmic relevance, referring to the way the information need (query or request) is represented within a system;
- situational relevance or utility, referring to the situation / work task at hand of the user, normally translated to a taxonomy of disputed cases;
- topical or subject relevance, referring to the topic of the legal information need;
- cognitive relevance or pertinence, referring to the cognitive needs of the user;
- domain relevance, referring to the most important legal sources recognized by the legal community.

This quadrant of various interplaying relevance’s is useful:

- for avoiding ambiguities on which kind of relevance is to be considered to decide a legal case;

- each specific dimension is made explicit;
- each specific dimension provides assessment criteria to infer how relevance is inferred;
- each dimension covers an information need of the user: the topic at hand, the cognitive need, the problem at hand, the domain authoritative sources, etc., which are important to the legal decision making process;
- each dimension is equally important.

This conceptualization was already approached in the legal domain by legal scholars, such as Van Opijnen, tailoring the five dimensions to the legal domain [Van Opijnen, 2014] [Van Opijnen, Santos, 2016]; and Geist, deepening mainly the algorithmic and domain relevance [Geist, 2009].

Table 3.2 provides a definition of each dimension; the relation between two entities: *the information object* and *the information need*; and its assessment criteria, which will be explained in detail in the subsections below.

Table 3.2 Dimensions of relevance and assessment criteria

Relevance dimensions	Describes a relation between	Assessment Criteria
Algorithmic	Query and information object	Comparative similarity in inferring relevance
Topical	Topic in the request and topic covered	Aboutness, interpretation
Cognitive	Information needs (background or specific needs) of the user and information object	Correspondence, novelty, information quality, informativeness, preferences
Situational	Situation / work task at hand and information object	Usefulness in decision-making, appropriateness in problem-solving, reduction of uncertainty
Domain	Opinion of the legal community and information object	Citations, legal importance

2.1.1 Algorithmic or System Relevance

“[A] *relation between the query and the information objects in the file of a system as retrieved by a given procedure or algorithm. Each system has ways and means by which given objects are represented, organized, and matched to a query. They encompass an assumption*

of relevance, in that the intent is to retrieve a set of objects that the system inferred (constructed) as being relevant to a query. Comparative effectiveness in inferring relevance is the criterion for system relevance”.

This dimension means a computational relationship between a query and the information objects, based on matching or a similarity between them: both the query or the objects should contain identical/similar features, such as words and other strings of signs, image colour or author name, etc.

This relevance is by nature system-oriented, cannot be observed and assessed without a computer; it is not influenced by the user, nor it is related to any subjective information need that the user may have.

There are various models of inferring this relation of similarity or matching the query to the information objects retrieved: Boolean⁴ (exact match); statistical;⁵ logical; vector-space;⁶ natural language processing, intended to improve algorithmic relevance at a later stage.

2.1.2 Topical or Subject Relevance

“A relation between the subject or topic expressed in a request and topic or subject covered by information objects (retrieved or in the systems file, or even in existence). It is assumed that both queries

⁴ Boolean of Information Retrieval model (BIR) are still in use in most information systems today: both the user query and the documents are regarded as a set of terms; and the BIR system will return documents where the terms in the query are present. The recall of this approach is modest, estimated by Blair to be 0.2 to retrieve full documents in the legal domain [Blair, Maron, 1985]. The limitations of this strategy lie in dealing with ambiguity, synonymy and complex expressions [Dabney, 1986]; and the biggest hurdle is that law is about concepts not directly related to a single term. These difficulties were soon alleviated by taking advantage of the structure of documents (permitting queries per field, where each field has a meaning) or simple linguistic approximation dealing with the problems of homonyms and of synonyms appeared [Schweighofer, 1999].

⁵ Topic models are a type of statistical model for discovering the latent topics that occur in a collection of documents; the most known being the Latent Dirichlet Analysis [Blei, Ng et al., 2003], [Clint, Puri et al., 2014].

⁶ Legal documents have been also represented in a vector space model: some features of the document being selected and ranked with similarity metrics [Moens, 2004]. Documents can be high ranked if they are relevant even if they lack some of the words in the query. The most famous among the related concepts is the term frequency - inverse document frequency (TF-IDF), a metric to evaluate the importance of a word to a document within a collection. The selection of features to compose the vector representing a document started being only the keywords, as in the FLEXICON system [Gelbart, Smith, 1990], but nowadays is made up of all the words in the document, or in general n-grams, possibly after having made stemming and Part of Speech Techniques (POS) tagging and being weighted via inference network analysis [Turtle, 1990].

and objects can be identified as being about a topic or subject. Aboutness is the criterion by which topicality is inferred”.

This dimension is both system-orientated, because the success of the relation depends on the system’s modelling ability to retrieve relevant information; and also user-dependent on the formulation of the request by the user.

The topic of the information objects might be computed, e.g. by classification algorithms, or hand-coded, if human indexing/knowledge organisation is applied to the system [Cosijn, 2003].

The information objects may be represented as keywords or documents on a semantic level; examples of these representations are taxonomies or domain ontologies covering specific contents.

Many types of legal information, particularly legal cases, are routinely categorized into a set of fixed or fluid categories [Saracevic, 2007a].

2.1.3 Cognitive Relevance or Pertinence

“A relation between the cognitive state of knowledge of a user and information objects (retrieved or in the systems file, or even in existence). Cognitive correspondence, informativeness, novelty, information quality, and the like are criteria by which cognitive relevance is inferred”.

A cognitive state generally refers to the tacit knowledge of the user. Authorship, information preferences are added criteria to assess this dimension [Cosijn, 2003]. The novelty criteria avert that a piece of information may be topically relevant, but repeating what the user already knows.

Cognitive relevance is system and user-dependent: the features of the system should take into account the user’s background conceptual knowledge and also his understanding or perception of his information need; but this relevance also depends on the system’s modelling ability to retrieve relevant documents.

The system features should be tailored to the past search experience, and should be able to explicitly or implicitly understand the information needs of the users. The information need of the user consists *a contrario* in an informational gap.

An example is provided in relation to a paper reviewing process, where a typical criterion is the degree of novelty of the research presented by the paper: a paper may be relevant but repeating earlier results [Cosijn, Ingwersen, 2000]. Another example of cognitive relevance is the research on profile building for information filtering. Personalization of information delivery rely on systems that selectively weed out the irrelevant information and can help people to find information with potential value to their information needs based on the user's preferences [Cosijn, 2003]. Van Opijnen evoke two types of filtering that can be distinguished [Van Opijnen, Santos, 2016]:

- (i) Collaborative filtering recommends documents by making use of the user's past search behaviour and/or that of a peer group;
- (ii) Content-based filtering uses shared features of the document at hand and other documents, based on e.g. topical resemblance, having comparable metadata or closeness in a citation network.

Within legal information retrieval, the Legal Recommender System is an example [Winkels, Boer et al., 2014]. Information seeking behavioural studies may help to understand the cognitive information needs of the users.

2.1.4 Situational Relevance or Utility

“ A relation between the situation, task, or problem at hand and information objects (retrieved or in the systems file, or even in existence). Usefulness in decision-making, appropriateness of information in resolution of a problem, reduction of uncertainty, and the like are criteria by which situational relevance is inferred”.

Situational relevance is system and user-related, as the success of the relation depends on the system's modelling ability to represent the relevant information resources, but also depends on the user's ability to use the information objects for a certain purpose, within a given situation. Situational relevance is strongly associated with a work task execution, in which a real information need (RIN) arises [Mizzaro, 1998].

According to Borlund,

“the judgement of situational relevance embraces not only the user's evaluation of whether a given information object is capable of satisfying the information need, it offers also the potential of creating new knowledge which may motivate change in the decision maker's

cognitive structures. The change may further lead to a modification of the perception of the situation and the succeeding relevance judgement, and in an update of the information need” [Borlund, 2000].

Examples in the legal domain are based on finding relevant court decisions relating to a case at hand. This can be pursued using a variety of technologies, like argumentation mining [Mochales, Moens, 2011], natural language processing (NLP) [Maxwell, Schafer, 2008], and also Network Analysis.

2.1.5 Domain Relevance or Legal Salience

As a fifth dimension, Saracevic used “Motivational or affective relevance” as a

“relation between the intents, goals, emotions, and motivations of a user and information (retrieved or in the systems file, or even in existence). Satisfaction, success, accomplishment, and the like are criteria for inferring motivational relevance” [Saracevic, 1996].

In a critical assessment, Cosijn and Ingwersen replaced this dimension by “socio-cognitive relevance”, owing to the latter’s social, cultural or organizational properties in which the individual finds himself. Hence, it is regarded as a subjective type of relevance determined by the individual in interaction with other actors within a community or organizational environment. When tangible and measured, it may exhibit objective characteristics and this is the reason for its application in scientific fields that are reliable, but which has a degree of uncertainty [Cosijn, 2003].

“is measured in terms of the relation between the situation, work task or problem at hand in a given socio-cultural context and the information objects, as perceived by one or several cognitive agents” [Cosijn, Ingwersen, 2000].

Cosijn goes further and provides some tangible or operational variables on this dimension, such as citations or accepted papers.

"The final result of a peer-review process, for instance, in the form of the final ranking of information objects submitted to a conference or candidates agreed upon by all the reviewers and its underlying reasons, are example of this type of relevance [Cosijn & Ingwersen, 2000].

Another example is the distribution of citations on a reference list in an essay [Cosijn, 2003].

Marc Van Opijnen delineates this dimension of relevance as "domain relevance", also used as a synonym for "legal authority" and "legal importance". For the first time, this dimension is tailored to the legal field. Domain relevance is defined as the relevance of information objects within the legal domain itself, encompassing the general opinion of the legal community or "legal crowd" on the significance of a case for legal theory and practice [Van Opijnen, 2013]. The author attends to the specific features of legal information, as well as for modelling reasons.

Within the "legal community" or legal operators, controversy regarding divergent opinions and perceptions are a constant. Also, authority is generally related to a corresponding sanctioning power and liability. Instead, in this work, following the author's cognition and adding a pragmatic approach, it is used legal salience of information in the accounted operation or case. In this work, legal salience IS taken to be synonym (cover) the concept of domain relevance.

Verschueren defines salience as:

"Status of processes of meaning generation in relation to the medium of adaptability, i.e., their status as determined by characteristics and mechanisms of processing" [Verschueren, 1999].

Domain relevance can be applied in the legal domain, for instance, by classifying and ranking categories of legal information objects as to their legal authority, e.g. supreme court decisions over district court decisions; network citation analysis in the legal domain⁷. Cosijn mentions that

⁷ Network analysis is a methodology to assess the relevant sources of law for a particular case, and which ones are the most important ones. Computer scientists and legal experts have used network citation analysis methods in order to construct case law citation networks [Winkels, Ruyter et al., 2011], as well as to further model and quantify the complexity of the legislation corpus [Mazzega, Bourcier et al., 2009], [Boulet, Mazzega et al, 2009]. The American legal system has been the one that has

metadata could ameliorate this dimension [Cosijn, 2003]; hence, the Electronic Legislation Identifier⁸ (ELI), the Electronic Case-Law Identifier⁹ (ECLI), and European Legal Doctrine Identifier (ELDI) could be envisioned within this dimension.¹⁰

2.2 Relevance in Legal Ontologies

Ontologies provide a model or view of the world with respect to a domain, this means that a shared vocabulary is *subject to queries and assertions, in a coherent and consistent manner* [Gruber, 1995].

The knowledge queried in the ontology is established by the knowledge engineer: he will know which concepts are relevant to be modelled in advance. Accordingly, in this work, relevance dimensions are elaborated for a legal ontology, following the classification by Saracevic.

In this study, a strict interpretation is followed of the information objects, only comprising the textual information encountered at different

undergone the widest series of studies in this direction. Fowler at first experimented methods to identify the most relevant decisions of the US Supreme Court, and afterwards they studied how the norm of stare decisis had changed over time in the jurisprudence of the US Supreme Court in order to identify the doctrine's most important related precedents [Fowler, Johnson et al., 2006], [Fowler, Jeon, 2008]. Van Opijnen states that network algorithms, which have been used in previous research, especially in-degree, HITS and PageRank, might not be the most appropriate to measure legal authority. The author proposed a Model for Automated Rating of Case law which incorporates data from the Dutch publication office and the citation of legal cases to estimate the legal importance of judgments [Van Opijnen, 2013b]. In all these studies, on the one hand it was proven that case law citation networks contain valuable information, capable of evaluating the relevance of court decisions, or even predicting the cases that will receive more citations in the future. On the other hand, citation network analysis over the legislation corpus, provides information over a single dimension view. Edges on the graph are of the same type and just simple references between documents. Whereas in legal practice, there are multiple and heterogeneous networks in different kind of legal sources of hard and soft law, each representing a particular kind of relationship playing a distinct role in a particular legal norm. Thus, in order to construct a network model that simulates legislation in a robust way a multi-scale structure of law should be considered. Distinct features of the law as the hierarchy between the sources of law, or different types of relations between legal documents could be properly carved and incorporated into a model.

⁸ Council conclusions inviting the introduction of the European Legislation Identifier (ELI), CELEX: 52012XG1026(01).

⁹ Council conclusions inviting the introduction of the European Case Law Identifier (ECLI) and a minimum set of uniform metadata for case law, CELEX: 52011XG0429(01).

¹⁰ LegalCiteM: www.oasis-open.org/committees/legalcitem/.

levels: resource, source, content and document level [Kuhlthau, Tama, 2001]¹¹, as shown in fig. 3.1.

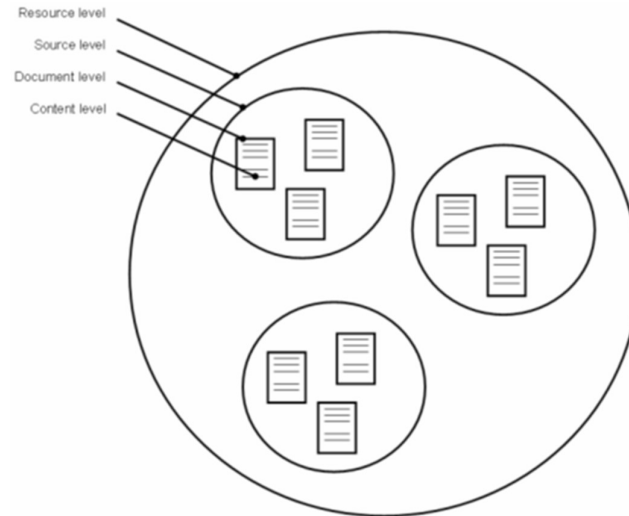


Fig. 3.1. Four levels of information [Kuhlthau, Tama, 2001]

The five dimensions applied to legal ontologies are explained below, along with tangible examples. Fig. 3.2 depicts the different dimensions.

¹¹ However, information objects can go beyond text and may include images, links, etc.

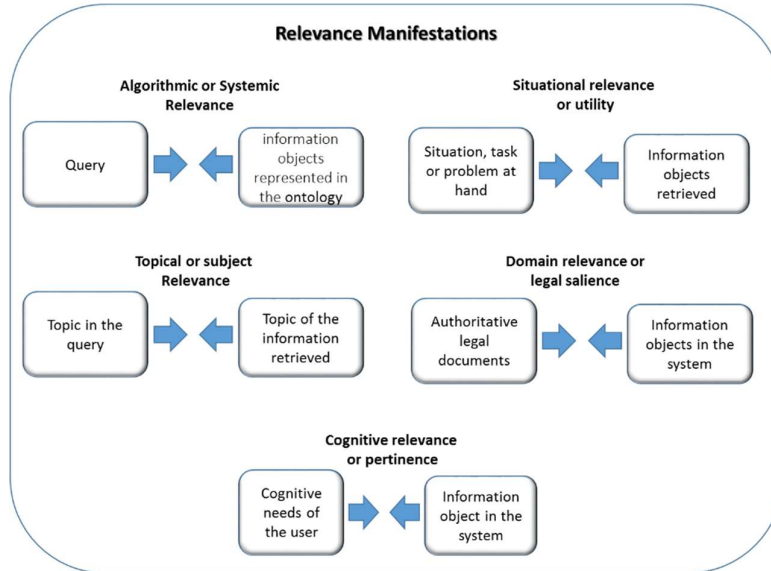


Fig. 3.2. Relevance dimensions (own elaboration).

2.2.1 Algorithmic or System Relevance

In this relation, the query is to be understood as the computer processable translation of the request, as entered in the user interface, or any other intermediary component like a Sparql endpoint, by the end-user.

Saracevic explains that each system has ways and means by which given information objects are represented, organized, and matched to a query. In this work, the information objects are represented through ontologies, in a specific ontology language, querying the information modelled therein. The intent, in this type of relevance, is to retrieve the information objects the system deemed relevant to a query.

2.2.2 Topical or Subject Relevance

The topical-cases were computed in the ontology; they correspond to the ATP domain and a case-taxonomy defines the relevant cases/incidents of this domain. Therefore, the topicality match relates the incident selected by the consumer —and the retrieved information objects from the ontology-based system. The user is limited to formulate his request: he must align it with the available classification system.

2.2.3 Cognitive Relevance or Pertinence

Cognitive correspondence evokes the following questions:

- Who are the end-users?
- What are the cognitive information needs the users have in the use-case considered?
- Is the document or information recovered really related to the underlying, maybe implicit, information need of the user?

In case the “*the information need is intrinsically vague, ill-defined or non-existent, and consequently variable*” [Ingwersen, 1996], which is what happens to some extent with complaints, the user will not have the necessary cognition to understand either the problem, nor the relevance of the information modelled by the system; in consequence, assessors (or other observers) may have difficulties in providing pertinence assessments [Cosijn, Ingwersen, 2000]. In practise, both in the analysed complaints and in the legal analysis, it was observed that the description of the incidents was sufficiently conveyed, and also the request explicitly addressed, which enabled the identification of the information needs.

In this study, to model the ontologies with cognitive relevance dimension, recourse to the expert-generated sources was required to ascertain the information needs of the users at stake and the user’s background conceptual knowledge, especially when dealing with consumers which are lay people, e.g. by consulting the Report from the European Consumer Centre Network on Air Passenger Rights (2015) [ECC-Net, 2015], BEUC papers, and in studies on information-seeking behaviour of consumers, and on the theory of behavioural economics embedded in consumer policy [Micklitz, Reisch et al, 2011] which demonstrate the information needs among consumers.

Accordingly, consumers need user-specific information that can provide the relevant benefits (ex. immediate exercise of rights, money savings, time savings), enabling consumers “to know before they owe”, as a “smart disclosure,” detailed information in standard, machine-readable formats. The user formulating a request in the ontology will attempt to find the rights, conditions, exceptions, constraints, interpretations, requisites that matches the incident at stake, e.g. what are the rights of a passenger in case of a cancelation of a flight? What are the exceptions to the right of compensation?

2.2.4 Situational Relevance or Utility

According to this dimension, the information objects retrieved in the system should be deemed appropriate to solve the user's information needs: the problem space or the end-user's legal problem, useful in decision-making, or at reducing uncertainty.

Discovering the actual legal problem of the users, in the context of decision-making, stems from a problem-oriented approach, requiring knowledge to facts derived from evidence convened through complaints, case-law, and also studies estimating passenger's patterns. A question may arise: does the document or information found really help the user to solve his legal problem?

In this work, in order to incorporate this dimension into a more tangible perspective, the ontologies model the most important disputed problems in the ATP domain and the correlative enforcement procedures (complaint procedures and legal action procedures), amenable to a better decision-making.

The modelling entails that:

- the ontologist is expected to anticipate, and then model accordingly, the future search and request-oriented features of a case;
- the end-user would wish to find in the system the incident under which he has been through.

On the one hand, some critics could be addressed to this modelling perspective. It requires thorough knowledge of the classified legal cases. The ontologist may have limited knowledge as to what features of a legal sourced-document are going to be useful to the later end-users or researchers. To the extent that the ontologist does not properly anticipate the use of the system, the classification will be hence ineffective. Even if the ontologist knows all possible questions and cases that might be modelled, the process of testing each document or its content against every one of those requests and cases is time-consuming. Moreover, the indexing process is prone to many sorts of errors and uncertainties.

Manual indexing is only as good as the ability of the indexer to anticipate questions to which the indexed document might be found relevant. It is limited by the quality of its thesaurus. It is necessarily precoordinated and is thus also limited in its depth. (...) [A]nd too

rigid to accommodate practically and efficiently either the continuous influx of routine material or such new precedent as lawyers and judges are now formulating in evolving areas of law. [Dabney, 1986].

Moreover, in querying for information in an ontology, the modeller should predict which terminology is used by the users. This *prediction game* is avoided by using a controlled vocabulary, which in turn improves the precision and recall for a given query; however, it constrains the possibility to express the user's information need via a query [Stojanovic, 2005].

On the other hand, attempting a classification of the most frequent cases in a request-oriented approach, implies a controlled vocabulary, and an *authority control* by the end-user [Dabney, 1986]; this means that the *selection* reasoning of the search of the relevant information is almost entirely in the hands of the searcher, and the searcher can tune the search to his or her individual requirements/cases.

Also, even if the end-user needs to conform to the classifications modelled in the ontology, the case-taxonomy refers to natural language incidents, like flight cancelation or damaged baggage, avoiding legal classifications, such as breach of contract.

2.2.5 Domain Relevance or Legal Salience

Salient legal information in the context of this work is two-folded, requesting the most salient or important documents, within the specific legal domain. Even if independent from an information system and from any user request, once adapted to knowledge engineering, the ontology therefore presents the most important legal information within the domain, such as case-law, legislation, and so on; the ontology also makes use of common referenced legal identifiers, such as ELI and ECLI.

3 Ontology-based Approach

This section describes the related ontologies modelling consumer, complaint and relevance topics. Subsection 3.1 portrays the ODR-based ontologies; subsection 3.2 conveys the consumer-based ontologies; subsection 3.3 provides the analysis on the complaint ontologies; subsection 3.4 renders the retrieval-oriented legal ontologies; subsection 3.5 renders the core ontologies in the legal domain; and finally subsection 3.6 provides the ontology design patterns.

3.1 ODR-based Ontologies

The **Mediation Core Ontology (MCO)** was built within the ONTOMEDIA project,¹² which aimed the design of a web-based platform [Poblet, Torralba et al., 2009] [Fernández-Barrera, Casanovas, 2011a] enabling online mediation in different domains between users and professional mediators, following a consumer-first approach.

The MCO ontology was developed in a bottom-up approach, representing practical knowledge and concepts from a user-generated complaint corpus. The following are the main top classes: **MediationRole** includes the Disputant, Mediator, ServiceProvider, etc.; **MediationAgent** class denotes the agents involved in the mediation process; **MediationInformationSource** declares any information source used in the process; **MediationProcess** expresses the mediation process according to the domain; **MediationProcessStage** declares the different phases of the process; **MediationSession** represents the sessions of the mediation process; **MediationRole** denotes the roles that actors might play in the mediation process; **MediationTopic** expresses the domains in which mediation can intervene; **ConsumerTopic** means the possible topics in the consumer domain.

This ontology presents common features in relation to the sources of knowledge acquisition of RIC and RIC-ATPI ontologies, such as complaints and practical expert knowledge; nevertheless, it does not address the required conceptualization for RIC ontology nor for the ATP domain. Figure 3.3 depicts a fragment of this ontology.

¹² ONTOMEDIA: Platform of Web Services for Online Mediation, Spanish Ministry of Industry, Tourism and Commerce (Plan AVANZA I+D, TSI-020501-2008, 2008-2010).

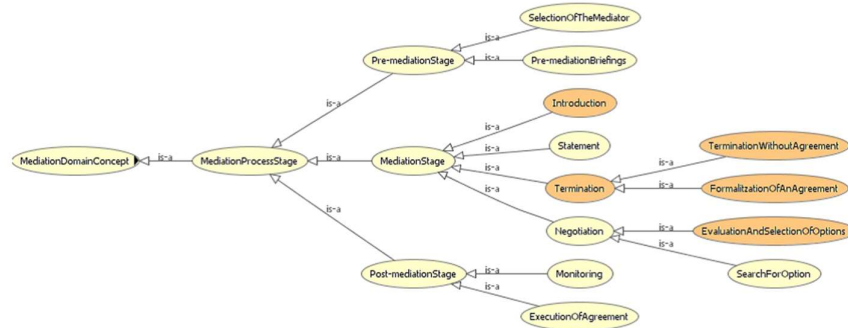


Fig. 3.3 Fragment of the Mediation-Core Ontology. Taken from [Poblet, Casellas et al. 2009]

Ontology-driven Data Acquisition system (ODA) [Arosio, Bagnara et al., 2013]. The authors claim that one of the main limitations of ODR systems relates to the collection of information for enabling any decision: claims and requirements are collected by a fixed-structure template to be filled in by the parties. Therefore, an intelligent support to legal ODR systems is proposed: ODA system relies upon an underlying ontological structure meant to represent the data flow from the user's input, and a corresponding resolution algorithm, implemented within a local for navigating the structure and providing the user with meaningful domain-specific support and insight. This system has been civil liability of motor vehicles litigation. ODA is a context sensitive adaptive questionnaire meant to mimic the exploratory behaviour exhibited by mediator practitioners in order to acquire relevant information from citizens, allowing two major processes, online Mediation, online management of activities related to the mediation process, and self-litigation, which is the capability of a citizen to autonomously classify and understand the potential outcome of a dispute. With the aim of verifying the actual responsibility of the driver, as well as contributory negligence of others involved in the accident (passengers, cyclists, pedestrians), several questions tending to assess the behaviour of all such subjects were introduced, as well as the violation of any norm or prohibition as set out by the Italian road traffic regulations. Lastly, a set of concepts has been modelled for the determination of the damages to be paid in accordance with the general criteria of the Italian Civil Code.

Relevance is not addressed as a filter within the collection of information from the end-user as to enable any decision and self-litigation;

this ontology is mainly focused on the procedural side of collecting information from the user.

Ontology of ODR processes. The Ontology of ODR processes was developed through the CEN Workshop on Standardization of Online Dispute Resolution Tools, in OWL.¹³ The ontology defines the concepts, terminology and semantics of ODR in both business and technical terms, in order to create a foundation for further work in domain-specific areas, enable communications between business and technical people, enhance the understanding of ODR concepts in the business and technical communities, provide a means to state problems and opportunities clearly and unambiguously, and promote mutual understanding. And on the other hand it potentially contributes to model-driven ODR implementation. Its proprietary nature hampered the analysis of the legal concepts use and its formalization. Also relevance is not considered in the modelling of the ontology, even if addressed to dispute resolution schemes.

3.2 Consumer-based Ontologies

Consumer Protection Ontology (CPO), developed within the DALOS¹⁴ project [Agnoloni, Bacci et al., 2007] [Agnoloni, Bacci et al., 2009] [Francesconi, Tiscornia, 2008], aimed at providing law-makers with linguistic and knowledge management tools to support the legislative drafting process. Consumer protection domain has been chosen with a corpus of 16 EU Directives, 33 Court of Justice Judgements and 9 Court of First Instance Judgements, on which the bottom-up resources implementation is based. DALOS is organized in two layers of abstraction:

- The ontological layer, containing the conceptual modelling at a language independent level;
- The lexical layer, containing lexical dimensions in different languages of the concepts at the ontological layer.

The ontological layer acts as a knowledge layer to align concepts at European level independently from the language and the legal systems. The domain ontology is populated by the conceptual entities which characterize the consumer protection domain. Examples of the concepts

¹³ <https://www.evs.ee/products/cwa-16026-2009>

¹⁴ DALOS (Drafting Legislation with Ontology-bases Support) e-Participation project (01- 01-2007/30-04-2008) website: <http://www.dalosproject.eu>;
<http://turing.ittig.cnr.it/jwn/ontologies/consumer-law.owl>

are CommercialTransaction, Consumer, Supplier, Good and Price. The DALOS domain ontology imports some basic notions, such as that of ‘legal role’ and ‘legal situation’, which are described in CLO. This project uses the results of the LOIS project (the database of 35,000 concepts in five European languages), but focuses on the consumer protection domain. The two layers representing the framework of DALOS informed the design of RIC and RIC ATPI ontologies (a legal ontological and a lexical layer).

Consumer Mediation Ontology (COM), also built within the ONTOMEDIA project,¹⁵ is an OWL domain ontology focused on the legal features of mediation in the consumer domain [Poblet, Torralba et al., 2009]. Users would select their region and query in natural language the relevant norms on consumer law for their region and hence be directed to relevant information available online. The following are the main top classes: **PartiesinConflict** denotes the parties involved in the conflict; **Regulation** denotes the regulation applicable to the conflict; **Territory** denotes the geographic area; and **Conflict** denotes the type of conflict (Fig. 3.4). The knowledge is acquired with the participation of experts, as mediators and lawyers.

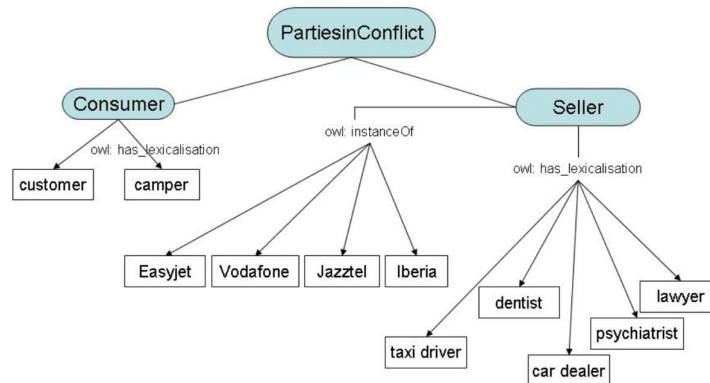


Fig. 3.4 Excerpt from the Consumer mediation domain ontology, reproduced from [Fernández-Barrera, Casanovas, 2011a]. The figure displays the concept PartiesinConflict, its subclasses and instances.

¹⁵ ONTOMEDIA: Platform of Web Services for Online Mediation, Spanish Ministry of Industry, Tourism and Commerce (Plan AVANZA I+D, TSI-020501-2008, 2008-2010).

For the purposes of this thesis, attention is conceded towards the recurrent narrative patterns or “frames” identified in the analysed complaint database (Fig. 3.5):

- Conflict appeared in all the user questions. It describes the participants: Consumer, Seller, the concerned Object, which can be either a good or a service, and certain contractual conditions;
- Argument-Seller identifies the opinion that the Seller holds on the conflict at hand and some justification for it. Its elements are a certain instantiation of the Seller, the argument content, its backing and in some cases a point in time in which the opinion was expressed;
- Argument-Consumer is similar, but from the perspective of the consumer;
- Request refers to quest for information on the steps to take to solve the conflict.

The identified frames were not included in the COM ontology, hence they are not machine readable nor reusable, and only committed to the specific consumer domain.

CONFLICT [Consumer, Seller, Place, Time, Object, Contractual conditions, Breach]
ARGUMENT-SELLER [Seller, Argument-Content, Backing, Time]
ARGUMENT-CONSUMER [Consumer, Argument-Content, Backing, Time]
NEGOTIATION [Consumer, Seller, Third-parties, Content, Result, Time]
REQUEST [Consumer, Content]
REQUEST-INFO [Consumer, Content-What]
REQUEST-PROCEDURAL [Consumer, Content-How]

Fig. 3.5 Sample of consumer's narrative frames. Taken from [Fernandez-Barrera, Casanovas 2011a]

European Legal Taxonomy Syllabus (ELTS)

ELTS is a legal ontology restricted to the consumer law domain and to five jurisdictions: England, France, Germany, Spain, Italy. ELTS is integrated in the Eunomos Legal Knowledge Management System [Boella, Humphreys et al., 2012] which enables customers to find and understand the law in their area of interest by searching a database of national and regional legislation, and using the ontology to find the precise definition for terms within a particular context. ELTS covers EU terminology drawn out from the main EU provisions on consumer protection, together with the transposition laws. It accounts horizontal divergences, i.e., between

various legal instruments at the European level or between various national legal orders, but also vertical ones, i.e., differing legal concepts between the European and domestic levels.

The ontology includes a particular structure for organizing information around individual prescriptions: elements within the legal text that could be extracted by automated means:

- deontic clauses: obligation, prohibition, permission, exception;
- active role, e.g., citizen, director, which is the addressee of the norm;
- passive role: the beneficiary of the norm;
- crime: the concept in the ontology of crimes resulting from the violation of the prescription, if it is an obligation or prohibition. This concept is often defined in other legislation;
- sanction: the concept describing the sanction resulting from the violation;

This ontology informs the design of RIC ontology with respect to the identification of legal provision types. Nevertheless, pertinent components such as legal source, enforcement procedure, requisite, right are out of scope of its structure and are considered in this thesis as important provision-types, specially regarded in the consumer law domain.

3.3 Complaint Ontologies

The **Customer Complaint Ontology** (CCO) [Jarrar, 2007] has been developed in the EU CCFORM project¹⁶ with the aim of studying the foundation of a central European customer complaint form (CC-form), and to underpin a European online complaint platform. Therefore, the CC-form provided the semantics represented in the ontology, which is not modelled in OWL. Its core covers a semantic description of complaints that could be issued by any legal person against any other legal person. It is modularized into seven ontological commitment modules shown in Fig. 3.6: Complaint, Complainant, Recipient, Address, Complaint Problems, Complaint Resolutions and Contract. The CCO glossary¹⁷ is the most useful and reusable component.

¹⁶ CCFORM Thematic Network project, IST-2001-34908, 5th framework. For more information regarding this project consult: <http://www.fedma.org/cc-form.71634.en.html>

¹⁷<http://www.jarrar.info/CContology/CCglossary.htm>

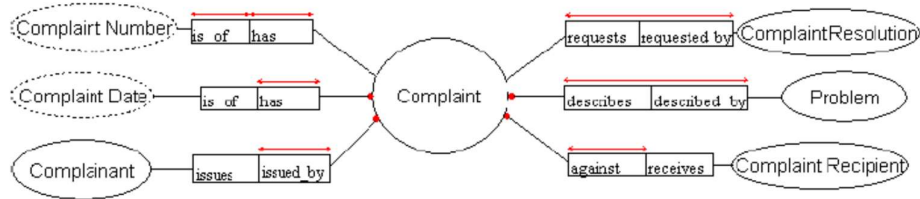


Fig. 3.6 The complaint module. Reproduced from [Jarrar, 2007]

The **Customer Complaint Ontology** [Yalan, Zhang, 2006] models complaint-related knowledge as to be machine-readable, however its documentation was not accessible at the time of this dissertation to discern if it would be possible its reuse. Complaint was defined as the central OWL class, specialized by two subclasses: *LightComplaint* and *StrongComplaint*. The class *Problem* has four subclasses: *LogisticService*, *PostSaleService*, *Attitude*, and *Quality*. The class *Resolution* has three subclasses: *EconomicCompensation*, *Improving_Service*, and *NoResponse*, etc., as depicted in Fig. 3.7.

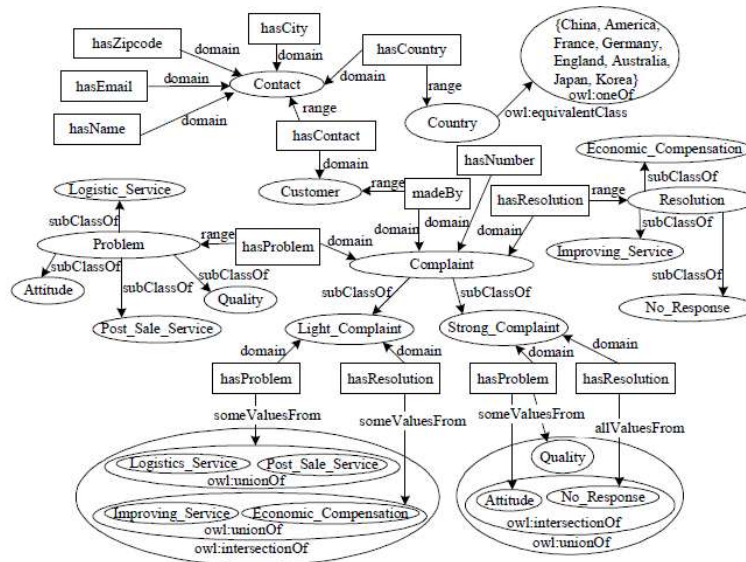


Fig. 3.7 Main concepts of the Customer Complaint Ontology. Reproduced from [Yalan, Zhang, 2006]

Ontology-based reasoning for the intelligent handling of customer complaints handling (i-CCH) [Lee, Wang et al, 2015] is based in a case-retrieval mechanism and owes its architecture to CCO. The ontology conceptualized the “customer complaint management” domain in OWL (even if not publically accessible), based on data analysis of the restaurant industry. There are two main domains in the ontology, represented as classes: Complaint and Handling. The class Problem is classified into ServiceDeliveryFailure, CustomerRequestFailure and UnsolicitedEmployeeAction. The Handling class is classified into EconomicRequest and EmotionalRequest. Thus, a complete customer complaint ontology, from macro to micro-levels, for a given service industry could be addressed (Fig. 3.8).

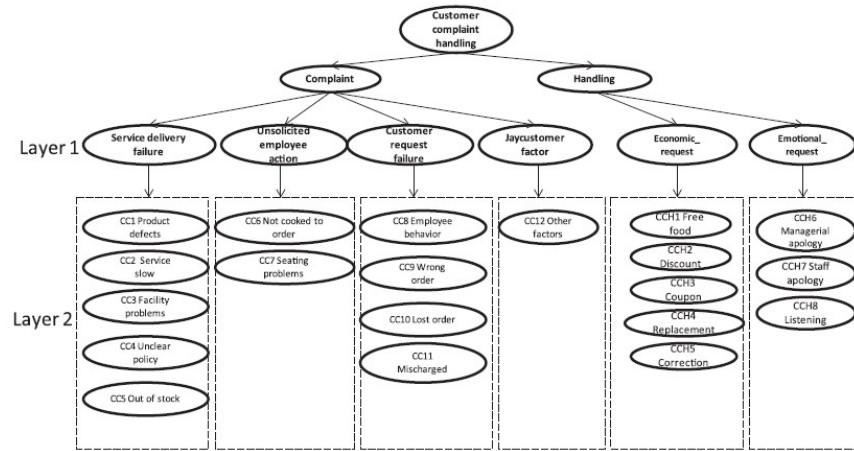


Fig. 3.8 The basic schema of the customer-complaint and handling ontology. Reproduced from [Lee, Wang et al, 2015]

3.4 IR-oriented Legal Ontologies

The approaches outlined in this subsection represent fundamental contributions of IR-oriented ontologies and are here evoked, as finding relevant documents and information is the aim of IR-based systems [Mizzaro, 1998], [Ingwersen, 1996]. Table 3.3 depicts the dimensions of relevance covered by each of the six presented IR-oriented ontological models.

Table 3.3 Dimensions of relevance covered by ontological models

Ontological models	Dimensions of Relevance covered
Bobillo's Ontology design pattern on relevance	Algorithmic
Stojanovic' IR ontology-based approach	Algorithmic and topical
Saravanan's legal IR ontology	System and topical
Schweighofer' Boolean search with query expansion ontology	Cognitive, topical and algorithmic
Lame's IR-oriented legal ontology of French Civil Code Law	Topical
BEST ontologies	Algorithmic, topical and cognitive

Schweighofer et al. acknowledged the improvement of Boolean search with query expansion using lexical ontologies and user relevance feedback [Schweighofer, Geist, 2007]. These two methods have been developed and tested in a prototype in the area of European state aid law. According to the authors, user studies suggest that search techniques have to be improved in order to meet legal particularities, and that query expansion can exploit the potential of linguistic knowledge and user search behaviour. It is the authors' cognition that legal information system providers store user's information on search practices, consisting of query, results and downloaded documents, and using query logs to improve search engine performance would be easy to implement, by improving the user's query with additional terms. This model depicts cognitive, topical and algorithmic relevance dimensions.

Saravanan et al. postulates that relevance in legal information retrieval is improved by using an ontological framework [Saravan, Ravindran et al., 2009]. They apply a standard mathematical model for term patterns identification in a judgement document. The methodological steps are summarized and consist of:

- an automatic rhetorical role identification in order to understand the structure of a legal judgment;
- a development of a legal knowledge base for the purpose of enhancement of queries given by user;

- application of a probabilistic model for the extraction of sentences to generate a final summary;
- and a modification the final summary to a more concise and readable format. Saravanan's model only approaches relevance in its system and topical dimensions.

The model only approaches relevance in its system and topical dimensions.

Lame's ontology of French Law. Giraude Lame presented an IR-oriented ontology of the French Civil Code Law [Lame, 2001]. The ontology is given the following IR tasks: request extension and text categorization. NLP tools are used to detect relevant domain terms and lexical relations in French legislation. In the knowledge acquisition process, firstly it is extracted legal terms and concepts from the legislative documents and then established lexical relationships between those concepts and terms. The ontology is not formalized in any existing representation language, as OWL, to understand the intended conceptualization. In this ontology, only topical relevance is envisioned.

Best Ontology was built within the BEST-project¹⁸ and aims at providing laymen with information regarding their Best Alternative to a Negotiated Agreement (BATNA), thus, to gain knowledge regarding what the outcome of a court decision would be in a similar case. It consists in an IR based-ontology, depicted in fig. 3.9, with two main functions:

(i) supporting the user to describe a specific legal situation [Klein, Van Steenbergen et al., 2006]; and

(ii) retrieving and ranking descriptions of court decisions on similar cases, making use of a document retrieval system, based on terms provided by the laymen that match terms provided in stored case-law [Van Laarschot, Van Steenbergen et al., 2005], [Wildeboer, Boer et al, 2007], [Uijttenbroek et al., 2007, 2008].

This information may offer laymen, in the field of Dutch tort law (liability), insights regarding their positions for negotiation.

¹⁸ The BEST project (Batna Establishment using Semantic Web Technology) is funded by the Netherlands Organisation for Scientific Research and is part of the ToKeN research programme (01-02-2005/01-07-2010, 634.000.436B).

Regarding the knowledge acquisition and conceptualization processes, books and Tort Law legislation were consulted, together with think aloud sessions with law students.

A hierarchical structure based on Tort Law articles was developed, which constitutes the basis for the development of the legal ontology. The layman's part of the ontology is constructed from the retrieval of case descriptions from <http://www.rechtspraak.nl>. The ontology is formalized in OWL, with about 300 classes and 50 relations.

Both RIC-ATPI (described in Chapter 4) and the BEST ontologies have the same viewpoints: the ontology retrieves the relevant information to the end-user, convening algorithmic, topical and domain relevance. Even if topical relevance is addressed, the information retrieved does not consider the granular information according to cognitive, situational and domain relevance. Other sources of law are not consulted to provide insights regarding laymen's positions for negotiation. RIC and RIC-ATPI ontologies instead covers the five dimensions of relevance.

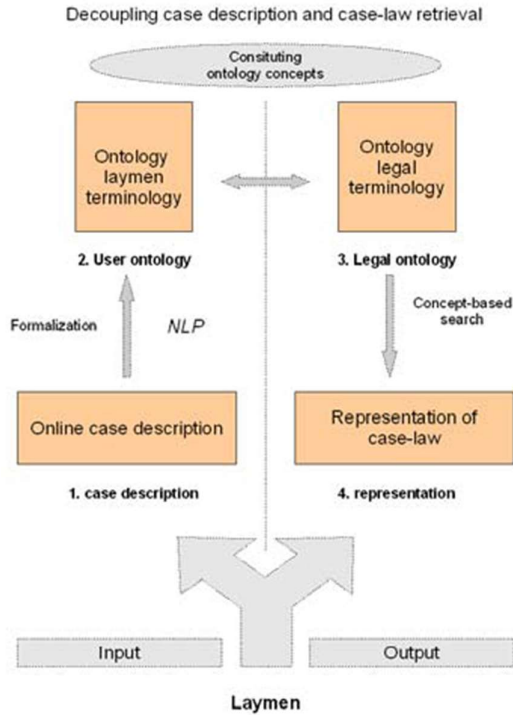


Fig. 3.9 Schematic overview of the BEST-project architecture. Taken from [Uijtttenbroek, et al., 2008].

Considering the specific purpose of providing relevant information, **Stojanovic** presented an IR ontology-based approach for calculating and ranking relevance, exploiting the semantics of explicit links [Stojanovic, 2005]. His approach is based on existing approaches in the traditional IR. An ontology supports the querying process such that other important sources for determining the relevance of results can be considered: the structure of the underlying domain and the characteristics of the searching process. The set of information resources and their properties is represented as a set of instances in the knowledge base. A user's information need is conceptualised in an ontology-based query. This query is matched against the set of information resources, and the set of answers is returned to the user. A query returns the set of concept instances as an answer, the relevance of these answers is defined on the level of the relation instances. The reason is that the concept instance is treated as an

identifier of an object, whereas the relation instance represents the property of that object whose relevance for the query can be determined.

He introduces a relevance function that computes the semantic relevance of a relation instance returned in the ontology-based retrieval process. Finally, the ranking of the answers for a query is achieved by ordering them according to their relevance, using a Bayesian or inference network model for IR.

Within this approach, only algorithmic and topical relevance are covered. In RIC-ATPI ontology, the set of information resources and their properties is also represented as a set of instances in the knowledge base.

3.5 Core Legal Ontologies

LKIF – Core Legal Ontology¹⁹ is a comprehensive and well-structured ontology for law and is likely the most reusable of the core ontologies due to its legal coverage. Its aim was to:

“enable the translation between legal knowledge bases written in different representation formats and formalisms”; and to act “as a knowledge representation formalism that is part of a larger architecture for developing legal knowledge systems” [Hoekstra, Breuker et al., 2007].

The LKIF Core ontology contains basic concepts of law and is part of a generic architecture to enable the interchange of knowledge. It is directed at supporting legal inference, knowledge acquisition, knowledge exchange and semantic annotation [Hoekstra, Breuker et al., et al., 2009]. The legal level of the ontology introduces a comprehensive set of legal agents, actions, rights, powers, legal roles and concept definitions. Some of its concepts are reused within RIC and RIC-ATPI ontologies and in the Complaint Design Pattern.

Core Legal Ontology (CLO) is an OWL ontology based on the “*Descriptions and Situations*” extension to DOLCE, which is an OWL-based foundational ontology for domain-independent axiomatic theories.

¹⁹ Estrella project (IST-2004-027665), <http://www.estrellaproject.org>. LKIF repository is online available in <http://github.com/RinkeHoekstra/lkif-core>.

CLO contains some of the following legal notions that are considered when building the thesis artifacts:

- Modal Descriptions. Some classes of legal modal descriptions are:
 - Legal rights
 - Duty, Privilege, Immunity, etc.
 - Legal Powers
 - Legal Empowerments
 - Faculty/Implicit Permission
 - Explicit Permission
- Legal Roles. Legal Functions are Legal Roles played by legal subjects.
- Legal Agents
- Legal Facts

3.6 Ontology Design Patterns

Content patterns (CPs) have been introduced as resources and design methods for engineering ontology content over the semantic web, for a specific domain of interest, i.e. they are content-dependent. Patterned design makes ontology design easier for both knowledge engineers, domain experts and for integration [Gangemi, 2005]. Hence they are designated as modelling components/building blocks in ontology design [Blomqvist, 2009].

Content patterns are transparent with respect to the rationales applied to the design of a certain ontology. They may constitute fragments extracted from either foundational (Foundational Ontology Patterns) or domain reference ontologies (Domain-related OPs, or DROPs). The latter should capture the knowledge related to a domain [Falbo, Guizzardi et al. 2013] and reuse by extension. Research has also addressed domain-oriented patterns, e.g. for content objects and multimedia [Arndt, 2007], software components [Oberle, 2006], business modelling and interaction [Gangemi et al, 2007, Relevance [Gomez-Romero, 2007], Place,²⁰ Norm-Case [Gangemi, 2009] (also composed by the LegalNorm and LegalCase Content Patterns), LimitViolationCase [Gangemi, 2009], Situation,²¹ Description and Situation²², Information-Realization²³ or Agent-Role²⁴ patterns. A good example is the participation-role pattern,²⁵ which can be observed in enterprise models, software management, fishery [Gangemi et al., 2004],

²⁰ <http://ontologydesignpatterns.org/wiki/Submissions:Place>

²¹ <http://ontologydesignpatterns.org/wiki/Submissions:Situation>

²² <http://ontologydesignpatterns.org/wiki/Submissions:DescriptionAndSituation>

²³ [http://ontologydesignpatterns.org/wiki/Submissions:Information realization](http://ontologydesignpatterns.org/wiki/Submissions:Information%20realization)

²⁴ <http://ontologydesignpatterns.org/wiki/Submissions:AgentRole>

²⁵ <http://ontologydesignpatterns.org/wiki/Submissions:ParticipantRole>

etc. These existent Content Patterns do not tackle the description of complaint. To the best of our knowledge, no pattern has addressed complaints, as consulted the ontologydesignpatterns.org community portal.

Types of ontology patterns were defined considering the ontology development phase [Falbo, Guizzardi et al. 2013] (Fig. 3.10).

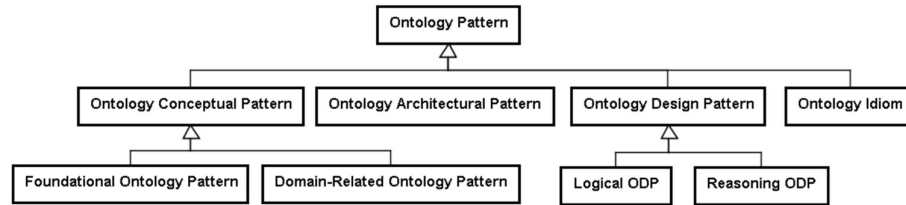


Fig. 3.10 Typology of ontology patterns. Reproduced from [Falbo, Guizzardi et al. 2013]

Bobillo et al. proposed a well formalized ontology design pattern for representing relevance in OWL [Bobillo, Delgado et al., 2007]. The idea behind their work was that there should be two sets of axioms in an ontology, one representing the domain and another representing the context. The domain ontology should be a comprehensive representation of the domain knowledge, being as complete as possible, and the context ontology should be a catalogue of circumstances that may take place.

Under a predefined set of profiles, concepts in the domain ontology and concepts in the context ontologies are related through the instances of a "relevance" class, reification of the relevance relation between relevant information and context. Adapted to our case, we may think of at least five different dimensions of relevance. The changes which are necessary to implement Bobillo's pattern would consist of:

- defining a single Relevance class and two properties (to relate an instance of relevance to domain and context classes);
- defining five instances of relevance and declaring axioms that relate the actual classes in the domain and in the context for each case.

4 Methodologies

Knowledge Engineering (KE) upholds a longstanding tradition emphasizing methodological issues associated with the acquisition and representation of knowledge in some formal language [Hoekstra, 2010]. Ontology Engineering consists in a discipline referring the languages (e.g. OWL, RDFS), tools (e.g., Protégé, NeOn Toolkit), and methods (e.g. Methontology, NeOn Methodology) to facilitate the development of ontologies. In particular, it is defined as:

“the set of activities that concern the ontology development process, the ontology life cycle, the methodologies for building ontologies, the tool suited and languages that support them” [Gómez-Pérez, Fernández-López et al, 2004].

Herein, the legacy guiding methodology from *Neon* Methodology,²⁶ complemented with *MeLOn Methodology* legal specificities, rendered the legal knowledge formalization.

NeOn methodology is based on practices and previous experiences and employed: METHONTOLOGY [Gómez-Pérez et al., 2003], On-To-Knowledge [Staab et al., 2001], DILIGENT [Pinto et al., 2004] and other methods available (e.g., [Grüninger and Fox, 1995]) to provide guidelines for carrying out a particular process or activity (Fig. 3.11).

²⁶ <http://www.neon-project.org/>

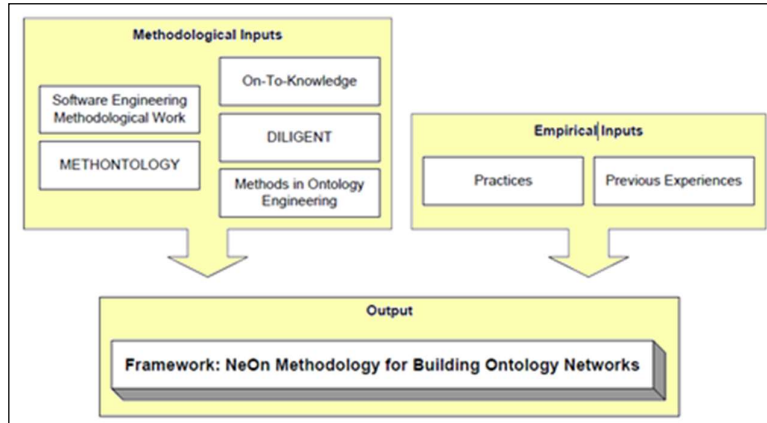


Fig. 3.11 Inputs accounted in the NeOn Methodology. Taken from [Suárez-Figueroa, 2010]

The *NeOn Methodology* for building ontology networks is a scenario-based methodology that provides prescriptive methodological guidelines for each of the nine scenarios that are foreseen,²⁷ which can be combined among them. The method for each scenario is decomposed in different processes and activities defined in the *NeOn Glossary*.²⁸ These guidelines were adapted in this work to the legal realm. In this sense, is followed a process or an activity-centric approach, in a descriptive way, adapted to the present artifact. The scenarios may unfold during the ontology network development, though they cannot be considered exhaustive (Figure 3.12).

- Scenario 1:*** From specification to implementation
- Scenario 2:*** Reusing and reengineering non-ontological
- Scenario 3:*** Reusing ontological resources
- Scenario 4:*** Reusing and reengineering ontological resources.
- Scenario 5:*** Reusing and merging ontological resources.
- Scenario 6:*** Reusing, merging and reengineering ontological resources
- Scenario 7:*** Reusing Ontology Design Patterns (ODPs)
- Scenario 8:*** Restructuring ontological resources
- Scenario 9:*** Localizing ontological resources

²⁷ 3 Deliverables D5.4.1, D5.3.2, and D5.4.2 (<http://www.neon-project.org/>)

²⁸ <http://mayor2.dia.fi.upm.es/oeg-upm/files/pdf/NeOnGlossary.pdf>

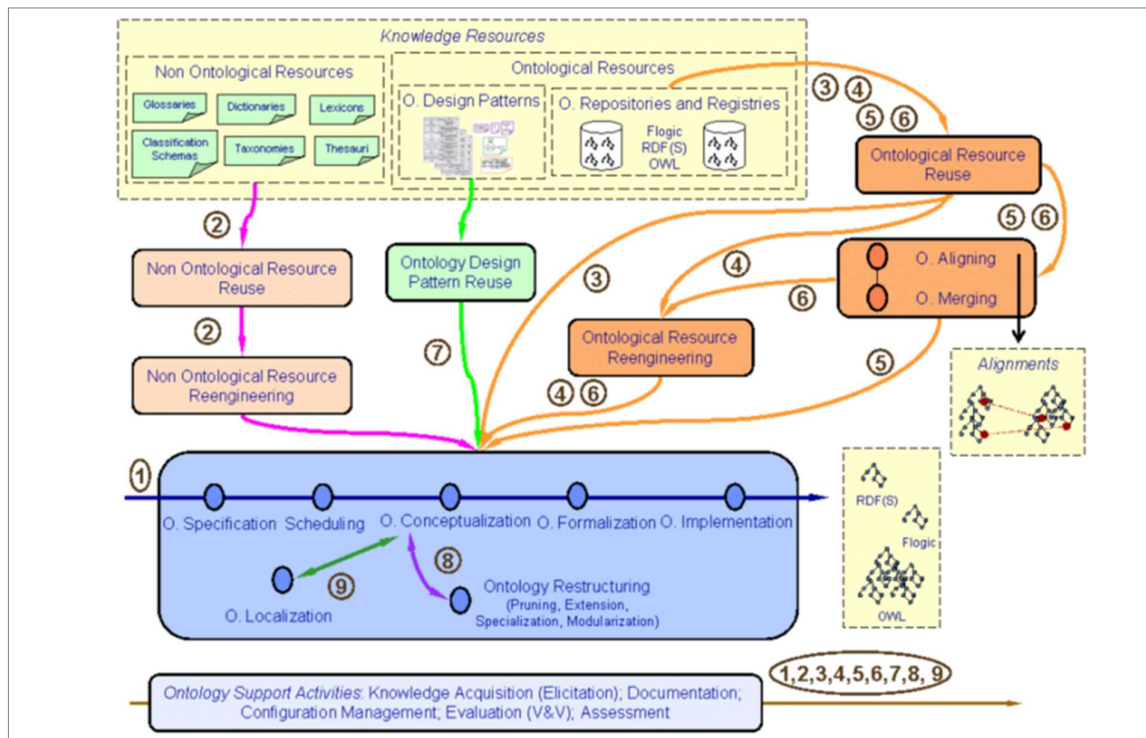


Fig. 3.12 NeOn scenarios. Figure reproduced from [Suárez-Figueroa, 2010]

These scenarios can be combined in different and flexible ways. Any combination of scenarios should include *Scenario 1* because this scenario is made up of the core activities that have to be performed in any ontology development. *Scenarios 2* and *3* are specifically addressed in this work.

Scenario 1: From specification to implementation

The ontology network is developed from scratch, that is, without reusing knowledge resources available.

Scenario 2: Reusing and reengineering non-ontological resources

Ontology developers should carry out the non-ontological resource reuse process for deciding, according to the requirements in the ORSD, which NORs can be reused to build the ontology network. Then, the selected NORs should be re-engineered into ontologies

Scenario 3: Reusing ontological resources

Ontology developers use ontological resources: ontologies as a whole, ontology modules, and/or ontology statements.

In line with Paradela, any methodology must fulfil a set of characteristics [Paradela, 2001], called “the suitability material characteristics”, that is, the sufficient conditions that the methodology must fulfil in the domain where it is applied. These conditions are determined by factors such as the following: the legal domain where the methodology is applied; grounded on legal cases, situations or problems to be dealt with; characteristics of the legal information, and the legal sources, etc.

MeLOn Methodology particularizes the specificities of the legal concepts: their legal definitions and links to normative or legal sources (Table 3.4). Hence, is necessarily conflated with *Neon* Methodology.

Table 3.4 Conceptual model of MeLOn Methodology

Explicit Concept	Definition by Legal Source	Normalized Definition	Equivalent to	Subclass of	Disjoint with	Link to Normative/ Legal Source
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5 Summary and Critical Assessment

As a summary and critical assessment of this chapter, brief comments are made concerning the used relevance framework and ontological models.

Framework: the five dimensions of relevance are the basis of the design of the legal ontologies described in Chapter 4. These dimensions are intertwined with each other. Once querying the ontologies (algorithmic relevance), they are able of answering what are the most authoritative documents within the ATP domain (legal salience); or what does the user needs to know in order to solve a

dispute (cognitive); or what is the legal problem of the user (situational) and how he can complaint to enforce his rights.

Models: regarding the ontological models consulted to build the artifacts (ontologies and design pattern), the following observations are posed:

- The approach of BEST ontologies represents a fundamental contribution to advance in the state of the art related to both ODR and legal information retrieval; the five dimensions of relevance conceptually is the most similar approach to the work presented in this dissertation. Both RIC-ATPI (described in Chapter 4) and the BEST ontologies have the same viewpoints: the ontology retrieves the relevant information to the end-user, convening algorithmic, topical and domain relevance. Even if topical relevance is addressed, the information retrieved does not consider the granular information according to cognitive, situational and domain relevance. Other sources of law are not consulted to provide insights regarding laymen's positions for negotiation. RIC and RIC-ATPI ontologies instead covers the five dimensions of relevance.
- As an alternative to classical IR techniques, knowledge engineering techniques have been used to improve the retrieval of the most relevant documents. In particular, ontologies have been used to improve legal information search and retrieval, reporting better results [Saravan, Ravindran et al., 2009]. However, the cost of manually developing these ontologies is high and not many ontologies have been specifically used to drive information systems.
- Amongst the ODR-based ontologies: MCO ontology presents some common features in relation to the sources of knowledge acquisition of RIC and RIC-ATPI ontologies, such as complaints and practical expert knowledge; nevertheless, it does not address the required conceptualization for RIC ontology nor for the ATP domain. Within the ODA ontology, relevance is not addressed as a filter within the collection of information from the end-user as to enable any decision and self-litigation; it is mainly focused on the procedural side of collecting information from the user. The ODR Processes ontology is proprietary and relevance is not considered in the modelling of the ontology, even if addressed to dispute resolution schemes.
- Amongst Consumer-based ontologies: the two layers representing the framework of CPO ontology informed the design of RIC and RIC ATPI ontologies (a legal ontological and a domain layer). The ELTS ontology includes types of prescriptions that inform the design of RIC ontology with respect to the identification of legal provision types: obligation, prohibition, permission, exception. Nevertheless, pertinent components, such as legal source, enforcement procedure, requisites, right, are out of scope of its structure and are considered in this thesis as important provision-types, specially regarded in the consumer law domain.

- Considering in particular the Complaint Design Pattern, both legal core ontologies, e.g., LKIF-Core and *Core Legal Ontology* [CLO], and domain ontologies, like consumer protection and consumer dispute resolution ones, do not include in their scope the concept of complaint, e.g., the Consumer Mediation Ontology (CMO), the Consumer Protection Ontology (CPO), the Legal Ontology Syllabus, the Mediation Core Ontology, and the Ontology of ODR Processes. The complaint concept is included only in customer-related ontologies, but they are not complete enough to be used.

Chapter 4 Ontology-based Modelling of Relevance in RIC and RIC-ATPI Ontologies

1 Overview

Simon describes the nature of an artifact-design as generating design alternatives, and evaluating the alternatives against requirements, until a satisfactory design is achieved [Simon, 1996]. In this chapter it is described design of the artifact and its development process.

A theoretical basis precedes the ontological work of the Relevant Legal Information in Consumer Disputes Ontology (RIC) and its specialization, the Air Transport Passenger Incidents Ontology (RIC-ATPI); the model of Legal Provisions and Domain Knowledge are expounded in section 2 to enable the balance between consensus and authoritativeness in legal knowledge representation.

In subsection 2.4, the legal information in the ATP domain is selected within the frames provided from the model of Legal Provisions and Domain Knowledge. The incidents analysed in chapter 2 are here revisited with the corresponding rights and its constraints, legal sources, further interpretation, exceptions, enforcement procedures, obligations and prohibitions.

The ontological development process of the RIC ontology and its specialization in RIC-ATPI are described in detail in Section 3. Relevance dimensions are contextualized along the Knowledge Engineering process. The development-oriented processes and activities, following the applied methodologies of NeOn¹ and Melon, are described in Subsection 3.1. The development-oriented processes and activities includes the specification of requirements (3.1.1), the elicitation of resources: non-ontological (3.1.2, 3.1.3) and ontological resources (3.1.4), its reuse and reengineering process, the conceptualization of both ontologies (3.2), the description of RIC ontology (3.3), the description of RIC-ATPI ontology (3.4), and the implementation (3.6). Support processes and activities category include activities that are necessary to assure the successful completion of an ontology project. It includes the knowledge acquisition, ontology evaluation (chapter 5) and documentation activities (Subsection 3.7). An ontology-

¹ <http://www.neon-project.org/>

based modelling is backing a web application providing relevant legal information (Subsection 3.8). Section 4 provides a summary and a critical assessment.

2 Legal Knowledge Representation

2.1 Balance Between Consensus and Authoritativeness

To accomplish the objective of modelling relevance of legal information in a legal ontology, it is important to cope with the problem in legal knowledge representation that consists in the balance between *consensus*² and *authoritativeness* [Francesconi, 2011]. *Consensus* is required in the legal knowledge representation and on the conceptualization. *Authoritativeness* refers to the authority embedded into the text.

The motivation to use ontologies for knowledge representation resides in sharing a common understanding of a domain. The similarity of different branches of law urges for the design of reusable frameworks. Therefore, the inter-relation of law and, in particular, consumer law, makes it a natural area for knowledge sharing.

For the purposes of this thesis, it is proposed a classical twofold modelling to respect the balance between these two requirements of consensus and authoritativeness. The twofold modelling, compounded of Legal Provisions and Domain Knowledge, implementing RIC and RIC-ATPI ontologies, is an amenable proposal to balance the interplay between consensus and authoritativeness.

The suggested double modelling and separation between types of knowledge (Legal Provisions and Domain Knowledge) was already addressed in the literature [Francesconi, 2011], [Casellas, 2008], [Breuker, Hoekstra 2004], [Breuker, Valente et al. 2004]:

“an ontology is in the first place a set of terminological definitions built around a taxonomic back-bone, while a framework is an assembly of concepts or types of knowledge that reflect recurrent patterns of use”.
[Casellas, 2008].

As Breuker and Hoekstra remarked,

² Consensus is an issue faced in knowledge representation in general (Gangemi et al. 2002, Guarino 1997), since ontological conceptualization has to be shared between stakeholders (Studer et al. 1998).

“Legal Knowledge Engineering suffers from epistemological promiscuity, or indiscriminately mixing epistemological knowledge and domain knowledge in ontologies” [Breuker, Hoekstra, 2004].

Similarly, others argued that usually knowledge representation is affected by the nature of the problem and by the applied inference strategy [Bylander, Chandrasekaran, 1987], [Chandrasekaran, 1986] and [van Heijst, 1995]; in this same segment, it is also referred as to an *interaction problem* between the knowledge about the domain and knowledge about reasoning on the domain being represented independently. Clancey commented that the separation of both types of knowledge is a commendable feature, since it facilitates knowledge sharing and reuse [Clancey, 1981].

In the following sections, the model of Legal Provisions and Domain Knowledge are analysed.

2.2 Legal Provisions

This model is conceived as a conceptual model of legistic knowledge³ [Biagioli, 1997]; its components are provisions-types [Biagioli, 1997], also understood as concepts, anchors, or handles [Breuker, Valente et al. 2004].

The yielded provision-types are the following: right, requisite, legal source, exception, constraint, enforcement procedure, prohibition, obligation, permission.

The provision-types are related to linguistic patterns occurring in the consulted sources and also derive from the content embedded in legal text: they are the instantiation of nested norms in textual representation, the legal concepts contained in sentences, articles, paragraphs, i.e. sequences of text, and in this way coheres with the authoritativeness of legal text.

The formalization of these provision-types in the RIC ontology enables to capture relevant legal knowledge embedded in a legal document. This facilitates the descriptiveness and semantics of the source document to be retained, and at the same time, the knowledge is machine-readable and computable.

This schema may provide the basis for the knowledge acquisition process, to elicit and integrate knowledge from heterogeneous sources, and

³ ‘Legistic knowledge the traditional technique used by legislator to build and express rules, i.e. how methodically the law speaks about its objects’ [Biagioli, 1997].

may be useful in information retrieval contexts, as to provide more information relevant to a user query.

The abstraction⁴ character of these provision-types is oriented towards interoperability and reusability in other domain ontologies and formal normative reasoning.

These provisions are pertinent for decision-making processes and to applications.⁵ These anchors make explicit the functions of the normative documents, the motivations that spurred their creation. Each provision is, from a general standpoint, the *meaning* of each basic text unit [Biagioli, 2005].

The detection of provisions in a normative text consists in a manual and documentalist activity which is to be carried out by legal experts. However, it can be particularly time consuming, especially for long and complex laws and other normative texts. An automatic tool able to support the intellectual activity of classifying provisions in normative text would be desirable to complement; Akoma Ntoso standard could be applied to turn the documents into a format amenable for computation.

Table 4.1 reflects some of the chosen provision-types and their corresponding sources. It is observed that the types of legal sources are heterogeneous and multiple. The rights emerge not only from legislation, but also from other sources of soft law.

⁴ Different national systems may organize the transposed concepts in different ways. To illustrate, the term contract corresponds to different concepts in common law and civil law, where it has the meaning of bargain and agreement respectively.

⁵ The use of analytical metadata permits different applications:

(i) allows to foster semantic indexing, classification, query and retrieval to normative documents. Legal professionals may query a legal information system where normative documents are indexed on the basis of the analytical metadata, searching for relevant information on the applicable rights, obtaining a selective answer.

(ii) can be used in the drafting phase, giving the drafter the possibility to annotate metadata and also of drawing up new normative documents starting from their structure using an editor able to use metadata in the phase of building up a text.

(iii) allows diagnosis on normative texts to analyze the coherency of the legal system.

Table 4.1 Some components of RIC and their sources

<i>Components</i>	<i>Depicted in</i>
Requisite	Legislation
Legal source	Policies of the Regulators, Case-law, EU Commission acts, Normative provisions and in recitals of legislation
Right	Legislation and complementary legislation, Case-law, EU Commission acts
Exception	Legislation
Constraint	Normative provisions and in recitals of legislation, contractual terms, soft law: policies of the regulators, EU Commission acts
Further Interpretation	Normative provisions and in recitals of legislation, complementary legislation, case law, EU Commission acts, Policies of the Regulators
Enforcement Procedure	EU Commission acts : Communications, Recommendations, Legislation, Case-law
Incident	Legislation, case-law, complaints, Practical legal professional knowledge' (PLK): such as public policies: ECC Reports, NEB's decisions

2.3 Domain Knowledge

The Domain Knowledge model consists in a conceptual model, able to present the entities of a thematic domain, dependent of a context, of a “situated cognition” [Clancey, 1997], [Benjamins, Contreras 2004]. RIC-ATPI ontology describes this model. The ontology models the legal cases in the ATP domain. The cases were extracted from expert-documents, complaints, literature and from case law, even if the gap between court decisions and disputant case-descriptions is evident: the court decisions are formal, well written, verbose and based on a judicial language, while the disputant text is mainly informal, factual, and based on common natural language, displaying the roots of the incidents/cases.

The ontology aims to represent the *request-oriented cases* in the ATP domain, according to the user’s needs. Hereby, the topical, cognitive and situational relevance are composed.

In order to resolve problems of using different vocabularies, the domain vocabulary is common shared, retrieved from the ATP sources of multiple players.

The conjugation of both LP model with DK may be able to describe, from a semantic point of view, the provision-types instances [Biagioli, 1997] of a legal ontology, as grounded in their legal sources, making ontologies more acceptable to practitioners. RIC-ATPI ontology instantiates the legal provisions-types with domain knowledge and their arguments. This ontology

provides terminological knowledge permitting its reusability by any legal information system (shareable knowledge on the web —possibly as linked data).

2.4 Relevance of Legal Information in the ATP Domain

In this subsection, the legal information in the ATP domain is selected within the frames provided from the model of Legal Provisions and Domain Knowledge. The incidents analysed in chapter 2 are here revisited with the corresponding rights and its constraints, legal sources, further interpretation, exceptions, enforcement procedures, obligations and prohibitions.

Excerpts of the relevant information are delivered in tables for readability purposes. Table 4.3a depicts the relevant legal information of the right to information when there is an incident of cancelation. Table 4.3b depicts the relevant legal information when there is a cancellation incident. Table 4.3c depicts the relevant legal information when there is an incident of cancelation.

Table 4.3a Excerpt of the Relevant legal information of the right to information when there is an incident of cancellation

RIC Components	Content Description
Air Transport Passenger Incident	Cancellation
Right and Legal Source	Right to information Art. 5(2), Art. 14(2) , Regulation (EC) 261/2004
Requisite and Legal Source ⁶	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Further Interpretation and Legal Source	Recital 20 Regulation (EC) "Passengers should be fully informed of their rights in the event of denied boarding and of cancellation or long delay of flights, so that they can effectively exercise their rights"; Art. 14 (2) Regulation (EC) 261/2004 "An operating air carrier denying boarding or cancelling a flight shall provide each passenger affected with a written notice setting out the rules for compensation and assistance in line with this Regulation. It shall also provide each passenger affected by a delay of at least two hours with an equivalent notice. The contact details of the national designated body referred to in Article 16 shall also be given to the passenger in written form
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses) Legal Action Procedure: when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

⁶ Another geographical requisite is the following: Where some entitlements (benefits or compensation and care) are given at the point of departure either on the basis of local legislation or on a voluntary basis, passengers cannot claim any further rights under the Regulation, Article 3(1)(b).

Table 4.3b Excerpt of the Relevant legal information when there is an incident of cancelation

RIC Components	Content Description
Air Transport Passenger Incident	Cancelation
Right and Legal Source	Right to choose between i) reimbursement and return flight to the first point of departure; or ii) right to rerouting. Art. 8 Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint to the right of Reimbursement: If the Passenger chooses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves.
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

Table 4.3c Excerpt of the Relevant legal information of the right to compensation when there is an incident of delayed baggage

RIC Components	Content Description
Air Transport Passenger Incident	Delayed baggage
Right and Legal Source	Right to 1 000 SDRs, Article 22(2) of the Montreal Convention
Requisite and Legal Source	Baggage Liability Requisite: For the air carrier to be liable for damage, the event that caused the destruction/loss of/damage to checked baggage, have to be taken place on board of the aircraft, or during any period the baggage was in charge of the air carrier, art. 17(2) Montreal Convention
Further Interpretation and Legal Source	<p>Interpretation Baggage Liability (Article 5, (EC) Regulation 889/2002) states that EU air carriers must 'without delay, and in any event, not later than 15 days after the identity of the natural person entitled to compensation has been established, make such advance payments as may be required to meet immediate economic needs on a basis proportional to the hardship suffered'</p> <p>Interpretation Baggage Information Request (Article 6(1) (2), Regulation 889/2002) states that "All air carriers shall, when selling carriage by air in the Community,</p> <p>-ensure that a summary of the main provisions governing liability for passengers and their baggage, including deadlines for filing an action for compensation and the possibility of making a special declaration for baggage, is made available to passengers at all points of sale, including sale by telephone and via the Internet. In order to comply with this information requirement, Community air carriers shall use the notice.</p> <p>All air carriers shall, in respect of carriage by air provided or purchased in the Community, provide each passenger with a written indication of:</p> <ul style="list-style-type: none"> — the applicable limit for that flight on the carrier's liability in respect of destruction, loss of or damage to baggage and a warning that baggage greater in value than this figure should be brought to the airline's attention at check-in or fully insured by the passenger prior to travel; — the applicable limit for that flight on the carrier's liability for damage occasioned by delay". <p>- Interpretation Damage Baggage (Decision of the Court of Justice of the EU on 6th May, Walz v Clickair SA,) in which the Court declared that this limit of 1,000SDRs must be interpreted as including both material and non-material damage.</p>

	Interpretation of complaint handling procedure: "When the operating and contracting airlines are different, the complaint for damages against can be issued against either. If the name or code of an air carrier is indicated on the ticket, that air carrier is the contracting air carrier". Legal Source: Article 42 ^o Montreal Convention
Exception	" bad damage unavoidable": Exception "the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures". Legal source: Article 19 Montreal Convention
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure:</p> <p>1 - To issue the complaint, the time limits to complain should be respected. Failure to do so often results in passengers losing their right to claim from the air carrier. For damaged luggage and items which are missing from bags, the time limit is seven days from the date on which the baggage was placed at the passenger's disposal (Article 17 (3) Montreal Convention). For delayed luggage, the time limit is 21 days from the date of delivery of the bag. For lost luggage, write after 21 days (Article 31 (2) Montreal Convention)</p> <p>2 - A standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>3 - For baggage incidents in particular, an additional form called PIR: Property Irregularity Report should be filled for baggage handling complaints, before leaving the airport. Generally, these desks are located at the baggage pick up point. Upon completion of the report, passengers should be given a copy of it or request for it.</p> <p>4 - Passengers have to prove the extent of their loss. Accordingly, Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use</p> <p><i>Legal Action Procedure</i> -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention</p>

The two models previously sketched support the engineering of RIC and RIC-ATPI ontologies, further described in section 3.

3 Ontology Engineering

Knowledge Engineering (KE) upholds a longstanding tradition emphasizing methodological issues associated with the acquisition and representation of knowledge in some formal language [Hoekstra, 2010]. Ontology Engineering consists in a discipline referring the languages (e.g. OWL, RDFS), tools (e.g., Protégé, NeOn Toolkit), and methods (e.g. Methontology, NeOn Methodology) to facilitate the development of ontologies. In particular, it is defined as:

“the set of activities that concern the ontology development process, the ontology life cycle, the methodologies for building ontologies, the tool suited and languages that support them” [Gómez-Pérez, Fernández-López et al, 2004].

The processes and activities classification adapted from *NeOn* Methodology and implemented in this work, are presented in Fig. 4.1, along with the corresponding chapters, sections and subsections, for readability purposes.

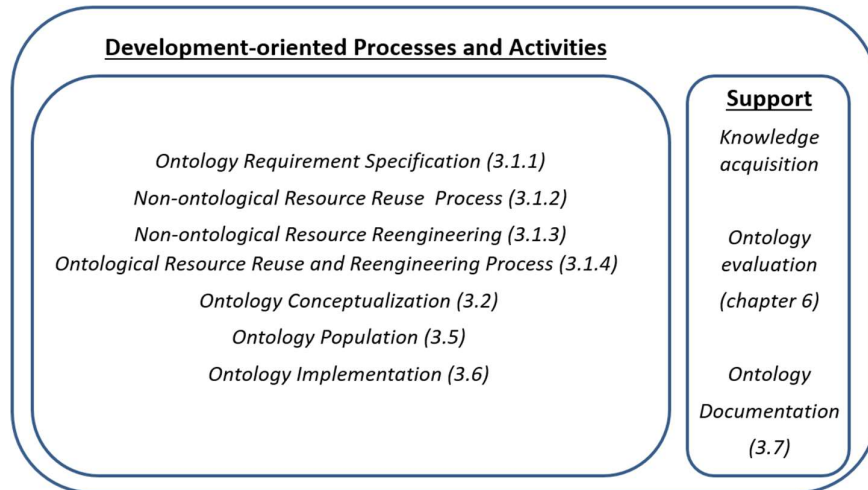


Fig. 4.1 Processes and activities classification and corresponding chapters, sections and subsections, adapted from [Suárez-Figueroa, 2010]

The Development-oriented Processes and Activities, adapted from *NeOn Methodology*, includes the specification of requirements, the elicitation of resources, non-ontological and ontological, their reuse and reengineering process, the conceptualization, and implementation. Support processes and activities category include activities that are necessary to assure the successful completion of an ontology project. It includes the knowledge acquisition, ontology evaluation and documentation activities. These activities are performed at the same time as the development-oriented activities, without which the ontology could not be built.

In this thesis, even if the reputed methodologies were followed, the specification of requirements are explained previously and the elicitation of knowledge sources follows it, in order to circumscribe better the resources, reuse and reengineering process. Fig. 4.2 depicts the name and the objective of each ontology.

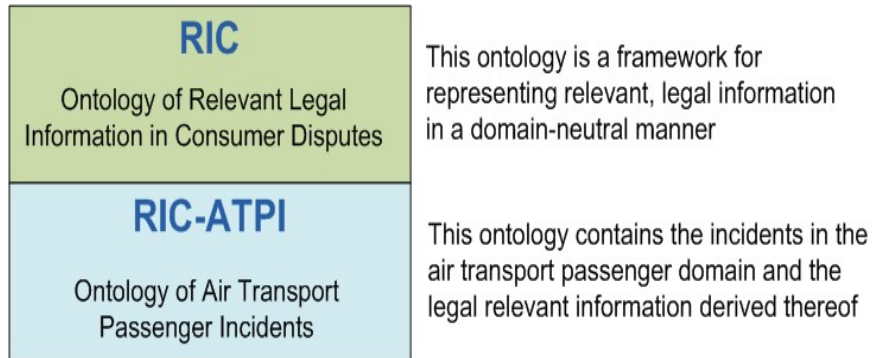


Fig. 4.2 RIC and RIC-ATPI ontologies

3.1 Development-oriented Processes and Activities

3.1.1 Ontology Specification of Requirements

The ontology specification phase is expressed in the Ontology Requirement Specification Document (ORSD) [Suárez-Figueroa, Gómez-Pérez et al, 2009], [Suárez-Figueroa, Dellschaft et al, 2008]. This document refers to the activity of collecting the requirements that the ontology should fulfil for its development: the purpose, intended scenarios of use, end-users, and the level of formality of the implemented ontology. In particular, the ORSD:

- (1) allows the identification of which particular knowledge should be represented in the ontology;
- (2) facilitates the reuse of knowledge resources by means of focusing the resource search towards the particular knowledge to be represented; and
- (3) permits the verification of the ontology with respect to the requirements that the ontology should fulfil.

The specification of requirements is made available in Table 4.4a, which describes the requirements of RIC ontology, and in Table 4.4b which describes the requirements of RIC-ATPI ontology, both built following the ontology engineering methodology.

Table 4.4a. *Ontology Requirements Document for RIC*

RIC Ontology Requirements	
Purpose	This ontology supports the representation of relevant, legal information in consumer disputes, regardless the sub-domain within consumer law.
Scope	The Ontology uses a general granularity at the level of legal provisions, representing rights, obligations, prohibitions, exceptions, constraints, enforcement procedures, further interpretation, requisites, legal sources.
Functional requirements	<ul style="list-style-type: none"> •Requirements represented through informal competency questions: <ol style="list-style-type: none"> (1) Do RIC entities derive from legal sources? (2) Which rights are triggered upon the happening of an incident? (3) Which requisite, exception, further interpretation, constraint, enforcement procedure are associated to a right in a given incident? •Requirements to evaluate RIC ontology: <ol style="list-style-type: none"> (1) Do RIC entities facilitate the process of knowledge acquisition? (2) Are RIC entities useful to retrieve relevant information? (3) Are RIC entities able to be reused and are they interoperable in different domains and applications? (4) Are RIC entities able to be instantiated into terminological knowledge?
Implementation	<ul style="list-style-type: none"> •Implemented in OWL 2 language and using Protégé as the ontology development environment. •Documentation in http://ricontology.com
Intended End-Users	Legal professionals, decision makers and drafters
Intended Uses	<ul style="list-style-type: none"> • Allows supporting rich semantic annotation, indexing, search and retrieval. Legal professionals may query a Legal Information System where documents are indexed on the basis of these analytical metadata, searching for relevant information, obtaining a selective retrieval; • Can be used in the drafting phase, giving the drafter the possibility to annotate metadata and drawing up new documents starting from their structure; • Allows diagnosis on normative texts to analyse the coherency of the legal system; • Enables the integration with other ontologies and vocabularies about related domains.

Table 4.4b *Ontology requirements document for RIC-ATPI*

RIC-ATPI Ontology Requirements	
Purpose	The ontology models the relevant legal information in the ATP domain

<p><i>Scope</i></p> <p><i>.coverage</i></p> <p><i>.degree of detail</i></p>	<ul style="list-style-type: none"> • Expresses the relevant legal information according to each ATP incident: the concrete exceptions, constraints, further interpretations and enforcement procedures. • Follows a bottom-up strategy; it uses the specific content refracted in the elicited sources, thus, at the level of normative provisions, recitals from legislation, paragraphs from a specific case-law or from the documents of the European Commission. • Declares as class the <i>AirTransportPassengerIncident</i> that is a subclass of <i>RIC:Incident</i>; it also includes the relevant legal information as class-instances of RIC classes. • Describes as use-case the ATP incidents, within the EU geographical scope. • Even though ATPI is consumer-based, related to business-to-consumer (B2C) transactions, our approach is broader, as a passenger might be considered a consumer or a professional. • It is out of the scope of the ATPI accidents, death or any other bodily injury suffered by a passenger, incidents related to package tours and contractual problems between online bookings, rights for disabled passengers, and persons with reduced mobility.
<p><i>Functional requirements</i></p>	<ul style="list-style-type: none"> • The ontology should articulate the types of relevance. • Requirements are represented through informal competency questions (CQs) [37]. The answerability of CQs hence becomes a functional requirement. CQs from were extracted from expert generated content sources, portrayed in Table 3.2. • The CQs are: <ol style="list-style-type: none"> (1) What are the Air Transport Passenger incidents? (2) For any given incident, which enforcement procedures should be followed? (3) Which are the exceptions in case of a flight cancelation, delay and denied boarding? (4) Which are the constraints in case of a flight cancelation, delay and denied boarding? (5) Which are the passenger's rights in case of a cancelled flight? (6) What is the further interpretation of extraordinary circumstances? (7) Which are the requisites for the entitlement of rights? (8) what are the legal sources that support the right to accommodation and transportation?
<p><i>Formalization and Implementation</i></p>	<ul style="list-style-type: none"> • Formalized in OWL 2 language and using Protégé as the ontology development environment • Online documentation in http://www.ricontology.com/
<p><i>Intended End-Users</i></p>	<p>Air carriers, Passengers, Regulators, National Enforcement Bodies (NEBS), ECC-Networks, Consumer Agencies and Ombudsmen, Alternative Dispute Resolution Bodies, Courts, Legal Assistance Consultancies, Enterprise Europe Network, Travel Agencies, Intermediate Booking Platforms or Price Comparison Websites, and collaborative economy</p>

<i>Intended Uses</i>	Legal Ontologies
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3.1.2 Non-Ontological Resource Reuse Process

To develop RIC and RIC-ATPI ontologies, knowledge resources were elicited: ontological resources and non-ontological resources, hereinafter named NOR. This division regards the level or degree of formalization.

Knowledge resources were elicited, used and reengineered, instead of custom-building a new ontology from scratch, promoting the application of good practices.

Firstly, the NOR Reuse process is described, including two activities: the Non-Ontological Resource Reuse Process and the Non-Ontological Resource Reengineering process.

Non-Ontological Resource Reuse Process refers to the process of choosing the most suitable non-ontological resources for the development of ontologies. The reuse of non-resources involves necessarily their reengineering into ontologies.

A NOR is a knowledge resource whose semantics has not been formalized yet by means of an ontology and have related semantics which allows interpreting the knowledge they hold. Sometimes this semantics is explicitly specified on documents in natural language; in other cases, however, the semantics is not explicitly available. Nevertheless, the semantic of non-ontological resources is not always formalized, and this lack of formalization avoids their use as ontologies.

Scenario 2 entitled “Building Ontology Networks by Reusing and Reengineering Non Ontological Resources” (NOR) is described in this Subsection.

NOR can range from resources in a unstructured (e.g., textual corpora), semi structured (e.g., folksonomies),⁷ and structured (e.g., databases, standards, catalogues, classifications, thesauri,⁸ lexicons,⁹ among others)

⁷ A folksonomy is the result of personal free tagging of information and objects (anything with an URI) for one’s own retrieval, T. Vander Wal. *Folksonomy coinage and definition*. 2007. <http://www.vanderwal.net/folksonomy.html>.

⁸ Thesauri is a controlled vocabulary arranged in a known order whose purpose is to facilitate retrieval of resources and to achieve consistency in indexing, ANSI/NISO Z39.19-2005 Guidelines for the Construction, Format, and Management of Monolingual Controlled Vocabularies.

⁹ A lexicon is the vocabulary of an individual person, an occupational group or a professional field, Glossary of Terms for the Standardization of Geographical Names, United Nations Group of Experts on Geographic Names, United Nations, New York, 2002.

way. Using non-ontological resources that have a minimal consensus portray benefits, e.g. interoperability in terms of the vocabulary used, information browse/search, decrease of the knowledge acquisition bottleneck, reuse, among others. In the development of RIC-ATPI, available NOR containing already consensuated terminology are used (refer to Table 3.2).

NOR in the legal domain are highly heterogeneous in their contents, legal weight, and data model, presenting a complex multi-layered informational structure.

A possible agreed-upon typology of legal sources relies on the legal hierarchy authority, shown in an informal way in Table 4.5 (for comprehension reasons and not for a discrete selection of the valid sources).

Table 4.5. Classification of the Primary and Secondary Sources of Law (own elaboration)

Primary sources of law	Electronic identifier
<ul style="list-style-type: none"> · Refer to legislation: rules of law created by a governmental body, e.g. constitutions, statutes and codes; regulations (from administrative agencies) · Case-law · Contracts · These sources of primary law are binding 	<ul style="list-style-type: none"> European Legal Identifier European Case-Law Identifier
Secondary sources of law	
<ul style="list-style-type: none"> · Legal doctrine (art. 38 (c) ICJ), which concerns legal scholarly writings and materials by legal scholars that explain, interpret or comment primary sources of law, such as: articles, legal commentaries, treatises, textbooks; legal encyclopaedias, legal dictionaries, monographs · Contain persuasive authority, which means that the court is not required to follow the analysis (non-binding) · Soft law instruments, which are interpretative sources generally making open textured concepts operational (generally non-binding) 	<ul style="list-style-type: none"> European Legal Doctrine Identifier [Van Opijnen, 2012]

As a result of the Open Data movement —legally backed by the PSI-Directive¹⁰ —the fundamental legal sources of democratic society, legislation, court decisions and Parliamentary documents datasets are freely available for reuse. The interoperability of the published datasets is still improving: most of them have Uniform Resource Identifiers (URIs) and are

¹⁰ Directive 2013/37/EU, CELEX:32013L0037.

being converted in linked data. The following building blocks are quite known:

- Eurovoc thesaurus;¹¹
- IATE database;¹²
- EU authority tables;¹³
- National terminology repositories;¹⁴
- European Case Law Identifier (ECLI);¹⁵
- European Legislation Identifier (ELI);¹⁶
- Possibly a neutral identifier for secondary literature, like ELDI or LegalCiteM (a global standard for legal citations);¹⁷

Within these, ELI and ECLI are explicitly declared, corresponding to primary sources of law (Table 4.5). Most of the doctrinal works lack unique digital identifiers, and textual citations are considered hard to resolve for computers as well as for humans.

In this ontology-based modelling, both hard and soft law were used. Therefore, it was assumed a broad approach towards the sources used, considering more than explicit legal knowledge, codified in standardized ways by the legal community. A pluralistic perspective of legal sources was followed, fitting into a pragmatic approach [Casanovas, Meritzel, 2011], [Casanovas, Casellas, 2005], [Casanovas, Doncel, 2016], [Gaines, 2013]. Concepts/terms were captured from a bulk of legal material:

- (i) Primary sources of law: legislation and case-law. Judicial decisions are meant to:

*'solve a conflict that is brought forward by the parties to the conflict.
Still, the specificities of the conflict, the interpretation of the existing*

¹¹ EuroVoc is a multilingual, multidisciplinary thesaurus covering the activities of the EU. Also available in XML and SKOS/RDF.

¹² InterActive Terminology for Europe, now also available in TermBase eXchange (TBX) format.

¹³ The EU Metadata Registry: The Metadata Registry registers and maintains definition data (metadata elements, named authority lists, schemas, etc.) used by the different European Institutions involved in the legal decision making process gathered in the Interinstitutional Metadata Maintenance Committee (IMMC) and by the Publications Office of the EU in its production and dissemination process.

¹⁴ The Legivoc project, <http://legivoc.org/>.

¹⁵ Council conclusions inviting the introduction of the European Case Law Identifier (ECLI) and a minimum set of uniform metadata for case law, CELEX:52011XG0429(01).

¹⁶ Council conclusions inviting the introduction of the European Legislation Identifier (ELI), CELEX:52012XG1026(01).

¹⁷ LegalCiteM: <http://www.oasis-open.org/committees/legalcitem/>.

law or the development of new rules might take a judicial decision of interest not only to the parties involved, but also to the legal community or society as a whole” [Van Opijnen, 2013].

- (ii) Secondary sources of law: legal doctrine; and soft law instruments¹⁸ —fluidizing the soft law/hard law divide;¹⁹
- (iii) ‘*Practical legal professional knowledge*’ (PPK), such as policies (ECC Reports, NEB’s decisions), complaints, a.s.o. which is knowledge constituted by legal language, statutes and previous judgments, but also “situated knowledge” related to personal behaviour, practical rules, corporate beliefs, effect reckoning and perspective on similar cases, which remain tacit. It is knowledge that is not being captured by the current trends in legal ontology modelling [Casellas, Blázquez et al, 2005], [Benjamins, Contreras et al, 2004]. It consists in knowledge

“that goes beyond codified legal knowledge in the aforementioned forms and consists in the know-how that tells how to apply codified knowledge in concrete situation (...) this knowledge is acquired through experience rather than by formal training, it is unequally distributed among the members of the community and it is difficult to elicit.” [Fernandez-Barrera, 2011].²⁰

Nevertheless, this is part of the multilevel structure of legal sources used to build these ontologies.

The set of selected NOR are described in Table 3.1. in Chapter 3.

Further considerations and examples are expounded to motivate the reason to use (and engineer) NOR of soft law.

The term Soft law refers to:

“[r]ules of conduct that are laid down in instruments which have not been attributed legally binding force as such, but nevertheless may

¹⁸ <http://europa.eu/eu-law/decision-making/legal-acts/index'en.htm>

¹⁹ Hard law corresponds to the situation where hard obligation and hard enforcement are connected, [Terpan, 2014, p.13]

²⁰ “ *PLK is: (i) shared among members of a professional group (e.g. judges); (ii) learned and conveyed formally or most often informally in specific settings (e.g. the Judicial School, associations, courts); (iii) expressible through a mixture of natural and technical language (legalese, legal slang); (iv) non-equally distributed among the professional group; (v) non-homogeneous (on individual bases); (vi) universally comprehensible by the members of the profession (identification principle)*”, in [Benjamins, Contreras et al, 2004].

have certain —indirect— legal effects, and that are aimed at and may produce practical effects” [EU Parliament Resolution, 2007],

which have been used historically to alleviate a lack of formal law-making capacity and/or means of enforcement.

A typical characteristic of soft law (supplementing, peripheral legal material) is that is generally conceived to: illustrate, or regulate, assist in the interpretation of legal norms, particularly when the latter contain vague formulations. This form of guidance is generally expected to result in benefits with regards to efficiency and consistency in legal decision-making [Helling, 1957]. Certain elements can be referred to as *quasi-legal* norms as they are characterized by exhibiting a norm-like construction, *law-like* promises or statements [Guzman, Meyer, 2010], whilst not qualifying as legal norms (i.e. not being the result of legislative/regulatory procedures): recitals [Humphreys, Santos et al, 2015], communications, recommendations, etc.

Due to the interwovenness of secondary and primary sources, it is assumed that there is a *continuum* line [Terpan, 2014, p.13] from non-binding legal positions to legally binding ones. In practice, it may be derived from soft law instruments *legal and practical effects* [Terpan, 2014, p.13] which are being considered by the CJUE and at national level. This “soft law hardening” may convey a new form of soft governance. In particular, definitions, rights, obligations, constraints, even with soft or no enforcement, echoing from them.

To define legal bindingness, the definition of Sartor is evoked [Sartor, 2008]. Sartor defines legal bindingness as an evaluative property and a deontic one, since a norm legally binding means that there is a role (which he defines as a deontic obligation) to take this norm into account both in legal reasoning and in legal decision-making. Legal decision-making is aimed at providing solutions to single cases, solutions that may be coercively enforced upon their addressees (in case they do not spontaneously comply). Legal reasoning by officers and citizens, even outside a disputational framework, aims at establishing normative determinations that are to be implemented by the individuals concerned and, if necessary, publicly enforced.

Following Sartor’s cognition and applying it to the present work, the legal bindingness of a norm does not entail that the norm always dictates the solution of every case falling within its apparent scope. In fact, the author explains that a legally binding norm may be defeated, in particular cases, by prevailing exceptions or incompatible principles, for instance, public safety may override, under certain conditions, freedom of speech. Moreover, a legally binding norm is not to be applied to cases falling outside its temporal and spatial

application domain, for instance, cases taking place before the norm enters into force, or outside the territorial competence of the authority issuing it.

Sartor provides a twofold criterion to ascertain the legal bindingness of a norm:

(i) the merits of its present coercible application, given its current features;

(ii) recognizing that law has a social institutional dimension, legally valid norms are mainly to be found in reasonable interpretations of the outcomes of institutionalised sources: legislation, case-law, custom, and so on, identified according to *shared validity-conferring meta-rules* and, in particular, given its social-institutional history until now, including, for instance, the fact the norm was laid down by a Parliamentary deliberation, a contract, or a judicial ruling, or was endorsed and practised by certain sections of the population with legal bindingness, and must examine the role of the latter concept in legal decision-making and more generally in legal reasoning.

Regarding this last criteria, legal bindingness of a norm depends on its *current institutional-historical features* and on the relevance of these features in the present social setting, in determining what norms are legally binding. To make it more tangible, Sartor refers one has to take into account the specific context in which and for which a norm has to operate, namely, a certain political community, characterized by certain ongoing practices, certain shared expectations and evaluations, certain past decisions taken according to certain procedures, and so on. EU Communications endorsing rights or further interpretations are examples of such interpretations of the outcomes of institutionalised sources (legislation, case-law), identified according to *shared validity-conferring meta-rules*.

Sartor also mentions that certain sources of normative contents deserve acceptance in legal reasoning even if state legislation does not characterise them, either explicitly or implicitly, as legally valid. Among such sources, the author mentions commercial practices (even at the international level), customs, case-law, decisions of international bodies, and so on. A decisive criterion for assuming the validity of the norms produced by such sources (namely, the ground for endorsing a validity-conferring norm to this effect) consists of the fact that, through collective practice and enforcement, these norms work (or are likely to work) as the *shared basis of forms of coordination advancing legal values* [Sartor, 2008]. Hence, for the purposes of this thesis, the selected sources of normative contents in the ATP domain deserve acceptance in legal reasoning, even if some consist in soft law, as legally valid, through collective practice and enforcement, these norms work as the shared basis of forms of coordination advancing legal values.

In this study, the understanding of soft law comprises both legally binding and non-legally binding norms. The fact that norms have ‘legal relevance’ –which means being relevant for the purpose of legal decision-making– is sufficient to place them on the *legal* side of the norms continuum, albeit their non-binding character. Less formal sources of law still need to be referenced to provide a more complete traceability [Boella, Humphreys et al, 2014].

Some examples are referred:

*Decision of the CJEU Case C-322/88 Grimaldi*²¹: held that national courts are *bound* to take EU Recommendations from the Commission into consideration in order to decide disputes submitted to them, in particular, where they cast light on the interpretation of national measures adopted in order to implement them or where they are designed to supplement binding Community provisions.

Recitals 14 and 15 of the 261/2004 EC Regulation: enunciate events which are regarded as extraordinary circumstances and have been used by the CJEU to determine to which extent air carrier are exempted from paying compensation.

NEB’s Draft List of Extraordinary Circumstances [NEB’s Draft]: purports to provide guidance on what circumstances should and should not be considered extraordinary; this list is considered in national courts.

Document of Directorate-General for Energy and Transport [IDDG, 2008]: mentions a constraint to the right of accommodation and transportation; whenever a cancelation occurs, it has to be taken in account the practicalities faced by airlines, such as the distance from the airport to the closest available hotels, combined with the time of the replacement flight in the following day.

Communication COM(2007)168 [COM, 2007] further interprets the right to rerouting, including other means of transport, such as train, taxi or bus if, the distance to be covered is appropriate for such transport modes.

In brief, it is assumed that soft law norms:

²¹ Case C-322/88 *Grimaldi* [1989] ECR 4407, paragraph 18. In Community law, a *Recommendation* is a legal instrument that enables the Commission to establish non-binding rules for the Member States or, in certain cases, Union citizens. Article 211 of the EC Treaty provides that “[i]n order to ensure the proper functioning and development of the common market, the Commission shall formulate recommendations (...).

- Can be used by courts and decision makers to interpret and complement hard law, which exert influence on legal actors, without resorting to judicial coercion.
- May have a practical impact as a hard law norm.
- Are used when no hard law is available (art. 38 ICJ c)).

Relevant sources evoked by consumer-based organizations and the airline industry are listed in Table 4.6.

Table 3.6. Some relevant sources in the ATP domain

<i>Type of Norms</i>	<i>Binding nature</i>	<i>Sources</i>
<i>Norms: Hard Law</i>	Binding	. Legislation: Regulation 261/2004/EC, Montreal Convention 1999 . Case Law . Contractual terms
<i>Norms:</i>	Binding norms with a soft dimension	. EU Commission acts . Policies: IATA and ICAO Glossaries, IATA Reports, IATA General Conditions of Carriage . BEUC positions; European Consumer Centres Network (ECC-Net) Reports, NEB's Draft list of Extraordinary Circumstances . EU complaint-form
<i>Non Legal Norms/ Documents</i>	Non-Binding (generally evoked)	. Reports, Surveys, Statistics, Datasets . Eurocontrol Reports . Eurobarometer Surveys . European Low Fares Airline Association (ELFAA) statistics . Dataset consumer complaints from the CCA

Fig. 4.3 represents the hierarchy of the information resources.

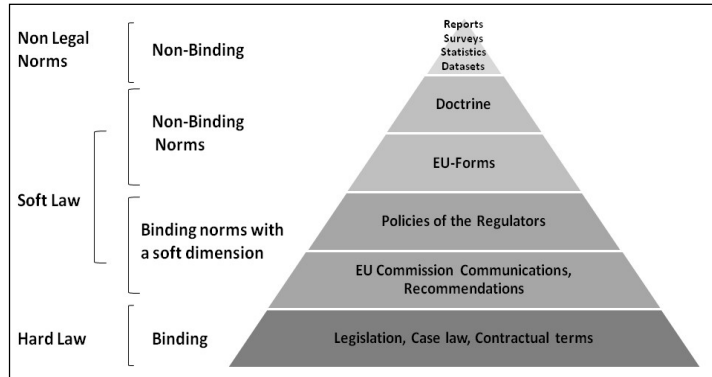


Fig.4.3 Hierarchy of the information resources (own elaboration)

Common resources in the ATP domain are herewith described: glossaries, dictionaries, classification schemes, taxonomies, lexicons (Fig. 4.4).

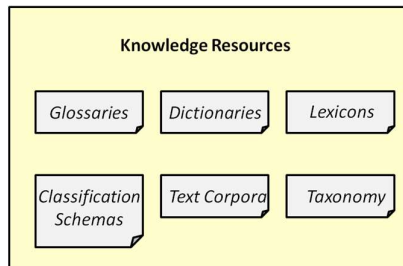


Fig. 4.4. Knowledge Resources

Table 4.7. Knowledge resources selected

Types of NOR	Definition and examples
Glossary	<i>Terminological dictionary that contains designations and definitions from one or more specific subject fields. The vocabulary may be monolingual, bilingual or multilingual. (ISO 1087:2000). IATA and ICAO institutional glossaries are used</i>
Classification scheme	<i>Descriptive information for an arrangement or division of objects into groups based on characteristics the objects have in common (ISO 2004) The EU Complaint Form, the ECC Network Reports, and the Interpretative Guidelines Documents from the EU Commission (C (2016) 3502 final) furnished the current classification of incidents in the ATP domain. The methodology for classifying consumer complaints from the EU Commission informed the typology in the ATP domain</i>
Dictionary	<i>A dictionary is a structured collection of lexical units with linguistic information about each of them (ISO 1087:1990) (IATA Terminological dictionary).</i>
Taxonomy	<i>Taxonomy is the simplest variant of controlled vocabularies as it contains only terms that are organized into a hierarchical structure. The List of Extraordinary Circumstances by the NEBS is a taxonomic example</i>
Text Corpora	<i>The dataset of complaints in the ATP domain, containing free text. Texts are among the strongest data available to acquire knowledge</i>

The user-context confines both the elicitation and the knowledge acquisition tasks both for RIC and RIC-ATPI ontologies. The types of expert-consultant documents identified as elicited sources for the knowledge acquisition, gather a correspondence and a “semantic deepness” between the use of the terminology in current practice, and an ecologically valid ontology.

The purposive criteria to elicit and assess NOR were 2, even if *a priori* interconnected: relevance dimensions and consensus and coverage, provided below. For each of the resource and whenever possible, both the purpose and the components stemmed thereof are made explicit.

- *Domain Relevance* (“*domain relevance or legal authority, legal importance*”), as construed in the former Section, is two-folded, requesting the most important domain documents, within the specific legal domain, which the “legal crowd” [Van Opijnen, 2013] considers relevant (even at the level of subdocument, the specific content). The most authoritative resources within the ATP domain, as illustrated in Table 3.1, are:
 - *Legislation*, such as the EU Regulations and Directives in the domain;

- *Case law* from the CJEU. In order to ascertain the most important case-law pertinent to the domain, the consulting list furnished by the European Commission suffice²² [CJEU Judgements];
- *EU Commission Interpretative Communications and Recommendations* are policy documents serving the purpose of providing legal certainty; *EU Commission* indications facilitate a more homogenous application of the EU Regulation 261/2004/EC, but lack on mandatory authority or bindingness; these guidelines are intended to tackle the issues most frequently raised by national enforcement bodies, passengers and their associations, the European Parliament and industry representatives;
- *Expert studies in the ATP domain*, commissioned by the EU Commission: studies on the application, evaluation and revision of the 261/2004/EC, and the Eurobarometer studies (the EU Commission, commissioned studies on the ATP domain, thus helping the preparation of texts, decision-making).
- *Cognitive Relevance*: the resources convening the users' cognitive and informational needs are mostly depicted in sources of the domain, such as the:
 - Dataset of consumer complaints from the Consumer Catalan Agency (CCA). It was collected an extensive data of a more than 20000 complaints, thus gaining insights into its topological and clustered structure;
 - European Consumer Centres Network (ECC-Net) Reports. The ECC-Net is co-financed by the EU Commission Directorate-General for Justice and Consumers (JUST) and by each of the participating states. This network provides consumers with information on their rights under European consumer legislation, and by giving them advice on, and assistance with the resolution of their cross border complaints and disputes. The network provides important feedback and statistics to national consumer agencies, national authorities, the European Commission and other stakeholders on potential problem areas which may require enforcement;
 - The European Consumer Organisation (BEUC). BEUC represents its members and defends the interests of consumers.

²² <http://ec.europa.eu/transport/themes/passengers/air/european'case'law'en.htm>

- *Situational Relevance*: the resources unfolding the user's problems/incidents or legal cases are mostly reported in case-law, in the dataset of consumer complaints, and in the European Consumer Centres Network (ECC-Net) Reports.
- *Consensus and Coverage*: consensus is a subjective and not quantifiable criterion. However, the reused resources contain terminology already consensuated by the ATP community (therefore the effort and time spent in finding out precise labels for the ontology terms decreased). NOR were searched from highly reliable domain-related sites of organizations embodying domain knowledge. Besides Eur-lex (where legislation and case-law were retrieved), the EU Commission website on air passenger's rights depicted the appointed documents. In addition, identified resources of the domain institutions were selected from:
 - a) National Enforcement Bodies (NEB's);
 - b) International Air Transport Association (IATA). IATA is a trade association representing and serving the airline industry worldwide.
 - c) International Civil Aviation Organization (ICAO). ICAO is a UN specialized agency trying to reach consensus on international civil aviation Standards and Recommended Practices (SARPs).
 - d) Eurocontrol. Eurocontrol is the European Organisation for the Safety of Air Navigation; is an international organisation working to achieve safe and seamless air traffic management across Europe, and committed to building a Single European Sky.
 - e) European Low Fares Airline Association (ELFAA). ELFAA represents the interests of the low-fare airlines in Europe.

The terms and conditions of 10 air carriers have been verified. To assemble a comprehensive representation of the ten's largest companies, the following criteria were followed: number of passengers carried, revenue, number of passenger-kilometres flown.²³ Analysis was made to their current general terms and conditions of carriage (passenger and baggage), their procedures, workflow and their required web-forms alike.

²³ American Airlines, Air France, Delta Airlines, Lufthansa, Ryan Air, Air China, amongst others, in http://en.wikipedia.org/wiki/World's_largest_airlines

3.1.3 Non-Ontological Resource Reengineering Process

This process aims to transform a non-ontological resource into an ontology. Domain expert conceptual knowledge, which have supported the modelling decisions, was manually harvested by extracting legal knowledge (concepts, terms) from the most relevant legal/normative sources, in order to develop a representation of the resource, such a conceptual structure (e.g. a taxonomy) or instance data for the selected ontology (Fig. 4.5 and 4.6).

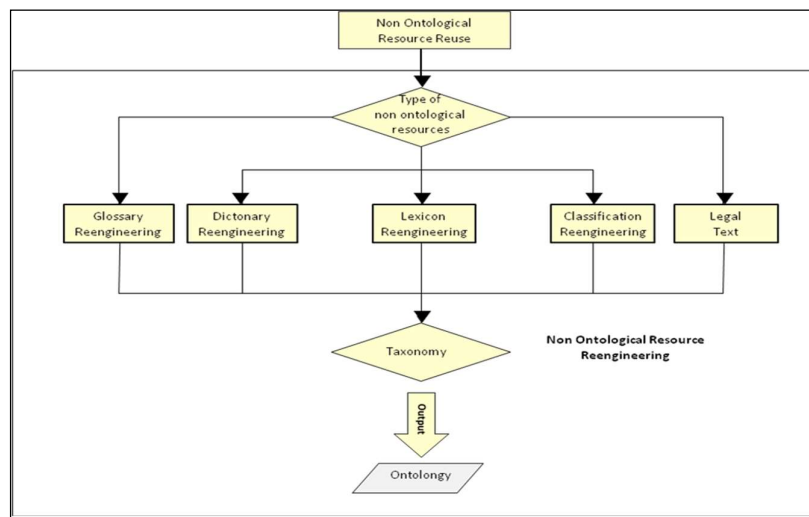


Fig. 4.5 Non Ontological Reuse and Reengineering approach, adapted from NeOn Methodology

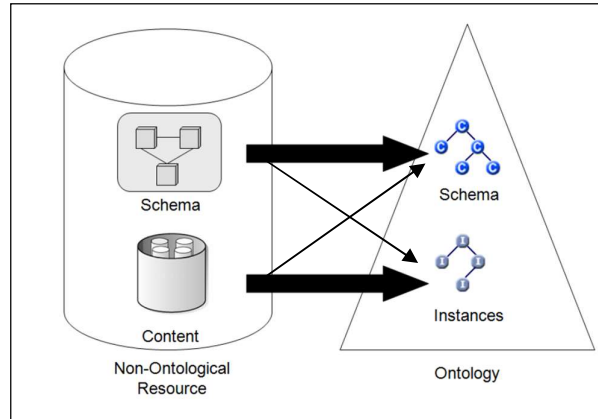


Fig. 4.6 Non-ontological Resource Reengineering. Reproduced from [Villazon-Terrazas, 2012]

Classification scheme examples:

Example 1: The alignment if the incident-based taxonomy conformed the common framework of the Recommendation of the European Commission on the use of a harmonised methodology for classifying consumer complaints [Recommendation, 2010]. This Recommendation identifies 12 types of complaints related to goods and services (see Fig. 2.4 and 2.5 located in chapter 3, indicating types of complaints). Analysing the type of complaints, most of its types and sub-types were adapted.

Example 2: The EU Complaint form from the EU is useful to extract domain incidents (Fig. 4.7).



	AIR PASSENGER RIGHTS EU COMPLAINT FORM	
Please carefully read these definitions, and indicate with a cross [X] that which applies to this complaint.		
<input type="checkbox"/> 'Long delay' means when a flight does not depart until after the scheduled departure time by: <ul style="list-style-type: none"> i) two or more hours, for flights of up to 1500 km; ii) three or more hours for intra-EU flights of 1,500 km and longer, or for other flights between 1501 and 3000 km; iii) four or more hours, for all other flights. 		
<input type="checkbox"/> 'Cancellation' means the non-operation of a flight that was previously planned.		
<input type="checkbox"/> 'Denied boarding' means a refusal by the airline to carry a passenger on a flight on which they hold a confirmed reservation and where have presented themselves for check-in and at the boarding gate not later than the time advised by the airline, tour operator or travel agent (if no time was indicated, not later than 45 minutes before the scheduled departure time). This does not include situations where the airline or its agent has reasonable grounds to deny passengers boarding, such as reasons of health, safety, and/or security, or in cases of inadequate travel documentation.		
<input type="checkbox"/> 'Downgrading' means the passenger involuntarily travelled in a class of service lower than the class of service for which they had a confirmed reservation.		
Did the passenger(s) hold a confirmed reservation on the flight concerned?		

Fig. 4.7 Air Passenger Rights EU Complaint form. Taken from the official EU documents.

Example 3: Extraction of provisions-types from the EU Regulation 261/2004. Provision-types are identified in the text of the law, in Fig. 4.8

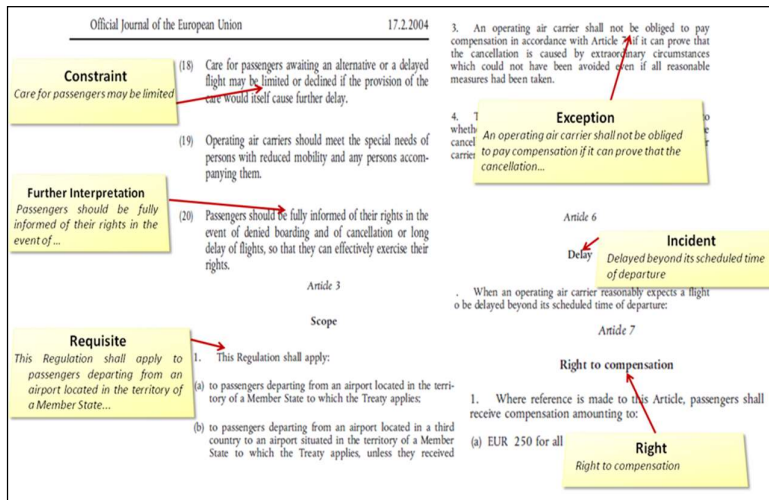


Fig. 4.8. Extraction of provisions-types from the EU Reg. 261/2004.

3.1.4 Ontological Resource Reuse and Reengineering Process

This scenario unfolds in those cases in which available ontological resources are considered useful for reuse in the ontology development.

Ontologies developed by reuse can also build on existing good practices (from well-developed ontologies), thus increasing the overall quality of the results. The importance of grounding legal domain ontologies in core ontologies in order to obtain ontological quality is referenced in ontology engineering literature [Guizzardi, 2005], [Uchold, Gruninger, 1996]. The specific activities are described within this process: ontology search, ontology assessment, ontology comparison, and ontology selection.

Ontological resources have been consulted rendering various functions for adapting and standardizing the ontologies to support knowledge acquisition and reuse by humans and machines. Candidate ontological resources were searched and assessed concerning its content and granularity in order to find out if such resources satisfy the requirements needs. The selected ones were LKIF, LCO, CCO, well agreed upon amongst the legal ontology community. Comparison between the resources is fulfilled taking in account a set of criteria: existing ontology documentation and the ontology requirements identified in the ORSD. After selecting the most appropriate ontological resources, it follows the definition of the reuse mode; there are three possible modes:

- (i) the ontological resources selected will be reused as they are;
- (ii) the ontology reengineering activity should be carried out with the ontological resources selected;
- (iii) some ontological resources will be merged into the new ontological resource. The latter mode was endeavoured. The referenced ontologies used in the thesis were LKIF-core and CLO, as shown in Table 4.8.

Table 4.8. Concepts used in RIC ontology

<i>Ontology name and concept label</i>	<i>Definitions</i>
CLO:Right	A legal position by which an Agent is entitled to obtain something from another Agent, under specified circumstances, through an enforcement uttered either in a Law, Contract, etc.
LKIF:Exception	Is something that is excluded from a general statement or does not follow a rule
LKIF:Legal Source	Any fact that embeds normative propositions and makes them legally valid by virtue of such an embedment

3.1.5 Knowledge Specifications

[Visser, 1998] recalls knowledge specifications criteria which are assessed within the ontology pre-development phase:

- *Knowledge Selection*. The selection of the knowledge features abided the model of LP and DK and relevance dimensions. The LP comprises legal provision types; DK covers the knowledge convened in the cases in the ATP domain, in the form of complaints and disputes.
- *Structuring*. Knowledge is structured according to the problem-solving tasks that are to be supported by the ontologies. Both ontologies have information-retrieval purposes, as to retrieve the relevant information in a domain context.
- *Knowledge Compiling*. The KB encloses different kinds of knowledge that are not specified separately, but compiled in the ontologies; it therefore contains compilations of knowledge within them. These knowledge differs not only with respect to:
 - its nature: empirical (deriving from complaint-datasets, in particular for the case ontology) and normative (as for the RIC);
 - the sources it is derived from hard and soft law.

Knowledge compilations are contained in specifications for two reasons. Expert knowledge is characterized by inaccessibility and incompleteness (problem known as the knowledge "acquisition bottleneck" [Breuker, Wielinga, 1997]. Knowledge from domain experts is mostly available in compiled form. [Bench-Capon, 1989] remarks:

'The knowledge elicited from an expert in the legal domain is not simply a matter of empirical associations. Rather a good deal of the relevant knowledge will be the understanding of the law that the expert has derived from his reading of the legislation and his consideration of case law. It is the marshalling of this diverse material into a form where he can apply it to a case that corresponds to the development of empirical associations in the diagnostic domains'. If knowledge can only be obtained from an expert in a compiled form, then knowledge compilations are hence inevitable [Gruber, 1995].

The normative sources are multiple and heterogeneous. Integration and KA from multiple and heterogeneous normative sources was fulfilled

through the *Legal Provisions* (LP) schema: explicating the knowledge embedded in the different documents.

Explicit Knowledge acquisition [Musen, 1993] relied on the extraction of terminological knowledge from legislation [Hoekstra, Breuker et al, 2007] and other source-documents. As a means of illustration, I extracted manually the incidents (delayed, denied, cancelled flights) from the EU Regulation 261/2004 EC, which explicitly qualifies the category of incidents the legislation is concerned about through its normative lexical relationships:

Implicit knowledge, on the other hand, is required in order to bring meaning to explicit knowledge [Visser, 1998], through constitutive rules. Constitutive rules (which assign a juridical profile to entities of a regulated reality, i.e. create institutional concepts by determining typically both conditions of subsistence and institutional consequences of a given institutional element) [Rotolo, Roversi, 2013] [Rawls, 1955] bridge the explicit and implicit knowledge [Mommers, 1998].

For instance, article 5 of Regulation EC 261/2004, headed “Cancellation”, provides that an operating air carrier shall not be obliged to pay compensation if it can prove that the cancellation is caused by extraordinary circumstances (EC) which could not have been avoided even if all reasonable measures had been taken. The term “extraordinary circumstances” is not defined in any of the articles of the Regulation (not even in Article 2 which is devoted to “definitions”). In order to produce the answer regarding what are EC, it requires looking for available knowledge that is not written in these normative provisions. However, (E1) recitals 14 and 15 of the Regulation give a few examples, by way of illustration, of events which may be regarded as extraordinary circumstances, namely cases of political instability, meteorological conditions incompatible with the operation of the flight concerned, security risks, unexpected flight safety shortcomings and strikes which affect the operation of an operating air carrier. These cases have been used by the Court to determine to which extent the air carrier is exempted from paying compensation²⁴, and again the implicit knowledge acquisition is derived now from Case law (C1), which says EC are:

“events which, owing to its nature or origin, is not inherent to the normal exercise of the activity of the air carrier, that could not have been avoided, even if all reasonable measures had been taken, namely circumstances which are beyond the air carrier’s actual control”, C-

²⁴ Case C-549/07 Wallentin-Hermann (2012) ECR I-11061, Paragraphs 16, 18 and 20,21, 22; and C-294/10 Eglitis and Ratnieks C-294/10 (2011) , [6, p.17].

549/07 (Friederike Wallentin-Hermann vs. Alitalia Linee Aeree Italiane SpA).

The air carrier must establish that:

“even if it had deployed all its resources in terms of staff or equipment and the financial means at its disposal, it would clearly not have been able - unless it had made intolerable sacrifices in the light of the capacities of its undertaking at the relevant time —to prevent the extraordinary circumstances” C-549/07.

Hence, now the explicit knowledge of what is an EC is consubstantiated by E1 and C1, which demonstrates the relationships between knowledge acquisition and constitutive rules (Fig. 4.9).

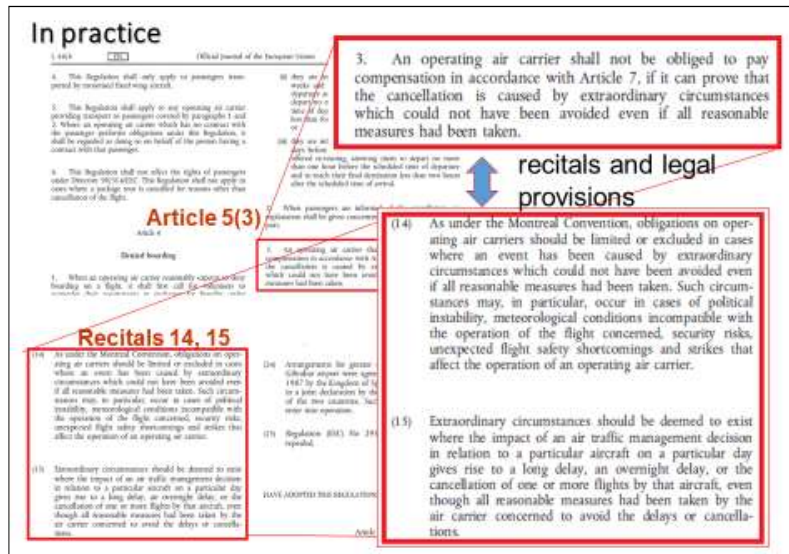


Fig. 4.9. Knowledge specification example (own elaboration).

From this analysis, it can be asserted that an *ex ante* legal cognition is an important requirement for knowledge acquisition; hence in this thesis I opted to build the legal ontology manually, even if even if this is not in line with the claims of Hepp concerning the ‘resource consumption bottleneck’ [Hepp, 2007].

It is legitimate at this point to question how to trade off accuracy with the costs of developing such a system manually, if it relies on the costly labour intensive task of annotating legal corpora, and its interpretation is

subjective. The approach taken is more cautious, taking into account the strict demand for accuracy from the legal sector, encouraging the expert user to couple between the relevant legal knowledge and its sources.

3.2 Conceptualization of RIC and RIC-ATPI Ontologies

The ontologies' conceptualization activity implies the organization and conversion of the informally perceived knowledge of the domain, obtained during the acquisition process, into a description of formal components.

A number of mechanisms are used in order to enrich the concepts and the object properties in order to make the domain knowledge explicit²⁵ in both ontologies and in the CDP pattern. For the purposes of clarity of the reader, the definition of the constructs is held herewith:

(1) *Class Restrictions*:

- (i) *Class Disjointness*. It guarantees that an individual that is a member of one class cannot simultaneously be an instance of a specified other class. The disjointness of a set of classes are expressed using the owl:disjointWith constructor;
- (ii) *Class Equivalence*. The constructor owl:equivalentClass is used to indicate that two classes may be stated to be equivalent. Hence, it indicates that two classes have precisely the same instances. In both presented ontologies there are no equivalent classes;
- (iii) *Class Hierarchy*. It is a taxonomic constructor for classes; it is expressed using rdfs:subClassOf. It relates a more specific class to a more general class. If X is a subclass of Y, then every instance of X is also an instance of Y. The rdfs:subClassOf relation is transitive. If X is a subclass of Y and Y a subclass of Z then X is a subclass of Z;

(2) *Object Property Restrictions*. Properties permit to assert general facts about the members of classes and specific facts about individuals. OWL distinguishes between the following main categories of properties that an ontology builder may want to define:

- (i) *Object Properties*: properties linking individuals to individuals, e.g. :hasLegalSource;

²⁵ <https://www.w3.org/TR/owl-ref/>

- (ii) *Datatype Properties*: properties linking individuals to data values. Examples of Primitive Datatypes are: string, Boolean, decimal, float, double, duration, dateTime, time, date, etc.;
- (iii) *Domain and Range properties*: they are designated as rdfs:domain, rdfs:range; when is supplied domain and range information for object properties, classes can be inferred based on the use of the property. The domain (rdfs:domain) specifies the classes of entities to which this property is applicable. The range (rdfs:range) specifies the classes of entities (for object-properties) or the datatypes (in case of data-properties).
- (iv) *Property Restrictions*. These constructors (sometimes known as allValuesFrom and someValuesFrom) are used to constrain the range of properties with respect to a class. OWL Lite allows restrictions to be placed on how properties can be used by instances of a class:
 - *Existential Quantification*: defines a class as the set of all individuals that are connected via a particular property to another individual which is an instance of a certain class. Natural language indicators for the usage of existential quantification are words like *at least some*, or *one* : someValuesFrom;
 - *Universal Quantification*: is used to describe a class of individuals for which *all* related individuals must be instances of a given class, e.g. allValuesFrom;
- (v) *Cardinality Restrictions*. One might want to specify the number of individuals involved in the restriction, by constructing the classes depending on a specific number. This permits the user to indicate "at least one", "no more than one", and "exactly one":
 - *maxCardinality*: Cardinality is stated on a property with respect to a particular class. If a maxCardinality of 1 is stated on a property with respect to a class, then any instance of that class will be related to at most one individual by that property (at most);
 - *minCardinality*: Cardinality is stated on a property with respect to a particular class. If a minCardinality of 1 is stated on a property with respect to a class, then any instance of that class will be related to at least one individual by that property. This restriction is another way of saying that the property is required to have a value for all instances of the class (at least);

- *exactCardinality*: Cardinality is provided as a convenience when is useful to state that a property on a class has both minCardinality 0 and maxCardinality 0 or both minCardinality 1 and maxCardinality 1 (exactly);
- (iv) *Property Characteristics*: In OWL it is possible to identify property characteristics, which provide a mechanism for enhanced reasoning about a property. The following identifiers can be used to provide information concerning properties and their values:
- *InverseOf*: When one property may be stated to be the inverse of another property;
 - *SymmetricObjectProperty*: when a property and its inverse coincide, or in other words, the direction of a property doesn't matter. For instance the property hasSpouse relates A with B exactly if it relates B with A;
 - *AsymmetricObjectProperty*: a property and its inverse do not coincide: if it connects A with B it never connects B with A;
 - *DisjointObjectProperties*: two properties are disjoint if there are no two individuals that are interlinked by both properties;
 - *ReflexiveObjectProperty*: such a property relates everything to itself. For the following example, note that everybody has himself as a relative;
 - *IrreflexiveObjectProperty*: no individual can be related to itself by such a role. A typical example is the following which simply states that nobody can be his own parent;
 - *FunctionalProperty*: Properties may be stated to have a unique value. If a property is a functionalProperty, then it has no more than one value for each individual. Consider the hasHusband property. As every person can have only one husband, every individual can be linked by the hasHusband property to, at most, one other individual;
 - *InverseFunctionalProperty* (or unambiguous): it states that there can be no more than one value for each individual. If there would be a statement that Mary's husband is James and another that Mary's husband is Jim, it could be inferred that Jim and James must refer to the same individual;
 - *TransitiveProperty*: Properties may be stated to be transitive. A transitive property interlinks two individuals A and C whenever it interlinks A with B and B with C for some individual B;

(3) *Annotating Entities* with Labels *and* Comments *and* SeeAlso. Labels and comments in natural language provide a sounder and understandable perception of its contents; they do not contribute to the “logical” knowledge specified in the ontology. Currently, the Semantic Web community is evaluating solutions for the generation of (close-to) natural language from RDF and OWL, as the provision of such technologies is deemed to be central to improve the usage of Semantic Web technologies by non-experts. Their description follows:

- (i) `rdfs:label` entry provides an optional human readable name, or a title for an entity. Presentation tools can make use of it. A label is like a comment and contributes nothing to the logical interpretation of an ontology;
- (ii) `rdfs:comment` entry provides the needed capability to annotate or describe an entity;
- (iii) `rdfs:seeAlso` entry relates a resource to another resource that might provide additional information about the subject resource.

All these summarized mechanisms are adapted from W3C Recommendations and their application to RIC and RIC-ATPI is described in both ontologies in the following sections and separately.

A Glossary of Terms (GT) was built and includes the concepts and terms of the domain, their natural language descriptions, their legal source definition and identification of the legal source (Table 4.9).

Table 4.9. Excerpt of the Glossary of Terms

<i>Term</i>	<i>Definition by legal source</i>	<i>Link to normative/ legal source</i>
Booking= Reservation	Action of reserving space on a flight for a passenger, e.g., inventory space or physical seat. See “Reservation”.	IATA PADIS 07.1
Reservation= booking	Means the fact that the passenger has a ticket, or other proof, which indicates that the reservation has been accepted and registered by the air carrier or tour operator, Article 2(g) 261/2004	Article 2(g) Reg. 261/2004/EC
Air carrier	Means an air carrier that performs or intends to perform a flight under a contract with a passenger or on behalf of another person, legal or natural, having a contract with that passenger, Article 2(b) Reg. 261/2004/EC; air carrier’ shall mean an air transport undertaking with a valid operating licence, 2(1)(b) Regulation (EC) No 889/2002	Article 2(b) Reg. 261/2004; 2(1)(b) Regulation (EC) No 889/2002
Final destination	Means the destination on the ticket presented at the check-in counter or, in the case of directly connecting flights, the destination of the last flight; alternative connecting flights available shall not be taken into account if the original planned arrival time is respected, Article 2 (h) Regulation 261/2004. “The ultimate stopping place according to the contract of carriage”, IATA PSCRM RP 1008. “The ultimate stopping place of the journey as shown on the ticket, IATA Tariff Reso 012.	Article 2(h) Reg. 261/2004/EC; IATA PSCRM RP 1008; IATA Tariff Reso 012.

3.3 Description of the RIC Ontology

The Relevant Legal Information for Consumer Disputes ontology (RIC) represents relevant legal information in a domain-neutral manner, hence, able for reuse in other domains (telecommunications, banking, utilities, etc.).

It includes nine concepts describing the Rights emerged whenever an Incident occurs. Rights are depicted in a LegalSource. The entitlement of Rights depends on some Requisite. The scope of the Rights may encompass relevant information, such as: Exception, Constraint, EnforcementProcedure and FurtherInterpretation, each of them referring to a specific LegalSource, respectively. Fig. 4.10 depicts the key elements in the RIC ontology.

It includes six object properties: isTriggeredBy, hasRequisite, subjectTo, hasEnforcementProcedure, hasLegalSource and isReportedIn.

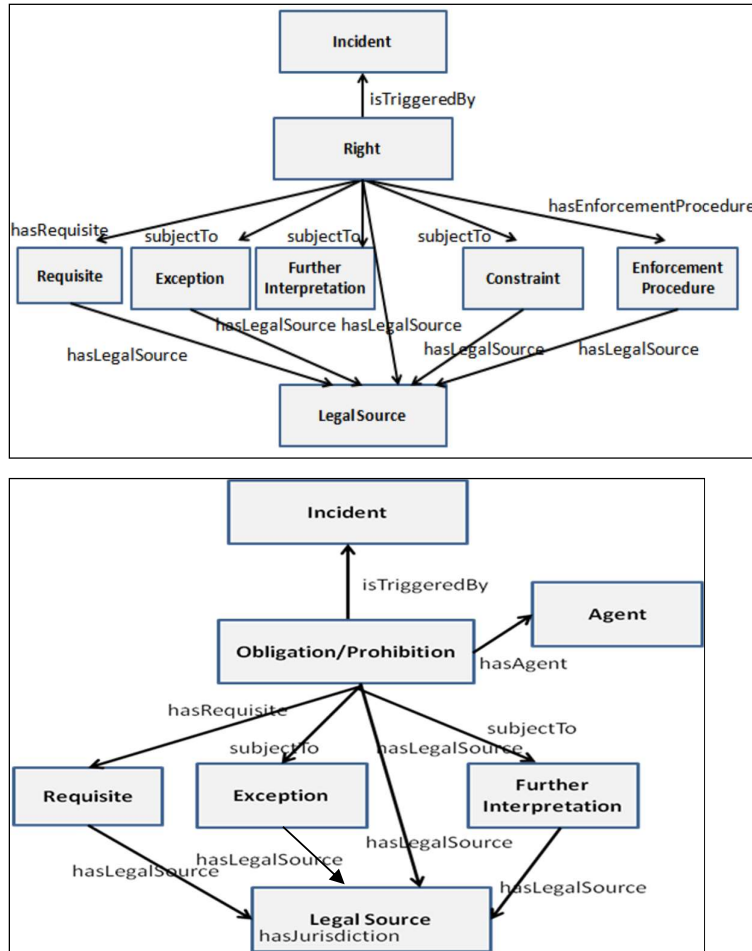


Fig. 4.10. RIC ontology. Arrows denote object properties, domain and range

Both class and object-property restrictions of RIC ontology are analysed below. A description for each of these entities follows, using the standard description logic notation to express the main axioms in the ontology. Formal axioms are logical expressions used to specify constraints in the ontology. Hereby, the identification of the formal axioms needed in the ontology and its description are demonstrated below, specifying the following information: name, natural language description, the logical expression that formally describes the axiom using first order logic, the concepts, and relations to which the axiom refers, and the variables used.

Class restrictions are shown in Table 4.10. All classes of RIC ontology are disjoint. There are no equivalent classes, nor any subClassOf. Class Property Restrictions are shown in Table 4.11.

- Incident. Incident is an event which is a “*certain useful and relevant patterns of world changes*” [Fani, Bagheri, 2015]. Incidents are described in complaints. Incidents trigger redress.

An Incident triggers 0 or more Right, Obligation, Prohibition, hence no axioms were added.

- Right. Right is the principal class of RIC ontology. Its definition has been taken from that in CLO: “*A legal position by which an Agent is entitled to obtain something from another Agent, under specified circumstances, through an enforcement uttered either in a Law, Contract, etc.*”;

A Right has, at least, one Requisite, has, at least, one Legal Source, and may have or not Exceptions, FurtherInterpretation, EnforcementProcedure, or Constraint;

$$\text{Right} \sqsubseteq \exists \text{hasRequisite.Requisite} \sqcap \exists \text{hasLegalSource.LegalSource}$$

- Obligation. The definition of this concept is imported from Sartor [Sartor, 2004].²⁶

“The proposition expressing the obligation to perform a certain action is true whenever optimal practical cognition would lead one to have the intention of accomplishing that action”;

An Obligation has, at least, one Requisite, has, at least, one LegalSource, is triggered by, at least one Incident.

²⁶ Article 3 (2) (a) EC Regulation 261/2004) enunciates a prohibition: “Passengers must have a confirmed reservation on the flight concerned; Passengers must be present on time for check-in at the time indicated in the electronic panel or in the ticket, or if no time is indicated—not later THEN 45 min before the published departure time; When passengers have been through-checked, they have an obligation to arrive at the gate on time for boarding”. This applies to both departing and connecting passengers.

An Obligation may have or not one Exception, may have or not one FurtherInterpretation, may have or not one EnforcementProcedure, may have or not one Constraint:

Obligation \sqsubseteq \exists hasRequisite.Requisite, \sqcap \exists hasLegalSource.LegalSource, \sqsubseteq \exists triggeredBy.Incident

- Prohibition. A legal restriction against the use of something or against certain conduct, described in a legal norm.²⁷

A Prohibition has, at least, one Requisite, has, at least, one Legal Source. A Prohibition may have or not one Exception, may have or not one Further Interpretation, may have or not one EnforcementProcedure, may have or not one Constraint:

Prohibition \sqsubseteq \exists hasRequisite.Requisite, \sqcap \exists hasLegalSource.LegalSource, \sqsubseteq \exists triggeredBy.Incident

- Exception. Means the exclusion of the entitlement of a right conceived by a legal norm. An exception “*is something that is excluded from a general statement or does not follow a rule*” according to the Ontology of Basic Legal Concepts [Estrella Project];

An Exception has, at least, one LegalSource.

Exception \sqsubseteq \exists hasLegalSource.LegalSource

- Constraint. Is a statement that comports a limitation or a restriction to the exercise of a legal right conveyed by hard or soft law;

A Constraint has at least one LegalSource.

Constraint \sqsubseteq \exists hasLegalSource.LegalSource

- Requisite. Consists in a legal requirement bound to the entitlement of rights; it can be related to the scope of a legislation (territorial or geographical scope; or material scope).

A Requisite has at least one LegalSource,

Requisite \sqsubseteq \exists hasLegalSource.LegalSource

²⁷ In RIC-ATPI ontology prohibitions were not instantiated, as they were not found within this ATP domain. As RIC ontology is intended to be used and extended to other domains, both Obligations and Prohibitions were considered.

- EnforcementProcedure. It is vested in procedures to enforce the legal rights, such as handling complaint and legal action procedures. Enforcement within consumer policy is defined as

“encompassing a spectrum of activities undertaken by a variety of actors, using different instruments, to ensure that consumer rights are respected (...) These include formal enforcement proceedings, primarily undertaken by public enforcement authorities, but also consumers acting to defend their own rights through private enforcement or other dispute-resolution mechanisms. An effective enforcement response combines activities which promote compliance through information of consumers and businesses, with more formal enforcement measures”, [COM, Consumer acquis, 2009];

An EnforcementProcedure has at least one LegalSource.

EnforcementProcedure \sqsubseteq \exists hasLegalSource.Legal Source

- LegalSource. Is defined as the legal base of

“[a]ny fact that embeds normative propositions and makes them legally valid by virtue of such an embedment” [Sartor, 2006].

According to the ontology of basic concepts of law, a legal source is a source for legal statements, both norms and legal expressions;

- FurtherInterpretation. The concept conceived as providing additional relevant information related to the right, obligation or prohibition. The wording of a legislative definition is generally usually insufficient to enable a full characterization/understanding of the concepts and a further interpretation or resort is important to consider. Any understanding of a legal source/concept presupposes an interpretation [Bing, 1976, p.269]. Laws tend to be defined by statute, but are often re-elaborated via scholarly or judicial legal interpretation.

Legal interpretation is a necessary part of the legal process, and established interpretation methodologies can modify or extend legal rules. Liebwald states that civil law countries often refer to Savigny’s canons of interpretation:

(i) *grammatical*: a literal reading of the norm itself;

(ii) *systematic*: taking into account the domain or legal system in general;

(iii) *historical*: based on the purpose of the norm as revealed in the preamble or preliminary discussions; and

(iv) *teleological*: based on the ‘independent will of the norm’ or the will of the interpreter;

Similar canons of interpretation exist in the Common Law tradition:

(i) *plain meaning rule* (which corresponds to the grammatical rule above);

(ii) *mischief rule* (corresponding to the historical rule);

(iii) *golden rule* where a word's usual meaning can be disregarded to avoid an absurd result. There are no firm rules on when to use such canons of interpretation, which means that in practice, they are used at will to best serve the demands of justice or the discretion of the interpreter [Liebwald, 2012].

FurtherInterpretation has at least one LegalSource,

FurtherInterpretation \sqsubseteq \exists hasLegalSource.Legal Source

Object properties are described below. The semantic relationships of the model are organized according to the role of the concept of right (along with obligation and prohibition) and their related relevant information.

- *isTriggeredBy*. The property expressing the relation between an Incident and Right, Prohibition, Obligation.

Domain: $\text{Right} \cup \text{Obligation} \cup \text{Prohibition}$. Range: Incident

A Right must be triggered by at least one Incident.

The domain of the objectProperty *ric:isTriggeredBy* spans the classes Right, Obligation, Prohibition. That is to say, individuals which are attributed the property *isTriggeredBy* can be qualified as either instances of Right, instances or Obligation or instances of Prohibition. As the standard practice recommends, this was modelled in the RIC ontology using the *owl:unionOf* construct as follows:

```
<rdfs:domain>
  <owl:Class>
    <owl:unionOf rdf:parseType="Collection">
      <owl:Class rdf:about="#&ric;#Right"/>
      <owl:Class rdf:about="#&ric;#Obligation"/>
      <owl:Class rdf:about="#&ric;#Prohibition"/>
    </owl:unionOf>
  </owl:Class>
</rdfs:domain>
```

- *hasRequisite*. The property indicating that Right/Obligation and Prohibition abide to a Requisite.

Domain: $\text{Right} \cup \text{Obligation} \cup \text{Prohibition}$. Range: Requisite.

A Right must have at least one Requisite.

- *subjectTo*. The property describing a Right, Prohibition, Obligation is subject to an Exception, Constraint, FurtherInterpretation.

Domain: Right \cup Obligation \cup Prohibition. Range: Exception \cup FurtherInterpretation \cup Constraint.

- hasEnforcementProcedure. The property indicating the necessary relation between the exercise of a Right/Obligation/Prohibition and an Enforcement Procedure.

Domain: Right \cup Prohibition \cup Obligation. Range: EnforcementProcedure

- hasLegalSource. The property declaring that a LegalSource is the base of provisions.

Domain: Right \cup Obligation \cup Prohibition \cup EnforcementProcedure \cup Requisite \cup Exception \cup Constraint \cup FurtherInterpretation. Range: LegalSource.

- isReportedIn. This property links RIC ontology and the Complaint Design Pattern. This property is declaring that an Incident is reported in a cop:Complaint;

Table 4.10. Class description in RIC ontology

<i>Concept</i>	<i>subClassOf equivalentClass</i>	<i>disjointWith</i>
Incident	Event	all
Right	-	all
Legal Source	-	all
Further Interpretation	-	all
Exception	-	all
Constraint	-	all
Enforcement Procedure	-	all
Requisite	-	all
Obligation	-	all
Prohibition	-	all

The 6 object properties declared in the RIC ontology are irreflexive (e.g. domain and range never match) but this has not been explicitly reflected (e.g. using the owl:IrreflexiveProperty) as it can be immediately deduced from the domain and range specifications. Equivalently, each of the properties is disjoint

with the other properties (no two individuals can be linked by two object properties simultaneously) but this is an obvious truth given that RIC has no two object properties where domain and range match (the domain and range of each of the object properties in RIC is disjoint for each of the possible pairs of classes). None of the object properties can be considered as transitive and none of the properties is functional, as even in the case of `isTriggeredBy`, a same right can be caused by different incidents. It is declared the inverse of the properties but not reflected in the owl file to assure simplicity.

Table 4.11. Object property restrictions in RIC ontology

<i>Object Property Name</i>	<i>Domain</i>	<i>Range</i>	<i>Inverse Property</i>	<i>Characteristics</i>
has Enforcement Procedure	Right	Enforcement Procedure	is Enforcement Procedure	irreflexive disjoint
has Legal Source	Right, Exception, Further Interpretation, Constraint, Requisite	Legal Source	is Legal Source	irreflexive
has Requisite	Right	Requisite	is Requisite	irreflexive disjoint
is Triggered By	Incident	Right	triggers	irreflexive
Subject To	Right	Exception, Constraint, Further Interpretation	is Subject To	irreflexive disjoint

Regarding the encoding of “rights” in different ontologies, rights have been represented by different ontologies in a different manner. The following approaches can be revisited:

- (i) Representing specific rights as class instances of a more generic Rights class:
 - Creative Commons ontology in RDF [CC];
 - LKIF;
- (ii) Representing specific rights as OWL classes:
 - Copyright Ontology [CO];
 - ODRL Ontology;

- MPEG-21 Media Contract Ontology;
- (iii) Representing specific rights as SKOS concepts:
- Data Dictionary for Preservation Metadata [PREMIS];

Important contextual issues in relation to Consumer Dispute Resolution emphasize a rights-based approach as the most appropriate in the consumer to business context²⁸. This is the position assumed in KE, following a rights-based approach and the relevance dimension in the design of RIC and RIC-ATPI ontologies.

Neither in RIC nor in RIC-ATPI there is strong commitment to external ontologies. Mappings to other ontologies have been provided, though, using SKOS elements. In particular, the key class Incident has been said to have a close match to Event (in the Event Ontology)²⁹ and to the Activity class in the PROV-O ontology³⁰. The latter link is especially important, as it declares Incident to be like an activity in the W3C provenance ontology (which is W3C Recommendation). This enables the rich declaration of provenance for incidents (e.g. providing additional information on the agents etc.).

3.4 Description of the RIC-ATPI Ontology

RIC-ATPI ontology extends the RIC ontology, representing the entities in a specific domain of discourse, as case-descriptions: the main clustered flight disruptions that frame the ATP dispute market, as studied in chapter 3.1.3, corresponding to the Domain Knowledge model, expounded in chapter 1.4.3.

Fig. 4.11 depicts an excerpt of a class diagram of the RIC-ATPI ontology, in particular, the taxonomy of cases.

²⁸The low value of many B2C disputes; the inequality of bargaining power; and information asymmetries between consumers and businesses, exploitation of power imbalances (such as through fraudulent practices).

²⁹ <http://motools.sourceforge.net/event/event.html>

³⁰ <https://www.w3.org/TR/prov-o/>

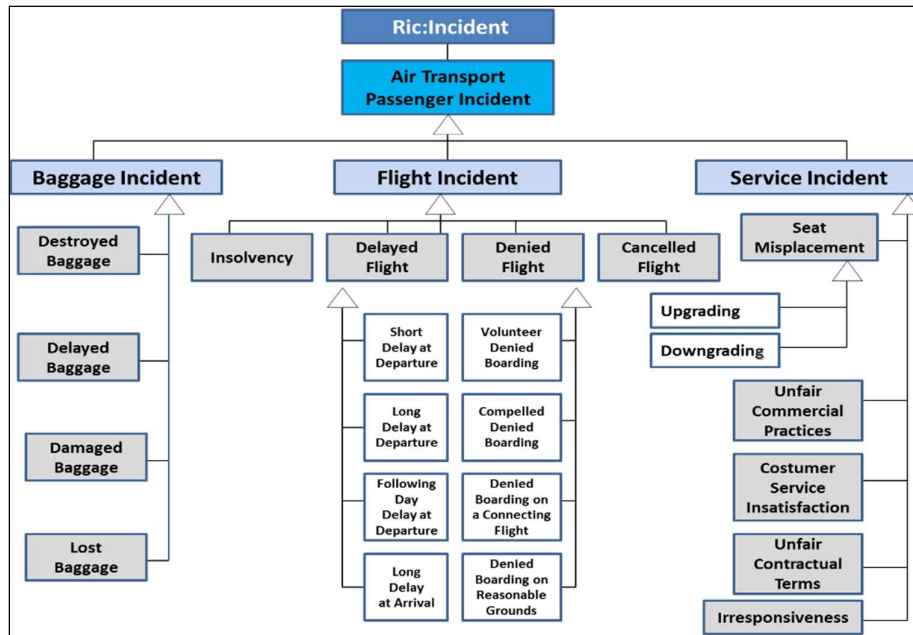


Fig. 4.11 Excerpt of a class diagram of the RIC-ATPI ontology

Both class and object property restrictions of RIC-ATPI ontology are analysed below, and depicted in Table 4.12. A description for each of these entities follows, using the standard description logic notation to express the main axioms in the ontology:

- **AirTransportPassengerIncident**. It is a subclass of **Ric:Incident**. It compounds three types of sub-incidents: **FlightIncident**, **BaggageIncident** and **ServiceIncident**. An **AirTransportPassengerIncident** can be subsumed in atomic or composite incidents (combining an interplay of more than one incident detected in the same complaint), which means is conceivable to ascertain in one complaint and dispute a combination of incidents, e.g. a **DelayedFlight** and a **DelayedBaggage**;
- **FlightIncident**. Defined as *Incident related to the provision of the flight*;
- **CancelledFlight**. Defined as *The non-operation of a flight which was previously planned and on which at least one place was reserved*;
- **DelayedFlight**. Defined as *When an operating air carrier reasonably expects a flight to be delayed beyond its scheduled time*,
 - **DelayedFlightAtArrival**. When an operating air carrier reaches their final destination three hours or more after the scheduled arrival time (originally scheduled by the air carrier);
 - **ShortDelayAtDeparture**. When an operating air carrier reasonably expects a flight to be delayed beyond its scheduled time of departure, from 2 to 5 hours;

- LongDelayAtDeparture. When an operating air carrier reasonably expects a flight to be delayed at least 5 hours;
- FollowingDayDelayatDeparture. When the reasonably expected time of departure is at least the day after the time previously announced;
- Denied Boarding. Refusal to carry passengers on a flight, although they have presented themselves for boarding;
 - VolunteerDeniedBoarding. A passenger has presented for boarding on time and responds positively to the air carrier's call for passengers to surrender the reservation in exchange for benefits;
 - CompelledDeniedBoarding. A passenger has presented himself for boarding on time and does not respond positively to the air carrier's call for passengers to surrender his reservation and hence is compelled to yield it;
 - DeniedBoardingOnAConnectingFlight. A passenger is denied boarding on a connecting flight due to the fact their previous flight was delayed and caused further delay by the airline;
 - DeniedBoardingOnReasonableGrounds. When there are reasonable grounds to deny boarding to passengers, such as reasons of health, safety or security, or inadequate travel documentation;
- Insolvency: When an air carrier has insufficient assets to meet all debts, or being unable to pay debts as and when they are due.
- BaggageIncident. Incident related to mishandled baggage, which was lost, delayed, destroyed or damaged baggage;
 - DamagedBaggage. Baggage and/or its contents subject to physical damage;
 - LostBaggage. Baggage which is irretrievably lost;
 - DelayedBaggage. Baggage which fails to arrive at the airport of destination on the same flight as the passenger but is subsequently delivered;
 - DestroyedBaggage. Baggage which became unusable;
- ServiceIncident. Incident related to the service provided.
 - SeatMisplacement. When an operating air carrier misplaces a passenger in a class different than that for which the ticket was purchased, including Downgrading and Upgrading;
 - CustomerServiceInsatisfaction. Declares the insatisfaction with the level or quality of the service provided, for example, with the booking or the ticket management (booking error; discriminatory issues; quality of food or the behaviour of some of the employees; long check-in waiting time due to the slow billing process, etc.);
 - UnfairCommercialPractices. Consist in commercial practices which are dishonest or misleading;

- **UnfairContractTerms.** Reflects a contractual term causing an imbalance to the consumer, such as the non-transferability of tickets to other passengers; “no-show” clause; non-refundable of tickets in case of force majeure of the passenger, or the application of surcharges for the use of credit cards;
- **Irresponsiveness.** Incident related to the difficulties suffered by the passengers when they aim to obtain information from the air carrier on where and how to complain and on claim redress (e.g. no phone number, no email or all telephone lines busy, no response to the complaint);

Most classes of RIC-ATPI ontology are disjoint. There are no equivalent classes. This ontology is an extension of RIC ontology and is defined as a case-taxonomy. No object properties were defined.

Table 4.12 Class description in RIC-ATPI ontology

<i>Explicit Concept</i>	<i>Sub Class of</i>	<i>Disjoint With</i>	<i>Normative Source</i>
Air Transport Passenger Incident	Incident		
Baggage Incident	Air Transport Passenger Incident	Flight Incident and Service Incident	Montreal Convention 1999
Lost Baggage	Baggage Incident	Destroyed Baggage, Damaged Baggage, Delayed Baggage	Montreal Convention 1999
Destroyed Baggage	Baggage Incident	Lost Baggage, Damaged Baggage, Delayed Baggage	Montreal Convention 1999
Damaged Baggage	Baggage Incident	Lost Baggage, Destroyed Baggage, Delayed Baggage	Montreal Convention 1999
Delayed Baggage	Baggage Incident	Lost Baggage, Destroyed Baggage, Damaged Baggage	Montreal Convention 1999
Insolvency	Flight Incident	Cancelled Flight, Delayed Flight and Denied Flight	Regulation 1346/2000/EC on insolvency proceedings, ECC Reports, EU Communication
Denied Flight	Flight Incident	Cancelled Flight, Insolvency and Delayed Flight	Regulation 261/2004/EC
Volunteer Denied Boarding	Denied Flight	Compelled Denied Boarding, Denied Boarding on a Connecting Flight,	Regulation 261/2004/EC

		Denied Boarding on Reasonable Grounds	
Compelled Denied Boarding	Denied Flight	Volunteer Denied Boarding, Denied Boarding on a Connecting Flight, Denied Boarding on Reasonable Grounds	Regulation 261/2004/EC
Denied Boarding on a Connecting Flight	Denied Flight	Volunteer Denied Boarding, Compelled Denied Boarding, Denied Boarding on Reasonable Grounds	Regulation 261/2004/EC
Denied Boarding on Reasonable Grounds	Denied Flight	Volunteer Denied Boarding, Compelled Denied Boarding, Denied Boarding on a Connecting Flight	Regulation 261/2004/EC

3.5 Ontology Population

Ontology population is a knowledge acquisition activity that, in this work, relied on a manual method to transform unstructured (e.g., corpora), semi-structured (e.g., legislation) data sources into instance data (e.g., A-Box). The relevant information is represented as class-instances of the RIC-ATPI ontology. To illustrate, an example is provided (in Fig. 4.12) of the relevant information regarding the right to meals and refreshments that applies when a flight is cancelled. It includes requisites, constraints and enforcement procedures modelled as class individuals.

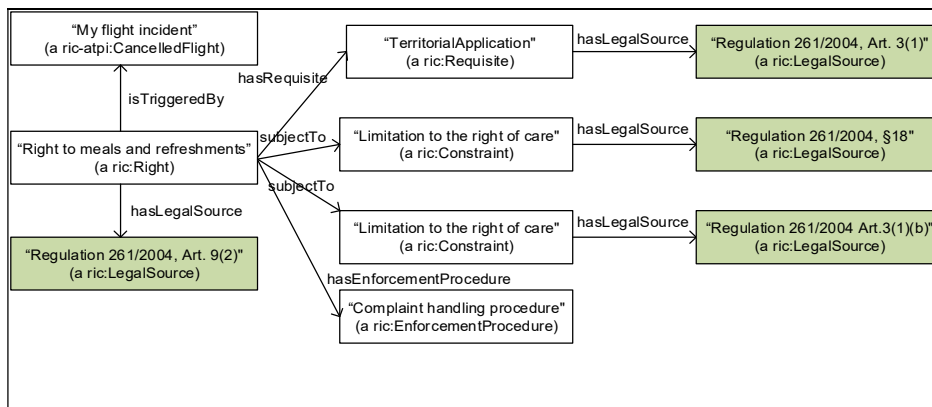


Fig. 4.12. RIC-ATPI: boxes denote classes, arrows denote object properties, with the arrow meaning domain and range.

The example provided in Fig. 4.12 is captured by the RDF below.

```
:righttomeals rdf:type ric:Right , owl:NamedIndividual ;
rdfs:label "Right to Meals and Refreshments"@en ;
rdfs:comment "Right to have free of charge meals and refreshments in a
reasonable relation to the waiting time. This right may vary according to
class of service and time of day" ;
ric:hasLegalSource :iataglossary, :regulation261art91a ;
ric:isTriggeredBy :cancelledflight ;
ric:subjectTo :territorialapplication, :careconstraint1, :careconstraint2 ;
ric:hasEnforcementProcedure :complainthandling .

:careconstraint1 rdf:type ric:Constraint , owl:NamedIndividual ;
rdfs:label "Constraint to the right of meals and refreshments if it causes
more delay"@en ;
rdfs:comment "Care for passengers awaiting an alternative or a delayed flight
may be limited or declined if the provision of the care would itself cause
further delay."@en ;
ric:hasLegalSource :regulation261rec18 .

:careconstraint2 rdf:type ric:Constraint , owl:NamedIndividual ;
rdfs:label "Constraint to the right of care if assistance already provided by
a third country airport authority"@en ;
rdfs:comment "If a third country airport authority provides assistance on a
flight incident to passengers (in the form of vouchers or accommodation), this
preclude passenger from claiming further assistance from the airline
concerned"@en ;
ric:hasLegalSource :regulation261art31b .

:territorialapplication rdf:type ric:Requisite , owl:NamedIndividual ;
rdfs:label "Territorial application requisite"@en ;
rdfs:comment "These rights only apply to worldwide airlines and passengers
when departing from an airport within EU, and also to all departing from an
airport in a third country to a destination within the EU, where the operating
air carrier is a Community air carrier (EU airline)"@en ;
ric:hasLegalSource :regulation261art31 .

:complainthandling rdf:type ric:EnforcementProcedure , owl:NamedIndividual ;
rdfs:label "Complaint handling procedure"@en ;
rdfs:comment ""To write a complaint, a standard complaint form should be
filled in and addressed against the air carrier. If the air carrier fails to
respond or if they reject the claim, a further step can be taken: lodging a
complaint to the National Enforcement Body. <a
href='http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/
eu_complaint_form_en.pdf'> Complaint form</a>; <a
href='http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_natio
nal_enforcement_bodies.pdf'>NEB address</a> ; CDPies of the proof documents
should be presented as annex to the complaint, in order to confirm the narrated
facts and sustain the redress request (CDPies of the boarding pass, expenses,
etc.)""@en ;
rdfs:seeAlso
<http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_co
mplaint_form_en.pdf> .

:CancelledFlight rdf:type owl:Class ;
rdfs:subClassOf :FlightIncident ;
rdfs:label "Cancelled Flight" ;
rdfs:comment ""The non-operation of a flight which was previously planned and
on which at least one place was reserved, Article(2)(1) (EC) Regulation
261/2004. Broader interpretation from the Court : 'cancellation' as meaning
that it does not refer exclusively to the situation in which the aeroplane in
question fails to take off at all. That concept also covers the case in which
an aeroplane took off but, for whatever reason, was subsequently forced to
return to the airport of departure where its passengers were transferred to
other flights, Aurora Sousa Rodríguez and Others v Air France SA, Judgment in
Case C-83/10, 13/10/2011"" .
```



```

:cancelledflight rdf:type :CancelledFlight , owl:NamedIndividual ;
rdfs:comment ""Means the non-operation of a flight which was previously
planned and on which at least one place was reserved, Art.(2)(1) (EC)
Regulation 261/2004. <hr> Cancellation covers the event in which an aeroplane
took off, but for whatever reason, was subsequently forced to return to the
airport of departure where its passengers were transferred to other flights,
(<a href='http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62010CJ0083:EN:HTML'>Case C-
83/10</a>).""@en ;
rdfs:label "Cancelled Flight"@en .

:regulation261rec18 rdf:type ric:LegalSource , owl:NamedIndividual ;
rdfs:comment "Care for passengers awaiting an alternative or a delayed flight
may be limited or declined if the provision of the care would itself cause
further delay" ;
rdfs:label "Regulation 261/2004, Recital 18"@en .

:regulation261art31b rdf:type ric:LegalSource , owl:NamedIndividual ;
rdfs:comment "This Regulation shall apply: (b) to passengers departing from
an airport located in a third country to an airport situated in the territory
of a Member State to which the Treaty applies, unless they received benefits
or compensation and were given assistance in that third country, if the
operating air carrier of the flight concerned is a Community carrier" ;
rdfs:label "Regulation 261/2004, Art. 3(1)b"@en .

:regulation261art31 rdf:type ric:LegalSource , owl:NamedIndividual ;
rdfs:comment "This Regulation shall apply: (a) to passengers departing from
an airport located in the territory of a Member State to which the Treaty
applies;(b) to passengers departing from an airport located in a third country
to an airport situated in the territory of a Member State to which the Treaty
applies, unless they received benefits or compensation and were given
assistance in that third country, if the operating air carrier of the flight
concerned is a Community carrier" ;
rdfs:label "Regulation 261/2004, Art. 3(1)"@en .

:regulation261art92 rdf:type ric:LegalSource , owl:NamedIndividual ;
rdfs:comment "In addition, passengers shall be offered free of charge two
telephone calls, telex or fax messages, or e-mails."@en ;
rdfs:label "Regulation 261/2004, Art. 9(2)"@en .

```

3.6 Ontology Implementation

This phase refers to the transformation of a conceptual model into a formal and computable model, according to the syntax of a formal representation language. The resulting files can be downloaded from <http://www.ricontology.com>.

RIC is an OWL DL ontology, which has been verified with the OWL-API library³¹. It does not qualify to be any of the OWL2 profiles (EL, QL, RL) due to the union of classes declared to constrain the domain of `hasLegalSource` and the range of the `subjectTo` object properties. May efficient computability be a requirement on the RIC ontology, changes would be made accordingly without much effort. Protégé was used as the ontology development environment. Both ontologies are also available online in the GitHub repositories. RIC entails the following metrics, shown in Fig. 4.13.

- There are total 63 axioms

³¹ <http://owlapi.sourceforge.net/>

- 9 classes, with 0 EquivalentClass and 0 DisjointClass axioms.
- There are 6 object properties.
- There is no data property used.
- ALCRF DL expressivity is used.

Ontology metrics:	
Metrics	
Axiom	63
Logical axiom count	13
Class count	9
Object property count	6
Data property count	0
Individual count	0
DL expressivity	ALC
Class axioms	
SubClassOf axioms count	1
EquivalentClasses axioms count	0
DisjointClasses axioms count	0
GCI count	0
Hidden GCI Count	0
Object property axioms	
SubObjectPropertyOf axioms count	0
EquivalentObjectProperties axioms count	0
InverseObjectProperties axioms count	0
DisjointObjectProperties axioms count	0
FunctionalObjectProperty axioms count	0
InverseFunctionalObjectProperty axioms count	0
TransitiveObjectProperty axioms count	0
SymmetricObjectProperty axioms count	0
AsymmetricObjectProperty axioms count	0

Fig. 4.13 RIC ontology metrics

RIC-ATPI entails the following metrics, shown in Fig. 4.14.

- There are total 937 axioms;
- 37 classes, with 27 SubClassOf, 0 EquivalentClass and DisjointClass axioms.
- There is 1 object property used.
- There is no data property used.
- ALCRF DL expressivity is used

Axiom	937
Logical axiom count	165
Class count	37
Object property count	0
Data property count	0
Individual count	138
DL expressivity	AL
Class axioms	
SubClassOf axioms count	27
EquivalentClasses axioms count	0
DisjointClasses axioms count	0
GCI count	0
Hidden GCI Count	0
Object property axioms	
SubObjectPropertyOf axioms count	0
EquivalentObjectProperties axioms count	0
InverseObjectProperties axioms count	0
DisjointObjectProperties axioms count	0
FunctionalObjectProperty axioms count	0
InverseFunctionalObjectProperty axioms count	0
TransitiveObjectProperty axioms count	0
SymmetricObjectProperty axioms count	0
AsymmetricObjectProperty axioms count	0
ReflexiveObjectProperty axioms count	0
IrreflexiveObjectProperty axioms count	0

Fig. 4.14 RIC-ATPI ontology metrics



3.7 Ontology Documentation

The collection of documents and explanatory comments is documented online in <http://www.ricontology.com/>. Documentation was generated using the LODE tool³² by S. Peroni, with a screenshot being shown in Fig. 4.14. Also, in Annex 1 it is presented the turtle serialization of RIC, RIC-ATPI and the Complaint Design Pattern.

³² LODE. Live Ontology Documentation Environment. <http://www.essepuntato.it/lode>

www.ricontology.com

PARQL RIC Ontology ATPI Ontology Sources Application About

IRI: <https://raw.githubusercontent.com/Rel-incode/ric-ontology/master/ric.owl#>  

Date: 28/01/2016

Current version: 1.0.2

Authors: Cristiana Santos

Contributors: Pompeu Casanovas
Victor Rodriguez

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Abstract

This ontology is a framework for representing relevant, legal information in a domain-neutral manner

Table of Content

- [1 Introduction](#)
- [2 Classes](#)
- [3 Object Properties](#)
- [4 Annotation Properties](#)
- [5 Namespace Declarations](#)

Fig. 4.15 Screenshot of the online documentation of RIC ontology

3.8 Ontology-based Application

In order to demonstrate the capabilities of RIC-ATPI for providing relevant information, a simple ontology-based application was developed by V. Rodriguez-Doncel, also depicted in Fig. 4.16.

Functionality

Here it is a brief description of how using the demo. The web application is accessible at <http://ricontology.com/>. The user selects the incident from a combo box, possibly refined with information from a second combo box.

The RIC-ATPI knowledge base is then queried and the relevant information is offered both in HTML and RDF. The HTML highlights the relevant entities (incidents, rights, constraints, requisites, exceptions, enforcement procedures) with in an intuitive color code. Hovering the mouse over these entities causes the web to display the provenance and additional information in a side box. The RDF is offered either with content negotiation or by clicking a button. The generated SPARQL queries can also be read (see <http://ricontology.com/manager>)

Technology

The web application consists of the following elements:

- An **HTML page with JavaScript** which transforms the user input into two HTTP REST queries (to retrieve RDF and HTML respectively). These queries invoke (using the POST method) two web services described below whenever the user changes the selection. The HTML page is formatted using Bootstrap and uses JavaScript to build the queries and present the information.
- A **web application** with two servlets accessible through HTTP REST calls using the method POST and having two parameters: *incident* and *subincident*. The methods are: *getRelevantInfo* and *getRelevantInfoRDF*. In order to grant support for international characters, exchanged information is encoded in Base64 and all the files are UTF-8. The services create an SPARQL query and a RDF store is queried. The returned information (RDF or set of strings) is parsed and a friendly HTML is returned (or the raw RDF if requested). The application is served by a Tomcat 8 web server and leans on the Jena libraries (which are licensed under an Apache License, Version 2.0).
- An **RDF store** containing solely the RIC and RIC-ATPI files. The RDF store is a Fuseki v2.0 running in the same machine where the web server lives. It accepts SPARQL queries.

The fact of having made available the functionality of this work as two general API calls makes the work to be reusable by other applications. For security reasons, the RDF store can only be queried

Home SPARQL RIC Ontology ATPI Ontology Sources Application About

Proof of concept

Please choose the options below that describe best your situation

Flight delayed long delay at departure (5h or more)

Relevant information

Incident: **Delayed flight at departure with a delay of 5 hours or more**.
You may have these rights:

- **Right to reimbursement** according to Regulation 261/2004, Art. 8(1)a
Has enforcement procedure **Legal Action Procedure and Complaint handling procedure**
It is subject to **Constraint to the right of reimbursement** and **Exception to liability for damage caused by delay** and **Territorial application requisite**

Requisite
Territorial application requisite
These rights only apply to worldwide airlines and passengers when departing from an airport within EU, and also to all departing from an airport in a third country to a destination within the EU, where the operating air carrier is a Community air carrier (EU airline) (Regulation 261/2004, Art. 3(1))

All the information here displayed pursuents mere research endeavors and should not be accounted at any regard as entitling legal advice. Hence the authors are not liable for its contents.

Work done in the framework of the Joint International Doctoral (Ph.D.) Degree in Law, Science and Technology, Last-JD
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Fig. 4.16. Ontology based application to retrieve relevant information

4 Summary and Critical Assessment

In this chapter, the knowledge sources were engineered according to the model of Legal Provisions and Domain Knowledge, and to the different dimensions of relevance.

Table 4.13 summarizes how the dimensions of relevance were modelled and applied to RIC and RIC-ATPI ontologies.

Table 4.13 Dimensions of relevance compared and applied to RIC and RIC-ATPI ontologies

Relevance dimensions	Describes a relation between	Assessment	Relevance in RIC and RIC-ATPI
Algorithmic	Query and information objects	Similarity (weighting and ranking functions)	The information is captured in RDF statements: class individuals of RIC-ATPI, in particular, by using the entry <code>rdfs:comment</code> entry provides the needed capability to annotate or describe an entity. The relevant information is

			retrieved by means of a predefined Sparql query
Topical	Topic in the request and topic covered	Aboutness Interpretation	ATP domain
Cognitive	Information needs (background or specific needs) of the user and information objects of the system	Correspondence, novelty, information quality, informativeness, preferences	Information needs of the end-user (consumers), captured in RIC classes as rights, obligations, legal sources, constraints, exceptions, and as class instances in RIC-ATPI
Situational	Situation / work task at hand and information object	Usefulness in decision-making, appropriateness in problem-solving, reduction of uncertainty	Consumer disputes in the ATP domain, modelled as information objects in RIC-ATPI ontology. RIC:EnforcementProcedure approaches this relation
Legal Saliency	Opinion of the legal community and information objects	Legal saliency, Citations	Requests the most important sources, within the specific legal domain, such as case-law, legislation. The class RIC:FurtherInterpretation provides additional relevant information related to a right; rdfs:seeAlso entry relates a resource to another resource that might provide additional information about the subject resource

By trying to explore the boundaries of relevancy within legal information in the analysed case-study, one is confined with the challenges of interpreting multiple and heterogeneous sources of legal information applied to a taxonomy of cases, and its explicit and possible modelling: dealing with open textured concepts, exceptions, constraints, requisites, procedures, etc.

Legal language, consisting of a complex structure of concepts, forms an abstraction from the text corpus as represented in legal databases. Such legal structural knowledge does not only contain interpretations of the meaning of legal terms, but also shows the (supposed) logical and conceptual structure. Bridging the gap between legal text archives and legal structural knowledge is a principal task of studying the law, and the key challenge in legal information retrieval [Schweighofer, Geist, 2007, p. 150].

Concerning the structural/architectural layer of the ontologies, on the one hand, RIC-ATPI ontology is composed by three taxonomic branches structured in parallel to each other with three levels of concepts, providing a balanced and equally developed hierarchy. The level of abstraction, to which the concepts refer, was taken in consideration: it refers to the ATP-consumer domain, in particular, the use-case components in a case ontology. Structure design was envisaged by putting on the same hierarchy level the concepts referring to the same level of abstraction, such as flight, service and baggage incidents on the same level, and its subclasses.

On the other hand, RIC ontology was designed as a lightweight ontology, storing low-level legal concepts, connected via low-level semantic relations.

It was not aimed at the creation of models of general legal concepts, as happens in some core legal ontologies, but at the modelling of a specific social mechanism, of anchoring provision-types to the sources where the information deemed to be relevant is retrieved.

This way, flexibility with respect to the language is rendered in order to make the knowledge base minimally acceptable by legal practitioners, who can then actively collaborate in the construction of the knowledge base.

Building axiomatic ontologies for the legal domain would not be shared nor used by the members of the scientific community so easily; heavy-weight axiomatic ontologies, fully-fledged, logically expressive knowledge engineering approaches would put legal knowledge in an unreal steadiness, making them difficult to be accepted by legal practitioners. In the line of Wahlgren,

[S]everal contributions in the field of AI and law appear to be incompatible with respect to the understanding of the law and legal work ... It is no secret that very few systems have been accepted by the legal community. The problems, however, are not primarily of a technical nature. With little doubt, the difficulties are more closely related to a too shallow understanding of the requirements of the domain taken as whole [Wahlgren P., 1994, p. 80].

In the same angle Peller stated:

“legal discourse can never escape its own textuality”, thus the need of more flexibility with respect to rich expressiveness of natural language, specifically “legalese” [Peller, 1985]

Within legal knowledge systems, an advocated property when representing legislation is that its executable representation should be isomorphic to their sources [Bench-Capon, Coenen, 1992] [Routen, 1989] [Karpf, 1989] [Prakken., Schrickx, 1991]. This principle evokes a one-to-one explicit and faithful correspondence/representation between the concepts in the knowledge base system to the source texts.

This *textualist*³³ view of the law in legal knowledge representation systems consists in:

“an explicit linkage back to the statute, since every rule in such a system is supposed to be a formal paraphrase of some clause of the legislation” [Palmirani, Cervone, et al, 2013].

³³ <http://www.yalelawjournal.org/forum/judges-in-jeopardy-could-ibms-watson-beat-courts-at-their-own-game>

It is assumed each article in the KB system contains one self-contained norm in a straightforward linkage of the source form. In essence a term is modelled and the units of controlled natural language text, express the information in the authoritative legal sources, such as excerpts of legislation [Palmirani, Contissa et al, 2009], [Palmirani, Cervone, et al, 2013]. It is thereby argued that keeping the structure of the formalization as close as possible to the original sources, assures and benefits, among other things, verification, validation and maintenance as the legislation is amended.

In this line, Sergot's objection consists in the fact that isomorphism is a good approach only if the legislation is itself well structured [Sergot, 1991].

Complete isomorphism challenges the peculiar structural features of legal texts and legal drafting; for example, exceptions are often expressed in legislation separate from the general rule, definitions may be placed outside the normative provisions, etc. Legal documents have very specific internal structures, attributes or metadata which often also are of substantive relevance, representing: its scope, regulation subject, legal effect, the name of a legal act, document type, name of the body which adopted the act, the time of its entry into force and termination; date of registration in the Ministry of Justice, the document status, the rules applied to the subjects, as rights, obligations, responsibilities, a.s.o. Although standards for structuring legal documents are emerging [Palmirani, 2012], many legal documents do not have any (computer readable) structure at all. This information is mostly represented as unstructured text information, which is difficult to formalize.

State-of-the-art systems have sophisticated rule reasoning systems with priorities, exceptions, etc. to identify norms from legislative text and representing them as formal rules. Such technologies are somehow viewed with scepticism by legal practitioners, mainly for being distant from the legal professionals' view of the law, ignoring usability and multiple interpretations.

Representing legislation, far from a mechanical process, requires casuistic interpretation against the context of applicable legal conventions, and the way in which the legislation is applied in practice.

Even if the proposed KB of this work constitutes a deviation towards a purist view of isomorphism, as one source unit is formalized in more KB units; and one single KB unit conflates and captures material from several source items – several contiguous source units are mixed in one KB, as legislation, additional case law and interpretative material– is aimed to make visible in the text the “evidence” that there is a minimal, but reasonable interconnection of a textual legal link, within a formal representation.

Hereby is recognized the *holistic* nature of law, where relevant meaning emerges from combining different legal texts [Breux, Anton, 2009]. Norms arise not only from one piece of legislation but also from multiple interpretative sources of law. Extracting norms from texts and tracing them back to their sources, while useful, may not be enough. Norms emerge from a plurality of sources and adapt continuously, not only to legislative changes, but also to the way in which they are interpreted and applied in different contexts by legal professionals (law in practice). Norms and their interpretation are required to be vested a status, active or inactive, and to be linked to explanations and sources for clarification as needed [Boella, Humphreys, et al, 2014a].

Contemporary legal practitioners, like policy-makers, judges, lawyers, administrators, and legal professionals, are mainly interested in verifying the results of the legal formal representation and its applications and in finding evidence in the legally binding text; they look for authoritativeness in knowledge representation.

This way any legal KB should be grounded in the reality of a juristic conceptualization of the law [Boella, Humphreys, et al, 2014a], promoting a reasonable threshold of reliability and authoritativeness to legal practitioners to facilitate relevant applications that would transfer academic research to legal industry.

Chapter 5. Complaint Design Pattern

1. Overview

This chapter presents the second artifact of this thesis. The Complaint Design Pattern, available in the ontology design patterns portal¹, was built to conceptualize complaints, in order to support knowledge engineers modelling complaints for further applications in specific domains and also processes, satisfying different requirements via CDP specializations.

The complaint domain is an important domain still uncovered by ODPs. The proposed Complaint Design Pattern (CDP) has been designed based on the analysis of free text complaints from available complaint datasets in banking, air transport, automobile, amongst other knowledge sources. The study case is based on consumer disputes.

This chapter is structured as follows. Section 2 motivates the pattern. Section 3 describes the use case, the requirements, the components of CDP and its features. Section 4 evaluates the pattern by aligning it to other ontologies, by annotating complaints, and by using Framenet. Finally, section 5 summarizes the pattern and provides a critical assessment.

2. Motivation

Complaints and complaint behaviour have been receiving a lot of attention in business, management, and dispute studies, as handling them properly might contribute to minimize users' dissatisfaction, increase users' loyalty, and generate trust both in business and public administration [Faed, 2013].

The proposed definition of Complaint consists in *an expression of dissatisfaction issued by a Complainant against a Complaint-Recipient, describing facts, motivations, where a request is explicitly or implicitly made*. The definition is consensuated in ISO standard [ISO Standard 10002:2014] and in complaint research. This term is broader, not necessarily linked to a legal suit, nor to a procedural modelling or domain, hence it models complaints in a neutral manner, i.e., the representation is useful in different scenarios.

¹ <http://ontologydesignpatterns.org/wiki/Submissions:COP>

CDP is motivated accordingly:

- occurrence in multiple domains and scenarios;
- occurrence in different formats;
- online availability of complaint datasets
- dispute resolution needs;
- a subset of information present in all studied domains;
- lack of formalization of this common subset in the existing ontologies.

Complaint description is an important modelling challenge, since complaints occur in many different domains, such consumer, criminal, and health complaints, received by diverse handling systems (from public administration, to companies or consumer centre handling bodies). However, handling systems record complaints in their own formats, reducing machine readability or systems interoperability.

Several complaint datasets² consist of free text documents; this hampers its understanding by computers and complexity to implement data analysis [Fernandez-Barrera, Casanovas, 2011a]. However, the increasing interest for transparency in business, the wider adoption of Linked Open Data (LOD) to publish data, and the online availability of complaint datasets reflects the need for these datasets to be more interoperable.

Moreover, professional mediators highlight the importance to better address complaints and the necessity to have ICT solutions to support their tasks [Casanovas, Díaz, et al, 2009] (as observed in other domains, like health, economy, etc.). They justify this need by emphasizing that complaints constitute the first stage of disputes, prone to scale to higher conflict levels, as litigation.

² The EU Complaint database, the dataset from the Consumer Financial Protection Bureau (CFPB), the Toyota complaint dataset, the complaint database from the UK Department for Work and Pension, amongst several other complaint datasets from disparate domains.

In this study, it was observed that the requirements to describe a complaint can slightly change according to the application domain, but a subset of information is present in all studied domains. In practical cases, the omission of such information or constituents, for e.g. evidence and motivation may entail a refusal or the misunderstanding of a complaint by the Complaint-Recipient. The complaint agents may articulate their position/case in a more grounded rule-oriented manner³ in the online textual environment. The combination of these entities required a separated pattern. CDP provides a more granular approach towards the inherent components of a complaint, explicitly declaring the types of agents, motivation, fact, evidence, request, medium.

Additionally, both legal core ontologies, e.g., *LKIF* [LKIF-Core] and *Core Legal Ontology* [CLO], and domain ontologies, like consumer protection and consumer dispute resolution ones, do not include in their scope the concept of complaint, e.g., the *Consumer Mediation Ontology*⁴ (CMO) [Poblet, Casanovas et al., 2010, the *Consumer Protection Ontology*⁵ (CPO) [Agnoloni, Bacci et al., 2007], [Agnoloni, Bacci et al., 2009], [Francesconi, Tiscornia, 2008], the *Legal Ontology Syllabus* [Boella, Humphreys et al., 2012, the *Mediation Core Ontology* [Poblet, Torralba, et al., 2009], and the *Ontology of ODR Processes*.⁶ The complaint concept is included only in customer-related ontologies [Jarrar, 2007], but they are not complete enough to be used. For instance, complaint main components like motivation, request, medium, etc., are still missing.

One efficient way to build good ontologies consists in using Ontology Design Patterns (ODP). These are modelling solutions to solve recurrent ontology development problems [Presutti, Daga et al, 2009], which facilitate practical ontology construction. ODPs are intended to guide ontology-engineering work, by packaging best practice into small reusable blocks to be adapted and specialized by users in ontology development use cases. An ODP-based strategy pre-empts a single over-arching view of domain(s) in favour of modular pieces. Therefore, it was designed a new ODP for the complaint domain.

³ A rule-oriented manner is the manner in which, for instance, judges often view cases, as opposed to presenting a case in a relational manner, where potential biases are emphasized, as the information asymmetries and underlying relationships between parties.

⁴ ONTOMEDIA: Platform of Web Services for Online Mediation, 2008-2010)

⁵ Drafting Legislation with Ontology-bases Support, <http://www.dalosproject.eu>

⁶ ODR stands for online dispute resolution; see <https://www.evs.ee/products/cwa-16026-2009>

At this stance, in this thesis it is proposed the Complaint Design Pattern (hereinafter CDP) mainly to support knowledge engineers to model complaints for further applications in specific domains and processes, satisfying different requirements via CDP specializations [Fernandez-Barrera, Casanovas, et al. 2011a].

3. Conceptual Foundation of the CDP

This Section presents the materials and the methodology adopted to create the complaint pattern and its components are introduced. Creating an ontology design pattern requires a generic use case (GUC) capturing the recurrent cross-domain issues; the use case relies on consumer disputes. Competency questions were used to refine it. A competency question is a query that a domain expert might want to submit to a knowledge base to complete a particular task [Gruninger, Fox, 1994].

3.1 Methodology

The NeOn methodology was used to build CDP. To develop CDP, ontological resources and non-ontological resources were used and re-engineered as explained in the processes below, considering the consumer law domain as a use case:

Non-Ontological Resource Reuse Process :

The following NOR were considered.

- *ISO Standard 10002:2014 on Guidelines for complaint handling in organizations* provides guidance for the design and implementation of an effective and efficient complaints-handling process for all types of commercial or non-commercial activities, including those related to e-commerce [ISO Standard 10002:2014];
- *Communication and Recommendation of the EU Commission on the use of a harmonized methodology for classifying and reporting consumer complaints and enquiries* for all European complaint handling bodies [COM, 2009], [Recommendation, 2010];
- *Customer Complaint Glossary*, stemming from the EU CCFORM project, with the aim of studying the foundation of a central European customer

complaint form (CC-form), and to underpin a European online complaint platform;

- *Text Corpora* composed by a dataset of consumer complaints, totalizing 20,000 complaints in the domain of consumer disputes, as air transport passenger field, telecommunications, etc., which have been addressed by consumers to the Catalan Consumer Agency (CCA) from 2007 to 2010; a database of complaints in the banking and in the automobile field, accessible as open data, thus gaining insight into its topological and clustered structure;
- *Legal texts*, furnishing definitions and rationale provided by the consumer dispute resolution legislations in Europe, consisting in a primary source of law: EU's Directive on Consumer Alternative Dispute Resolution and Online Dispute Resolution Regulation [ADR Directive], [ODR Regulation].

Non-Ontological Resource Reengineering.

An annotation structure captured both the terminological and the narrative structure from the knowledge sources. It was proceeded manually through a:

- (i) direct extraction of terms; and
- (ii) abstraction of named entities.

The refinement of the concepts and properties was manually done from the expertise in consumer law. Manual analysis of complaint datasets was done in order to extract relevant concepts and competency questions (CQs) from each analysed domain of application. This step provided a list of competency questions that were used as requirements for generating CDP. These competency questions are presented in Table 5.1 (see general use case) and it is assumed that the ontology must provide ways to answer these questions. A classification of the complaint is made according to their propositions, e.g., describe a fact, indicate the existence of evidence, indicate a motivation, specify what they request, and indicate when, how, and to who they first complaint. The adopted "classes" were intuitively selected when searching for answers to the competency questions.

Ontological Resource Reuse and Reengineering Process:

It is defined as the process of using available ontological resources (ontologies, modules, statements, or ontology design patterns) for solving different problems. The implemented following steps were:

- (i) Literature review about legal core ontologies, consumer and complaint-related domain ontologies, and content ODPs in order to extract common or close related concepts relevant to describe complaints;
- (ii) Analysis of the obtained outcomes in order to determine the requirements for describing a complaint.

A list of concepts was extracted from the selected ontologies that could potentially be reused to represent a complaint. Some slight differences in their definition allowed to select the ones that better satisfy the requirements. Table 5.1, where the concepts are defined, also indicates the source ontology; if the link is not indicated, then the concept was created based on the dataset analysis.

It was checked if the classes from the analysed ontologies aligned to CDP concepts, and if not, which adaptations/extensions are necessary. Finally, the relations between the selected/adapted concepts were defined. The analysis step was an iterative process that required domain expertise and several iterations. The results of this analysis are summarized in Table 5.2, according to the catalogue entry fields proposed by [Gangemi, 2009].

Table 5.1 Definition of the concepts reused in CDP

<i>Ontology Name and concept label</i>	<i>Definitions</i>
CCO:Complaint	An expression of grievance or resentment issued by a complainant against a compliant-recipient, describing a problem(s) that needs to be resolved.
CCO:Problem	A source of difficulty or dissatisfaction in a consumer-provider relationship
CCO:Evidence	All the means by which any alleged matter of fact whose truth is investigated at judicial trial is established or disproved
CCO:Complaint Recipient	A legal person to whom a complaint is addressed.
CCO:Complainant	The legal person who issues a complaint.

Finally, the CDP was cooperatively built as an OWL2 ontology. Details about the CDP entities are presented in the next Subsection.

Table 5.2: CDP requirements

<i>Slot</i>	<i>Value</i>
Name and Identifier	Complaint Design Pattern (CDP)
Intent	To represent core constituents found commonly in complaints across domains.
Consequence	Heterogeneous models for complaints can be aligned to this pattern, which then acts as a semantic facade to different complaint management applications, such as complaint handling process, customer complaint management systems, customer relationship management.
Scenario	A complaint refers to the narrated facts of an agent, grounded with a motive and a request, through a specific medium used to generate the complaint document, where evidence may support the facts.
General Use Case (GUC)	GUCs are expressed using CQs [Blomqvist, 2009], [Gruninger, Fox, 1994]. The following CQs are generated to reflect the needs CDP is designed for and are formulated according to the specificities of the domain. 1. Who is the complaint recipient? 2. Who is involved in this complaint? 3. Which medium was used to express the complaint? 4. What motivates the complaint? 5. Which facts describe the complaint? 6. Which facts happened in “this” date or in “this” place? 7. What evidence is used to prove the narrated fact? 8. What is the claim?
Approaches	It is asserted guarded domain and range restrictions for every property in the pattern (i.e., each object property P pointing from class A to class B has $\exists P.B \sqsubseteq A$ as the guarded domain restriction and $A \sqsubseteq \forall P.B$ as the guarded range restriction). Time is modelled in all the classes, with exception of Medium and Agent as time stamp.
Logic addressed	The classes and properties are formally encoded using OWL2. Description Logics (DL) notation is used.
Referenced to	<i>LKIF</i> and <i>CCO</i>

3.2 CDP Components

Taken into account the requirements to build CDP, proposed the ODP depicted in Fig. 5.1. CDP has 11 concepts: Complaint, Motivation, Fact, Evidence, Medium, Request, Agent, Complainant, ComplaintRecipient, Role and ThirdParty; 10 object properties: addressedTo, basedOn, expressedIn, hasComplaintMotivation, partOf, hasThirdParty, justifiedBy, madeBy, supportedBy and playsRole; and three datatype properties: hasSpace, hasStampTime, hasTimeOccurence.

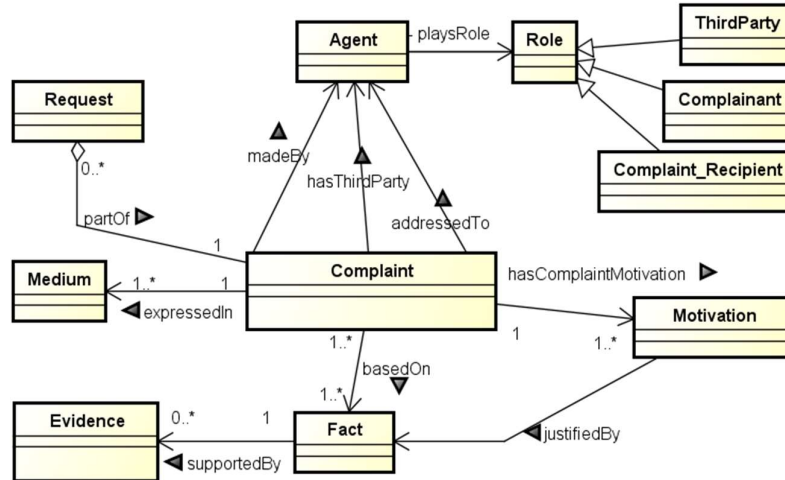


Fig. 5.1: UML class diagram representing CDP. Some axioms and datatypes were deliberately hidden to give better readability to the figure.

A description for each of these concepts and properties follows using the standard description logic notation to express the main axioms in the pattern:

- Complaint. This class is the cornerstone of the pattern. It is defined as an *expression of dissatisfaction issued by a Complainant against a Complaint-Recipient, describing the facts, motivations, where a response or resolution is explicitly or implicitly made*. Facts are used to describe complaints, regardless the nature of a fact (a legitimate or an unfounded fact).⁷ A Complaint is based on, at least, one Fact, has at least one Motivation, made by at least one Agent (Complainant), addressing at least to one ComplaintRecipient and expressed in, at least, one Medium:

$$\text{Complaint} \sqsubseteq \exists \text{addressedTo}.\text{Agent} \sqcap \exists \text{basedOn}.\text{Fact} \sqcap \exists \text{expressedIn}.\text{Medium} \sqcap \exists \text{hasComplaintMotivation}.\text{Motivation} \exists \text{madeby}.\text{Agent}$$

⁷ The proposed concept relies in the middle term of both definitions from ISO and CCO [Jarrar, 2007], in a more abstract manner. In the ISO definition, complaint is an “[E]xpression of dissatisfaction made to an organization, related to its products, or the complaints-handling process itself, where a response or resolution is explicitly or implicitly expected”. In CCO, it is “An expression of grievance or resentment issued by a complainant against a compliant-recipient, describing a problem(s) that needs to be resolved.”

- **Motivation.** A motivation is a *subjective motive of dissatisfaction, justified by facts*. The motivation allows to identify the main reasons/causes/problems, among the described facts, that push the complainant to make a complaint. It is generally rooted on some service disruption (e.g. cancelled flight), behaviour (discrimination issue), or product (damaged baggage), therefore it allows to distinguish the type of problem the complaint addresses. Each Motivation is justified by, at least, one fact:

Motivation $\sqsubseteq \exists$ justifiedBy. Fact $\sqcap \exists$ hasComplaintMotivation.Complaint

- **Fact.** A fact is a *proposition about something described in a complaint*. *Facts are described events by the Complainant Agent*. The concept of fact is, by definition, made by the complainant agent, assuring that it is his interpretation to be accounted. This includes the background to the complaint and the complainant's view of their problem. Because the appropriated definition of fact varies widely depending on the particular application, such details are not restricted in the pattern to foster reuse and adaptability. However, further specializations of this concept can be done, e.g. the provenance of a fact, characterization of a fact (assumedFact vs verifiableFact);

Fact $\sqsubseteq \exists$ justifiedBy. Motivation $\sqcap \exists$ basedOn. Complaint

- **Agent.** An Agent can act, i.e. *play the 'actor' role wrt. an action*. *It is a holder for propositional attitudes*. This class is related (skos:relatedMatch) to `l kif-core:Agent`. Recognizing that in a linked data setting an agent can be involved in multiple complaints, the following object properties "addressedTo" and "madeBy" are explicitly used to provide the distinction of roles and different assertions. Three subclasses of Agent have been defined:

- **Complainant.** *Person, organization, or its representative, making a complaint* [ISO Standard 10002:2014]. The Complainant can be assumed or implicit in some datasets. Complainant is a defined class, being any agent having made, at least, one complaint. Using the inverse property of madeBy, the axiom can be formulated as:

Complainant \equiv Agent $\sqcap \exists$ madeBy.Complaint

- **Complaint Recipient:** *Person, organization, or its representative, receiving a complaint* [ISO Standard 10002:2014]. Recipient is concretely the entity to whom the complaint is addressed to and is

the object of the complaint. The recipient may be implicit in some datasets. This concept varies from the addressee, which may be the Recipient, or any other entity that receives the complaint. The Complaint Recipient is a defined class, with the condition of an agent having receiving a complaint, namely:

ComplaintRecipient \equiv Agent \sqcap \exists addressedTo.Complaint

- **Third Party:** *Any natural or any legal person who is acting, including through any person acting in his name or on his behalf, for purposes not related to the object of the complaint.* For example, a consumer complaining to a consumer protection entity about a dispute with an air transport company, the third party is the consumer entity, and the recipient is the company. A Third Party is a defined class, with the condition of an agent having acting to intermediate, accelerate, or judge a complaint, namely:

ThirdParty \equiv Agent \sqcap \exists hasThirdParty.Complaint

- **Medium.** *A Medium is a bearer of expressions, i.e. externalized propositions. Propositions become expressions once they are externalized through some medium.* In some complaint datasets, the medium is implicit. This concept is a close match (skos:closeMatch) to the lki-core:Medium concept. Medium class is intentionally generic to accommodate possible different granularities in the use cases; verbal, writing, or face-to-face are known mediums of a complaint.

Medium \sqsubseteq \exists expressedIn.Complaint

- **Evidence:** *Proof supporting a fact described in the complaint.* Examples of proofs include receipt, contract, testimony, email correspondence, expenses, photo, etc. When an Agent holds the necessary proof, it mitigates the burden of proof of the counterpart. Evidence class is intentionally generic allowing one to freely introduce adornments to the class according to the needs of a particular use (e.g. verifiedEvidence).
- **Request:** *A demand, claim or remedy set by the Complainant and expected to be pondered by the Complaint-Recipient.* The Request is part of a Complaint. Indeed, in other ontologies it was observed that an Agent can issue a Request regardless of being related to a Complaint; however, this scenario is out of scope of CDP. Examples of request consist in a service or a practical action, compensation or financial award, apology, an explanation for what has happened, resolution,

settlement, or other action. The basis of a request can be made explicit using the Dublin Core `dct:source` element. Moreover, the complainant can use evidence to justify the request, but again it would require a specialization of CDP.

- **Role:** A role played by an Agent.

The main classes have been asserted to be disjoint with each other: **Agent**, **Complaint**, **Request**, **Evidence**, **Medium**, **Fact**, **Motivation**. Agent subclasses are not disjoint because an Agent can perform different roles, for instance, a Complainant can also be a Complaint Recipient in different situations simultaneously.

Properties are described below:

- **addressedTo:** The property describing the Agent Recipient of the Complaint. Domain: Complaint Range: Agent
- **madeBy:** The property relating the Complaint to an Agent. A Complaint is made by an Agent. Domain: Complaint Range: Agent
- **justifiedBy:** Expresses the relation between the Motivation and the Fact(s). Domain: Motivation. Range: Fact
- **expressedIn:** The property that declares by which Medium the Complaint is expressed. Domain: Complaint. Range: Medium.
- **supportedBy:** The object property stating that a Fact can be supported by an Evidence. Domain: Fact. Range: Evidence.
- **hasComplaintMotivation:** The relation expressing the Motivation of a Complaint. Domain: Complaint. Range: Motivation.
- **basedOn:** The property declaring the Facts that contextualize a Complaint. Domain: Complaint. Range: Fact.
- **partOf:** The property stating that a Request can only exist if there is a Complaint. Domain: Request. Range: Complaint
- **playsRole:** The property declaring that an Agent has a Role. Domain: Agent. Range: Role

Some datatype properties are domain specific and need to be adapted by the expert to satisfy the needs of the domain. For these cases, a datatype

was not set, instead a link to another ODP is provided that can support the expert in this specialization task. CDP datatype properties are described below:

- **hasPlace:** It was not defined a type for this datatype, instead it is suggested the consultation to the ODP Place⁸ to detail this property. Domain: Complaint \sqcap Evidence \sqcap Fact \sqcap Motivation \sqcap Request
- **hasStampTime:** Use the type `xsd:dateTimeStamp` to describe specific time which a complaint, evidence, fact, motivation or request was declared or referenced: It can indicate the complaint date, or the date of presentation of evidences, or the date of description of the fact, or the date of a decision to make a complaint, or the request date. Domain: Complaint \sqcap Evidence \sqcap Fact \sqcap Motivation \sqcap Request
- **hasTimeOccurrence:** Refers to the description of a time period. It was not defined a type for this datatype, instead is suggested consulting the ODP TimeIndexedClassification⁹ to detail this property. Domain: Complaint \sqcap Evidence \sqcap Fact \sqcap Motivation \sqcap Request

3.3 The Features of the CDP

In this Subsection the characteristics of the pattern are presented:

1. Template representing a modelling problem: the complaint concept.
2. Computational components: CDP is encoded in OWL to be (re)used as building blocks for other ontologies.
3. Requirements covering components are expressed in terms of CQs.
4. Small, autonomous components.
5. Inference-enabling components by using the definition of the semantic relationships.
6. Cognitively and linguistically relevant components: catching relevant, “core” notions of the consumer law domain.
7. Best practice components. CDP aims at describing a “best practice” modelling, justified by the provenance of the knowledge

⁸ <http://ontologydesignpatterns.org/wiki/Submissions:Place>

⁹ <http://ontologydesignpatterns.org/wiki/Submissions:TimeIndexedClassification>

resources where CDP comes from - expert generated content sources - emerging from real settings and domain ontologies, and from domain ontologies.

8. Reference ontology: CDP aligns to the CCO domain ontology, which constitutes its background and reference, providing its taxonomic context.

9. General character. CDP key-concepts applies to datasets without the need for a complete agreement or conformance on all parts of a domain model. CDP makes minimal ontological commitments singled out necessary to describe the concept it represents, permitting its reuse in different application contexts. Thereby it respects the heterogeneity of existing data schemas as possible.

4. Experimental Assessment and Evaluation

The evaluation method consists in:

- (i) expressing complaints with CDP;
- (ii) the alignment of the pattern with other ontologies; and
- (iii) linking CDP with the FrameNet's Complaining frame.

(i) Graphic notations are employed to visualize the application of CDP with existing complaints from the Toyota dataset (Fig. 5.2) and from the CCA dataset (Fig. 5.3). As to the later, by direct extraction of terms, the following key terms were identified: flight delay, compensation, hours. By an abstraction from the named entities in the modelling problem description it is possible to associate the terms flight delay and compensation with the concepts motivation and request, respectively.

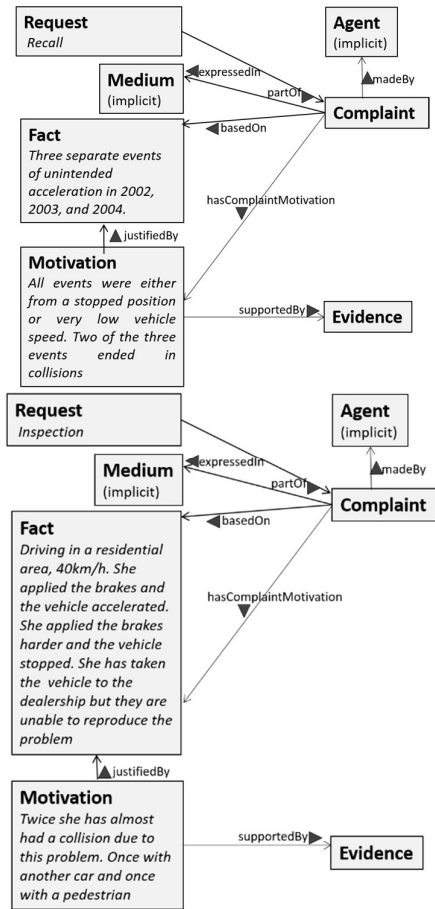


Fig. 5.2. CDP annotated with 2 complaints from the Toyota Dataset

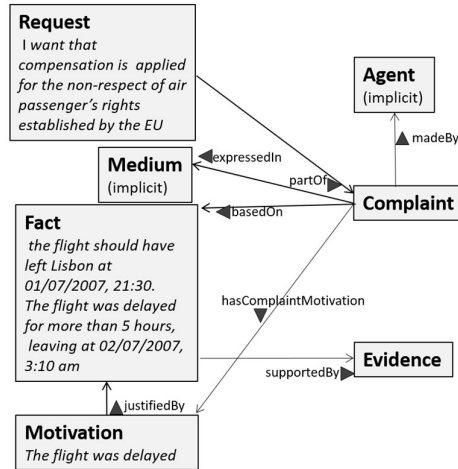


Fig. 5.3 Example of modelling CDP with a complaint from the CCA dataset

(ii) CDP was aligned with other ontologies, as depicted in Table 5.3. CCO represents the customer complaint as part as a global framework for complaint management and therefore CDP is complementary to CCO. By analysing the definition of the concepts of CCO and CDP, it could be easily identified that the concepts of “complainant” and “complaint recipient” are equivalent. However, CCO failed to introduce the notion of “motivation” and “fact” that are important to describe and, later on, process the complaint. In consequence, CDP complements CCO by relating “CDP:Motivation” to the “CCO:Problem”, enriching CCO and making it possible to deal with the problem typology¹⁰ at CDP level. CDP can be imported into other ontologies, such as: the Relevant Legal Information Ontology for Consumer Disputes ontology¹¹ (RIC): an incident (in the consumer dispute domain) is reported in a complaint. CDP is also aligned to LKIF ontology.

¹⁰ <http://www.jarrar.info/CContology/ComplaintProblems.htm>

¹¹ <https://github.com/Rel-incode/ric-ontology/blob/master/ric.owl>

Table 5.3 CDP aligned to other ontologies

CDP	Object property used	Ontology concepts to be aligned
CDP:Agent	skos:relatedMatch	Lkif:Agent
CDP:Medium	Skos:closeMatch	Lkif:Medium
CDP:Complaint	reportedIn	RIC:Incident
CDP:Motivation	equivalentTo	CCO:Problem
CDP:Evidence	equivalentTo	CCO:Evidence
CDP:ComplaintRecipient	equivalentTo	CCO:ComplaintRecipient
CDP:Complainant	equivalentTo	CCO:Complainant

(iii) Frames are good resources for ODPs. By searching for “Complaining”, it is visible that *frame elements* have a substantial overlap with the elements in CDP (fig. 5.4). CDP can be linked to the FrameNet’s Complaining frame¹². FrameNet is an important lexical knowledge base featuring cognitive plausibility, and grounded in a large corpus. Besides being actively used by the NLP community, frames are a great source of knowledge patterns once converted into a knowledge representation language [Nuzzolese, Gangemi, et al, 2011]. The very reason for linking, besides the cognitive foundation of FrameNet, is that frames are linked to lexical and data resources, so that one can easily detect complaining signs from any text.

Complainer [complr]	The Complainer is the sentient entity that produces the Complaint (whether spoken or written). Peter has MOANED about it on another thread but it sure must be nice for him to wallow again.
Semantic Type: Sentient	
Complaint [com]	The lamentable situation that the Complainer is communicating to the Addressee . One observer GROUSED that Skagway was “little better than hell on earth.”
Medium [Medium]	Medium is the physical entity or channel used by the Complainer to transmit the Complaint . I don't mean to discount any of what he has BITCHED about in his article, because most of his points are actually valid.
Topic [Top]	The Topic is the subject matter to which the Complaint pertains. Ferdinand attended the reception at the city hall and COMPLAINED vociferously about his reception at the city.

Fig. 5.4 FrameNet’s Complaining frame

This pattern was kept as simple as possible, but other patterns could have been used. For example, it is the frequent case of delegating the complaint procedure into a third party, e.g. consumer agency, then the actingFor pattern¹³ could have been invoked. Further aspects of the quality of the

¹² <https://framenet.icsi.berkeley.edu/fndrupal/index.php?q=frameIndex>.

¹³ <http://ontologydesignpatterns.org/wiki/Submissions:ActingFor>

pattern have been evaluated. First, the ontology pitfall scanner OOPS¹⁴ was used to verify inconsistencies and no major problem was found. Second, the validity of the pattern in multiple environments is demonstrated with the examples in the Toyota and ATP domain. Third, the representation of complaints using the CDP model can give answer to the CQs initially proposed –the SPARQL queries being of a trivial nature: each of the 8 CQs refer to an entity that has been modelled with a class. In regard to the reusability of the ODP within the community, an OWL file and its documentation are provided and publically available in Github, which makes this resource easy to (re)use. It is published in the community portal for ODPs, benefiting from a persistent identifier. CDP is documented <https://w3id.org/vocabulary/CDP>. This ODP is distributed under a Creative Commons CC-BY 4.0 license.

5. Summary and Critical Assessment

This chapter presented an ODP to represent complaints, consisting in a useful artefact [Hammar, 2014], as it models a phenomenon relevant to ontologists; and is constructed, published and documented in a manner which makes it accessible and easy to use. It stems from real complaint analysis, work already done in online dispute resolution concepts and ontology building.

CDP stems from the combination of existing patterns and ontologies in this domain, which makes it stand out from other complaint ontologies.

¹⁴ <http://oops.linkeddata.es>

Since CDP has the potential to improve semantic interoperability between complaint handling systems, it is envisioned an extended version of this ODP:

(i) to further specialize CDP into a more procedural pattern, supporting complaint-related workflows, such as complaint submission, analysis, classification, complaint resolution, complaint archival, etc. expressing, for example, which is the status of the complaint; or if the request has been issued or declined;

(ii) an alignment of CDP with the PROV-O¹⁵ ontology (Fig. 5.5), considering the Entity (complaint), Activity (the act of complaining) and Agent components, using a new class called “Complaining” derived from prov:Activity, and reusing the properties prov:wasGeneratedBy, prov:used, prov:startedAtTime. Adding these elements may support complaint-related processes. CDP can bring complaint platforms into a new dimension where, for instance, e-mediation and information can be generated automatically, promoting personalized and rapid assistance to complainants. Hence, it has been designed with the intention of continuously validate and evaluate it in collaboration with companies which receive complaints in a daily basis.

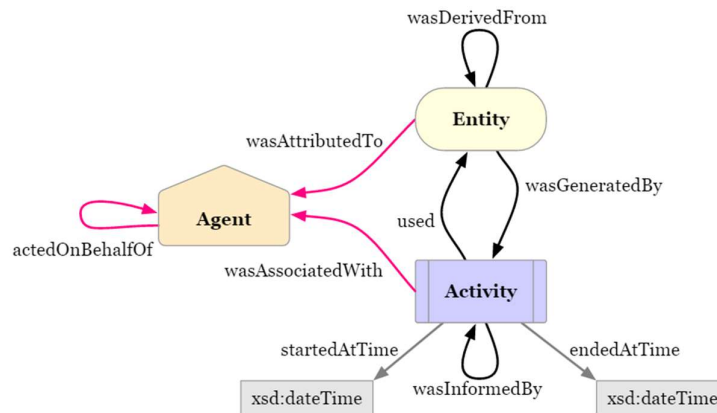


Fig. 5.5 Core elements in the PROV Ontology

¹⁵ <https://www.w3.org/TR/prov-o/>

Chapter 6 Ontology Evaluation

1. Overview

According to Design Science Research, the output from the design science research must be returned into the Environment for study and evaluation in the environmental application domain.

Evaluation requires the development of metrics and the measurement of artifacts according to those metrics. Metrics define what we are trying to accomplish. They are used to assess the performance of an artifact. Lack of metrics and failure to measure artifact performance according to established criteria result in an inability to effectively judge research efforts. [March, Smith, 1995].

Hence, this Chapter draws in the additions to the knowledge base, as results of design science research. The research output consists in an artifact composed of both RIC and RIC-ATPI ontologies¹, in particular, following the Information Systems Research Framework, the proposed artifact is a model.

“Models are evaluated in terms of their fidelity with real world phenomena, completeness, level of detail, robustness, and internal consistency” [March, Smith, 1995].

According to this quadrant, this Chapter is devoted to present theoretical and technical evaluative results of the model, considering: ontology validation, verification, assessment, as proposed in the NeOn Methodology:

- *Ontology Validation.* It is the ontology evaluation that compares the meaning of the ontology definitions against the intended model of the world aiming to be conceptualized; therefore, *evaluated in terms of their fidelity with real world phenomena*;
- *Ontology Verification.* It is the ontology evaluation that compares the ontology against the ontology requirement specification document, thus ensuring that the ontology is built correctly, in compliance with the ontology requirements specification; therefore, *evaluated in terms of their completeness, level of detail*;
- *Ontology Assessment.* It refers to the activity of checking an ontology against the user’s requirements, such as usability, usefulness, abstraction,

¹ The Complaint Design Pattern is evaluated in Chapter 5.

quality; therefore, *evaluated in terms of their robustness, and internal consistency*;

The following metrics to evaluate RIC and RIC-ATPI ontologies are described below. Firstly, the evaluation has been performed through a theoretical and critical analysis of evaluative criteria, focused on epistemological adequacy, operationability and reusability for the legal ontologies; the sub-criteria are further categorized. These constitute ontology-comparison criteria, used in [Visser, Bench-Capon, 1998], considered to be used as main principles in order to evaluate legal ontologies [Rahman, 2016], discussed in Section 2.

Four domain independent meta-properties as proposed by OntoClean, such as identity, unity, dependent and rigidity, are used for evaluating both ontologies, and discoursed in Section 3.

The technical quality is verified through standardized tools, such as OOPS, in Section 4. The OnToology system has been used to publish the ontology and the related documentation.²

To assess how well the ontology meets a set of predefined requirements, or the completeness feature, completeness [Gruninger, Fox, 1994] [Uschold, King, 1995], the evaluation is thereby convened through CQ formalized as SPARQL in Section 5. The ontologies are evaluated also as a support to a computer system in Section 6., as postulated by [Porzel, Malaka, 2004]. Section 7 summarizes the Chapter.

2. Evaluative Criteria for Ontology Construction

The main three criteria used for evaluating the ontology construction are based on the typology criteria from [Visser, Bench-Capon, 1998], stemming from criteria mentioned in the AI&Law literature: epistemological adequacy, operationability, reusability. A definition provided by its authors is given and relevant questions are posed to discern whether the ontologies address such criteria.

1) Epistemological adequacy

It refers to the degree to which the ontology resembles the cognitive framework of the human problem solver [Heijst, Schreiber, 1994]. Thus, the ontology should represent the cognitive understanding of which lawyers use the concepts and relations modelled in the ontology. It is divided into five sub-criteria:

- **Clarity**

² <http://ceur-ws.org/Vol-1515/demo3.pdf>

*It is intended to provide a clear meaning of the concepts used in the ontology.
Do all concepts and relations in the ontology have a clear and unequivocal meaning? Does the ontology effectively communicate the intended meaning of the defined concepts and relations?*

In both ontologies it is aimed at providing a consensuated and textual definition for the concepts and relations distinguished, whenever possible. The meaning of the concepts is rooted on reliable sources of the community:

- In LKIF it was encountered the definitions for the concepts of `Exception` and `LegalSource`;
- CLO provided the definition of `Right`;
- Legislation rendered the definition of `EnforcementProcedure`, as in [COM (2009) 330];
- Legal theory provided the definition of `Obligation`, derived from Sartor [Sartor, 2004].

`FurtherInterpretation`, `Constraint` and `Requisite` are refracted in legal theory. The object properties defined, explicitly connect the concepts. As for RIC-ATPI ontology, the meaning of its concepts are cautiously defined in the Glossary (see in Appendix) and stem mostly from the domain legislations [Reg.261/2004/EC], [Montreal Convention 99], [UCPD], [UCTD], and from institutional glossaries of the domain (IATA, Eurocontrol and ICAO glossaries), portraying consensuated and clear meanings. Service incidents hold a meaning provided by the author, grounded on the domain expert studies from European Consumer Centres Network (ECC-Net) Reports.

○ **Intuitiveness**

Ensures the representation of the concepts and their relationships in such a way that articulates the intuition of the experts of the domains [Bench-Capon, 1990 p.17]. Do the ontological concepts and relations provide a vocabulary that matches the intuition of the experts in the domain?

The epistemological intuitiveness of RIC-ATPI ontology grounded on the incidents depicted in the consumer domain knowledge expressed in the expert documented sources, as listed in Table 3.2. (List of resources, Chapter 3). RIC ontology reflects deontic modalities regularly encountered in legislative text, formulated by the legislator, legal doctrine, and in reliable projects within legal informatics, involving experts like legal theorists, lawyers, legal knowledge engineers. Even if each practitioner might have his own preferences, the entities embedded in this ontology appear to be cognitively valid, and intuitive in several respects to both the average reader or laymen and the lawyer.

- **Relevance**

Refers to the degree in which the categories distinguished are relevant for all tasks and sub domains. Are all the concepts and relations in the ontology relevant for modelling legal tasks, methods, and domains?

This holds for RIC and RIC-ATPI as its constructs support the expression a certain distinguishable of relevant legal information, and express the conceptualization of the relevance types.

- **Completeness**

In order to determine whether an ontology facilitates the modelling of some piece of legal knowledge we need to identify this piece of knowledge first. This requires at least some commonly accepted theory about legal knowledge that tells us what pieces of knowledge exist in the legal domain. The problem is that we do not have such a theory. Briefly stated, there is no golden standard for the comparison. For this reason, we confine ourselves to a brief discussion covering two issues: (a) norm types, and (b) legal procedures.

(a) Norm types

The RIC legal ontology recognizes norms, but distinguished them by their function for supporting the decision-making of the end-user; it distinguishes the following nine provision-types: right, obligation, prohibition, requisite, further interpretation, constraint, exception, legal source, enforcement procedure; these provision-types do not exhaust the legal text, and that is not its scope. Within these provision-types, three of them correspond to deontic clauses, such as right, obligation, prohibition.

(b) Legal procedures:

RIC ontology represents norms describing legal procedures, such as: enforcement procedure, legal source, requisite, together with its object properties, declaring procedural knowledge.

The completeness of the ontology is decomposed in the CQs that both ontologies should answer, through SPARQL queries (Section 5 of this Chapter).

- **Discriminative Power**

Does the ontology have enough discriminative power in that it provides distinctions at a sufficiently high granularity level (viz. sufficient detail)?

Regarding the level of detail of the ontologies, RIC ontology is a uses a general granularity at the level of legal provisions.

RIC-ATPI ontology expresses the relevant legal information according to each ATP incident: the concrete rights, obligations, prohibitions, exceptions,

constraints, further interpretations, enforcement procedures, requisites, legal sources. It uses the specific content refracted in the elicited sources, thus, at the level of concrete articles, recitals from legislation, paragraphs from a specific case-law or from the documents of the European Commission. It declares as class the *AirTransportPassengerIncident* that is a subclass of *RIC:Incident*; it also includes the relevant legal information as class-instances of RIC classes.

The general contention is that there is no generally desirable abstraction level that should be chosen for the expression of an ontology. On the one hand, legal ontology theory denotes that a very detailed ontology (viz. one with a high discriminative power) is a useful tool in the acquisition and expression of domain knowledge. On the other hand, the more detailed an ontology, the more commitments are made to particular tasks, methods and (sub)domains. The more discriminative power, the less likely it is to be reusable for arbitrary tasks, methods and (sub)domains. A suitable compromise between both is reflected in RIC and RIC-ATPI ontologies.

2) Operationality

The operationality of an ontology refers to the effort required to implement the ontological concepts and relations in a representational language [Schreiber, 1992, p. 122]. Therewith, the criterion is a measure for the ease with which the concepts and relations in the ontology can be used as a basis for an operational language given a legal task, method and domain. It is comprised of the following sub-criteria:

- **Encoding bias**

Encoding bias happens when the ontological representation is based on the suitability of any particular approach or method of notation and/or implementation. Does the ontology rely on symbol-level choices? An ontology has an encoding bias if it makes commitments to a certain representational formalism. In principle an ontology should be independent of a representational formalism. Hence, it should be possible to implement any ontology in any representation formalism.

RIC and RIC-ATPI ontologies do not commit to any representational formalism.

- **Coherence**

Is the ontology coherently defined in that it is internally consistent? An ontology is not coherently defined (incoherent) if a sentence can be inferred from the definitions that is inconsistent with another definition or (informally specified) example.

RIC and RIC-ATPI ontologies are consistent according to the Hermit 1.3 reasoner; the ontologies resulted to have a complexity of ALCO+, and AL

respectively, hence tractable. To evaluate the technical quality and consistency checking of both ontologies, OOPS! (OntOlogy Pitfall Scanner!) as pitfall detector, as referred in Section 4.

- **Computationality**

The computationality of an ontology refers to the degree in which the ontology provides a suitable basis for computationally adequate representations. Does the ontology provide a suitable basis for (computational) representation, and is this representation computationally adequate?

The ontologies support a computer system described in Section 6 of this Chapter.

3) Reusability

The reusability of an ontology refers to the degree in which the ontology can be reused (possibly by extending it) to conceptualize new legal tasks, methods and domains. In general, we could say that the higher the level of detail of an ontology, the more commitments are made to tasks, methods and domains. Hence, an abstract ontology will have a greater reusability than an ontology with a high level of detail. Two sub criteria are distinguished:

- **Task and method reusability**

It expresses the reusability of the ontology based on their tasks and method by extending or subtracting the concepts and relations required for performing other legal tasks. Is the ontology dependent on certain (types of) tasks and methods, or alternatively, to what extend is the ontology reusable for various methods and tasks?

RIC ontology is general enough to be extended and reused in other legal ontologies or LIS supporting the definition of a case descriptions, or LIS based on information retrieval, for instance.

- **Domain reusability**

Is the degree in which the ontologies can be (re)used for different legal subdomains without compromising the internal coherence of the existing ontology? Is the ontology dependent on certain (types of) legal subdomains, or alternatively, to what extend is the ontology reusable for various legal subdomains?

RIC ontology is able to be reused in other legal domains: in any consumer law domain, as for instance, telecommunications, banking, utilities, where rights, obligations and permissions emerge from a given incident. In principle, RIC ontology is not dependent on any legal subdomain as such. However, it is likely

that it has embedded assumptions that stem from the domain to which the ontology has been tested in RIC-ATPI ontology.

3. Ontoclean

OntoClean is a methodology designed to analyse taxonomies used for evaluating hierarchical relationships based on domain-independent meta-properties of concepts, proposed by [Guarino, Welty, 2004]. Four domain independent meta-properties proposed by OntoClean are used to evaluate the ontologies; these meta-properties are identity, unity, rigidity and dependence hereby explained and then applied to RIC and RIC-ATPI.

Identity in OntoClean is associated with two fundamental conditions – it must be informative and cannot be trivial. If any concept carries its identity criteria is called *sortal*, which is further used to analyse *sortal* individuation and expandability. It is indicated with the +I superscript, and as -I for non-sortals. A concept is marked with +O, -O otherwise, if and only if it satisfies the following conditions – the concept is rigid, it has its *own* identity criteria and the same identity criteria is not carried by all the concepts subsuming it.

Unity. A concept carries unity criteria if and only if exists a single relation under which each instance of the concept is necessarily whole independent from any particular time in consideration. +U is used to express if a concept carries unity criteria, where all instances are wholes under the same relation. The concept carries non-unity, denoted as -U, if some instances of a concept are not wholes by the same relation. The concept is anti-unity, indicated by \sim U, if all instances of a concept are not wholes by the same relation.

Rigidity. If a concept holds some essential property that cannot change, the concept is rigid and therefore designated by +R; otherwise non-rigid -R, or anti-rigid \sim R, which means their properties must be changeable.

Dependence is a concept externally dependent over another concept if each instance of the former concept has necessarily some instances of the latter concept, which is neither a part nor a constituent of such instance. Being dependent is expressed with +D, independent with -D.

OntoClean uses the following constraints and assumptions in order to analyse conceptual hierarchies in the taxonomy, given two properties A and B, when A subsumes B –:

- B must be anti-rigid if A is anti-rigid.
- B must carry same identity criterion as A carries.
- B must carry same unity criterion as A carries.
- B must have anti-unity if A carries anti-unity.
- B must be externally depended if A is externally depended.

- No entity without identity means every element of a domain must instantiate some identity criteria – which is addressed as sortal individuation.
- If an instance relates to different times, it must be an instance of a general property carrying the same type of criterion for its identity – which is known as sortal expandability.

The application of the meta-properties of a concept in the legal domain will not be as same as it supposed to be in any other domains: legal concepts are not rigid due to the fact that legal rules evolve over time and jurisdiction. Moreover, legal information, as observed in Chapter 3, carries its own hierarchical authority within and/or outside legislation, which must be maintained.

Table 6.1 declares the meta-properties of RIC. With the exception of the class Incident, all the other classes carry identity +I, with unity +U, independent +D, while they carry no rigidity -R.

Table 6.2 declares the meta-properties of RIC-ATPI. All the classes carry identity +I, with no unity -U, dependent on some external concepts, +D while they carry no rigidity -R.

Table 6.1 Meta-properties of RIC ontology classes

Concept	Identity	Unity	Dependence	Rigidity
Incident	Informative +I	-U	+D	Non Rigid -R
Right	Informative +I	+U	-D	Non Rigid -R
Obligation	+I	+U	-D	Non Rigid -R
Prohibition	+I	+U	-D	Non Rigid -R
Requisite	Informative +I	+U	-D	Non Rigid -R
Exception	Informative +I	+U	-D	Non Rigid -R
Further Interpretation	Informative +I	+U	-D	Non Rigid -R
Constraint	Informative +I	+U	-D	Non Rigid -R
Enforcement Procedure	Informative +I	+U	-D	Non Rigid -R
Legal Source	Informative +I	+U	-D	Non Rigid -R

Table 6.2 Meta-properties of the upper classes of RIC-ATPI ontology

Concept	Identity	Unity	Dependence	Rigidity
Air Passenger Transport Incident	Informative +I	-U	+D	Non Rigid -R
Flight Incident	Informative +I	-U	+D	Non Rigid -R
Service Incident	Informative +I	-U	+D	Non Rigid -R
Baggage Incident	Informative +I	-U	+D	Non Rigid -R

4. Evaluation of the Technical Quality

The following aspects of the ontologies have been evaluated:

(i) Consistency

RIC and RIC-ATPI ontologies are consistent according to the Hermit 1.3 reasoner; the ontologies resulted to have a complexity of ALCO+, and AL respectively, hence tractable. To evaluate the technical quality and consistency checking of both ontologies, OOPS! (OntOlogy Pitfall Scanner!) as pitfall detector.

(ii) Conformance to good practices

The ontologies have been published according to standards:

- the URIs are de-referenceable;
- the ontologies are accessible in different serializations;
- the changes and editing process are traceable in GitHub;
- the ontologies have been developed following standard practices in ontology development, identifying competency questions with different domain stakeholder's documents.

5. Evaluation of the Completeness (CQ Formalized as SPARQL)

The usage of informal CQs for ontology requirements' description and its further evaluation has already been accounted in ontology design methodologies [Gruninger, Fox, 1994] [Uschold, King, 1995], [Gruninger, Fox, 1995], [Gomez-Perez, 2001]. A formalisation of competency questions (CQs) into SPARQL queries [Zemmouchi-Ghomari L., Ghomari A. R., 2013] and CQs into DL queries [Malheiros Y., Freitas F., 2013] have also been implemented.

A total of 11 competency questions have been posed for the RIC and RIC-ATPI ontologies, defined in the ORSD. Upon construction of the ontology, these questions were verified as answerable with the elements in the ontology. Further, some of them were made explicit as SPARQL queries³ and can be resolved using the ontology. The results of SPARQL queries can be result sets or RDF graphs.

³ SPARQL is a general term for both a protocol and a query language. Most uses of the SPARQL acronym refer to the RDF query language. The language's features include basic conjunctive patterns, value filters, optional patterns, and pattern disjunction. SPARQL can be used to express queries across data stored as RDF.

The RDF data is stored in a SPARQL endpoint, which can be queried for complex information needs. The SPARQL queries are available online.⁴ For example, the following query determines which are the rights for a short delayed departure.

```
? SELECT (str(?lab) as ?label) (str(?com) as ?comment) (str(?sour) as
?sourcelabel) (str(?sc) as ?sourcecomment) (?r as ?uri) ?tipo{
    ?r ric:isTriggeredBy ric-atpi:shortdelayedatdeparture .
    ?r rdfs:label ?lab .
    ?r rdf:type ?tipo .
    OPTIONAL {
        ?r rdfs:comment ?com .
    }
    OPTIONAL {
        ?r ric:hasLegalSource ?ls .
        ?ls rdfs:label ?sour .
        OPTIONAL {
            ?ls rdfs:comment ?sc .
        }
    }
    FILTER (?tipo != owl:NamedIndividual) .
} ORDER BY ?label LIMIT 50
```

The ability to answer a CQ *meaningfully* can be regarded as a functional requirement that must be satisfied by the ontologies. The answers are meaningful in w.r.t. their presuppositions [Ren, Y., Parvizi A., et al. 2014]. As an illustrative example regarding RIC-ATPI ontology content evaluation, in order to meaningfully answer the CQ (2): *For any given incident, which enforcement procedures should be followed?*, it is necessary for the ontology to satisfy the following presuppositions:

1. The classes: Incident, EnforcementProcedure, Right, and property: hasEnforcementProcedure should occur in the ontology;
2. The ontology allows the possibility of Rights having an EnforcementProcedure. Thus, the modelling elements mentioned in the question occur in the ontology.

6. Evaluation of the Ontology as a Support to a Computer System

The proposed ontologies can be used to drive an ontology-based system providing relevant information for each of the incidents. A web based legal ontology tool conforming to the ontology schema was enabled to provide the visualization of the modelled knowledge.

In order to demonstrate the ability of the ontology to serve as a knowledge base of a computer program providing relevant legal information, the demonstrative application available at <http://ricontology.com/application.html>

⁴ <http://www.ricontology.com/manager>

was developed. The web application is also optimized to be visited from a mobile device with a reduced screen.

This application permits selecting the type of incident and the particular case.

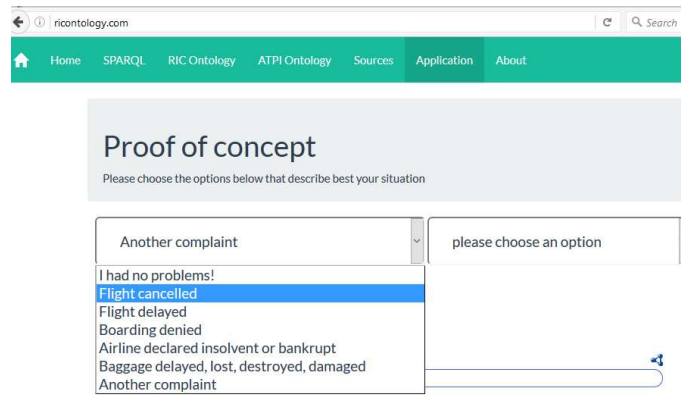


Fig. 6a. Types of incidents

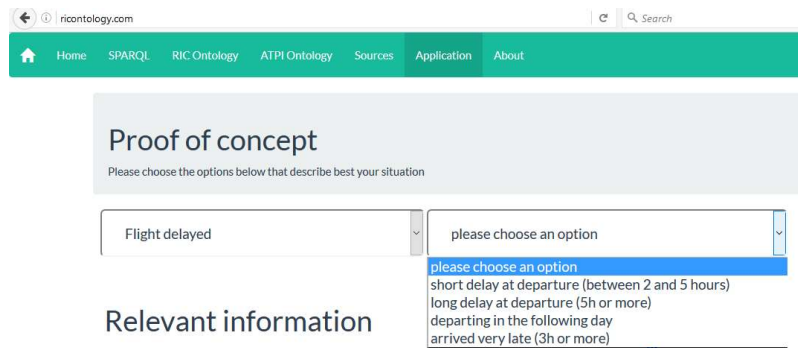


Fig. 6b Types of incidents and the particular cases

Then, the relevant legal information is shown as instances of the classes of RIC-ATPI. This information consists of the precise excerpts that are deemed relevant and according to its classes: right, further interpretation, exception, constraint, enforcement procedure, requisite, legal source; together with the precise provenance information, e.g. which article in which regulation.

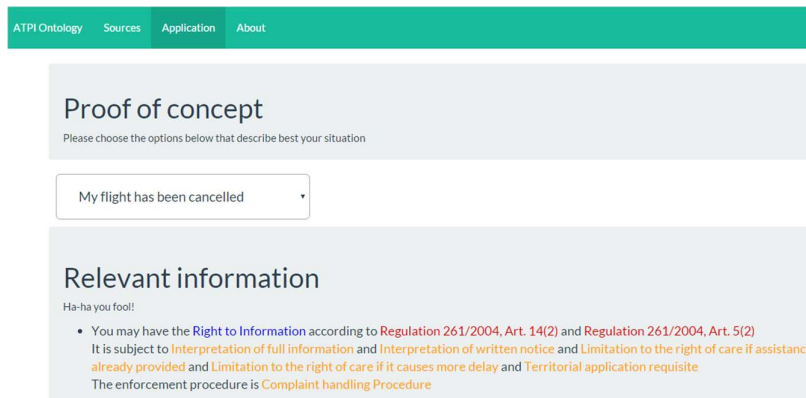


Fig. 6c Relevant information regarding the right to information

Additional information is shown for specific circumstances or interpretations when moving the mouse over the general description. The demonstrative application proves the feasibility of the idea. The former screenshots depict the functionality of the tool.

7. Summary

This chapter has assessed whether the requirements are fulfilled as a result of ontology authoring actions both in RIC and in RIC-ATPI, evaluating thereby its completeness, technical quality, precision and recall. Both ontologies were constructed manually, from the legal knowledge acquisition, taxonomy development, concept definition, to property relationship - all are mapped and constructed manually. Nevertheless, their evaluation resorts to state of the art techniques.

Chapter 7 Conclusion

1 Overview

This chapter concludes this doctoral dissertation recalling the development process work, identifying the problem to solve and the opportunities; it presents the main contributions and the limitations of the work done. The chapter ends revealing the future prospects for work.

This work presented an ontological model aimed at representing in a structured manner relevant legal information, contextualized in a specific use case, and models an ontology design pattern on complaints. At this stance, it is conceivable to devise a comprehensive retrospective of the thesis by articulating it with respect to the RQs:

- **RQ 1: Which information is relevant for the merit/non-merit of a consumer dispute?**

It is consigned in chapters 2 and 3.

To provide relevant information for an initial assessment of the merit/non-merit of a dispute, the conceptualization of relevance in its five dimensions: systemic, topical, cognitive, situational and domain relevance were accounted within the case study of consumer disputes in the ATP domain.

In particular, it was performed an analysis of the ATP domain, enhanced by the study of real complaints, by a market-based analysis and by an extensive review of the ATP legal literature. Derived from this analysis and considering the clusters of the most frequent incidents, a taxonomy of incident-cases was assembled. The cognitive information needs of the end-users were also considered through the study of the information-seeking behaviour of consumers, and on the theory of behavioural economics embedded in consumer policy. The taxonomy of cases configured the base to elicit the legal information contained at: resource, source, document, and content levels.

- **RQ 2: How can the dimensions of relevance be modelled in an ontology?**

In chapter 4, the relevant information within the case-study correspond to a consensuated vocabulary, modelled in a structured way. The proposed conceptualization of relevance was designed for legal ontologies. The architecture of the model of Legal Provisions and Domain Knowledge provided the structure of both ontologies: RIC and RIC-ATPI ontologies. The development process of the

ontologies follows the applied methodologies and the acquired knowledge resources. Topical relevance corresponds to the consumer dispute in the ATP domain. The algorithmic dimension is reflected in the ontologies. The relevant information is captured as RDF statements, as class individuals of RIC-ATPI, in particular, by using the entry `rdfs:comment`, which describes an entity; and by means of SPARQL query, to retrieve the information. The cognitive information needs of the end-user are captured in RIC classes as rights, obligations, legal sources, constraints, exceptions, and as class instances in RIC-ATPI. Situational relevance is reflected in the ontologies by means of representing the cases or incidents of the ATP domain modelled as classes in RIC-ATPI ontology; the class `RIC:EnforcementProcedure` expresses this relation. Legal Saliency is mirrored in the ontologies, as they contain the important documents in this specific legal domain (case law, legislation, etc.), according to the defined cases; class `RIC:FurtherInterpretation` provides additional information related to a right and `rdfs:seeAlso` entry relates a resource to another resource.

In chapter 6, the informal competency questions were verified as answerable with the elements in the ontology. Further, some of them were made explicit as SPARQL queries and can be resolved using the ontology.

- **RQ 3: How to define an Ontology Design Pattern on Complaints?**

Chapter 5 presents the Complaint Design Pattern (CDP), available in the ontology design patterns portal¹, built to conceptualize complaints and hence to support knowledge engineers creating domain specific ontologies where this concept arises. CDP used best practices to provide a high abstraction level ontology that can be reused and declined into more specialized ones. CDP has been designed based on the analysis of free text complaints from several available sectors of complaint datasets (banking, air transport, automobile), amongst other knowledge sources. The study case is based on consumer disputes. The pattern is evaluated by annotating the complaints from the use case and by discussing how CDP aligns to existing ontologies.

2 Contributions

In order to understand and position the thesis's contribution to knowledge representation, a reference to design-science research (DSR) is made, in particular, to the knowledge contribution framework [Gregor, Hevner, 2013]. It is composed of four quadrants which are defined and analysed below, depending on the *problem*

¹ <http://ontologydesignpatterns.org/wiki/Submissions:COP>

maturity and *solution maturity* of a research contribution (Fig. 7.1). According to this DSR framework, the research contributions can be defined as the following:

(i) *Invention* quadrant result in novel solutions (artifacts or inventions) addressing new problems;

(ii) *Improvement* quadrant’s goal is to create new solutions (in the form of more efficient products, processes, services, technologies) to known problems. Researchers therefore must contend with a known contextual application for which previous artifacts either do not exist or are suboptimal;

(iii) *Exaptation* quadrant refers to the expropriation of design knowledge in one field to solve new problems in another field. When artifacts required in a field are not available or are suboptimal, effective artifacts may exist in related problem areas that may be adapted, extended, refined or, more accurately, exapted to the new contextual problem;

(iv) *Routine design* occurs when existing knowledge for the problem area is well understood and when existing artifacts are used to address the opportunity or question. Existing knowledge is applied in familiar problem areas in a routine way.

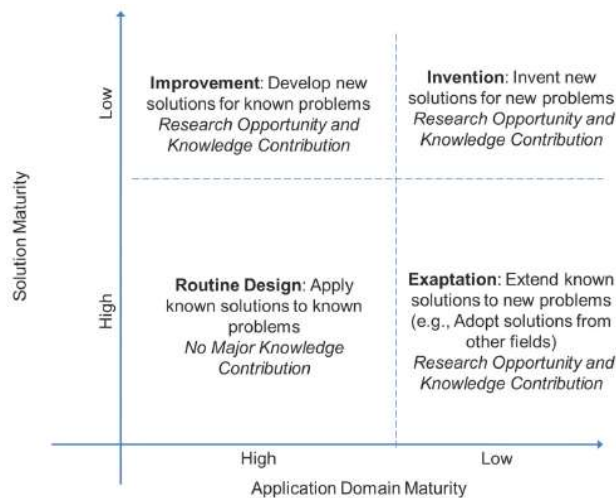


Fig. 7.1. Knowledge Contribution Framework. Reproduced from [Gregor, Hevner, 2013]

At this stance, it is possible to assert that the contributions this dissertation claims refers to the extension of known designed knowledge — relevance framework, coming from Information Science and applied within Information Retrieval Systems — into a new problem of framing and accessing relevant legal information in consumer law, enabled by semantic web technologies, in particular, legal ontologies. The *problem environment* inherent to information disclosure within consumer policy

demonstrates particular challenges that can be dealt with the relevance framework. Complaints are conceptualized for the first time within an ontology design pattern. Hence the artifact presented corresponds to the *Exaptation* quadrant.

Additionally, in consonance with DSR, a designed artifact should be innovative, solving a heretofore unsolved problem, or solving a known problem in a more effective or efficient manner. Hence, there should be an identification of a contribution to the existent archival knowledge-base of *foundations* and *methodologies*;

- *Design foundations* (design construction knowledge). Constructs, models, methods, or instantiations that extend and improve the existing foundations in the design-science knowledge base; examples of such artifacts are: modelling formalisms, ontologies, problem and solution representations, design algorithms; and/or
- *Design methodologies* (design evaluation knowledge). The creative development and use of evaluation methods, e.g., experimental, analytical, observational, testing, and descriptive evaluation methods; and new measure and evaluation metrics.

It is tenable to affirm that the artifact presented in this dissertation is a *model* representing two ontologies: Relevant Legal Information in Consumer Disputes Ontology (RIC) and its specialization, the Air Transport Passenger Incidents Ontology (RIC-ATPI). The Design Artifact applies existing knowledge in an innovative way. The contributions are the following:

- establishment of a taxonomy of cases in the ATP domain which might be used by additional information systems (e.g. automatic classification of complaints) (chapter 2);
- conceptualization of a framework of relevance tailored to legal ontologies using as a use-case the ATP domain steered in the Relevant Legal Information in Consumer Disputes Ontology (RIC) and its specialization, the Air Transport Passenger Incidents Ontology (RIC-ATPI) (chapter 4);
- complaint design pattern (chapter 5).

3 Critical Issues

Design Science Research was applied in this work, as it is essentially pragmatic in nature due to its emphasis on relevance and in making a clear contribution into the application environment. It furnished methodological guidelines helpful to structure the thesis, adapted to the problem-solving approach considered herein; for instance,

the field testing could not be applied to test its effects, exercising and improvements within the contextual application environment with the end-users. The modelling of relevant legal information does not suffice without an efficient disclosure to its addressees, for example, through applications, tools - an *ex post* configuration only foreseen as a demo in this thesis.

The ontology-based approach of modelling relevant legal information does not consider the measurement or ranking of the captured information, considered necessary as future work.

This academic research was prepared with a small dataset. Therefore, it runs the risk of being too small scaled to extrapolate its results to real life environments. A larger database would possibly render solid conclusions and minimize this risk.

Furthermore, it only considers a specific legal field (air transport passenger domain) and is therefore strictly domain-dependent. On one side domain-ontologies represent a gold mine, on the other hand, they make the ontology system strictly dependent on the availability of domain expert knowledge.

The content of legal documents, as laid down by empowered bodies (e.g., contractors, legislators), should be preserved from any manipulation; also, it is important to connect the legal documents, which themselves include many legal values (e.g., authenticity, integrity, referable evidence, written form, etc.) with the multiple interpretations coming from legal knowledge modelling [Palmirani, 2013]. However, the mere possession of relevant sources does not render relevant knowledge for a task at hand; a lot of information is irrelevant in case law, for example. Relevant textual pieces may consist only of a short paragraph or even only of a single sentence in a very long legal document (as a recital). Full text legal document retrieval does not help searching large quantities of legal documents. The salient characteristics of a legal sourced-document are not intrinsic to the document being modelled, but are relative to the needs of the users of the system [Dabney, 1986]; therefore, the content information was extracted from the text according to an incident case-taxonomy.

This method of modelling facilitates the retrieval of case-incidents but makes the ontology poor at retrieving concepts and rules. A search for the concept of “breach” can be frustrating because of the many different ways these words are used in cases.

Even if the incident taxonomy reflects the textual description provided by a litigant, this fixed taxonomy of case incidents only partially describes or covers the relevant cases, which were selected on the base of legal grounding to complaint or pursue legal action. There is with no possibility to provide further claims and argumentations by using natural language.

Matthijssen recalls four theoretical limitations in legal information retrieval:

- (1) *the fact that the index of a database only partially describes its information contents;*
- (2) *the imperfect description of an information need by the query formulation;*
- (3) *the rough heuristics and tight closed world assumption of the matching function; and*
- (4) *the presence of the conceptual gap: the discrepancy between users' views of the subject matter of the stored documents in the context of their professional setting and the reduced formal view on these subjects as presented by information retrieval systems. Legal practitioners have to translate their information need - which they have in mind in the form of legal concepts - into a query, which must be put in technical database terms [Matthijssen, 1999].*

The legal ontologies presented in this work do not aim to address the denounced retrieval issues, but only to assure the point number (4).

The ontology was built manually. This leads to high costs of manual labour, limited capacity of the ontology extension and updating of its contents. Also it leads to the viability and functioning of relatively small knowledge projects in volume. In large projects, it is too expensive a scheme—it is necessary to organize the work and interactions of a great number of experts.

This thesis does not deal with the linguistic challenge of polysemy and synonymy of legal language. Moreover, this work does not address the scope to which entity or context the norm applies: when mentioning the disputants, it is represented the rights (and after the obligations, prohibitions) of the passenger, only, even if some rights correspond exactly to obligations of the air carrier.

4 Future Work

The RIC ontology may also be extended to other domains, beyond the try-out ATP one, such as telecommunications, utilities, banking, data protection and copyright amongst others, to confer the preliminary relevance framework presented in this work.

In this thesis, the end-users comprised in the case study were consumers, and the represented information was relevant from their perspective. As forthcoming work, relevant information might be selected from the prism of other stakeholders like their counterparts, legal professionals, data providers, publishers, etc.

An explicit framework of relevance is an *a priori* component of a Legal Information Systems (LIS) which may complement and position the human element of legal advice. A plausible research might follow the impact of such a conceptual framework within an industrial application.

As future work, and following Bobillo’s philosophy, a small ontology will be built to label every piece of information in the different dimensions of relevance and to describe the user context (including the user’s cognitive abilities). Some of these values for relevance, cannot be pre-established, but must be dynamically calculated. However, having the terms for each of the relevance aspects will foster computer scientists to determine what to evaluate algorithmically, posing the challenges.

The advantages of an ontology-based system providing legal information should be evidenced in a future work, by rigorous user studies where the precision and recall are measured against alternative IR systems. Will ATP consumers find the information faster using Google? Will it be as accurate and its source as neatly described as with the ontology-based system? These questions recall for measurement, regarded as future work. The evaluation of an ontology-based system has to be compared necessarily in terms of precision and recall with other means of accessing the same information with the same queries. A comparative analysis is achieved considering other IR systems, such as: OpenLaws, EUCases², EUR-Lex³ and Google search. A naive first query⁴ in the ATP domain (based in one of the complaints of the dataset) was made in these platforms, and the first impression lies on the following Table, which is about to be tested as future work.

Table 7.1 Comparative analysis between Ontology-based system and IR-based system

<i>Ontology-based system</i>	<i>Information retrieval systems</i>
Higher precision at retrieving documents	Lower precision
Content information is represented more accurately	Information is given at a document level
Information is obtained deterministically (the same results will always be offered for the same input)	Information is not obtained deterministically. Two identical queries may produce different results in different moments
Needs heavy human-supervised training	Does not need human training
Needs manual updating	Can be automatically updated along the time
Links to other documents are qualified	Related documents can be automatically obtained, but no qualification is given on these relations

² Consumer cases can be found in <http://EUCases.eu>; an RDF Sparql endpoint can be found in <http://graphdb.eucases.eu/graphdb/sparql>

³ <http://api.epdb.eu/>

⁴ <http://www.openlaws.eu/?page'id=619:query>

Higher coverage of types of relevance: topical, domain, cognitive and situational relevance	Only topical and domain Relevance are easier to be attained
Information retrieved is faster	Information can be slow to be retrieved

The next line of work has to do with the convergence of this structured model with totally unstructured information sources. The relevance conceptualization delved in the thesis is in consonance to the next-generation of Semantic Web applications [D’Aquin, Motta et al, 2008]. It is envisioned that intelligent application development may perform the following tasks, approaching the concept of relevance, to leverage online semantics: finding relevant sources, selecting appropriate knowledge exploiting heterogeneous knowledge sources and combining ontologies resources.

IBM Watson⁵ configures such an example; integrating different technologies (NLP, machine learning, etc.) to reveal insights from large amounts of unstructured data. IBM Watson has started to be applied in the legal domain, in particular, in different industrial scenarios, like the Ross Intelligence system⁶ or the IBM partnership with Thomson Reuters⁷, leveraging legal information retrieval. To illustrate a plausible scenario,

*“(...) Watson (or something like it) will likely become a standard authoring/query model. Just as most companies today write their Web information to optimize for Google’s search, professional knowledge (which is published in a multi-tier structure) will want to be better synthesized through a system like Watson and will adopt new authoring and publishing norms. Watson won’t displace lawyers—it will make law more accessible and transparent, as it should be”.*⁸

As future work, the relevance conceptualization and the presented legal ontologies may possibly be articulated with such a system.

Possible research questions to be dealt with in the incoming future could be: are these five relevance manifestations enough to model relevant legal information? How to compute better the relevance manifestations within legal ontologies? Is it possible to define such manifestations in a more formal way? To answer these questions, it is mandatory to proceed in an experimental way, as this research implies important and practical consequences in actual legal information systems.

⁵ <http://www.ibm.com/smarterplanet/us/en/ibmwatson/what-is-watson.html>

⁶ <http://www.rossintelligence.com/>

⁷ <http://thomsonreuters.com/en/press-releases/2015/october/thomson-reuters-ibm-collaborate-to-deliver-watson-cognitive-computing-technology.html>

⁸ <http://www.abajournal.com/legalrebels/article/10'predictions'about'how'ibms'watson'will'impac>
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As for the pattern, future work in this area will build upon the application of the pattern into dispute resolution companies receiving complaints in a daily base. Work with experts from other domains could also insure that CDP is general enough to apply beyond the current use-case. With the increase interest of Linked Open Data to publish governmental data, complaints datasets are becoming accessible. However, the format of these complaints depends on the source. None of the datasets found followed the LOD 5* recommendations. As a future work, research will consider if the model can contribute to improve existing datasets in order to achieve a fully computer-interpretable format for complaints.

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1 Annex 1. OWL Ontologies (excerpt)

1.1 RIC Ontology

```
#####
#
#   Annotation properties
#
#####

### http://www.w3.org/2004/02/skos/core#closeMatch
skos:closeMatch rdf:type owl:AnnotationProperty .

#####
#
#   Object Properties
#
#####

:hasConstraint rdf:type owl:ObjectProperty ;
  rdfs:domain :Right ;
  rdfs:range :Constraint .

:hasEnforcementProcedure rdf:type owl:ObjectProperty ;
  rdfs:domain [ rdf:type owl:Class ;
                owl:unionOf ( :Obligation
                                :Prohibition
                                :Right
                              )
              ] ;
  rdfs:range :EnforcementProcedure .

:hasException rdf:type owl:ObjectProperty ;
  rdfs:subPropertyOf owl:topObjectProperty ;
  rdfs:domain :Right ;
  rdfs:range :Exception .

:hasLegalSource rdf:type owl:ObjectProperty ;
  rdfs:domain [ rdf:type owl:Class ;
                owl:unionOf ( :EnforcementProcedure
                                :Exception
                                :FurtherInterpretation
                                :Obligation
                                :Prohibition
                                :Requisite
                                :Right
                              )
              ] ;
  rdfs:range :LegalSource ;
  rdfs:label "has legal source" ;
  skos:closeMatch dct:source .

:hasRequisite rdf:type owl:ObjectProperty ;
  rdfs:domain :Right ;
  rdfs:range :Requisite .

:hasTypeOfIncident rdf:type owl:ObjectProperty ;
  rdfs:subPropertyOf owl:topObjectProperty ;
  rdfs:domain :Incident ;
  rdfs:label "has type of incident" .

:isTriggeredBy rdf:type owl:ObjectProperty ;
  rdfs:domain [ rdf:type owl:Class ;
                owl:unionOf ( :Obligation
                                :Prohibition
                                :Right
                              )
              ] ;
  rdfs:range :Incident ;
  rdfs:label "is triggered by" .

:reportedIn rdf:type owl:ObjectProperty ;
  rdfs:domain :Incident ;
```

```

        rdfs:range <http://github.com/Rel-incode/cop/blob/master/cop.owl#Complaint> ;
        rdfs:label "is reported in" .

:subjectTo rdf:type owl:ObjectProperty ;
        rdfs:domain [ rdf:type owl:Class ;
                owl:unionOf ( :Obligation
                        :Prohibition
                        :Right
                )
        ] ;
        rdfs:range [ rdf:type owl:Class ;
                owl:unionOf ( :Constraint
                        :Exception
                        :FurtherInterpretation
                )
        ] ;
        rdfs:label "subject to" .

#####
#
#   Classes
#
#####

:Constraint rdf:type owl:Class ;
        rdfs:subClassOf [ rdf:type owl:Restriction ;
                owl:onProperty :hasLegalSource ;
                owl:someValuesFrom :LegalSource
        ] ;
        rdfs:comment "Limitations to the exercise of the legal right, conveyed in hard or soft
law" ;
        rdfs:label "Constraint" .

:EnforcementProcedure rdf:type owl:Class ;
        rdfs:subClassOf [ rdf:type owl:Restriction ;
                owl:onProperty :hasLegalSource ;
                owl:someValuesFrom :LegalSource
        ] ;
        rdfs:comment "Consist in procedures to enforce the legal rights, such as
handling complaint procedures and filling a claim in court procedures" ;
        rdfs:label "Enforcement Procedure" .

:Exception rdf:type owl:Class ;
        rdfs:subClassOf [ rdf:type owl:Restriction ;
                owl:onProperty :hasLegalSource ;
                owl:someValuesFrom :LegalSource
        ] ;
        rdfs:comment "Excluding facts or norms to the entitlement of the right" ;
        rdfs:label "Exception" .

:FurtherInterpretation rdf:type owl:Class ;
        rdfs:subClassOf [ rdf:type owl:Restriction ;
                owl:onProperty :hasLegalSource ;
                owl:someValuesFrom :LegalSource
        ] ;
        rdfs:comment "Additional relevant information related to the legal right" ;
        rdfs:label "Further Interpretation" .

:Incident rdf:type owl:Class ;
        rdfs:comment ""Incidents are events, wich are \"certain useful and relevant patterns of
world changes\", An Ontology for Describing Security Events, H Fani, E Bagheri
Mapped to Event Ontology"" ;
        rdfs:label "Incident" ;
        skos:closeMatch prov:Activity .

:LegalSource rdf:type owl:Class ;
        rdfs:comment "Any fact that embeds normative propositions and makes them legally valid
by virtue of such an embedment. SARTOR, Giovanni, Fundamental Legal Concepts: A Formal and
Teleological Characterisation, European University Institute,EUI LAW; 2006/11" ;
        rdfs:label "Legal Source" .

:Obligation rdf:type owl:Class ;
        rdfs:subClassOf [ owl:intersectionOf ( [ rdf:type owl:Restriction ;
                owl:onProperty :hasLegalSource ;
                owl:someValuesFrom :LegalSource
        ]
                [ rdf:type owl:Restriction ;
                owl:onProperty :hasRequisite ;
                owl:someValuesFrom :Requisite
        ]
                [ rdf:type owl:Restriction ;
                owl:onProperty :isTriggeredBy ;
                owl:someValuesFrom :Incident
        ]
        )
        ] ;
        rdf:type owl:Class

```



```

    ] ;
    rdfs:comment "'The proposition expressing the obligation to perform a certain action is
true whenever optimal practical cognition would lead one to have the intention of accomplishing that
action" .

:Prohibition rdfs:type owl:Class ;
    rdfs:subClassOf [ owl:intersectionOf ( [ rdf:type owl:Restriction ;
        owl:onProperty :hasLegalSource ;
        owl:someValuesFrom :LegalSource
    ]
    [ rdf:type owl:Restriction ;
        owl:onProperty :hasRequisite ;
        owl:someValuesFrom :Requisite
    ]
    [ rdf:type owl:Restriction ;
        owl:onProperty :isTriggeredBy ;
        owl:someValuesFrom :Incident
    ]
    ) ;
    rdfs:type owl:Class
    ] ;
    rdfs:comment "A legal restriction against the use of something or against certain
conduct, described in a legal norm" .

:Requisite rdfs:type owl:Class ;
    rdfs:subClassOf [ rdf:type owl:Restriction ;
        owl:onProperty :hasLegalSource ;
        owl:someValuesFrom :LegalSource
    ] ;
    rdfs:comment "Legal requirements for the rights to be entitled" ;
    rdfs:label "Requisite" .

:Right rdfs:type owl:Class ;
    rdfs:subClassOf [ owl:intersectionOf ( [ rdf:type owl:Restriction ;
        owl:onProperty :hasLegalSource ;
        owl:someValuesFrom :LegalSource
    ]
    [ rdf:type owl:Restriction ;
        owl:onProperty :hasRequisite ;
        owl:someValuesFrom :Requisite
    ]
    ) ;
    rdfs:type owl:Class
    ] ;
    rdfs:comment """"A legal position by which an Agent is entitled to obtain something from
another Agent , under specified circumstances, through an enforcement explicated either in a Law,
Contract , etc.\" , http://www.loa-cnr.it/ontologies/CLO/CoreLegal.owl

Rights \"are a social advantage (Bentham), a free choice (Hart), or a protected interest
(MacCormick); it justifies the imposition of duties, the entitlement of claims and privileges, the
transfer of powers. In this wide sense, it includes subjective rights. In the strict sense, it is,
according to the Hohfeldian definition, correlative of Duty and better expressed by Claim, which is a
subclass of Legal Right\"
A. Gangemi, M.-T. Sagri, and D. Tiscornia, A Constructive Framework for Legal Ontologies, Law and the
Semantic Web, Volume 3369 of the series Lecture Notes in Computer Science pp 97-124. p. 112.\"\"\" ;

    rdfs:label "Right" .

```

1.2 RIC-ATPI Ontology

```

#####
#
#   Annotation properties
#
#####

```

```

ric:LegalSource rdfs:type owl:AnnotationProperty .
ric:hasEnforcementProcedure rdfs:type owl:AnnotationProperty .
ric:hasLegalSource rdfs:type owl:AnnotationProperty .
ric:isTriggeredBy rdfs:type owl:AnnotationProperty .
ric:subjectTo rdfs:type owl:AnnotationProperty .
ric:subjectTo rdfs:type owl:AnnotationProperty .

```

```

#####
#
#   Object Properties
#
#####

:happensIn rdf:type owl:ObjectProperty ;

        rdfs:domain :AirTransportPassengerIncident ;

        rdfs:label "happens in" .

#####
#
#   Classes
#
#####

:AirTransportPassengerIncident rdf:type owl:Class ;
                                rdfs:comment "Incident related to the air transport passenger domain"
;
                                rdfs:label "Air Transport Passenger Incident" .

:BaggageIncident rdf:type owl:Class ;
                  rdfs:subClassOf :AirTransportPassengerIncident ;
                  rdfs:comment "Incident related to mishandled baggage, which was lost,
delayed, destroyed or damaged" ;
                  rdfs:label "Baggage Incident" .

:CancelledFlight rdf:type owl:Class ;
                 rdfs:subClassOf :FlightIncident ;
                 rdfs:comment "The non-operation of a flight which was previously planned and on
which at least one place was reserved, Article(2)(1) (EC) Regulation 261/2004. Broader interpretation
from the Court : 'cancellation' as meaning that is does not refer exclusively to the situation in
which the aeroplane in question fails to take off at all. That concept also covers the case in which
an aeroplane took off but, for whatever reason, was subsequently forced to return to the airport of
departure where its passengers were transferred to other flights, Aurora Sousa Rodríguez and Others v
Air France SA, Judgment in Case C-83/10, 13/10/2011" ;
                 rdfs:label "Cancelled Flight" .

:CompelledDeniedBoarding rdf:type owl:Class ;
                          rdfs:subClassOf :DeniedBoarding ;
                          rdfs:label "Compelled Denied Boarding" .

:CustomerServiceInsatisfaction rdf:type owl:Class ;
                                rdfs:subClassOf :ServiceIncident ;
                                rdfs:comment "When the passenger was not satisfied with the customer
service provided by the air carrier in relation to the purchase of a service up to the point of
delivery of the service." ;
                                rdfs:label "Customer Service Insatisfaction",
                                           "Customer Service Insatisfaction"@en .

:DamagedBaggage rdf:type owl:Class ;
                 rdfs:subClassOf :BaggageIncident ;
                 rdfs:comment "Physical damage to baggage and/or its contents. IATA PSCRM, Reso780" ;
                 rdfs:label "Damaged Baggage" .

:DelayedBaggage rdf:type owl:Class ;
                 rdfs:subClassOf :BaggageIncident ;
                 rdfs:comment "A piece(s) of baggage which fails to arrive at the airport of
destination on the same flight as the passenger, but is subsequently delivered. IATA PSCRM, Reso780"
;
                 rdfs:label "Delayed Baggage" .

:DelayedFlight rdf:type owl:Class ;
                rdfs:subClassOf :FlightIncident ;
                rdfs:comment "When an operating air carrier reasonably expects a flight to be delayed
beyond its scheduled time, Article 6 Regulation 261/2004" ;
                rdfs:label "Delayed Flight"@en ,
                           "Vuelo restrasado"@es .

:DeniedBoarding rdf:type owl:Class .

:DeniedBoardingOnAConnectingFlight rdf:type owl:Class ;
                                   rdfs:subClassOf :DeniedBoarding ;
                                   rdfs:comment "Passengers that are denied boarding on a connecting
flight due to the fact their previous flight was delayed and caused further delay by the airline." ;
                                   rdfs:label "Denied Boarding on a Connecting Flight" .

:DeniedBoardingOnReasonableGrounds rdf:type owl:Class ;
                                    rdfs:subClassOf :DeniedBoarding ;
                                    rdfs:label "Denied Boarding on Reasonable Grounds" .

:DeniedFlight rdf:type owl:Class ;
               rdfs:subClassOf :FlightIncident ;

```

```

        rdfs:comment "Denied Flight or denied boarding means a refusal to carry passengers on a
flight, although they have presented themselves for boarding under the conditions laid down in
Article 3(2), except where there are reasonable grounds to deny them boarding, such as reasons of
health, safety or security, or inadequate travel documentation, Article (2)(j) Regulation (EC)
261/2004. Broader interpretation from the CJEU: \" the concept of 'denied boarding' relates not only
to cases of overbooking, denied boarding covers all circumstances in which an air carrier refuses to
carry a passenger, such as those concerning other grounds, such as operational reasons\", German
Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de
Espana SA, Case C-321/11, 04/10/2012, and C-22/11 (Finnair Oyj vs. Timy Lassooy)\" ;
        rdfs:label "Denied Boarding" ;
        rdfs:seeAlso
<http://curia.europa.eu/juris/document/document.jsf?text=&docid=128002&pageIndex=0&doclang=en&mode=re
q&dir=&occ=first&part=1&cid=118809> .

:DestroyedBaggage rdf:type owl:Class ;
        rdfs:subClassOf :BaggageIncident ;
        rdfs:comment "A baggage which became unusable" ;
        rdfs:label "Destroyed Baggage" .

:Downgrading rdf:type owl:Class ;
        rdfs:subClassOf :SeatMisplacement ;
        rdfs:comment "When an operating air carrier places a passenger in a class lower than
that for which the ticket was purchased,Article 10 (2) Regulation 261/2004" ;
        rdfs:label "Downgrading" .

:Event rdf:type owl:Class .

:FlightIncident rdf:type owl:Class ;
        rdfs:subClassOf :AirTransportPassengerIncident ;
        rdfs:comment "Incident related to the provision of the flight" ;
        rdfs:label "Flight Incident" .

:FollowingDayDelayDeparture rdf:type owl:Class ;
        rdfs:subClassOf :DelayedFlight ;
        rdfs:comment "When the reasonably expected time of departure is at least
the day after the time of departure previously announced, Art. 6 (1) (ii) EC Regulation 261/2004" ;
        rdfs:label "Following Day Delay at Departure" .

:InsolvencyIncident rdf:type owl:Class ;
        rdfs:subClassOf :FlightIncident ;
        rdfs:comment "When an air carrier has insufficient assets to meet all debts, or
being unable to pay debts as and when they are due, Council Regulation (EC) No 1346/2000 of 29 May
2000 on insolvency proceedings" ;
        rdfs:label "Insolvency Incident" .

:Irresponsiveness rdf:type owl:Class ;
        rdfs:subClassOf :ServiceIncident ;
        rdfs:comment "Incident related to the difficulties in getting information from the
air carrier on where and how to complain and on claim redress (e.g. no phone number, no email or all
telephone lines busy, no response to the complaint)." ;
        rdfs:label "Irresponsiveness" .

:LongDelayedAtArrival rdf:type owl:Class ;
        rdfs:subClassOf :DelayedFlight ;
        rdfs:comment "Interpretation from the CJEU: When an operating air carrier
reach their final destination three hours or more after the scheduled arrival time (originally
scheduled by the air carrier), Joined Cases C-402/07 (Sturgeon vs. Condor Flugdienst GmbH) and C-
432/07 (Böck/Lepuschitz vs. Air France); Joined Cases C-581/10 Nelson and Others v Deutsche Lufthansa
AG and C-629/10 Tui Travel, British Airways, EasyJet, IATA vs. Civil Aviation Authority" ;
        rdfs:label "Long Delay at Arrival" .

:LongDelayedAtDeparture rdf:type owl:Class ;
        rdfs:subClassOf :DelayedFlight ;
        rdfs:comment "When an operating air carrier reasonably expects a flight to be
delayed at departure at least five hours or more, Art. 6 (1) (iii) (EC) Regulation 261/2004" ;
        rdfs:label "Long Delay at Departure" .

:LostBaggage rdf:type owl:Class ;
        rdfs:subClassOf :BaggageIncident ;
        rdfs:comment "A piece(s) of baggage which is irretrievably lost. IATA PSCRM, Reso780" ;
        rdfs:label "Lost Baggage" .

:SeatMisplacement rdf:type owl:Class ;
        rdfs:subClassOf :ServiceIncident ;
        rdfs:comment "When an operating air carrier misplaces a passenger in a class
different than that for which the ticket was purchased.Article 10 Regulation 261/2004" ;
        rdfs:label "Seat Misplacement"@en .

:ServiceIncident rdf:type owl:Class ;
        rdfs:subClassOf :AirTransportPassengerIncident ;
        rdfs:comment "Incident related to the quality of the service" ;
        rdfs:label "Service Incident" .

:ShortDelayedAtDeparture rdf:type owl:Class ;
        rdfs:subClassOf :DelayedFlight ;
        rdfs:comment ""When an operating air carrier reasonably expects a flight to
be delayed beyond its scheduled time of departure,
(a) for two hours or more in the case of flights of 1500 kilometres

```

```

or less; or
(b) for three hours or more in the case of all intra-Community
flights of more than 1 500 kilometres and of all other
flights between 1 500 and 3 500 kilometres; or
(c) for four hours or more in the case of all flights not falling
under (a) or (b),
Article 6 (1) (EC) Regulation 261/2004""@en ;
      rdfs:label "Short Delay at Departure"@en .

:UnfairCommercialPractices rdf:type owl:Class ;
      rdfs:subClassOf :ServiceIncident ;
      rdfs:comment "Commercial practices which are dishonest practises;
misleading commercial practices (such as false claims, deceiving information or leaving out important
information that would affect the consumer decision to buy something); and aggressive sales
techniques that harass the consumer into buying something under pressure, Article 5 of the Directive
2005/29/EC of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal
market."@en ;
      rdfs:label "Unfair Commercial Practices"@en .

:UnfairContractTerms rdf:type owl:Class ;
      rdfs:subClassOf :ServiceIncident ;
      rdfs:comment "A contractual term shall be regarded as unfair if, contrary to the
requirement of good faith, it causes a significant imbalance in the parties' rights and obligations
arising under the contract, to the detriment of the consumer, Article 3 (1) Directive of Unfair
Contract terms 93/ 13/EEC" ;
      rdfs:label "Unfair Contract Terms"@en .

:Upgrading rdf:type owl:Class ;
      rdfs:subClassOf :SeatMisplacement ;
      rdfs:comment "When an operating air carrier places a passenger in a class higher
than that for which the ticket was purchased, Article 10 (1) Regulation 261/2004"@en .

:VolunteerDeniedBoarding rdf:type owl:Class ;
      rdfs:subClassOf :DeniedBoarding ;
      rdfs:label "Volunteer Denied Boarding" .

ric:Constraint rdf:type owl:Class .

ric:EnforcementProcedure rdf:type owl:Class .

ric:Exception rdf:type owl:Class .

ric:FurtherInterpretation rdf:type owl:Class .

ric:LegalSource rdf:type owl:Class .

ric:Requisite rdf:type owl:Class .

ric:Right rdf:type owl:Class .

#####
#
#   Individuals
#
#####

:arrivaltimereinterpretation rdf:type owl:NamedIndividual ,
      ric:FurtherInterpretation ;
      rdfs:comment "The actual arrival time corresponds to the time at which at
least one of the doors of the aircraft is opened, the assumption being that, at that moment, the
passengers are permitted to leave the aircraft" ;
      rdfs:label "Further interpretation of 'arrival time'" ;
      ric:hasLegalSource :case45213 .

:badbagexception rdf:type owl:NamedIndividual ,
      ric:Exception ;
      rdfs:comment "If the baggage had any vice or inherent defect prior to the flight,
the airline is not liable for any damage caused to the baggage" ;
      rdfs:label "Baggage with prior defect or inherent vice" ;
      ric:hasLegalSource :montrealart172 .

:bagdamageunavoidable rdf:type owl:NamedIndividual ,
      ric:Exception ;
      rdfs:comment "The carrier shall not be liable for damage occasioned by delay if
it proves that it and its servants and agents took all measures that could reasonably be required to
avoid the damage or that it was impossible for it or them to take such measures, Art. 19 Montreal
Convention"@en ;
      rdfs:label "Exception to liability for damage caused by delay"@en ;
      ric:hasLegalSource :montrealart19 .

:baggagecomplainthandling rdf:type owl:NamedIndividual ,
      ric:EnforcementProcedure ;

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rdfs:comment ""The following complaint form should be used and addressed against the air carrier and also submitted to the National Enforcement Body. Airline complaint form); and NEB address.

An additional form called PIR (Property Irregularity Report) should be filled for baggage complaints, before leaving the airport (the complaint desks are located generally at the baggage pick up point).

Upon completion of the report, passengers should be given a copy of it or request it.

Passengers have to prove the extent of their loss. Accordingly, copies of the proof documents should be presented in annex to the complaint, in order to confirm the narrated facts and to sustain the redress request (proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses).

Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use.

Legal Action Procedure - The time-limit to claim for damages in court proceedings is 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention"" ;

rdfs:label "Luggage complaint handling procedure"@en .

:baggageabilityrequisite rdf:type owl:NamedIndividual ,
ric:Requisite ;
rdfs:comment "For the air carrier to be liable for damage, the event that caused the destruction/loss of/damage to checked baggage, have to be taken place on board of the aircraft, or during any period the baggage was in charge of the air carrier" ;
rdfs:label "Baggage liability requisite"@en .

:burdenofproof rdf:type owl:NamedIndividual ,
ric:Constraint ;
rdfs:comment "The burden of proof concerning a cancellation and whether it is caused by extraordinary circumstances rests with the operating air carrier"@en ;
rdfs:label "Constraint in the burden of proof reason"@en ;
ric:hasLegalSource :regulation261art52 .

:cancelledflight rdf:type owl:NamedIndividual ,
:CancelledFlight ;
rdfs:comment ""Means the non-operation of a flight which was previously planned and on which at least one place was reserved, Art.(2)(1) (EC) Regulation 261/2004.
<hr>Broader interpretation from the Court: 'cancellation' as meaning that it does not refer exclusively to the situation in which the aeroplane in question fails to take off at all. That concept also covers the case in which an aeroplane took off but, for whatever reason, was subsequently forced to return to the airport of departure where its passengers were transferred to other flights. See Aurora Sousa Rodríguez and Others v Air France SA, Judgment in Case C-83/10, 13/10/2011""@en ;
rdfs:label "Cancelled Flight"@en .

:careconstraint1 rdf:type owl:NamedIndividual ,
ric:Constraint ;
rdfs:comment "Care for passengers awaiting an alternative or a delayed flight may be limited or declined if the provision of the care would itself cause further delay."@en ;
rdfs:label "Constraint to the right of meals and refreshments if it causes more delay"@en ;
ric:hasLegalSource :regulation261rec18 .

:careconstraint2 rdf:type owl:NamedIndividual ,
ric:Constraint ;
rdfs:comment "If a third country airport authority provides assistance on a flight incident to passengers (in the form of vouchers or accommodation), this preclude passenger from claiming further assistance from the airline concerned"@en ;
rdfs:label "Constraint to the right of care if assistance already provided by a third country airport authority"@en ;
ric:hasLegalSource :regulation261art31b .

:case13911 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
dct:identifier "ECLI:EU:C:2012:741" ;
rdfs:comment "Time-limits for bringing actions" ;
rdfs:label "(Case C-139/11)" ;
rdfs:seeAlso <http://curia.europa.eu/juris/document/document.jsf?docid=130243&doclang=en>

:case20408 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
dct:identifier "ECLI:EU:C:2009:439" ;
rdfs:comment "Jurisdiction" ;
rdfs:label "(Case C-204/08)" ;
rdfs:seeAlso
<http://curia.europa.eu/juris/document/document.jsf?text=&docid=76299&pageIndex=0&doclang=en&mode=lst&dir=&occ=first&part=1&cid=715643> .

:case32111 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
dct:identifier "ECLI:EU:C:2012:609" ;

rdfs:comment "'Denied boarding' relates not only to cases of overbooking, but covers all circumstances in which an air carrier refuses to carry a passenger, such as those concerning other grounds, operational reasons" ;
 rdfs:label "(Case C-321/11)" ;
 rdfs:seeAlso
 <http://curia.europa.eu/juris/document/document.jsf?text=&docid=128002&pageIndex=0&doclang=en&mode=req&dir=socc=first&part=1&cid=118809> .

:case40207 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 dct:identifier "ECLI:EU:C:2009:716" ;
 rdfs:comment "A long delay entitles passengers to the same compensation as in the case of a flight cancellation: the passenger is entitled to compensation if he reaches his/her final destination with a delay of three hours or more. Such a delay does not, however, entitle passengers to compensation if the air carrier can prove that the long delay was caused by extraordinary circumstances which could not have been avoided even if all reasonable measures had been taken, namely circumstances beyond the actual control of the air carrier" ;
 rdfs:label "(Joined Cases(C-402/07);(C-432/07))" ;
 rdfs:seeAlso <http://curia.europa.eu/juris/document/document.jsf?docid=73703&doclang=EN> .

:case45213 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 dct:identifier "ECLI:EU:C:2014:2141" ;
 rdfs:comment "The actual arrival time corresponds to the time at which at least one of the doors of the aircraft is opened, the assumption being that, only at that moment, the passengers are permitted to leave the aircraft" ;
 rdfs:label "(Case C-452/13)" ;
 rdfs:seeAlso <http://curia.europa.eu/juris/document/document.jsf?docid=157348&doclang=EN> .

:case54907 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 dct:identifier "ECLI:EU:C:2008:771" ;
 rdfs:comment "Extraordinary circumstances are events which could not have been avoided even if all reasonable measures had been taken, namely circumstances beyond the actual control of the air carrier; ii) events which, by their nature or origin, are inherent in the normal exercise of the activity of the air carrier and are beyond its actual control" ;
 rdfs:label "(Case C-549/07)" ;
 rdfs:seeAlso <http://curia.europa.eu/juris/document/document.jsf?docid=73223&doclang=en> .

:case58110 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 dct:identifier "ECLI:EU:C:2012:657" ;
 rdfs:comment "Compensation should also apply to long delays, provided that passengers reach their final destination three hours or more after the scheduled arrival time (originally scheduled by the air carrier). A delay must be assessed in relation to the scheduled arrival time at that destination, that is, at the destination of the last flight, given that passengers suffer an irreversible loss of time. Such fixed compensation, is established in article 7 of the Regulation (between €250 and €600 depending on the distance of the flight). Such a delay does not, however, entitle passengers to compensation if the air carrier can prove that the long delay is caused by extraordinary circumstances" ;
 rdfs:label "(Joined Cases(C-581/10);(C-629/10))" ;
 rdfs:seeAlso <http://curia.europa.eu/juris/document/document.jsf?docid=128861&doclang=EN> .

:case8310 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 dct:identifier "ECLI:EU:C:2011:652" ;
 rdfs:comment "'Further compensation' is intended to supplement the application of the standardised and immediate measures provided for by the EU Regulation. Further compensation allows passengers to be compensated for the entirety of the material and non-material damage they suffered due to the failure of the air carrier to fulfil its contractual obligations. Further compensation is carried by national courts." ;
 rdfs:label "(Case C-83/10)"@en ;
 rdfs:seeAlso <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62010CJ0083:EN:HTML> .

:casewalzcliclair rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 dct:identifier "ECLI:EU:C:2010:251" ;
 rdfs:comment "The term 'damage' applied to baggage must be interpreted as including both material and non-material damage" ;
 rdfs:label "(Case C-63/09)"@en ;
 rdfs:seeAlso <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:62009CJ0063> .

:com168p7 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 rdfs:comment "Communication from the Commission to the European Parliament and the Council pursuant to Article 17 of the Regulation (EC) No 261/2004 on the operation and the results of this Regulation establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights {SEC(2007) 426} (COM(2007) 168 final" ;
 rdfs:label "Communication COM(2007)168" ;
 rdfs:seeAlso <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52007DC0168> .

:com1748 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 rdfs:comment "Communication from the Commission to the European Parliament and the Council on the application of Regulation 261/2004 establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights, (COM(2011) 174 final)" ;

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rdfs:label "Communication COM(2011) 174" ;
rdfs:seeAlso <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011DC0174> .

:compelleddeniedboarding rdf:type owl:NamedIndividual ,
    :CompelledDeniedBoarding ;
    rdfs:comment "Compelled Denied Boarding reflects the incident when a person
who has presented himself for boarding under the conditions laid down in Article 3(2) and does not
respond positively to the air carrier's call for passengers to surrender their reservation and hence
is compelled to yield it. Article 4(2)Regulation (EC) 261/2004"@en ;
    rdfs:label "Compelled denied boarding"@en .

:compensationincaseofcancellationconstraint rdf:type owl:NamedIndividual ,
    ric:Constraint ;
    rdfs:comment "If the passenger is rerouted to his final destination, on an
alternative flight, the operating air carrier may reduce the compensation by 50%, when the arrival
time (of which does not exceed the scheduled arrival time of the flight originally booked) by: -2h
in respect to all flights of ≤ 1500 kms; -3h, in respect to all intra-Community flights of > 1500
kms; -3h, in respect for all other flights between 1500 and 3500km, Art. 7(2) (b) -4h, in respect
of all other flights" ;
    rdfs:label "Constraint to the right of compensation in case of cancelled
flight"@en ;
    ric:hasLegalSource :regulation261art72 .

:compensationincaseofdeniedboardingconstraint rdf:type owl:NamedIndividual ,
    ric:Constraint ;
    rdfs:comment "If the passenger is rerouted to his final
destination, on an alternative flight, the operating air carrier may reduce the compensation by 50%,
when the arrival time (of which does not exceed the scheduled arrival time of the flight originally
booked) by: -2h in respect to all flights of ≤ 1500 kms; -3h, in respect to all intra-Community
flights of > 1500 kms; -3h, in respect for all other flights between 1500 and 3500km, Art. 7(2) (b)
-4h, in respect of all other flights" ;
    rdfs:label "Constraint to the right of compensation in
case of compelled denied boarding"@en ;
    ric:hasLegalSource :regulation261art72 .

:complainthandling rdf:type owl:NamedIndividual ,
    ric:EnforcementProcedure ;
    rdfs:comment ""To write a complaint, a standard complaint form should be used and
addressed against the air carrier and also submitted to the National Enforcement Body.
Copies of the proof documents should be presented as annex to the complaint, in
order to confirm the narrated facts and sustain the redress request (copies of the boarding pass,
expenses, etc.)""@en ;
    rdfs:label "Complaint handling procedure"@en ;
    rdfs:seeAlso
<http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf> .

:consequentialdamagedelayinterpretation rdf:type owl:NamedIndividual ,
    ric:FurtherInterpretation ;
    rdfs:comment "The consequential damage due to delay needs to
be proved according to the losses that passengers are subjected to. Examples of damage consist in
costs of missing work, days of holidays, pre-booked accommodation or events, purchase necessities." ;
    rdfs:label "Right to 4150 SDR in case of consequential damage
in a delayed flight" ;
    ric:hasLegalSource :montreal221 .

:damagedbaggage rdf:type owl:NamedIndividual ,
    :DamagedBaggage ;
    rdfs:comment "A baggage damage is a physical damage to baggage and/or its contents."
;
    rdfs:label "Damaged baggage"@en .

:delayedbaggage rdf:type owl:NamedIndividual ,
    :DelayedBaggage ;
    rdfs:comment "A delayed baggage is a piece(s) of baggage which fails to arrive at the
airport of destination on the same flight as the passenger, but is subsequently delivered." ;
    rdfs:label "Delayed baggage"@en .

:deniedboardinginterpretation rdf:type owl:NamedIndividual ,
    ric:FurtherInterpretation ;
    rdfs:comment "The concept of 'denied boarding' covers all circumstances
in which an air carrier refuses to carry a passenger, such as those concerning other grounds, such as
operational reasons, because of the anticipated delay to an earlier flight also operated" ;
    rdfs:label "Further interpretation of the concept of 'denied boarding'"
;
    ric:hasLegalSource :case32111 .

:deniedboardingonaconnectingflight rdf:type owl:NamedIndividual ,
    :DeniedBoardingOnAConnectingFlight ;
    rdfs:comment "Passengers that are denied boarding on a connecting
flight due to the fact their previous flight was delayed and caused further delay by the airline"@en
;
    rdfs:label "Denied boarding on a connecting flight"@en .

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:deniedboardingonreasonablegrounds rdf:type owl:NamedIndividual ,
:DeniedBoardingOnReasonableGrounds ;
rdfs:comment "Denied boarding occurs when there are reasonable
grounds to deny them boarding, such as reasons of health, safety or security, or inadequate travel
documentation, Article (2)(j) Regulation (EC) 261/2004. Broader interpretation from the CJEU: 'the
concept of denied boarding relates not only to cases of overbooking, denied boarding covers all
circumstances in which an air carrier refuses to carry a passenger, such as those concerning other
grounds, such as operational reasons', German Rodriguez Cachafeiro, Maria de los Reyes Martinez-
Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Case C-321/11, 04/10/2012, and C-22/11
(Finnair Oyj vs. Timy Lassooy)";
rdfs:label "Denied boarding on reasonable grounds"@en .

:destroyedbaggage rdf:type owl:NamedIndividual ,
:DestroyedBagagge ;
rdfs:comment "A destroyed baggage is a baggage which became unusable" ;
rdfs:label "Destroyed baggage"@en .

:downgrading rdf:type owl:NamedIndividual ,
:SeatMisplacement ;
rdfs:comment "When an operating air carrier places a passenger in a class lower than
that for which the ticket was purchased. (Regulation 261/2004, Art. 10(2))"@en ;
rdfs:label "Seat Misplacement: Downgrading"@en .

:earlynoticeexception rdf:type owl:NamedIndividual ,
ric:Exception ;
rdfs:comment """"There is no right to compensation if the passenger is informed
of the cancellation:
i)at least 2 weeks before the scheduled time of departure;
ii)between 2 weeks and 7 days before the scheduled time of departure and are offered
rerouting (allowing them to depart no more than 2h before the scheduled time of departure and less
than 4 h after the scheduled time of arrival); or
iii)less than 7 days before the scheduled time of departure, and are offered
rerouting, allowing them to depart no more than 1h before the scheduled time of departure and less
than 2 h after the scheduled time of arrival)""";
rdfs:label "Exception to the right of compensation in case of being informed in
advance of the cancellation" ;
ric:hasLegalSource :regulation261art51ci .

:eccprocedure rdf:type owl:NamedIndividual ,
ric:EnforcementProcedure ;
rdfs:comment "Please see the following page. " ;
rdfs:label "Complaint to the nearest ECC-Net"@en ;
rdfs:seeAlso <http://ec.europa.eu/consumers/solving_consumer_disputes/non-
judicial_redress/ecc-net/index_en.htm> .

:ecdraft rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment """"<b>List of extraordinary circumstances</b>
War / Political Instability - unforeseen disruption arising from war where travel is not
recommended.
War / Political Instability - incident where the supply of aircraft fuel is limited or
unavailable at short notice and without pre-notification.
Unlawful Act - e.g. terrorism
Sabotage - Acts of sabotage to the aircraft scheduled to operate the flight.
Security - Closure of the airport of departure or the airport of arrival without pre-
notification for security reasons.
Security - Bomb discovery or bomb scare either onboard the aircraft or at the airport of
departure or the airport of arrival.
Security - Hi-jacking of the aircraft.
Security - Removal of unaccompanied baggage due to a serious security concern.
Security - Removal of an unruly passenger from the aircraft for security reasons - thereby
causing either a flight delay or diversion.
Meteorological - Weather conditions incompatible with the safe operation of the flight.
These weather conditions may be forecast to arise at either the airport of departure, the airport of
arrival or along the intended flight path of the aircraft.
Meteorological - Closure of either the airport of departure or the airport of arrival due to
meteorological conditions.
Meteorological - Weather conditions resulting in capacity restrictions at either the airport
of arrival or the airport of departure.
Meteorological - Damage to the aircraft which could affect the safety of the flight or the
integrity of the aircraft and requires immediate assessment and/or repair and caused by other
meteorological events (lightning strikes, hailstones, thunderstorms, severe turbulence etc).
Meteorological / De-icing - Extreme weather conditions which result in the elevated
consumption and subsequent exhaustion of what would usually constitute ample de-icing stocks due to
third party supply failures - with the result that the aircraft cannot be de-iced for departure.
Airport Closure - Closure of either the airport of arrival or the airport of departure for
non-security and non-meteorological reasons.
Medical Grounds - Passenger or crew member becomes seriously ill or dies on-board or during
the flight.
Bird-strikes - Bird-strikes to the aircraft during a flight which might cause damage which
requires immediate compulsory checks and possible repair.
Manufacturing Defects - Discovery of a hidden manufacturing defect by the air carrier (this
is often noted by unusual failure of the same aircraft part).

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Unexpected flight safety shortcomings - Damage to the aircraft primary or secondary structure (e.g. metallic or composite structure) caused by third parties on the ground prior to the departure of a flight and requiring immediate assessment and/or repair. For example a collision between an airport vehicle and an aircraft.

Unexpected flight safety shortcomings - In-flight damage to the aircraft during the preceding flight, caused by a foreign object, and which requires immediate assessment and/or repair.

Unexpected flight safety shortcomings - Any technical issues which cause the pilot to carry out an aircraft turnaround or diversion.

Unexpected flight safety shortcomings - Failure of the bleed-air system/environmental control system on an aircraft (which had been properly maintained) either immediately prior to departure or in-flight.

Unexpected flight safety shortcomings - Premature failure of life-limited parts (as referenced in applicable maintenance data, contained within the aircraft maintenance manual, or Maintenance Planning Document, or Maintenance Review Board Report prior to their scheduled inspection/removal/retirement date (where those parts had been maintained in accordance with the required maintenance programme).

Unexpected flight safety shortcomings - Failure of on-condition/condition monitored parts i.e. parts which should not require unscheduled maintenance or replacement during normal operational service (for example propeller oil-temperature gauges. The premature failure of these parts during normal operational service when maintained in accordance with the maintenance programme is unpredictable).

Unexpected flight safety shortcomings - Failure of necessary or required aircraft systems (for example the cooling system, avionics system, flight control system, flaps, slats, rudders, thrust reverser, landing gear) either immediately prior to departure or in-flight (where those systems had been maintained in accordance with the required maintenance programme).

Unexpected flight safety shortcomings - Any other technical defects which become apparent immediately prior to departure or in-flight (where the system or part had been maintained in accordance with the required maintenance programme) and which require investigation and/or repair before the aircraft is airworthy for the intended flight.

Unexpected flight safety shortcomings - Smoke, fire or fumes on board the aircraft unless the problem has been caused by a part not being maintained in accordance with the required maintenance programme or due to a failure to follow appropriate operational procedures.

Industrial Relation Issues - Strikes that affect the operation of an air carrier. For example strikes undertaken by Air Traffic Control.

Air Traffic Management - Where Air Traffic Control suspends or restricts operations out of the airport of departure or into the airport of arrival.

Air Traffic Management - Where Air Traffic Control suspends or restricts operations into or out of a block of air-space through which the air carrier must travel in order to operate the flight.

List of circumstances which are not extraordinary

Technical Issues - Technical issues which arise as a result of the air carrier's failure to maintain its aircraft in accordance with the required maintenance programme.

Technical Issues - Technical issues which were found during maintenance where the part or system in question was scheduled to be checked. Over-running maintenance can be a reflection of poor maintenance planning.

Crew Out-of-Hours - When this occurs as a result of poor operational planning by the air carrier and inadequate flight and turnaround times being allocated for the aircraft.

Absence of correct Flight Documentation - Where the failure to prepare and submit the documentation necessary to operate the flight was due to factors within the air carrier's control.

Safety Assessment of Foreign Aircraft (SAFA) Inspections - SAFA aircraft inspections which reveal technical issues which require immediate assessment and/or aircraft repair. (These are issues that should have been addressed during the normal maintenance or operation of the aircraft)"" ;

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    rdfs:label "Draft list of extraordinary circumstances" ;
    rdfs:seeAlso <http://ec.europa.eu/transport/themes/passengers/air/doc/neb-extraordinary-
circumstances-list.pdf> .
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:extraordinarycircumstances rdf:type owl:NamedIndividual ,
    ric:Exception ;
    rdfs:comment "An operating air carrier shall not be obliged to pay
compensation if it can prove that the cancellation is caused by extraordinary circumstances which
could not have been avoided even if all reasonable measures had been taken."@en ;
    rdfs:label "Exception to the right of compensation if there are
extraordinary circumstances"@en ;
    ric:hasLegalSource :regulation261art53 .
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:extraordinarycircumstancesinterpretation1 rdf:type owl:NamedIndividual ,
    ric:FurtherInterpretation ;
    rdfs:comment "Extraordinary circumstances which could not
have been avoided even if all reasonable measures had been taken. Such circumstances may, in
particular, occur in cases of political instability, meteorological conditions incompatible with the
operation of the flight concerned, security risks, unexpected flight safety shortcomings and strikes
that affect the operation of an operating air carrier."@en ;
    rdfs:label "Further interpretation of extraordinary
circumstances1" ;
    ric:hasLegalSource :regulation261rec14 .
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:extraordinarycircumstancesinterpretation2 rdf:type owl:NamedIndividual ,
    ric:FurtherInterpretation ;
    rdfs:comment "Extraordinary circumstances should be deemed
to exist where the impact of an air traffic management decision in relation to a particular aircraft
on a particular day gives rise to a long delay, an overnight delay, or the cancellation of one or
more flights by that aircraft, even though all reasonable measures had been taken by the air carrier
concerned to avoid the delays or cancellations"@en ;
    rdfs:label "Further interpretation of extraordinary
circumstances2" ;
    ric:hasLegalSource :regulation261rec15 .
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:extraordinarycircumstancesinterpretation3 rdf:type owl:NamedIndividual ,
      ric:FurtherInterpretation ;
      rdfs:comment "Extraordinary Circumstances are events
which, owing to its nature or origin, are not inherent to the normal exercise of the activity of the
air carrier, that could not have been avoided, even if all reasonable measures had been taken, namely
circumstances which are beyond the air carrier's actual control" ;
      rdfs:label "Further interpretation of extraordinary
circumstances3" ;
      ric:hasLegalSource :case54907 .

:followingdaydelaydeparture rdf:type owl:NamedIndividual ,
      :FollowingDayDelayDeparture ;
      rdfs:comment "Delayed flight at departure, when the reasonably expected
time of departure is at least the day after the time of departure previously announced"@en ;
      rdfs:label "Flight delayed until the following day" ;
      ric:hasLegalSource :regulation261art612 .

:furthercompensationinterpretation rdf:type owl:NamedIndividual ,
      ric:FurtherInterpretation ;
      rdfs:comment "Passengers have rights to further compensation that
should be pursued at the national court" ;
      rdfs:label "Meaning of further compensation" ;
      ric:hasLegalSource :case8310 ,
      :regulation261art12 .

:iataglossary rdf:type owl:NamedIndividual ,
      ric:LegalSource ;
      rdfs:label "IATA Glossary"@en ;
      rdfs:seeAlso <http://www.iata.org/whatwedo/passenger/Documents/passenger-glossary-of-
terms.xls> .

:insatisfaction rdf:type owl:NamedIndividual ,
      :CustomerServiceInsatisfaction ;
      rdfs:comment "Insatisfaction with the customer service provided by the
airline in relation to the purchase of a service up to the point of delivery of the service.Examples:
queue length, discriminatory issues related to language, nationality,quality of the food,  behavior
or attitude of some of its employees" ;
      rdfs:label "Customer Service Insatisfaction"@en .

:insolvency rdf:type owl:NamedIndividual ,
      :InsolvencyIncident ;
      rdfs:comment "When an air carrier has insufficient assets to meet all debts, or being
unable to pay debts as and when they are due" ;
      rdfs:label "Insolvency"@en ;
      ric:hasLegalSource :regulation1346 .

:insolvencyagreement rdf:type owl:NamedIndividual ,
      ric:LegalSource ;
      rdfs:comment "In the event of an airline bankruptcy, IATA member airlines flying
to and from the EU will make their best efforts to offer repatriation to passengers stranded away
from home. These passengers will be provided access to discounted transport to return home, subject
to available capacity. The 'rescue fares' of a nominal amount will be available for purchase up to
a maximum of two weeks after the event to anyone flying to and from or within Europe who does not
already possess insurance covering this eventuality. States responsible for the licensing of the
insolvent airline should also play their role in communicating to stranded passengers the possibility
of this rescue service. 2 - In some Member States purchases made by a credit card (and some debit
cards) allow consumers to claim a refund from the card provider in the event of the service
provider's insolvency. However, this refund is usually limited to the cost of the original ticket and
in some cases subject to a minimum amount"@en ;
      rdfs:label "Agreement on Voluntary Repatriation Assistance To Passengers by
IATA" ;
      rdfs:seeAlso <http://www.iata.org/pressroom/pr/Documents/Voluntary-Repatriation-
Assistance-to-Passengers-Report-PR-2014-11-25-01.pdf> .

:insolvencyprocedure rdf:type owl:NamedIndividual ,
      ric:EnforcementProcedure ;
      rdfs:comment "It shall be for each Member State to decide which of these
facilities shall be available and whether to enable the courts or administrative authorities to
require prior recourse to other established means of dealing with complaints, Article 11 Directive
2005/29/EC;The Passenger should request help in the local ECC"@en ;
      rdfs:label "Resort to the ECC network"@en .

:interpretationbaggageinformationrequest rdf:type owl:NamedIndividual ,
      ric:FurtherInterpretation ;
      rdfs:comment "" All air carriers shall, when selling
carriage by air,
      -ensure that information governing liability for passengers and their baggage,
including deadlines for filing an action for compensation and the possibility of making a special
declaration for baggage, is made available to passengers at all points of sale (including sale by
telephone and via the Internet).
      -provide each passenger with a written indication of the liability limits in respect
of destruction, loss of or damage to baggage, and for damage occasioned by delay. ""@en ;

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request"@en ;
                                rdfs:label "Further interpretation of baggage information
                                ric:hasLegalSource :regulation88961 .

:interpretationbaggageability rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "EU air carriers must 'without delay, and in any event,
not later than 15 days after the identity of the person entitled to compensation has been
established, make such advance payments to meet immediate economic needs on a basis proportional to
the hardship suffered'"@en ;
                                rdfs:label "Further interpretation of baggage liability"@en ;
                                ric:hasLegalSource :regulation8895 .

:interpretationcomplainthandlingprocedure rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "When the operating and contracting airlines
are different, the complaint can be issued against either. If the name or code of an air carrier is
indicated on the ticket, that is the contracting air carrier" ;
                                rdfs:label "Further interpretation of complaint handling
procedure" ;
                                ric:LegalSource :montreal42 .

:interpretationdamagebaggage rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "The limit of 1,000SDRs must be interpreted as including
both material and non-material damage"@en ;
                                rdfs:label "Further interpretation of damage in baggage" ;
                                ric:hasLegalSource :casewalzclicair .

:interpretationofpassengersobligations rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "Passengers must have a confirmed reservation on
the flight concerned; Passengers must be present on time for check-in at the time indicated in the
electronic panel or in the ticket, or if no time is indicated-not later THEN 45 min before the
published departure time;When passengers have been through-checked, they have an obligation to arrive
at the gate on time for boarding. This applies to both departing and connecting passengers" ;
                                rdfs:label "Further interpretation of the obligations of the
passengers" ;
                                ric:hasLegalSource :regulation261art32a .

:interpretationofrighttoinformation1 rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "Passengers should be fully informed of their
rights in the event of denied boarding and of cancellation or long delay of flights, to effectively
exercise their rights"@en ;
                                rdfs:label "Further interpretation of the right to
information1"@en ;
                                ric:hasLegalSource :regulation261rec20 .

:interpretationofrighttoinformation2 rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "An operating air carrier denying boarding,
delaying or cancelling a flight shall provide each passenger affected with a written notice setting
out the rules for compensation and assistance. The contact details of the national designated body
shall also be given to the passenger in written form"@en ;
                                rdfs:label "Further interpretation of the right to
information2"@en ;
                                ric:hasLegalSource :regulation261art142 .

:interpretationofrighttorerouting1 rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "Passengers should be rerouted via other carriers or
by surface transport, if there is no alternative flight available on their own aircraft. The 'network
airlines' generally have reciprocal agreements enabling them to reroute passengers via other carriers
if necessary, at a reasonable price." ;
                                rdfs:label "Further Interpretation to the right to rerouting1"@en
;
                                ric:hasLegalSource :coml68p7 .

:interpretationofrighttorerouting2 rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "Rerouting alternatives can be proposed by other
means of transport, such as train, taxi or bus, if, the distance to be covered is appropriate for
such transport modes" ;
                                rdfs:label "Further Interpretation to the right to rerouting2"@en
;
                                ric:hasLegalSource :coml68p7 ,
                                :opiniondget11 .

:interpretationofrighttorerouting3 rdf:type owl:NamedIndividual ,
                                ric:FurtherInterpretation ;
                                rdfs:comment "Rerouting may be conducted by another mode of
transport or by another carrier covering the same route or a very similar one, in the same or similar

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fare class. The 'comparable transport conditions' must be defined on the basis of the same or similar class and not on the ticket price paid by the individual passenger." ;
 rdfs:label "Further Interpretation to the right to rerouting3"@en .

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 :interpretationondocumentation rdf:type owl:NamedIndividual ,
 ric:FurtherInterpretation ;
 rdfs:comment "It is stated in the terms and conditions of the air carriers that it is entirely the passenger's responsibility to ensure that they are in possession of the necessary documentation. This includes items such as photographic ID, passports, visas, transit visas. It is advisable that passengers read the terms and conditions carefully to see what forms of identification are specified by the air carrier." ;
 rdfs:label "Documentation of the passenger" .

:irresponsiveness rdf:type owl:NamedIndividual ,
 :Irresponsiveness ;
 rdfs:comment "Incident related to the difficulties in getting information from the air carrier on where and how to complain; and on claiming redress (e.g. no phone number, no email or all telephone lines busy, no response to the complaint)" ;
 rdfs:label "Irresponsiveness"@en .

:legalactionprocedure rdf:type owl:NamedIndividual ,
 ric:EnforcementProcedure ;
 rdfs:comment ""Follow Legal Action Procedure in courts.
<i>When to take the legal action</i>. When there is a delayed/cancelled/denied flight, the limitation period is determined according to the rules of each Member state on the limitation of actions, (Case C-139/11); <i>Where to take the legal action</i>. The jurisdiction can be both at the place of departure and the place of arrival - depending on the passenger's choice, (Case C-204/08).""@en ;
 rdfs:label "Legal Action Procedure"@en .

:longdelayedatarrival rdf:type owl:NamedIndividual ,
 :LongDelayedAtArrival ;
 rdfs:comment "When an operating air carrier reaches its final destination three hours or more after the scheduled arrival time (originally scheduled)" ;
 rdfs:label "Delayed flight at arrival with a delay of 3 hours or more"@en ;
 ric:hasLegalSource :case40207 ,
 :case43207 ,
 :case58110 ,
 :case629 .

:longdelayedatdeparture rdf:type owl:NamedIndividual ,
 :LongDelayedAtDeparture ;
 rdfs:comment "When an operating air carrier reasonably expects a flight to be delayed at least 5 hours" ;
 rdfs:label "Delayed flight at departure with a delay of 5 hours or more"@en ;
 ric:hasLegalSource :regulation261art6 .

:lostbaggage rdf:type owl:NamedIndividual ,
 :LostBaggage ;
 rdfs:comment "Lost baggage is a piece(s) of baggage which is irretrievably lost." ;
 rdfs:label "Lost baggage"@en .

:montreal172 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 rdfs:comment "The air carrier is liable for damage in case of destruction, loss of, or damage to, checked baggage upon condition only that the event which caused the damage took place on board of the aircraft or during any period within which the checked baggage was in the charge of the carrier. However, the air carrier is not liable if the damage resulted from the inherent defect, quality or vice of the baggage. In the case of unchecked baggage, including personal items, the carrier is liable if the damage resulted from its fault or that of its servants or agents" ;
 rdfs:label "Montreal Convention, Art. 17(2)"@en .

:montreal173 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 rdfs:comment "If the carrier admits the loss of the checked baggage, or if the checked baggage has not arrived at the expiration of twenty-one days after the date on which it ought to have arrived, the passenger is entitled to enforce against the carrier the rights which flow from the contract of carriage" ;
 rdfs:label "Montreal Convention, Art. 17(3)"@en .

:montreal221 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;
 rdfs:comment "The carrier is liable for damage occasioned by delay in the carriage by air of passengers, baggage. Nevertheless, the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures" ;
 rdfs:label "Montreal Convention, Art. 22(1)"@en .

:montreal222 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;

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        rdfs:comment ""In the carriage of baggage, the liability of the carrier in the case of
destruction, loss, damage or delay is limited to 1,000 Special Drawing Rights for each passenger,
        unless the passenger has made, at the time when the checked baggage was handed over
to the carrier, a special declaration of interest in delivery at destination and has paid a
supplementary sum if the case so requires. In that case the carrier will be liable to pay a sum not
exceeding the declared sum, unless it proves that the sum is greater than the passenger's actual
interest in delivery at destination"" ;
        rdfs:label "Montreal Convention, Art. 22(2)"@en .

:montreal31 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:comment "Receipt by the person entitled to delivery of checked baggage or cargo
without complaint is prima facie evidence that the same has been delivered in good condition and in
accordance with the document of carriage. In the case of damage, the person entitled to delivery must
complain to the carrier forthwith after the discovery of the damage, and, at the latest, within seven
days from the date of receipt in the case of checked baggage and fourteen days from the date of
receipt in the case of cargo. In the case of delay, the complaint must be made at the latest within
twenty-one days from the date on which the baggage or cargo have been placed at his or her disposal.
Every complaint must be made in writing and given or dispatched within the times aforesaid. If no
complaint is made within the times aforesaid, no action shall lie against the air carrier" ;
        rdfs:label "Montreal Convention, Art. 31"@en .

:montreal42 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:comment "Any complaint to be made or instruction to be given under this Convention
to the carrier shall have the same effect whether addressed to the contracting carrier or to the
actual carrier" ;
        rdfs:label "Montreal Convention, Art. 42"@en .

:norightreasonabledenied rdf:type owl:NamedIndividual ,
        ric:Right ;
        rdfs:label "No Right"@en ;
        ric:isTriggeredBy :deniedboardingonreasonablegrounds ;
        ric:subjectTo :reasonablegroundsinterpretation .

:opiniondget11 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:comment "Information Document of Directorate-General for Energy and Transport,
Answers to Questions on the application of Regulation 261/2004" ;
        rdfs:label "Opinion from the Information Document of Directorate-General for Energy
and Transport (DGET)" ;
        rdfs:seeAlso
<http://ec.europa.eu/transport/themes/passengers/air/doc/neb/questions_answers.pdf_reg_2004_261.pdf>
.

:opiniondget12 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:comment "Information Document of Directorate-General for Energy and Transport,
Answers to Questions on the application of Regulation 261/2004" ;
        rdfs:label "Opinion from the Information Document of Directorate-General for Energy
and Transport (DGET)" ;
        rdfs:seeAlso
<http://ec.europa.eu/transport/themes/passengers/air/doc/neb/questions_answers.pdf_reg_2004_261.pdf>
.

:reasonablegroundsinterpretation rdf:type owl:NamedIndividual ,
        ric:FurtherInterpretation ;
        rdfs:comment ""Denied boarding due to reasonable grounds. E.g.

cases of:
        i) health
        ii) safety
        iii) security
        iv) inadequate/insufficient travel documentation.
        The wording reasonable grounds allows a margin for personal judgement (e.g. on the
part of ground staff and thus for an honest mistake).
        The passenger must always confirm which travel documentation the company demands.
Adequate travel documentation depends on each companies' terms and conditions, e.g. passport or Id,
especially in case of minors.""@en ;
        rdfs:label "Further interpretation of the concept of reasonable
grounds" .

:regulation1346 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:label "Council Regulation (EC) No 1346/2000 of 29 May 2000 on insolvency
proceedings" .

:regulation261art101 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:comment "If an operating air carrier places a passenger in a class higher
than that for which the ticket was purchased, it may not request any supplementary payment" ;
        rdfs:label "Regulation 261/2004, Art. 10(1)"@en .

:regulation261art102 rdf:type owl:NamedIndividual ,
        ric:LegalSource ;
        rdfs:comment "If an operating air carrier places a passenger in a class lower
than that for which the ticket was purchased, it shall within seven days, reimburse: a) 30 % of the
price of the ticket for all flights of 1 500 kilometres or less; b) 50 % of the price of the ticket

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for all intra-Community flights of more than 1 500 kilometres, except flights between the European territory of the Member States and the French overseas departments, and for all other flights between 1 500 and 3 500 kilometres, or c)75 % of the price of the ticket for all flights not falling under (a) or (b), including flights between the European territory of the Member States and the French overseas departments" ;

rdfs:label "Regulation 261/2004, Art. 10(2)a"@en .

:regulation261art12 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "This Regulation shall apply without prejudice to a passenger's rights to further compensation. The compensation may be deducted from such compensation" ;
rdfs:label "Regulation 261/2004, Art. 12"@en .

:regulation261art142 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "An operating air carrier denying boarding, cancelling or denying a flight shall provide each passenger affected with a written notice setting out the rules for compensation and assistance. The contact details of the national enforcement body shall also be given to the passenger in written form."@en ;
rdfs:label "Regulation 261/2004, Art. 14(2)"@en .

:regulation261art31 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "This Regulation shall apply: (a) to passengers departing from an airport located in the territory of a Member State to which the Treaty applies;(b) to passengers departing from an airport located in a third country to an airport situated in the territory of a Member State to which the Treaty applies, unless they received benefits or compensation and were given assistance in that third country, if the operating air carrier of the flight concerned is a Community carrier" ;
rdfs:label "Regulation 261/2004, Art. 3(1)"@en .

:regulation261art31b rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "This Regulation shall apply: (b) to passengers departing from an airport located in a third country to an airport situated in the territory of a Member State to which the Treaty applies, unless they received benefits or compensation and were given assistance in that third country, if the operating air carrier of the flight concerned is a Community carrier" ;
rdfs:label "Regulation 261/2004, Art. 3(1)b"@en .

:regulation261art32 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "This Regulation shall apply on the condition that passengers: (a) have a confirmed reservation on the flight concerned and, except in the case of cancellation referred to in Article 5, present themselves for check-in, - as stipulated and at the time indicated in advance and in writing (including by electronic means) by the air carrier, the tour operator or an authorised travel agent, or, if no time is indicated, - not later than 45 minutes before the published departure time; or (b) have been transferred by an air carrier or tour operator from the flight for which they held a reservation to another flight, irrespective of the reason" ;
rdfs:label "Regulation 261/2004, Art. 3(2)"@en .

:regulation261art32a rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "Passengers must have a confirmed reservation on the flight concerned;Passengers must be present on time for check-in at the time indicated in the electronic panel or in the ticket, or if no time is indicated-not later THEN 45 min before the published departure time;When passengers have been through-checked, they have an obligation to arrive at the gate on time for boarding. This applies to both departing and connecting passengers" ;
rdfs:label "Regulation 261/2004, Art. 3(2) (a)"@en .

:regulation261art33 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment "This Regulation shall not apply to passengers travelling free of charge or at a reduced fare not available directly or indirectly to the public. However, it shall apply to passengers having tickets issued under a frequent flyer programme or other commercial programme by an air carrier or tour operator" ;
rdfs:label "Regulation 261/2004, Art. 3(3)"@en .

:regulation261art4 rdf:type owl:NamedIndividual ,
ric:LegalSource ;
rdfs:comment ""When an operating air carrier reasonably expects to deny boarding on a flight, it shall first call for volunteers to surrender their reservations in exchange for benefits under conditions to be agreed between the passenger concerned and the operating air carrier. If an insufficient number of volunteers comes forward to allow the remaining passengers with reservations to board the flight, the operating air carrier may then deny boarding to passengers against their will. If boarding is denied to passengers against their will, the operating air carrier shall immediately compensate them and assist them"" ;
rdfs:label "Regulation 261/2004, Art. 4"@en .

:regulation261art51b rdf:type owl:NamedIndividual ,
ric:LegalSource ;

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rdfs:label "Regulation 261/2004, Art. 5(1)(b)"@en .

:regulation261art51c rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment "In case of cancellation of a flight, the passengers concerned
shall have the right to compensation by the operating air carrier" ;
                    rdfs:label "Regulation 261/2004, Art. 5(1)(c)"@en .

:regulation261art51ci rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment ""In case of cancellation of a flight, the passengers concerned
shall have the right to compensation by the operating air carrier, unless:
(i) they are informed of the cancellation at least two weeks before the scheduled
time of departure; or
(ii) they are informed of the cancellation between two weeks and seven days before
the scheduled time of departure and are offered rerouting, allowing them to depart no more than two
hours before the scheduled time of departure and to reach their final destination less than four
hours after the scheduled time of arrival; or
(iii) they are informed of the cancellation less than seven days before the
scheduled time of departure and are offered rerouting, allowing them to depart no more than one hour
before the scheduled time of departure and to reach their final destination less than two hours after
the scheduled time of arrival"" ;
                    rdfs:label "Regulation 261/2004, Art. 5(1)(c)(i)"@en .

:regulation261art52 rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment "When passengers are informed of the cancellation, an explanation
shall be given concerning possible alternative transport."@en ;
                    rdfs:label "Regulation 261/2004, Art. 5(2)"@en .

:regulation261art53 rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment "An operating air carrier shall not be obliged to pay compensation
if it can prove that the cancellation is caused by extraordinary circumstances which could not have
been avoided even if all reasonable measures had been taken."@en ;
                    rdfs:label "Regulation 261/2004, Art. 5(3)"@en .

:regulation261art54 rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment "The burden of proof concerning a cancellation and whether it is
caused by extraordinary circumstances rests with the operating air carrier"@en ;
                    rdfs:label "Regulation 261/2004, Art. 5(4)"@en .

:regulation261art6 rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment ""When an operating air carrier reasonably expects a flight to be
delayed beyond its scheduled time of departure:
(a) for two hours or more in the case of flights of 1 500 kilometres or less; or
(b) for three hours or more in the case of all intra-Community flights of more than 1 500 kilometres
and of all other flights between 1 500 and 3 500 kilometres; or
(c) for four hours or more in the case of all flights not falling under (a) or (b) ""@en ;
                    rdfs:label "Regulation 261/2004, Art. 6"@en .

:regulation261art612 rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment "When the reasonably expected time of departure is at least the day
after the time of departure previously announced, the passengers should be offered by the operating
air carrier the assistance specified in Article 9(1)(b) and 9(1)(c) "@en ;
                    rdfs:label "Regulation 261/2004, Art. 6(1)(ii)"@en .

:regulation261art71 rdfs:type owl:NamedIndividual ,
                    ric:LegalSource ;
                    rdfs:comment ""Passengers shall receive compensation amounting to:
(a) EUR 250 for all flights of 1 500 kilometres or less;
(b) EUR 400 for all intra-Community flights of more than 1 500 kilometres, and for
all other flights between 1 500 and 3 500 kilometres;
(c) EUR 600 for all flights not falling under (a) or (b) "" ;
                    rdfs:label "Regulation 261/2004, Art. 7(1)"@en .

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:regulation261art72b rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment ""If the passenger is Rerouted to his final destination, on an alternative flight, the operating air carrier may reduce the compensation by 50%, when the arrival time (of which does not exceed the scheduled arrival time of the flight originally booked) by:
-2h, in respect to all flights of ≤ 1500 kms,
-3h, in respect to all intra-Community flights of > 1500 kms,
-3h, in respect for all other flights between 1500 and 3500km,
-4h, in respect of all other flights."" ;

 rdfs:label "Regulation 261/2004, Art. 7(2)b"@en .

:regulation261art81 rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment ""passengers shall be offered the choice between:
(a) reimbursement within seven days of the full cost of the ticket at the price at which it was bought, for the part or parts of the journey not made, and for the part or parts already made if the flight is no longer serving any purpose in relation to the passenger's original travel plan (together with, when relevant, a return flight to the first point of departure, at the earliest opportunity);
The reimbursement shall be paid in cash, by electronic bank transfer, bank orders or bank cheques or, with the signed agreement of the passenger, in travel vouchers and/or other services.
(b) rerouting, under comparable transport conditions, to their final destination at the earliest opportunity; or
(c) rerouting, under comparable transport conditions, to their final destination at a later date at the passenger's convenience, subject to availability of seats"" ;

 rdfs:label "Regulation 261/2004, Art. 8 (1)"@en .

:regulation261art81a rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment "passengers shall be offered the choice between: (a) - reimbursement within seven days, by the means provided for in Article 7(3), of the full cost of the ticket at the price at which it was bought, for the part or parts of the journey not made, and for the part or parts already made if the flight is no longer serving any purpose in relation to the passenger's original travel plan, together with, when relevant, - a return flight to the first point of departure, at the earliest opportunity;" ;

 rdfs:label "Regulation 261/2004, Art. 8(1)a"@en .

:regulation261art91a rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment "Passengers shall be offered free of charge meals and refreshments in a reasonable relation to the waiting time."@en ;

 rdfs:label "Regulation 261/2004, Art. 9(1)a"@en .

:regulation261art91b rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment "Hotel accommodation in cases - where a stay of one or more nights becomes necessary, or - where a stay additional to that intended by the passenger becomes necessary;"@en ;

 rdfs:label "Regulation 261/2004, Art. 9(1)b"@en .

:regulation261art91c rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment "Transport between the airport and place of accommodation (hotel or other)."@en ;

 rdfs:label "Regulation 261/2004, Art. 9(1)c"@en .

:regulation261art92 rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment "In addition, passengers shall be offered free of charge two telephone calls, telex or fax messages, or e-mails."@en ;

 rdfs:label "Regulation 261/2004, Art. 9(2)"@en .

:regulation261recl4 rdf:type owl:NamedIndividual ,
ric:LegalSource ;

 rdfs:comment "Extraordinary circumstances which could not have been avoided even if all reasonable measures had been taken. Such circumstances may, in particular, occur in cases of political instability, meteorological conditions incompatible with the operation of the flight

concerned, security risks, unexpected flight safety shortcomings and strikes that affect the operation of an operating air carrier."@en ;

 rdfs:label "Regulation 261/2004, Recital 14"@en .

:regulation261rec18 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;

 rdfs:comment "Care for passengers awaiting an alternative or a delayed flight may be limited or declined if the provision of the care would itself cause further delay" ;

 rdfs:label "Regulation 261/2004, Recital 18"@en .

:regulation261rec20 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;

 rdfs:comment "Passengers should be fully informed of their rights in the event of denied boarding and of cancellation or long delay of flights, so that they can effectively exercise their rights" ;

 rdfs:label "Regulation 261/2004, Recital 20"@en .

:regulation8895 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;

 rdfs:comment "The air carrier shall without delay, and in any event not later than fifteen days after the identity of the natural person entitled to compensation has been established, make such advance payments to meet immediate economic needs on a basis proportional to the hardship suffered" ;

 rdfs:label "Regulation 889/2002, Art. 5"@en .

:regulation889612 rdf:type owl:NamedIndividual ,
 ric:LegalSource ;

 rdfs:comment "All air carriers shall, when selling carriage by air in the Community, ensure that a summary of the main provisions governing liability for passengers and their baggage, including deadlines for filing an action for compensation and the possibility of making a special declaration for baggage, is made available to passengers at all points of sale, including sale by telephone and via the Internet. In addition all air carriers shall provide each passenger with a written indication of: the applicable limit for that flight on the carrier's liability in respect of destruction, loss of or damage to baggage and a warning that baggage greater in value than this figure should be brought to the airline's attention at check-in or fully insured by the passenger prior to travel; and the applicable limit for that flight on the carrier's liability for damage occasioned by delay" ;

 rdfs:label "Regulation 889/2002, Art. 6(1)(2)"@en .

:reimbursementconstraint rdf:type owl:NamedIndividual ,
 ric:Constraint ;

 rdfs:comment "If the Passenger chooses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves."@en ;

 rdfs:label "Constraint to the right of reimbursement"@en .

:rightofvolunteerstorerouting rdf:type owl:NamedIndividual ,
 ric:Right ;

 rdfs:label "Right to choose between i) reimbursement and return flight to the first point of departure; or ii) right to rerouting"@en ;

 ric:hasEnforcementProcedure :complainthandling ,
 :legalactionprocedure ;

 ric:hasLegalSource :regulation261art4 ;

 ric:isTriggeredBy :volunteerdeniedboarding ;

 ric:subjectTo :deniedboardinginterpretation ,
 :interpretationofpassengersobligations ,
 :interpretationofrighttorerouting1 ,
 :interpretationofrighttorerouting2 ,
 :interpretationofrighttorerouting3 ,
 :territorialapplication .

:rightreimbursementreroutingcompelled rdf:type owl:NamedIndividual ,
 ric:Right ;

 rdfs:label "Right to reimbursement or rerouting"@en ;

 ric:hasEnforcementProcedure :complainthandling ,
 :legalactionprocedure ;

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ric:hasLegalSource :case32111 ,
                  :regulation261art8ab ;

ric:isTriggeredBy :deniedboardingonaconnectingflight ;

ric:subjectTo :deniedboardinginterpretation ,
              :interpretationofpassengersobligations ,
              :interpretationofrighttorerouting1 ,
              :interpretationofrighttorerouting2 ,
              :interpretationofrighttorerouting3 ,
              :reimbursementconstraint .

:rightreimbursementreroutingdelaydeparture rdf:type owl:NamedIndividual ,
                                             ric:Right ;

      rdfs:comment "<ul><li>Reimbursement consists in the
refund, within seven days, of the full cost of the ticket at the price at which it was bought, for
the part or parts of the journey not made unused flight tickets), and for the part or parts already
made if the flight is no longer serving any purpose in relation to the passenger's original travel
plan. This right is offered together with, when relevant, a return flight to the first point of
departure, at the earliest opportunity, Article 8 (1) (a) of the (EC) Regulation"@en ;

      rdfs:label "Right to reimbursement"@en ;

      ric:hasEnforcementProcedure :complainthandling ,
                                  :legalactionprocedure ;

      ric:hasLegalSource :regulation261art81a ;

      ric:isTriggeredBy :longdelayedatdeparture ;

      ric:subjectTo :bagdamageunavoidable ,
                    :consequentialdamageinterpretation ,
                    :reimbursementconstraint ,
                    :territorialapplication .

:rightreimbursementreroutingdeniedcancellation rdf:type owl:NamedIndividual ,
                                                    ric:Right ;

      rdfs:label "Right to choose between i) reimbursement;
or ii) right to rerouting"@en ;

      ric:hasEnforcementProcedure :complainthandling ,
                                  :legalactionprocedure ;

      ric:hasLegalSource :regulation261art81 ;

      ric:isTriggeredBy :cancelledflight ;

      ric:subjectTo :com168p7 ,
                    :com1748 ,
                    :interpretationofrighttorerouting1 ,
                    :interpretationofrighttorerouting2 ,
                    :interpretationofrighttorerouting3 ,
                    :opiniondget11 ,
                    :opiniondget12 ,
                    :regulation261art31b ,
                    :reimbursementconstraint ,
                    :territorialapplication .

:rightsinlongdelayatarrivalinterpretation rdf:type owl:NamedIndividual ,
                                             ric:FurtherInterpretation ;

      rdfs:comment "A long delay entitles passengers to the same
compensation as in the case of a flight cancellation: the passenger is entitled to compensation if he
reaches his/her final destination with a delay of three hours or more. Such a delay does not,
however, entitle passengers to compensation if the air carrier can prove that the long delay was
caused by extraordinary circumstances which could not have been avoided even if all reasonable
measures had been taken, namely circumstances beyond the actual control of the air carrier. See other
cases. Christopher Sturgeon v Condor Flugdienst GmbH (C-402/07); and Stefan Bock and Others v Air
France SA (C-432/07), 19/11/2009. Nelson v Lufthansa AG (C-581/10); and TUI Travel/IATA/British
Airways/easyJet/the Queen v Civil Aviation Authority ( C-629/10) 23/10/2012. 2)Art. 12 Regulation
(EC) 261/2004 'This Regulation shall apply without prejudice to a passenger's rights for further
compensation' " ;

      rdfs:label "Further interpretation of the rights in case of
long delay interpreted at arrival" ;

      ric:hasLegalSource :case40207 ,
                          :case5810 ,
                          :case58110 .

:rightthatdependsonnationallegislation rdf:type owl:NamedIndividual ,
                                             ric:Right ;

      rdfs:label "Right that depends on national legislation"@en ;

```

```

        ric:hasEnforcementProcedure :eccprocedure ;

        ric:isTriggeredBy :insatisfaction ,
                          :irresponsiveness ,
                          :unfaircommercial ,
                          :unfaircontractterms .

:righttoaccommodationbycancellation rdf:type owl:NamedIndividual ,
                                     ric:Right ;

        rdfs:comment ""When the reasonably expected time of departure of
the new flight is at least the day after the departure as it was planned for the cancelled flight.
Right to have free of charge transport between the airport and place of
accommodation (hotel or other) and right to accommodation (in cases where a stay of one or more
nights becomes necessary).""@en ;

        rdfs:label "Right to accommodation and transportation, in case of
rerouting caused by a cancelled flight" ;

        ric:hasEnforcementProcedure :complainthandling ,
                                    :legalactionprocedure ;

        ric:hasLegalSource :regulation261art9bc ;

        ric:isTriggeredBy :cancelledflight ;

        ric:subjectTo :interpretationofrighttorerouting3 ,
                      :opiniondget12 ,
                      :territorialapplication .

:righttoaccommodationdenied rdf:type owl:NamedIndividual ,
                                  ric:Right ;

        rdfs:comment "Right to have free of charge transport between the airport
and place of accommodation (hotel or other)" ;

        rdfs:label "Right to accommodation and transportation."@en ;

        ric:hasEnforcementProcedure :complainthandling ,
                                    :legalactionprocedure ;

        ric:hasLegalSource :regulation261art91bc ;

        ric:isTriggeredBy :compelleddeniedboarding ;

        ric:subjectTo :opiniondget12 ,
                      :territorialapplication ,
                      :transportationandaccommodationconstraint .

:righttoaccommodationfollowindaydep rdf:type owl:NamedIndividual ,
                                     ric:Right ;

        rdfs:comment "Right to have free of charge transport between the
airport and place of accommodation (hotel or other) and right to accommodation (in cases where a stay
of one or more nights becomes necessary)" ;

        rdfs:label "Right to accommodation and transportation."@en ;

        ric:hasEnforcementProcedure :complainthandling ,
                                    :legalactionprocedure ;

        ric:hasLegalSource :regulation261art91b ,
                            :regulation261art91c ;

        ric:isTriggeredBy :followingdaydelaydeparture ;

        ric:subjectTo :bagdamageunavoidable ,
                      :consequentialdamageinterpretation ,
                      :opiniondget12 ,
                      :territorialapplication ,
                      :transportationandaccommodationconstraint .

:righttocommunications rdf:type owl:NamedIndividual ,
                          ric:Right ;

        rdfs:comment "Right to have free of charge two telephone calls, telex or fax
messages, or e-mails" ;

        rdfs:label "Right to Communications"@en ;

        ric:hasEnforcementProcedure :complainthandling ;

        ric:hasLegalSource :regulation261art92 ;

        ric:isTriggeredBy :cancelledflight ;

```

```

ric:subjectTo :territorialapplication .

:righttocommunicationsshortdelay rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:comment "Right to have free of charge two telephone calls,
telex or fax messages, or e-mails" ;

    rdfs:label "Right to Communications"@en ;

    ric:hasEnforcementProcedure :complainthandling ,
        :legalactionprocedure ;

    ric:hasLegalSource :regulation261art92 ;

    ric:isTriggeredBy :shortdelayedatdeparture ;

    ric:subjectTo :territorialapplication .

:righttocompensationforcancellation rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:comment ""The right to compensation consists of a payment
of an amount of money regarding the passenger's inconvenience of a flight disruption.
The amount depends on the flight distance and on the type of flight.
The compensation shall be paid in cash, by electronic bank transfer, bank orders or
bank cheques or, with the signed agreement of the passenger, in travel vouchers and/or other
services. ""@en ;

    rdfs:label "Right to compensation due to cancellation"@en ;

    ric:hasEnforcementProcedure :complainthandling ,
        :legalactionprocedure ;

    ric:hasLegalSource :regulation261art51c ,
        :regulation261art51ci ,
        :regulation261art71 ;

    ric:isTriggeredBy :cancelledflight ;

    ric:subjectTo :burdenofproofcancellation ,
        :earlynoticeexception ,
        :ecdraft ,
        :extraordinarycircumstances ,
        :extraordinarycircumstancesinterpretation1 ,
        :extraordinarycircumstancesinterpretation2 ,
        :extraordinarycircumstancesinterpretation3 ,
        :furthercompensationinterpretation ,
        :territorialapplication .

:righttocompensationforcompelled rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:label "Right to compensation due to denied boarding"@en ;

    ric:hasEnforcementProcedure :complainthandling ,
        :legalactionprocedure ;

    ric:hasLegalSource :ecdraft ,
        :regulation261art71 ;

    ric:isTriggeredBy :compelleddeniedboarding ;

    ric:subjectTo :compensationincaseofcancellationconstraint ,
        :furthercompensationinterpretation ,
        :territorialapplication .

:righttocompensationforlatearrival rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:comment "A long delay entitles passengers to the right of
compensation if he reaches his/her final destination with a delay of three hours or more. The right
to compensation consists of a payment of an amount of money regarding the passenger's inconvenience
of a flight disruption. The amount depends on the flight distance and on the type of flight. The
compensation shall be paid in cash, by electronic bank transfer, bank orders or bank cheques or, with
the signed agreement of the passenger, in travel vouchers and/or other services"@en ;

    rdfs:label "Right to compensation" ;

    ric:hasEnforcementProcedure :complainthandling ,
        :legalactionprocedure ;

    ric:hasLegalSource :case40207 ,
        :case5810 ,
        :case58110 ,
        :regulation261art71 ;

```

```

ric:isTriggeredBy :longdelatedatarrival ;

ric:subjectTo :arrivaltimeinterpretation ,
              :bagdamageunavoidable ,
              :consequentialdamagedelayinterpretation ,
              :ecdraft ,
              :extraordinarycircumstances ,
              :extraordinarycircumstancesinterpretation1 ,
              :extraordinarycircumstancesinterpretation2 ,
              :extraordinarycircumstancesinterpretation3 ,
              :rightsinsolongdelayatarrivalinterpretation ,
              :righttofurthecomensationinterpretation .

:righttoinformation rdf:type owl:NamedIndividual ,
                    ric:Right ;

                    rdfs:comment "Right to be informed about the cause of the incident and the
applicable rights" ;

                    rdfs:label "Right to Information"@en ;

                    ric:hasEnforcementProcedure :complainthandling ;

                    ric:hasLegalSource :regulation261art142 ,
                                        :regulation261art52 ;

                    ric:isTriggeredBy :cancelledflight ;

                    ric:subjectTo :interpretationofrighttoinformation1 ,
                                  :interpretationofrighttoinformation2 ,
                                  :territorialapplication .

:righttoinformationshortdelay rdf:type owl:NamedIndividual ,
                               ric:Right ;

                               rdfs:comment "Right to be informed about the cause of the incident and
the consequent applicable rights" ;

                               rdfs:label "Right to Information"@en ;

                               ric:hasEnforcementProcedure :complainthandling ;

                               ric:hasLegalSource :regulation261art142 ;

                               ric:isTriggeredBy :shortdelayedatdeparture ;

                               ric:subjectTo :interpretationofrighttoinformation1 ,
                                             :interpretationofrighttoinformation2 ,
                                             :territorialapplication .

:righttoinformationvolunteers rdf:type owl:NamedIndividual ,
                                ric:Right ;

                                rdfs:comment "Right to be informed about the cause of the incident and
the consequent applicable rights" ;

                                rdfs:label "Right to Information"@en ;

                                ric:hasEnforcementProcedure :complainthandling ,
                                                            :legalactionprocedure ;

                                ric:hasLegalSource :regulation261art142 ;

                                ric:isTriggeredBy :volunteerdeniedboarding ;

                                ric:subjectTo :territorialapplication .

:righttomeals rdf:type owl:NamedIndividual ,
               ric:Right ;

               rdfs:comment "Right to have free of charge meals and refreshments in a reasonable
relation to the waiting time. This right may vary according to class of service and time of day" ;

               rdfs:label "Right to Meals and Refreshments"@en ;

               ric:hasEnforcementProcedure :complainthandling ;

               ric:hasLegalSource :iataglossary ,
                                   :regulation261art91a ;

               ric:isTriggeredBy :cancelledflight ;

               ric:subjectTo :careconstraint1 ,
                             :careconstraint2 ,
                             :territorialapplication .

```

```

:righttomealsdenied rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:comment "Consists in a form of assistance based in the right to have free of
charge meals and refreshments in a reasonable relation to the waiting time. This may vary according
to class of service and time of day" ;

    rdfs:label "Right to Meals and Refreshments"@en ;

    ric:hasEnforcementProcedure :complainthandling ,
        :legalactionprocedure ;

    ric:hasLegalSource :iataglossary ,
        :regulation261art91a ;

    ric:isTriggeredBy :compelleddeniedboarding ;

    ric:subjectTo :careconstraint1 ,
        :territorialapplication .

:righttomealsshortdelay rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:comment "Consists in a form of assistance based in the right to have
free of charge meals and refreshments in a reasonable relation to the waiting time. This may vary
according to class of service and time of day" ;

    rdfs:label "Right to Meals and Refreshments"@en ;

    ric:hasEnforcementProcedure :complainthandling ,
        :legalactionprocedure ;

    ric:hasLegalSource :iataglossary ,
        :regulation261art91a ;

    ric:isTriggeredBy :shortdelayedatdeparture ;

    ric:subjectTo :careconstraint1 ,
        :careconstraint2 ,
        :territorialapplication .

:righttoreimbursement1000sdr rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:label "Air carrier is liable for right to up to 1000 SDRs"@en ;

    ric:hasEnforcementProcedure :baggagecomplainthandling ;

    ric:hasLegalSource :montreal172 ,
        :montreal222 ;

    ric:isTriggeredBy :damagedbaggage ,
        :destroyedbaggage ,
        :lostbaggage ;

    ric:subjectTo :badbagexception ,
        :baggageabilityrequisite ,
        :interpretationbaggageinformationrequest ,
        :interpretationbaggageability ,
        :interpretationcomplainthandlingprocedure ,
        :interpretationdamagebaggage .

:righttoreimbursement1000sdrfordelay rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:label "Right to up to 1000 SDRs in case of delay"@en ;

    ric:hasEnforcementProcedure :baggagecomplainthandling ;

    ric:hasLegalSource :montreal172 ,
        :montreal222 ;

    ric:isTriggeredBy :delayedbaggage ;

    ric:subjectTo :bagdamageunavoidable ,
        :baggageabilityrequisite ,
        :interpretationbaggageinformationrequest ,
        :interpretationbaggageability ,
        :interpretationcomplainthandlingprocedure ,
        :interpretationdamagebaggage .

:righttoreimbursementdowngrading rdf:type owl:NamedIndividual ,
    ric:Right ;

    rdfs:label "Right to Reimbursement due to Downgrading"@en ;

    ric:hasEnforcementProcedure :complainthandling ;

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```

ric:hasLegalSource :regulation261art102 ;
ric:isTriggeredBy :downgrading .

:rightto reimbursementreroutingdeniedconnecting rdf:type owl:NamedIndividual ,
ric:Right ;

rdfs:label "Right to reimbursement or rerouting"@en ;
ric:hasEnforcementProcedure :complainthandling ,
:legalactionprocedure ;
ric:hasLegalSource :case32111 ,
:regulation261art8 ;
ric:isTriggeredBy :deniedboardingonaconnectingflight ;
ric:subjectTo :deniedboardinginterpretation ,
:interpretationofrighttorerouting1 ,
:interpretationofrighttorerouting2 ,
:interpretationofrighttorerouting3 ,
:reimbursementconstraint .

:rightto reimbursementupgrading rdf:type owl:NamedIndividual ,
ric:Right ;

rdfs:label "No Right"@en ;
ric:hasLegalSource :regulation261art101 ;
ric:isTriggeredBy :upgrading .

:rightto repatriation rdf:type owl:NamedIndividual ,
ric:Right ;

rdfs:label "Right to Repatriation"@en ;
ric:hasEnforcementProcedure :insolvencyprocedure ;
ric:hasLegalSource :insolvencyagreement ;
ric:isTriggeredBy :insolvency .

:shortdelayedatdeparture rdf:type owl:NamedIndividual ,
:ShortDelayedAtDeparture ;

rdfs:comment ""When an operating air carrier reasonably expects a flight to
be delayed:
(a) 2h or more in the case of flights of 1500 km or less, or
(b) 3h or more in the case of all intra-Community flights of more than 1500 km and
for other flights between 1500 and 3500km, or
(c) 4h or more in case of other flights not falling under (a) or (b)""@en ;

rdfs:label "Short delay at departure" ;
ric:hasLegalSource :regulation261art6 .

:territorialapplication rdf:type owl:NamedIndividual ,
ric:Requisite ;

rdfs:comment "These rights only apply to worldwide airlines and passengers
when departing from an airport within EU, and also to all departing from an airport in a third
country to a destination within the EU, where the operating air carrier is a Community air carrier
(EU airline)"@en ;

rdfs:label "Territorial application requisite"@en ;
ric:hasLegalSource :regulation261art31 .

:transportationandaccommodationconstraint rdf:type owl:NamedIndividual ,
ric:Constraint ;

rdfs:comment "It has to be taken in account also the
practicalities faced by the airline, such as the distance from the airport to the closest available
hotels, combined with the time of the replacement flight in the following day."@en ;

rdfs:label "Constraint to the right of transportation and
accommodation"@en .

:unfaircommercial rdf:type owl:NamedIndividual ,
:UnfairCommercialPractices ;

rdfs:comment "Commercial practices which are unhoneest practises; misleading
commercial practices (such as false claims, deceiving information or leaving out important
information that would affect the consumer decision to buy something); and aggressive sales

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techniques that harass the consumer into buying something under pressure. (Article 5 of the Directive 2005/29/EC of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market" ;

rdfs:label "Unfair commercial practices"@en .

:unfaircontractterms rdf:type owl:NamedIndividual ,
:UnfairContractTerms ;

rdfs:comment "A contractual term shall be regarded as unfair if, contrary to the requirement of good faith, it causes a significant imbalance in the parties' rights and obligations arising under the contract, to the detriment of the consumer. (Article 3 (1) Directive of Unfair Contract terms 93/ 13/EEC)" ;

rdfs:label "Unfair contract terms"@en .

:upgrading rdf:type owl:NamedIndividual ,
:SeatMisplacement ;

rdfs:comment "When an operating air carrier places a passenger in a class higher than that for which the ticket was purchased. (Article 10 (1) Regulation 261/2004)" ;

rdfs:label "Seat Misplacement: Upgrading"@en .

:volunteerdeniedboarding rdf:type owl:NamedIndividual ,
:VolunteerDeniedBoarding ;

rdfs:comment "Volunteer Denied Boarding reflects the incident when a person who has presented himself for boarding under the conditions laid down in Article 3(2) and responds positively to the air carrier's call for passengers prepared to surrender their reservation in exchange for benefits, Article 2(k), Regulation (EC) 261/2004. Article 2(k), and 4(1) Regulation (EC) 261/2004" ;

rdfs:label "Volunteer denied boarding"@en .

Annotations

#####

:regulation261rec15 rdfs:label "Regulation 261/2004, Recital 15"@en ;

rdfs:comment "Extraordinary circumstances should be deemed to exist where the impact of an air traffic management decision in relation to a particular aircraft on a particular day gives rise to a long delay, an overnight delay, or the cancellation of one or more flights by that aircraft, even though all reasonable measures had been taken by the air carrier concerned to avoid the delays or cancellations"@en .

:rightofvolunteerstobenefits ric:hasLegalSource :regulation261art41 ;

ric:hasEnforcementProcedure :legalactionprocedure ,
:complainthandling ;

ric:subjectTo :territorialapplication ,
:deniedboardinginterpretation ;

ric:isTriggeredBy ric:isTriggeredBy .

1.3 Complaint Design Pattern

Annotation properties

http://purl.org/dc/terms/contributor

dct:contributor a owl:AnnotationProperty .

http://purl.org/dc/terms/creator

dct:creator a owl:AnnotationProperty .
#


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# http://purl.org/dc/terms/date
dct:date a owl:AnnotationProperty .
#
# http://purl.org/dc/terms/license
dct:license a owl:AnnotationProperty .
#
# http://purl.org/dc/terms/rights
dct:rights a owl:AnnotationProperty .
#
# http://purl.org/dc/terms/title
dct:title a owl:AnnotationProperty .
#
# http://www.w3.org/2004/02/skos/core#closeMatch
skos:closeMatch a owl:AnnotationProperty .
#
# http://www.w3.org/2004/02/skos/core#relatedMatch
skos:relatedMatch a owl:AnnotationProperty .
#
#
#
# #####
# # Object Properties
# #
# #####
#
# http://ricontology.com/cdpaddressedTo
<http://ricontology.com/cdpaddressedTo> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpComplaint> ;
  rdfs:range <http://ricontology.com/cdpAgent> ;
  rdfs:comment "The property describing the Agent Recipient of the Complaint or the Agent
Recipient of the Request" ;
  rdfs:label "addressed to" .
#
# http://ricontology.com/cdpbasedOn
<http://ricontology.com/cdpbasedOn> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpComplaint> ;
  rdfs:range <http://ricontology.com/cdpFact> ;
  rdfs:comment "The property declaring the Facts that are the base of a Complaint." ;
  rdfs:label "based on" .
#
# http://ricontology.com/cdpexpressedIn
<http://ricontology.com/cdpexpressedIn> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpComplaint> ;
  rdfs:range <http://ricontology.com/cdpMedium> ;
  rdfs:comment "The property that declares by which Medium the Complaint is expressed." ;
  rdfs:label "expressed in" .
#
# http://ricontology.com/cdphasThirdParty
<http://ricontology.com/cdphasThirdParty> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpComplaint> ;
  rdfs:range <http://ricontology.com/cdpAgent> ;
  rdfs:comment "Property describing agents which are third parties in a complaint" ;
  rdfs:label "has third party" .
#
# http://ricontology.com/cdphas_complaint_motivation
<http://ricontology.com/cdphas_complaint_motivation> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpComplaint> ;
  rdfs:range <http://ricontology.com/cdpMotivation> ;
  rdfs:comment "The relation expressing the Motivation of a Complaint." ;
  rdfs:label "has complaint motivation" .
#
# http://ricontology.com/cdpjustifiedBy
<http://ricontology.com/cdpjustifiedBy> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpMotivation> ;
  rdfs:range <http://ricontology.com/cdpFact> ;
  rdfs:comment "Expresses the relation between the Motivation and the Fact(s)." ;
  rdfs:label "justified by" .
#
# http://ricontology.com/cdpmadeBy
<http://ricontology.com/cdpmadeBy> a owl:ObjectProperty ;
  rdfs:domain <http://ricontology.com/cdpComplaint> ;
  rdfs:range <http://ricontology.com/cdpAgent> ;

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        rdfs:comment "The property relating the Complaint and Request to an Agent. A complaint and a
request are made by an agent." ;
        rdfs:label "made by" .
#
# http://ricontology.com/cdppart_of

<http://ricontology.com/cdppart_of> a owl:ObjectProperty ;
    rdfs:domain <http://ricontology.com/cdpRequest> ;
    rdfs:range <http://ricontology.com/cdpComplaint> ;
    rdfs:comment "A request can only exist if a complain exist" ;
    rdfs:label "part of" .
#
# http://ricontology.com/cdpsupportedBy

<http://ricontology.com/cdpsupportedBy> a owl:ObjectProperty ;
    rdfs:domain <http://ricontology.com/cdpFact> ;
    rdfs:range <http://ricontology.com/cdpEvidence> ;
    rdfs:comment "The object property stating that a Fact is supported by an Evidence." ;
    rdfs:label "supported by" .
#
# http://ricontology.com/cdp#playsRole

<http://ricontology.com/cdp#playsRole> a owl:ObjectProperty ;
    rdfs:domain <http://ricontology.com/cdpAgent> ;
    rdfs:range <http://ricontology.com/cdp#Role> ;
    rdfs:comment "playes a Role in the sense of Agents' roles" ;
    rdfs:label "playes Role" .
#
#
# #####
# #
# #   Data properties
# #
# #####
#
#
# http://ricontology.com/cdphasSpace

<http://ricontology.com/cdphasSpace> a owl:DatatypeProperty ;
    rdfs:domain _:genid1 .

_:genid1 a owl:Class ;
    owl:unionOf _:genid6 .

_:genid6 a rdf:List ;
    rdf:first <http://ricontology.com/cdpComplaint> ;
    rdf:rest _:genid5 .

_:genid5 a rdf:List ;
    rdf:first <http://ricontology.com/cdpEvidence> ;
    rdf:rest _:genid4 .

_:genid4 a rdf:List ;
    rdf:first <http://ricontology.com/cdpFact> ;
    rdf:rest _:genid3 .

_:genid3 a rdf:List ;
    rdf:first <http://ricontology.com/cdpMotivation> ;
    rdf:rest _:genid2 .

_:genid2 a rdf:List ;
    rdf:first <http://ricontology.com/cdpRequest> ;
    rdf:rest rdf:nil .

<http://ricontology.com/cdphasSpace> rdfs:comment "Another ODP (Place) can be used to express in more
detail space related values, but the link with this ODP is out of the scope of CDP and may depend on
each application case." , ""It allow the description of a place used as reference to Complaint,
Evidence, Fact, Motivation, or Request.
Complaint: It is related to the place where the complaint was registered (in a media)
Evidence: It refers to the place related to the evidences
Fact: It is related to the place where the fact was observed
Motivation; It refers to the place where the fact motivated the complaint
Request: It refers to the place were the request is requered to be executed"" .
#
# http://ricontology.com/cdphasStampTime

<http://ricontology.com/cdphasStampTime> a owl:DatatypeProperty ;
    rdfs:domain _:genid7 .

_:genid7 a owl:Class ;
    owl:unionOf _:genid12 .

_:genid12 a rdf:List ;
    rdf:first <http://ricontology.com/cdpComplaint> ;
    rdf:rest _:genid11 .

_:genid11 a rdf:List ;

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    rdf:first <http://ricontology.com/cdpEvidence> ;
    rdf:rest _:genid10 .

_:genid10 a rdf:List ;
  rdf:first <http://ricontology.com/cdpFact> ;
  rdf:rest _:genid9 .

_:genid9 a rdf:List ;
  rdf:first <http://ricontology.com/cdpMotivation> ;
  rdf:rest _:genid8 .

_:genid8 a rdf:List ;
  rdf:first <http://ricontology.com/cdpRequest> ;
  rdf:rest rdf:nil .

<http://ricontology.com/cdphasStampTime> rdfs:range xsd:dateTimeStamp ;
  rdfs:comment ""This property is related to the time which a complaint, evidence, fact,
motivation or request was declared or referenced. Complaint: It is related to the complaint date
Evidence: It refers to the date of presentation of evidences
Fact: It is related to the date of description of the fact
Motivation; It refers to the date of a decision to make a complaint
Request: It refers to the date of the request"" .
#
# http://ricontology.com/cdphasTimeOccurrence

<http://ricontology.com/cdphasTimeOccurrence> a owl:DatatypeProperty ;
  rdfs:domain _:genid13 .

_:genid13 a owl:Class ;
  owl:unionOf _:genid18 .

_:genid18 a rdf:List ;
  rdf:first <http://ricontology.com/cdpComplaint> ;
  rdf:rest _:genid17 .

_:genid17 a rdf:List ;
  rdf:first <http://ricontology.com/cdpEvidence> ;
  rdf:rest _:genid16 .

_:genid16 a rdf:List ;
  rdf:first <http://ricontology.com/cdpFact> ;
  rdf:rest _:genid15 .

_:genid15 a rdf:List ;
  rdf:first <http://ricontology.com/cdpMotivation> ;
  rdf:rest _:genid14 .

_:genid14 a rdf:List ;
  rdf:first <http://ricontology.com/cdpRequest> ;
  rdf:rest rdf:nil .

<http://ricontology.com/cdphasTimeOccurrence> rdfs:comment "Another ODP (TimeIndexedClassification)
can be used to express in more detail time related values, but the link with this ODP is out of the
scope of CDP and may depend on each application case." , ""It allow the description of a time period
used as reference to Complaint, Evidence, Fact, Motivation, or Request.
Complaint: It is related to the period involved in the complaint
Evidence: It refers to the period that evidence was acquired
Fact: It is related to the period where the fact was observed
Motivation: It refers to the period that motivated the complaint
Request: It refers to the period that request is required to be executed"" .
#
#
#
# #####
# #
# #   Classes
# #
# #####
#
#
# http://ricontology.com/cdpAgent

<http://ricontology.com/cdpAgent> a owl:Class ;
  owl:disjointWith <http://ricontology.com/cdpComplaint> ,
<http://ricontology.com/cdpEvidence> , <http://ricontology.com/cdpFact> ,
<http://ricontology.com/cdpMedium> , <http://ricontology.com/cdpMotivation> ,
<http://ricontology.com/cdpRequest> ;
  rdfs:comment "An Agent can act, i.e. play the 'actor' role wrt. an action. It is a holder
for propositional attitudes. As for this definition, we have adopted LKIF definition of Agent." ;
  rdfs:label "Agent" ;
  skos:relatedMatch "http://www.estrellaproject.org/lkif-core/expression.owl#Agent" .
#
# http://ricontology.com/cdpComplainant

<http://ricontology.com/cdpComplainant> a owl:Class ;
  rdfs:subClassOf <http://ricontology.com/cdp#Role> ;
  rdfs:comment "Person, organization, or its representative, making a complaint (ISO
10002:2014). The Complainant may be implicit in some datasets." ;

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        rdfs:label "Complainant" .
#
# http://ricontology.com/cdpComplaint
<http://ricontology.com/cdpComplaint> a owl:Class ;
    rdfs:subClassOf _:genid19 .

_:genid19 a owl:Restriction ;
    owl:onProperty <http://ricontology.com/cdpaddressedTo> ;
    owl:someValuesFrom <http://ricontology.com/cdpAgent> .

<http://ricontology.com/cdpComplaint> rdfs:subClassOf _:genid20 .

_:genid20 a owl:Restriction ;
    owl:onProperty <http://ricontology.com/cdpbasedOn> ;
    owl:someValuesFrom <http://ricontology.com/cdpFact> .

<http://ricontology.com/cdpComplaint> rdfs:subClassOf _:genid21 .

_:genid21 a owl:Restriction ;
    owl:onProperty <http://ricontology.com/cdpexpressedIn> ;
    owl:someValuesFrom <http://ricontology.com/cdpMedium> .

<http://ricontology.com/cdpComplaint> rdfs:subClassOf _:genid22 .

_:genid22 a owl:Restriction ;
    owl:onProperty <http://ricontology.com/cdpmadeBy> ;
    owl:someValuesFrom <http://ricontology.com/cdpAgent> .

<http://ricontology.com/cdpComplaint> owl:disjointWith <http://ricontology.com/cdpEvidence> ,
<http://ricontology.com/cdpFact> , <http://ricontology.com/cdpMedium> ,
<http://ricontology.com/cdpMotivation> , <http://ricontology.com/cdpRequest> ;
    rdfs:comment "This class is the cornerstone for the pattern. We defined as an expression of
dissatisfaction issued by a Complainant against a Complaint-Recipient, describing the facts,
motivations, where a response or resolution is explicitly or implicitly expected. The complaint
entity differs from the act of complaining, which is out of the scope of this ODP , as it is out of
our use-case" ;
    rdfs:label "Complaint" .
#
# http://ricontology.com/cdpComplaint_Recipient
<http://ricontology.com/cdpComplaint_Recipient> a owl:Class ;
    rdfs:subClassOf <http://ricontology.com/cdp#Role> ;
    rdfs:comment "Person, organization, or its representative, receiving a complaint (ISO
10002:2014). This concept varies from the addressee, which may be the Recipient, or any other that
shall receive the complaint. The Complainant Recipient may be implicit in some datasets." ;
    rdfs:label "Complaint Recipient" .
#
# http://ricontology.com/cdpEvidence
<http://ricontology.com/cdpEvidence> a owl:Class ;
    rdfs:subClassOf _:genid23 .

_:genid23 a owl:Restriction ;
    owl:onProperty _:genid24 .

_:genid24 owl:inverseOf <http://ricontology.com/cdpsupportedBy> .

_:genid23 owl:someValuesFrom <http://ricontology.com/cdpFact> .

<http://ricontology.com/cdpEvidence> owl:disjointWith <http://ricontology.com/cdpFact> ,
<http://ricontology.com/cdpMedium> , <http://ricontology.com/cdpMotivation> ,
<http://ricontology.com/cdpRequest> ;
    rdfs:comment "Proof(s) supporting the facts described in the complaint. Possibilities of
Evidence are receipt, contract, testimony, email, and photo." ;
    rdfs:label "Evidence" .
#
# http://ricontology.com/cdpFact
<http://ricontology.com/cdpFact> a owl:Class ;
    owl:disjointWith <http://ricontology.com/cdpMotivation> ,
<http://ricontology.com/cdpRequest> ;
    rdfs:comment "Proposition about something described in a complaint. Facts are observed
events by the complainant." ;
    rdfs:label "Fact" .
#
# http://ricontology.com/cdpMedium
<http://ricontology.com/cdpMedium> a owl:Class ;
    owl:disjointWith <http://ricontology.com/cdpMotivation> ,
<http://ricontology.com/cdpRequest> ;
    rdfs:comment "A medium is a bearer of expressions, i.e. externalized propositions.
Propositions become expressions once they are externalized through some medium (LKIF imported
definition). In some complaint datasets, the medium is implicit." ;
    rdfs:label "Medium" ;
    skos:closeMatch lkif-expression:Medium .
#
# http://ricontology.com/cdpMotivation

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<http://ricontology.com/cdpMotivation> a owl:Class ;
    rdfs:subClassOf _:genid25 .

_:genid25 a owl:Restriction ;
    owl:onProperty <http://ricontology.com/cdpjustifiedBy> ;
    owl:someValuesFrom <http://ricontology.com/cdpFact> .

<http://ricontology.com/cdpMotivation> owl:disjointWith <http://ricontology.com/cdpRequest> ;
    rdfs:comment "Subjective motive of dissatisfaction, justified by facts." ;
    rdfs:label "Motivation" .

#
# http://ricontology.com/cdpRequest

<http://ricontology.com/cdpRequest> a owl:Class ;
    rdfs:comment "A demand, claim or remedy set by the Complainant, e.g., financial
compensation, apology, response, resolution, settlement, or other action." ;
    rdfs:label "Request" .

#
# http://ricontology.com/cdpThirdParty

<http://ricontology.com/cdpThirdParty> a owl:Class ;
    rdfs:subClassOf <http://ricontology.com/cdp#Role> ;
    rdfs:comment "Any natural persons or any legal person, who is acting, including through any
person acting in his name or on his behalf, for purposes not related to the object of the complaint."
;
    rdfs:label "Third Party" .

#
# http://ricontology.com/cdp#Role

<http://ricontology.com/cdp#Role> a owl:Class ;
    rdfs:comment "Role in the sense of Agents' roles" ;
    rdfs:label "Role" .

```

<i>Term</i>	<i>Definition by legal source</i>	<i>Link to normative/ legal source</i>
Booking= Reservation	Action of reserving space on a flight for a passenger, e.g., inventory space or physical seat. See "Reservation".	IATA PADIS 07.1
Reservation= booking	means the fact that the passenger has a ticket, or other proof, which indicates that the reservation has been accepted and registered by the air carrier or tour operator, Article 2(g) 261/2004	Article 2(g) reg 261/2004
Air carrier	means an air carrier that performs or intends to perform a flight under a contract with a passenger or on behalf of another person, legal or natural, having a contract with that passenger, Article 2(b) reg 261/2004 ; air carrier' shall mean an air transport undertaking with a valid operating licence, 2(1)(b) Regulation (EC) No 889/2002	Article 2b reg 261/2004; 2(1)(b) Regulation (EC) No 889/2002
Final destination	'final destination' means the destination on the ticket presented at the check-in counter or, in the case of directly connecting flights, the destination of the last flight; alternative connecting flights available shall not be taken into account if the original planned arrival time is respected, Article 2 (h) Regulation 261/2004. "The ultimate stopping place according to the contract of carriage", IATA PSCRM RP 1008. "The ultimate stopping place of the journey as shown on the ticket, IATA Tariff Reso 012.	Article 2(h) Regulation 261/2004; IATA PSCRM RP 1008; IATA Tariff Reso 012.

Denied Boarding on a Connecting Flight	Passengers that are denied boarding on a connecting flight due to the fact their previous flight was delayed and caused further delay by the airline.	
Denied Boarding on reasonable Grounds	Denied boarding when there are reasonable grounds to deny them boarding, such as reasons of health, safety or security, or inadequate travel documentation, Article (2)(j) Regulation (EC) 261/2004. Broader interpretation from the CJEU: " the concept of 'denied boarding' relates not only to cases of overbooking, denied boarding covers all circumstances in which an air carrier refuses to carry a passenger, such as those concerning other grounds, such as operational reasons", German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Case C-321/11, 04/10/2012, and C-22/11 (Finnair Oyj vs. Timy Lassooy)	, Article (2)(j) Regulation (EC) 261/2004. German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Case C-321/11, 04/10/2012, and C-22/11 (Finnair Oyj vs. Timy Lassooy)
Compelled Denied Boarding	Compelled Denied Boarding reflects the incident when a person who has presented himself for boarding under the conditions laid down in Article 3(2) and does not respond positively to the air carrier's call for passengers to surrender their reservation and hence is compelled to yield it.	Article 4(2) Regulation (EC) 261/2004
Volunteer Denied Boarding	Volunteer Denied Boarding reflects the incident when a person who has presented himself for boarding under the conditions laid down in Article 3(2) and responds positively to the air carrier's call for passengers prepared to surrender their reservation in exchange for benefits,	Article 2(k), and 4(1) Regulation (EC) 261/2004

	Article 2(k), Regulation (EC) 261/2004.	
denied boarding	<p>Denied boarding means a refusal to carry passengers on a flight, although they have presented themselves for boarding under the conditions laid down in Article 3(2), except where there are reasonable grounds to deny them boarding, such as reasons of health, safety or security, or inadequate travel documentation, Article (2)(j) Regulation (EC) 261/2004. Consists in an individual measure taken by the air carrier arbitrarily against a passenger who has nevertheless satisfied all the conditions for boarding (not attributable to the passenger himself).</p> <p>Broader interpretation from the CJEU: " the concept of 'denied boarding' relates not only to cases of overbooking, denied boarding covers all circumstances in which an air carrier refuses to carry a passenger, such as those concerning other grounds, such as operational reasons", German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Case C-321/11, 04/10/2012, and Case C-22/11, Finnair vs Timy Lassooy, ECLI:EU:C:2012:604, paragraph 26</p>	Article 2 (j) Regulation (EC) 261/2004. Case Law of the CJEU German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Case C-321/11, 04/10/2012, and C-22/11 (Finnair Oyj vs. Timy Lassooy)
community air carrier	means an air carrier with a valid operating licence granted by a Member State in accordance with the provisions of Council	2(1)(b) Reg 889/2002; 2(c) Reg 261/2004

	Regulation (EEC) No 2407/92 of 23 July 1992 on licensing of air carriers; 2(1)(b) Reg 889/2002; 2(c) Reg 261/2004	
delay at arrival	When an operating air carrier reach their final destination three hours or more after the scheduled arrival time (originally scheduled by the air carrier).	Joined Cases C-402/07 (Sturgeon vs. Condor Flugdienst GmbH) and C-432/07 (Böck/Lepuschitz vs. Air France); Joined Cases C-581/10 Nelson and Others v Deutsche Lufthansa AG and C-629/10 Tui Travel, British Airways, EasyJet, IATA vs. Civil Aviation Authority
delay at departure	When an operating air carrier reasonably expects a flight to be delayed beyond its scheduled time of departure.	Article 6 Regulation 261/2004
cancellation	Means the non-operation of a flight which was previously planned and on which at least one place was reserved, Article(2)(1) (EC) Regulation 261/2004. Broader interpretation from the Court: ‘cancellation’ as meaning that is does not refer exclusively to the situation in which the aero plane in question fails to take off at all. That concept also covers the case in which an aeroplane took off but, for whatever reason, was subsequently forced to return to the airport of departure where its passengers were transferred to other flights, Aurora Sousa Rodríguez and Others v Air France SA, Judgment in Case C-83/10, 13/10/2011	Article(2)(1) reg 261/2004, case law

operating air carrier	An air transport undertaking with a valid operating licence, Article 2 (a) Regulation 261/2004. "The Carrier that holds the Air Operator's Certificate for the aircraft used for that flight. The airline actually providing carriage or other services incidental to such air carriage. The Operating Carrier may be different from the Marketing Carrier in situations where bilateral agreements exist, e.g. code share agreement", IATA PADIS 07.1	Article 2(a) Regulation 261/2004; IATA PADIS 07.1
volunteer	means a person who has presented himself for boarding under the conditions laid down in Article 3(2) and responds positively to the air carrier's call for passengers prepared to surrender their reservation in exchange for benefits.2(k) reg 261/2004	2(k) reg 261/2004
Check-in	The check-in process involves those activities necessary to evaluate passengers and make them ready to board flights. It also includes management of flight activities immediately before and after a flight has been dispatched from a gate, and other tasks associated with the handling of passengers in transit. Check-in activities can be performed at airports or at a remote location. Check-in can be performed by humans or by machines (self-service devices such as kiosks). To get up-to-date information it is best to confirm timings with the airline.	Glossary for Passengers IATA

Contract of carriage	contract of carriage' means a contract for or including air transport services, including one where the carriage is composed of two or more flights operated by the same or different air carriers	Art. 2(b) REGULATION (EC) No 2111/2005 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 December 2005 on the establishment of a Community list of air carriers subject to an operating ban within the Community and on informing air transport passengers of the identity of the operating air carrier
connecting carrier	A carrier to whose services the passenger and his baggage are to be transferred for onward connecting transportation.	IATA PSCRM RP1008
Connecting flight	Also known as "Transfer". The ability to transfer passengers, baggage, cargo or mail from one flight to another within a reasonable time period. On-line connections concern transfers between flights of the same airline designator and interline connections between flights of different airline designators.	IATA SSIM
Direct flight	Flight connecting two cities or airports with or without enroute stops; passengers need not change aircraft (except for a change of gauge flight.)	EDIFACT, IATA PADIS 07.1
Actual distance	Distance on the route the aircraft actually flies. In practice the great circle distances between the waypoints on the route network the aircraft follows might be used as an approximation of an actual distance 1.1.4 EUROCONTROL Glossary for Flight	1.1.4 EUROCONTROL Glossary for Flight
person entitled to compensation	person entitled to compensation' shall mean a passenger or any person entitled to claim in respect of that passenger, in accordance with applicable law, 2(1)(c) Reg 889/2002	2(1)(c) Reg 889/2002

Destroyed Baggage	A baggage which became unusable and cannot be used as supposed to.	
Lost baggage	"A piece(s) of baggage which is irretrievably lost". Similar to lost baggage is the situation of missing items from the baggage. Therefore, the same rules apply for those items. However, it will be hard to prove for the passenger that the specific object had been in the baggage in the first place.	IATA PSCRM, Reso780
damaged baggage	"Physical damage to baggage and/or its contents". It comprises all impairments to the substance of the baggage	IATA PSCRM, Reso780
Baggage, Checked	Equivalent to "Luggage, Registered". Baggage of which the carrier takes sole custody and for which carrier has issued a baggage check.	IATA PSCRM, RP1008
Baggage, Unchecked = cabin luggage	Baggage which is retained in the custody of the passenger.	IATA PSCRM, RP1008
Delayed Baggage	A piece(s) of baggage which fails to arrive at the airport of destination on the same flight as the passenger, but is subsequently delivered.	IATA PSCRM, Reso780
baggage	'baggage' shall mean both checked and unchecked baggage with the meaning of Article 17(4) of the Montreal Convention, Article 2(1)(d) Reg 889/2002 Personal property of passengers and crew loaded or carried on board an aircraft by agreement with the operator. 1.4.14 Eurocontrol, Glossary	Article 2(1)(d) Reg 889/2002
SDR - Special Drawing Right	'SDR' shall mean a special drawing right as defined by the International Monetary Fund, Article 2(1)(e) Reg 889/2002; https://www.imf.org/external/np/fin/data/rms_five.aspx	Article 2(1)(e) Reg 889/2002. https://www.imf.org/external/np/fin/data/rms_five.aspx

Montreal Convention	'Montreal Convention' shall mean the 'Convention for the Unification of Certain Rules Relating to International Carriage by Air', signed at Montreal on 28 May 1999.	Article 2(1)(g) Reg 889/2002
special declaration of interest	means the declaration made by the Passenger when handing over the Baggage to be checked, which specifies a value that is higher than that fixed as a liability limit by the Convention, in consideration for the payment of a surcharge. Article 22(2) Montreal Convention and Article 3(a) Reg 889/2002	Article 22(2) Montreal Convention and Article 3(a) Reg 889/2002
Boarding Pass=ticket	Document issued to a passenger to enable access to an aircraft. These may be issued at airports by Airports Council International (ACI) or Departure Control Systems (DCS), in advance by travel agencies or airlines, or by other means such as kiosks, internet or mobile devices. Industry standards control the content and format of a boarding pass.	IATA PADIS 07.1
ticket=boarding pass	ticket means a valid document giving entitlement to transport, or something equivalent in paperless form, including electronic form, issued or authorized by the air carrier or its authorized agent. It means also the card given to the passenger after check-in which allocates a seat number or indicates a boarding pattern. The stub of the card should be retained after going through the boarding gate to show to the flight crew once reaching the aircraft.	Article 2(f) Reg. 261/2004

Passenger	Any person, excluding on-duty members of the flight and cabin crews, who makes a journey by air. Infants in arms are included. 1.4.2, Eurocontrol Glossary. "Any person, except members of the crew, carried or to be carried in an aircraft with the consent of carrier",	1.4.2, Eurocontrol Glossary; IATA PSCRM RP 1008
Flight	A "flight" is to be understood as only concerning either the outward or homeward journey, not the two combined, and this is so even if both are booked at the same time, broader interpretation from the CJUE, C-173/07 (Emirates Airlines vs. Schenkel). The concept of 'flight' within the meaning of the Regulation must be interpreted as consisting essentially in an air transport operation, being as it were a 'unit' of such transport, performed by an air carrier which fixes its itinerary. The operation of an aircraft on a flight stage or number of flight stages with the same flight number. 1.2.23 Eurostat Glossary ICAO;	1.2.23 Eurostat Glossary ICAO. Case C-173/07, Emirates Airlines vs. Schenkel, ECLI:EU:C:2008:400, paragraph 40.
Departure	"Departure is a movement, which starts on aerodrome belonging to the airspace volume or two dimensional area considered. It ends with exit from the airspace volume or two-dimensional area considered", 1.2.3 Eurocontrol Glossary. "The day/time of the flight on which the passenger is booked/ticketed to travel NOTES: 1) Before departure: the definition refers to the first flight of the pricing unit 2) After departure: the definition refers to	1.2.3 Eurocontrol Glossary; IATA Tariff Res. 012

	subsequent flights of the pricing unit", IATA Tariff Res. 012	
Arrival	Arrival is a movement, which starts with the entry into the airspace volume or two-dimensional area. It ends with arrival at an aerodrome belonging to the airspace volume or two-dimensional area considered, 1.2.2 Eurocontrol Glossary.	1.2.2 Eurocontrol Glossary
actual arrival time	actual arrival time corresponds to the time at which at least one of the doors of the aircraft is opened, the assumption being that, at that moment, the passengers are permitted to leave the aircraft, Germanwings GmbH v Ronny Henning, Case C-452/13	Germanwings GmbH v Ronny Henning, Case C-452/13

compensation	<p>The right to compensation consists of a payment of an amount of money regarding the passenger's inconvenience of a flight disruption. The amount depends on the flight distance and on the type of flight. The compensation shall be paid in cash, by electronic bank transfer, bank orders or bank checks or, with the signed agreement of the passenger, in travel vouchers and/or other services. Passengers shall receive compensation amounting to:</p> <p>(a) EUR 250 for all flights of 1 500 kilometres or less; (b) EUR 400 for all intra-Community flights of more than 1 500 kilometres, and for all other flights between 1 500 and 3 500 kilometres; (c) EUR 600 for all flights not falling under (a) or (b).</p>	Article 7 (1) EC Regulation
further compensation	<p>The Court holds that 'further compensation' is intended to supplement the application of the standardized and immediate measures provided for by the Regulation. Therefore, that 'further compensation' allows passengers to be compensated for the entirety of the material and non-material damage they suffered due to the failure of the air carrier to fulfil its contractual obligations. Carried by national courts.</p>	Aurora Sousa Rodríguez and Others v Air France SA, Judgment in Case C-83/10, 13/10/2011

damage	The term 'damage', which underpins Article 22(2) of the Montreal Convention, that sets the limit of an air carrier's liability for the damage resulting, inter alia, from the loss of baggage, must be interpreted as including both material and non-material damage, Walz v Clickair SA, Case C-63/09, 6/05/2010	Article 22(2) of the Montreal Convention, Walz v Clickair SA, Case C-63/09, 6/05/2010
extraordinary circumstances	<p>CJEU interpretation: "Extraordinary Circumstances" are "events which, owing to its nature or origin, is not inherent to the normal exercise of the activity of the air carrier, that could not have been avoided, even if all reasonable measures had been taken, namely circumstances which are beyond the air carrier's actual control", C-549/07 (Friederike Wallentin-Hermann vs. Alitalia Linee Aeree Italiane SpA).</p> <p>This analysis is made in a case by case assessment</p> <p>The air carrier has to demonstrate the existence of extraordinary circumstances, and also explain what reasonable measures it took to subsequently avoid the disruption.</p> <p>-Examples which might amount to "extraordinary", are latent defects identified by the manufacturer, sabotage and terrorism. And even if there are such circumstances, the air carrier has a second hurdle to overcome, namely how they relate to it. The carrier must establish that "even if it had deployed all its resources in terms of staff or equipment and the financial means at its disposal, it would clearly not</p>	Wallentin-Hermann v Alitalia — Linee Aeree Italiane SpA (Case C-549/07), 22/12/2008. Recital 14 and 15 of the Regulation 261/2004. C-257/14 (Corina van der Lans vs. KLM). Draft list of extraordinary circumstances following the National Enforcement Bodies (NEB) meeting held on 12 April 2013 Version 19 April 2013

	<p>have been able - unless it had made intolerable sacrifices in the light of the capacities of its undertaking at the relevant time – to prevent the extraordinary circumstances.” C-549/07 (Friederike Wallentin-Hermann vs. Alitalia Linee Aeree Italiane SpA).</p> <p>-Recital 14 a 15 of the Regulation 261/2004 provides some examples of Extraordinary Circumstances, such as political instability, meteorological conditions incompatible with the operation of the flight concerned, security risks, unexpected flight safety shortcomings and strikes that affect the operation of an operating air carrier.</p> <p>- A "technical problem", which occurred unexpectedly, not attribute to poor maintenance and which was also not detected during routine maintenance checks, does not fall within the definition of “extraordinary circumstances”, C-257/14 (Corina van der Lans vs. KLM). Other examples are shown in a Draft list of extraordinary circumstances following the National Enforcement Bodies (NEB) meeting held on 12 April 2013 Version 19 April 2013.</p>	
<p>incident = Event Event Ontology</p>	<p>An occurrence or event related to the flight, baggage or service.</p>	

Legal Source	Any fact that embeds normative propositions and makes them legally valid by virtue of such an embedment. SARTOR, Giovanni, Fundamental Legal Concepts: A Formal and Teleological Characterisation, European University Institute, EUI LAW; 2006/11. According to the Ontology of basic concepts of law, a legal source is a source for legal statements, both norms and legal expressions. In a sense it is literally a 'source' of law", in Ontology of Basic Legal Concepts, http://www.estrellaproject.org/doc/D1.4-OWL-Ontology-of-Basic-Legal-Concepts.pdf	SARTOR, Giovanni, Fundamental Legal Concepts: A Formal and Teleological Characterisation, European University Institute, EUI LAW; 2006/11
Enforcement Procedure	Enforcement within consumer policy is defined as "Enforcement in consumer policy encompasses a spectrum of activities undertaken by a variety of actors, using different instruments, to ensure that consumer rights are respected. These include formal enforcement proceedings, primarily undertaken by public enforcement authorities, which are in the focus of this Communication, but also consumers acting to defend their own rights through private enforcement or other dispute-resolution mechanisms. An effective enforcement response combines activities which promote compliance through information of consumers and businesses, with more formal enforcement measures", Communication from the Commission to the European Parliament, the	Communication from the Commission to the European Parliament, the Council, the EESC and the Committee of the Regions on the enforcement of the consumer acquis, Brussels, 2.7.2009 COM(2009) 330 final

	Council, the EESC and the Committee of the Regions on the enforcement of the consumer acquis, Brussels, 2.7.2009 COM(2009) 330 final	
Exception	Excluding facts or norms to the use of the right. An exception" is something that is excluded from a general statement or does not follow a rule", http://www.estrellaproject.org/doc/D1.4-OWL-Ontology-of-Basic-Legal-Concepts.pdf , p. 61	http://www.estrellaproject.org/doc/D1.4-OWL-Ontology-of-Basic-Legal-Concepts.pdf , p. 61
Further Interpretation	Additional relevant information related to the legal right	
Constraint	Limitations to the exercise of the legal right, conveyed in hard or soft law	

Right	Rights "are a social advantage (Bentham), a free choice (Hart), or a protected interest (MacCormick); it justifies the imposition of duties, the entitlement of claims and privileges, the transfer of powers. In this wide sense, it includes subjective rights. In the strict sense, it is, according to the Hohfeldian definition, correlative of Duty and better expressed by Claim, which is a subclass of Legal Right" A. Gangemi, M.-T. Sagri, and D. Tiscornia, A Constructive Framework for Legal Ontologies, Law and the Semantic Web, Volume 3369 of the series Lecture Notes in Computer Science pp 97-124. p. 112. "A legal position by which an Agent is entitled to obtain something from another Agent , under specified circumstances, through an enforcement explicited either in a Law, Contract , etc.", http://www.loa-cnr.it/ontologies/CLO/CoreLegal.owl	A. Gangemi, M.-T. Sagri, and D. Tiscornia, A Constructive Framework for Legal Ontologies, Law and the Semantic Web, Volume 3369 of the series Lecture Notes in Computer Science pp 97-124. p. 112; http://www.loa-cnr.it/ontologies/CLO/CoreLegal.owl;
Flight Incident	Incident related to the provision of the flight	
upgrading	When an operating air carrier places a passenger in a class higher than that for which the ticket was purchased	Article 10 (1) Regulation 261/2004
downgrading	When an operating air carrier places a passenger in a class lower than that for which the ticket was purchased	Article 10 (2) Regulation 261/2004
Seat Misplacement	When an operating air carrier misplaces a passenger in a class different than that for which the ticket was purchased.	Article 10 Regulation 261/2004

Insolvency Incident	When an air carrier has insufficient assets to meet all debts, or being unable to pay debts as and when they are due	Council Regulation (EC) No 1346/2000 of 29 May 2000 on insolvency proceedings
Baggage Incident	Incident related to mishandled baggage, which was lost, delayed, destroyed or damaged baggage	
Service incident	Incident related to the service provided.	
unfair contract terms	A contractual term shall be regarded as unfair if, contrary to the requirement of good faith, it causes a significant imbalance in the parties' rights and obligations arising under the contract, to the detriment of the consumer, Article 3 (1) Directive of Unfair Contract terms 93/ 13/EEC	Article 3 (1) Directive of Unfair Contract terms 93/ 13/EEC
unfair commercial practices	Commercial practices which are dishonest practices; misleading commercial practices (such as false claims, deceiving information or leaving out important information that would affect the consumer decision to buy something); and aggressive sales techniques that harass the consumer into buying something under pressure, Article 5 of the Directive 2005/29/EC of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market.	Article 5 of the Directive 2005/29/EC of 11 May 2005
irresponsiveness	Incident related to the difficulties in getting information from the air carrier on where and how to complain; and on claiming redress (e.g. no phone number, no email or all telephone lines busy, no response to the complaint).	

complaint	<p>‘Complaint’ means a statement of dissatisfaction with a specific trader made by a consumer, in relation to the promotion, sale or supply of a good or a service, use of a good or a service or after-sales service, VADEMECUM European Consumer Centres’ Network (ECC-Net), http://ec.europa.eu/chafea/documents/consumers/ECC-NET/2013/ECC-Net_Vademecum.pdf</p> <p>- ‘consumer complaint’ means a statement, supported by reasonable evidence, that a seller or supplier has committed, or is likely to commit, an infringement of the laws that protect consumers' interests; Article 3(j), REGULATION (EC) No 2006/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (the Regulation on consumer protection cooperation)</p>	<p>VADEMECUM European Consumer Centres’ Network (ECC-Net), http://ec.europa.eu/chafea/documents/consumers/ECC-NET/2013/ECC-Net_Vademecum.pdf Article 3(j), REGULATION (EC) No 2006/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (the Regulation on consumer protection cooperation)</p>
dispute	<p>‘Dispute’ means a referral to an out-of-court entity or a Court in particular using the Small Claims Procedure¹ or the European order for payment procedure</p>	<p>VADEMECUM European Consumer Centres’ Network (ECC-Net), http://ec.europa.eu/chafea/documents/consumers/ECC-NET/2013/ECC-Net_Vademecum.pdf</p>
Claim = request	<p>A written demand for compensation prepared and signed by or on behalf of the passenger in the case of baggage, containing an itemized list and value of goods for which compensation is being requested.</p>	<p>IATA PSCRM Reso 780</p>

reimbursement =refund	"Reimbursement consists in the refund, within seven days, of the full cost of the ticket at the price at which it was bought, for the part or parts of the journey not made unused flight tickets), and for the part or parts already made if the flight is no longer serving any purpose in relation to the passenger's original travel plan", Article 8 (1) (a) of the EC Regulation. "The repayment to the purchaser of all or a portion of a fare, rate or charge for unused carriage or service", IATA PSCRM RP1008. This right may be offered together with, when relevant, with a return flight to the first point of departure, at the earliest opportunity.	Article 8 (1) (a) of the EC Regulation
rerouting	Rerouting to the passenger's final destination, at the earliest opportunity; or at a later date at the passenger's convenience, subject to availability of seats under comparable transport conditions, Article 8 (1) (b) of the (EC) Regulation	Article 8 (1) (b) of the (EC) Regulation

information	<p>Right to be informed about the cause of the incident and the consequent rights. The right to information is expressed in Article 14 of the Regulation 261/2004 and stems from the obligation of the air carrier to inform passengers of their rights. The operating air carrier shall ensure that at check-in a clearly legible notice containing the following text is displayed in a manner clearly visible to passengers: 'If you are denied boarding or if your flight is cancelled or delayed for at least two hours, ask at the check-in counter or boarding gate for the text stating your rights, particularly with regard to compensation and assistance'. An operating air carrier denying boarding or cancelling a flight shall provide each passenger affected with a written notice setting out the rules for compensation and assistance in line with this Regulation. It shall also provide each passenger affected by a delay of at least two hours with an equivalent notice.</p>	Article 14 and Recital 20 of the Regulation 261/2004
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assistance	<p>The right to assistance or right to care entitles each passenger, free of charge:</p> <p>(a) meals and refreshments in a reasonable relation to the waiting time;</p> <p>(b) hotel accommodation in cases</p> <p>— where a stay of one or more nights becomes necessary,</p> <p>or</p> <p>— where a stay additional to that intended by the passenger becomes necessary;</p> <p>(c) transport between the airport and place of accommodation (hotel or other).</p> <p>In addition, passengers shall be offered free of charge two telephone calls, telex or fax messages, or e-mails, according to Article 9 of the EC Regulation.</p>	Art. 6 of the Regulation 261/2004
Communication	<p>Consists in a form of assistance based in the right to have free of charge two telephone calls, telex or fax messages, or e-mails.</p>	Article 9(2) of the 261/2004 EC Regulation
Accommodation	<p>Consists in a form of assistance based in the right to have free of charge hotel accommodation in cases—</p> <p>where a stay of one or more nights becomes necessary, or—</p> <p>where a stay additional to that intended by the passenger becomes necessary;</p> <p>(c) transport between the airport and place of accommodation (hotel or other).</p>	Article 9 (1) (b) of the EC Regulation 261/2004.

Meals and refreshments	Consists in a form of assistance based in the right to have free of charge meals and refreshments in a reasonable relation to the waiting time, Article 9 (1) (a) EC Regulation 261/2004. Type of refreshment or food service served in flight. This may vary according to class of service and time of day. Meal codes are typically a single alpha character which appear in an availability display, IATA PADIS 07.1	Article 9 (1) (a) of the EC Regulation 261/2004; IATA PADIS 07.1
Transportation	Consists in a form of assistance based in the right to have free of charge transport between the airport and place of accommodation (hotel or other)	Article 9 (1) (c) of the EC Regulation 261/2004.
Flight Coupon or Voucher	Each component part of a ticket containing separate travel authority for subdivisions of the total travel covered by the passenger ticket.	ICAO Glossary (International Civil Aviation Organization)
Conditions of Carriage	The terms and conditions established by a carrier in respect to its carriage.	IATA PSCRM RP1008
Regulatory Authorities	Generic term used to describe bodies that control various aspects of the airline industry, e.g., European Union (EU) for "Passengers with Reduced Mobility".	IATA PADIS 07.1 RP1008
Schedule Change	Any modification to the operation of a flight which may require passenger notification. This may be a change in arrival or departure times, flight number or class of service, frequency of operation or airports served, etc. A change in arrival or departure time, as a result of a city's conversion to or from Daylight Time also constitutes a schedule change. There is no change when the only factor is	IATA PSCRM Reso766

	conversion to or from Daylight Time, with departure and arrival times remaining the same in terms of local time.	
Property Irregularity Report	If passenger is experiencing difficulties with their luggage, whether it is damaged, delayed or lost, the first step is to report the matter, usually to a representative of the airline or more commonly a handling agent, and complete a Property Irregularity Report.	contractual terms of companies
Obligation	The definition of this concepts is imported from [Sartor, 2004]: "The proposition expressing the obligation to perform a certain action is true whenever optimal practical cognition would lead one to have the intention of accomplishing that action"	[Sartor, 2004]
Prohibition	A legal restriction against the use of something or against certain conduct, described in a legal norm.	
Requisite	Legal requirements bound to the entitlement of rights	
seller or supplier	'seller or supplier' means any natural or legal person who, in respect of the laws that protect consumers' interests, is acting for purposes relating to his trade, business, craft or profession;	Article 3(h), REGULATION (EC) No 2006/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (the Regulation on consumer protection cooperation)

Customer Service Insatisfaction	Insatisfaction with the customer service provided by the airline in relation to the purchase of a service up to the point of delivery of the service. Examples: queue length, discriminatory issues related to language, nationality, quality of the food, behavior or attitude of some of its employees.	
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Annex 3 Relevant Legal Information in the ATP domain

<i>Ric Components</i>	<i>Content Description (modelled as instances in RIC-ATPI)</i>
Air Transport Passenger Incident	Cancelation
Right and Legal Source	Right to information Art. 5(2), Art. 14(2) , Regulation (EC) 261/2004
Requisite and Legal Source ¹	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Further Interpretation and Legal Source	Recital 20 Regulation (EC) "Passengers should be fully informed of their rights in the event of denied boarding and of cancellation or long delay of flights, so that they can effectively exercise their rights"; Art. 14 (2) Regulation (EC) 261/2004 "An operating air carrier denying boarding or cancelling a flight shall provide each passenger affected with a written notice setting out the rules for compensation and assistance in line with this Regulation. It shall also provide each passenger affected by a delay of at least two hours with an equivalent notice. The contact details of the national designated body referred to in Article 16 shall also be given to the passenger in written form
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies ⁷ of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies ⁷ of the original receipts, such as boarding pass, receipts of the expenses) Legal Action Procedure: when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

<i>RIC Components</i>	<i>Content Description</i>
Air Transport Passenger Incident	Cancelation
Right and Legal Source	Right to choose between i) reimbursement and return flight to the first point of departure; or ii) right to rerouting. Art. 8 Regulation (EC) 261/2004

¹ Another geographical requisite is the following: Where some entitlements (benefits or compensation and care) are given at the point of departure either on the basis of local legislation or on a voluntary basis, passengers cannot claim any further rights under the Regulation, Article 3(1)(b).

Annex 3 Relevant Legal Information in the ATP domain

Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint to the right of Reimbursement: If the Passenger chooses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves.
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure</i> : when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

RIC Components	Content Description
Air Transport Passenger Incident	Cancelation
Right and Legal Source	Right to communications Art 9 (2) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure</i> : when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

RIC Components	Content Description
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Annex 3 Relevant Legal Information in the ATP domain

Air Transport Passenger Incident	Cancelation
Right and Legal Source	right to meals and refreshments Art. 9(1) (a) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint to the right of care: Recital 18 "care for passengers awaiting an alternative or a delayed flight may be limited or declined if the provision of the care would itself cause further delay -If a third country airport authority provides assistance on a flight incident to passengers (in the form of vouchers or accommodation in the third country), this preclude passenger from claiming further assistance (availing the rights) under the Regulation, from the airline concerned, Article 3(1)(b) Regulation 261/2004
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

<i>RIC Components</i>	<i>Content Description</i>
Air Transport Passenger Incident	Cancelation
Right and Legal Source	i) Right to rerouting and ii) Right to accommodation and transportation, when the reasonably expected time of departure of the new flight is at least the day after the departure as it was planned for the cancelled flight.

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	Art. 5 (1) (b), Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Further Interpretation and Legal Source	<p>-Further Interpretation of the right to rerouting 1</p> <p>"Passengers should be rerouted via other carriers or by surface transport, if there is no alternative flight available on their own aircraft. The 'network airlines' generally have reciprocal agreements enabling them to reroute passengers via other carriers if necessary, at a reasonable price". COM(2007) 168 final, p. 7</p> <p>-Further Interpretation of the right to rerouting 2</p> <p>"Rerouting alternatives can be proposed by other means of transport, such as train, taxi or bus, if, the distance to be covered is appropriate for such transport modes". -Opinion from the Information Document of Directorate-General for Energy and (Transport DGET), p. 11</p> <p>-Further Interpretation of the right to rerouting 3</p> <p>Rerouting may be conducted by another mode of transport or by another carrier covering the same route or a very similar one, in the same or similar fare class. The "comparable transport conditions" must be defined on the basis of the same or similar class and not on the ticket price paid by the individual passenger, COM(2011) 174 final, p. 8</p>
Constraint and Legal Source	<p>Constraint to the right of transportation and accommodation</p> <p>It has to be taken in account also the practicalities faced by the airline, such as the distance from the airport to the closest available hotels, combined with the time of the replacement flight in the following day.</p> <p>legal source: Opinion from the Information Document of Directorate-General for Energy and Transport (DGET), p. 12</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses);</p> <p><i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)</p>

<i>RIC Components</i>	<i>Content Description</i>
Air Transport	Cancelation

Annex 3 Relevant Legal Information in the ATP domain

Passenger Incident	
Right and Legal Source	Right to compensation Art. 7 (1) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Further Interpretation and Legal Source	Art. 12 Regulation (EC) 261/2004 states that passengers have rights to further compensation. -Case Law 22/12/2008, Aurora Sousa Rodríguez and Others v Air France SA, Judgment in Case C-83/10 -Recital (14) Regulation (EC) 261/2004 "circumstances which could not have been avoided even if all reasonable measures had been taken. Such circumstances may, in particular, occur in cases of political instability, meteorological conditions incompatible with the operation of the flight concerned, security risks, unexpected flight safety shortcomings and strikes that affect the operation of an operating air carrier. -Recital (15) Extraordinary circumstances should be deemed to exist where the impact of an air traffic management decision in relation to a particular aircraft on a particular day gives rise to a long delay, an overnight delay, or the cancellation of one or more flights by that aircraft, even though all reasonable measures had been taken by the air carrier concerned to avoid the delays or cancellations. Draft list of EC (extraordinary circumstances). -Case law: Extraordinary Circumstances are "events which, owing to its nature or origin, is not inherent to the normal exercise of the activity of the air carrier, that could not have been avoided, even if all reasonable measures had been taken, namely circumstances which are beyond the air carrier's actual control", C-549/07 (Friederike Wallentin-Hermann vs. Alitalia Linee Aeree Italiane SpA).
Exception and Legal Source	-extraordinary circumstances: 5(3) Regulation (EC) 261/2004 "An operating air carrier shall not be obliged to pay compensation if it can prove that the cancellation is caused by extraordinary circumstances which could not have been avoided even if all reasonable measures had been taken". -early notice exception to the right of compensation: i) at least 2 weeks before the scheduled time of departure; ii) between 2 weeks and 7days before the scheduled time of departure AND are offered rerouting (allowing them to depart no more than 2h before the scheduled time of departure and less than 4 h after the scheduled time of arrival); iii) less than 7 days before the scheduled time of departure, AND are offered rerouting, allowing them to depart no more than 1h before the scheduled time of departure and less than 2 h after the scheduled time of arrival). Art 5(1) (c) Regulation (EC) 261/2004

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Constraint and Legal Source	<p>-Constraint to the Right of Compensation in case of cancelled flight Art. 7(2): If the passenger is rerouted to his final destination, on an alternative flight, the operating air carrier may reduce the compensation by 50%, when the arrival time (of which does not exceed the scheduled arrival time of the flight originally booked) by:</p> <ul style="list-style-type: none"> -2h in respect to all flights of ≤ 1500 kms; -3h, in respect to all intra-Community flights of > 1500 kms; -3h, in respect for all other flights between 1500 and 3500km; -4h, in respect of all other flights. <p>-Art. 5(4) "The burden of proof concerning a cancellation and whether it is caused by extraordinary circumstances rests with the operating air carrier"</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses);</p> <p><i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)</p>

RIC Components	Content Description
Air Transport Passenger Incident	<p>Short Delay at departure</p> <ul style="list-style-type: none"> -length_flight 2h \geq AND distance_flight ≤ 1500 km, -length_flight 3h \geq AND distance_flight 3h \geq AND of intra-Community flights, -length_flight 3h \geq AND distance_flight between 1500 and 3500 km, -length_flight 4h \geq AND in case of other flights
Right and Legal Source	<p>-right to information Art. 14 (2) Regulation (EC) 261/2004</p>
Requisite and Legal Source	<p>Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)</p>
Further Interpretation and Legal Source	<p>-Interpretation of information 1 Recital 20 Regulation (EC) 261/2004 "Passengers should be fully informed of their rights in the event of denied boarding and of cancellation or long delay of flights, so that they can effectively exercise their rights";</p>

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	-Interpretation of information 2 Art 14 (2) Regulation (EC) 261/2004 "An operating air carrier denying boarding or cancelling a flight shall provide each passenger affected with a written notice setting out the rules for compensation and assistance in line with this Regulation. It shall also provide each passenger affected by a delay of at least two hours with an equivalent notice. The contact details of the national designated body referred to in Article 16 shall also be given to the passenger in written form".
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

RIC Components	Content Description
Air Transport Passenger Incident	Short Delay at departure -length_flight 2h ≥ AND distance_flight ≤ 1500 km, -length_flight 3h ≥ AND distance_flight 3h ≥ AND of intra-Community flights, -length_flight 3h ≥ AND distance_flight between 1500 and 3500 km, -length_flight 4h ≥ AND in case of other flights
Right and Legal Source	-right to communications Art 9 (2) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at

Annex 3 Relevant Legal Information in the ATP domain

	the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08)
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RIC Components	Content Description
Air Transport Passenger Incident	Short Delay at departure -length_flight 2h ≥ AND distance_flight ≤ 1500 km, -length_flight 3h ≥ AND distance_flight 3h ≥ AND of intra-Community flights, -length_flight 3h ≥ AND distance_flight between 1500 and 3500 km, -length_flight 4h ≥ AND in case of other flights
Right and Legal Source	right to meals and refreshments, Art. 9(2) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint to the right of care: Recital 18 Regulation (EC) 261/2004 "care for passengers awaiting an alternative or a delayed flight may be limited or declined if the provision of the care would itself cause further delay. -If a third country airport authority provides assistance on a flight incident to passengers (in the form of vouchers or accommodation in the third country), this preclude passenger from claiming further assistance (availing the rights) under the Regulation, from the airline concerned, Article 3(1)(b) Regulation 261/2004
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies’ of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies’ of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”, C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08)

RIC Components	Content Description
Air Transport Passenger Incident	Short Delay at departure -length_flight 2h ≥ AND distance_flight ≤ 1500 km, -length_flight 3h ≥ AND distance_flight 3h ≥ AND of intra-Community flights, -length_flight 3h ≥ AND distance_flight between 1500 and 3500 km,

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	-length_flight 4h≥ AND in case of other flights
Right and Legal Source	right to compensation of 4150 SDR in case of consequential damage occasioned by delay, Art. 19 and 22 (1) Montreal Convention
Further Interpretation	This damage needs to be proved according to the losses that passengers were subjected to. Examples of damage consist in cost of missing work, days of their holidays, pre-booked accommodation or events, purchase necessities
Requisite and Legal Source	Territorial application requisite: the rights applies to all international carriage of persons performed by aircraft for reward, art 1 Cv Montreal Convention
Exception and Legal Source	"The carrier is liable for damage occasioned by delay in the carriage by air of passengers, baggage. Nevertheless, the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures". Art. 19 and 22 (1) Montreal Convention
Enforcement Procedure and Legal Source	Passengers have to prove the extent of their loss. Accordingly, copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use Legal Action Procedure -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention

RIC Components	Content Description
Air Transport Passenger Incident	Long Delay at Departure with length flight 5h≥
Right and Legal Source	right to reimbursement and right to return flight to the first point of departure, Art. 8(1) (a) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint to the right of Reimbursement: If the Passenger choses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves, EU Commission Interpretative Guidelines on Regulation (EC) No 261/2004
Enforcement Procedure	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and

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and Legal Source	also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure</i> : when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)
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<i>RIC Components</i>	<i>Content Description</i>
Air Transport Passenger Incident	Long Delay at Departure with length flight 5h \geq
Right and Legal Source	right to compensation of 4150 SDR in case of consequential damage occasioned by delay, Art. 19 and 22 (1) Montreal Convention
Requisite and Legal Source	Territorial application requisite: the rights applies to all international carriage of persons performed by aircraft for reward, art 1 Cv Montreal Convention
Exception and Legal Source	"The carrier is liable for damage occasioned by delay in the carriage by air of passengers, baggage. Nevertheless, the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures". Art. 19 and 22 (1) Montreal Convention
Further Interpretation	This damage needs to be proved according to the losses that passengers were subjected to. Examples of damage consist in cost of missing work, days of their holidays, pre-booked accommodation or events, purchase necessities
Enforcement Procedure and Legal Source	Passengers have to prove the extent of their loss. Accordingly, copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use <i>Legal Action Procedure</i> -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention

<i>RIC Components</i>	<i>Content Description</i>
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Annex 3 Relevant Legal Information in the ATP domain

Air Transport Passenger Incident	Delayed flight at departure, when the reasonably expected time of departure is at least the day after the time of departure previously announced
Right and Legal Source	right to accommodation and transportation Article 9(1)(b) and 9(1)(c) EU Regulation
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Exception and Legal Source	Constraint to the right of transportation and accommodation It has to be taken in account also the practicalities faced by the airline, such as the distance from the airport to the closest available hotels, combined with the time of the replacement flight in the following day. legal source: Opinion from the Information Document of Directorate-General for Energy and Transport (DGET), p. 12
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses); <i>Legal Action Procedure</i> : when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)

RIC Components	Content Description
Air Transport Passenger Incident	Delayed flight at departure, when the reasonably expected time of departure is at least the day after the time of departure previously announced
Right and Legal Source	right to compensation of 4150 SDR in case of consequential damage occasioned by delay, Art. 19 and 22 (1) Montreal Convention
Requisite and Legal Source	Territorial application requisite: the rights applies to all international carriage of persons performed by aircraft for reward, Art 1 CV Montreal Convention
Exception and Legal Source	"The carrier is liable for damage occasioned by delay in the carriage by air of passengers, baggage. Nevertheless, the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures". Art. 19 and 22 (1) Montreal Convention

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Further Interpretation	This damage needs to be proved according to the losses that passengers were subjected to. Examples of damage consist in cost of missing work, days of their holidays, pre-booked accommodation or events, purchase necessities
Enforcement Procedure and Legal Source	Passengers have to prove the extent of their loss. Accordingly, copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use Legal Action Procedure -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention

RIC Components	Content Description
Air Transport Passenger Incident	Delayed flight at arrival with a length of 3 hours or more
Right and Legal Source	right to Compensation to: (a) EUR 250 for all flights of 1 500 kilometers or less; (b) EUR 400 for all intra-Community flights of more than 1 500 kilometers, and for all other flights between 1 500 and 3 500 kilometers; (c) EUR 600 for all flights not falling under (a) or (b). Art. 7(1) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Further Interpretation and Legal Source	- "A long delay entitles passengers to the same compensation as in the case of a flight cancellation: the passenger is entitled to compensation if he reaches his/her final destination with a delay of three hours or more. Such a delay does not, however, entitle passengers to compensation if the air carrier can prove that the long delay was caused by extraordinary circumstances which could not have been avoided even if all reasonable measures had been taken, namely circumstances beyond the actual control of the air carrier". Joined Cases: Christopher Sturgeon v Condor Flugdienst GmbH (C-402/07); and Stefan Bock and Others v Air France SA (C-432/07), 19/11/2009. Confirmed by Joined Cases: Nelson v Lufthansa AG (C-581/10) ; and TUI Travel/IATA/British Airways/easyJet/the Queen v Civil Aviation Authority (C-629/10) 23/10/2012. -Art. 12 Regulation (EC) 261/2004 " This Regulation shall apply without prejudice to a passenger's rights for further compensation"

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	<p>-Recital (14) "cases of political instability, meteorological conditions incompatible with the operation of the flight concerned, security risks, unexpected flight safety shortcomings and strikes that affect the operation of an operating air carrier".</p> <p>-Recital (15) "Extraordinary circumstances should be deemed to exist where the impact of an air traffic management decision in relation to a particular aircraft on a particular day gives rise to a long delay, an overnight delay, or the cancellation of one or more flights by that aircraft, even though all reasonable measures had been taken by the air carrier concerned to avoid the delays or cancellations". (EC) Regulation 261/2004</p> <p>-The actual arrival time corresponds to the time at which at least one of the doors of the aircraft is opened, the assumption being that, at that moment, the passengers are permitted to leave the aircraft, Case Law Judgment in Case C-452/13 Germanwings GmbH v Ronny Henning</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((Copies' of the original receipts, such as boarding pass, receipts of the expenses);</p> <p><i>Legal Action Procedure:</i> when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions", C-139/11); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08)</p>

RIC Components	Content Description
Air Transport Passenger Incident	Delayed flight at arrival with a length of 3 hours or more
Right and Legal Source	right to compensation of 4150 SDR in case of consequential damage occasioned by delay, Art. 19 and 22 (1) Montreal Convention
Requisite and Legal Source	Territorial application requisite: the rights applies to all international carriage of persons performed by aircraft for reward, art 1 Cv Montreal Convention
Further Interpretation and Legal Source	This damage needs to be proved according to the losses that passengers were subjected to. Examples of damage consist in cost of missing work, days of their holidays, pre-booked accommodation or events, purchase necessities
Exception and Legal Source	"The carrier is liable for damage occasioned by delay in the carriage by air of passengers, baggage. Nevertheless, the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents

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	took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures". Art. 19 and 22 (1) Montreal Convention
Enforcement Procedure and Legal Source	Passengers have to prove the extent of their loss. Accordingly, copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use Legal Action Procedure -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention

RIC Components	Content Description
Air Transport Passenger Incident	Volunteer Denied Boarding
Right and Legal Source	Volunteers have right to choose between Reimbursement and return flight to the first point of departure; or right to Rerouting, Art. 4, (1) (2) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Further Interpretation and Legal Source	-denied boarding interpretation (Case C-321/11, 04/10/2012) German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA: "The concept of 'denied boarding' covers all circumstances in which an air carrier refuses to carry a passenger, such as those concerning other grounds, such as operational reasons, (because of the anticipated delay to an earlier flight also operated) -Denied Boarding interpretation due to reasonable grounds -Further Interpretation of the right to rerouting 1: "Passengers should be rerouted via other carriers or by surface transport, if there is no alternative flight available on their own aircraft. The 'network airlines' generally have reciprocal agreements enabling them to reroute passengers via other carriers if necessary, at a reasonable price". COM(2007) 168 final, p. 7 Further Interpretation of the right to rerouting 2: "Rerouting alternatives can be proposed by other means of transport, such as train, taxi or bus, if, the distance to be covered is appropriate for such transport modes". -Opinion from the

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	<p>Information Document of Directorate-General for Energy and (Transport DGET), p. 11</p> <p>-Further Interpretation of the right to rerouting 3: Rerouting may be conducted by another mode of transport or by another carrier covering the same route or a very similar one, in the same or similar fare class. The "comparable transport conditions" must be defined on the basis of the same or similar class and not on the ticket price paid by the individual passenger. COM(2011) 174 final, p. 8</p>
Constraint and Legal Source	<p>Reimbursement Constraints: If the Passenger chooses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves.</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>

RIC Components	Content Description
Air Transport Passenger Incident	Volunteer Denied Boarding
Right and	Volunteers have right to benefits, Article 4 (1) Regulation (EC) 261/2004

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Legal Source	
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012);</p> <p>Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>

RIC Components	Content Description
Air Transport Passenger Incident	Volunteer Denied Boarding
Right and Legal Source	Volunteers have right to information, Art. 14(2) , Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p>

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	Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)
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RIC Components	Content Description
Air Transport Passenger Incident	Compelled Denied Boarding
Right and Legal Source	right to communications, Art. 9(2), Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>

RIC Components	Content Description

Annex 3 Relevant Legal Information in the ATP domain

Air Transport Passenger Incident	Compelled Denied Boarding
Right and Legal Source	Compelled passengers have right to meals and refreshments, Art. 9(1), (a) Art. (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint1 to the right of care: Recital 18 Regulation (EC) 261/2004: care for passengers awaiting an alternative or a delayed flight may be limited or declined if the provision of the care would itself cause further delay
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions". (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction: the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger's choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>

<i>RIC Components</i>	<i>Content Description</i>
Air Transport Passenger Incident	Compelled Denied Boarding
Right and Legal Source	Compelled passengers have right to accommodation and right to transportation, Art. 9 (1) (b) (c), Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)

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Constraint and Legal Source	Constraint to the right of transportation and accommodation: It has to be taken in account also the practicalities faced by the airline, such as the distance from the airport to the closest available hotels, combined with the time of the replacement flight in the following day. Legal source: Opinion from the Information Document of Directorate-General for Energy and Transport (DGET), p. 12
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf ; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf . Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses) Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)

RIC Components	Content Description
Air Transport Passenger Incident	Compelled Denied Boarding
Right and Legal Source	Compelled passengers have right to choose between i) reimbursement and return flight to the first point of departure; or ii) rerouting Art. 8 Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Constraint to right of Reimbursement If the Passenger chooses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves.
Further Interpretation and Legal Source	-Further Interpretation of the right to rerouting 1 "Passengers should be rerouted via other carriers or by surface transport, if there is no alternative flight available on their own aircraft. The 'network airlines' generally have reciprocal agreements enabling them to reroute passengers via other carriers if necessary, at a reasonable price". COM(2007) 168 final, p. 7

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	<p>-Further Interpretation of the right to rerouting 2 "Rerouting alternatives can be proposed by other means of transport, such as train, taxi or bus, if, the distance to be covered is appropriate for such transport modes". -Opinion from the Information Document of Directorate-General for Energy and (Transport DGET), p. 11</p> <p>-Further Interpretation of the right to rerouting 3 Rerouting may be conducted by another mode of transport or by another carrier covering the same route or a very similar one, in the same or similar fare class. The "comparable transport conditions" must be defined on the basis of the same or similar class and not on the ticket price paid by the individual passenger. COM(2011) 174 final, p. 8</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be "determined in accordance with the rules of each Member state on the limitation of actions". (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012);</p> <p>Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>

RIC Components	Content Description
Air Transport Passenger Incident	Compelled Denied Boarding

Annex 3 Relevant Legal Information in the ATP domain

Right and Legal Source	Compelled passengers have right to compensation, Art. 7 (1) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	compensation in case of cancellation constraint- Article 7(2) (b) Regulation (EC) 261/2004: If the passenger is rerouted to his final destination, on an alternative flight, the operating air carrier may reduce the compensation by 50%, when the arrival time (of which does not exceed the scheduled arrival time of the flight originally booked) by: -2h in respect to all flights of \leq 1500 kms -3h, in respect to all intra-Community flights of $>$ 1500 kms -3h, in respect for all other flights between 1500 and 3500km -4h, in respect of all other flights
Further Interpretation and Legal Source	-Art. 12 Regulation (EC) 261/2004: Passengers have right to further compensation. -Draft list of Extraordinary Circumstances (extraordinary circumstances) Case law: Wallentin-Hermann v Alitalia —Linee Aeree Italiane SpA (Case C- 549/07) -Case Law 22/12/2008; Aurora Sousa Rodríguez and Others v Air France SA, Judgment in Case C-83/10 (further compensation)
Enforcement Procedure and Legal Source	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf ; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf . Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses) Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)

<i>RIC Components</i>	<i>Content Description</i>
Air Transport	Denied Boarding on Reasonable Grounds

Annex 3 Relevant Legal Information in the ATP domain

Passenger Incident	
Right and Legal Source	The Passenger has no rights and no legal grounding to complaint

RIC Components	Content Description
Air Transport Passenger Incident	Denied Boarding on a Connecting Flight
Right and Legal Source	Right to reimbursement or rerouting, for denied boarding on the connecting flight, if the delay to the first flight was within the control of the same airline. Case C-321/11, 04/10/2012 German Rodriguez Cachafeiro, Maria de los Reyes Martinez-Reboredo Varela-Villamor v Iberia Lineas Aereas de Espana SA, Art. 8 (1) (a) (b) Regulation (EC) 261/2004
Requisite and Legal Source	Territorial application requisite: "the rights apply to worldwide airlines and passengers departing from an airport located within the EU, and also to all departing from an airport located in a third country, to an airport within the EU, where the operating air carrier is a EU air carrier, Regulation 261/2004, Art. 3(1)
Constraint and Legal Source	Reimbursement Constraint: if the Passenger chooses reimbursement, the airline no longer owes them a duty of care and they must make other travel arrangements themselves.
Further Interpretation and Legal Source	<p>Further Interpretation of the right to rerouting 1: "Passengers should be rerouted via other carriers or by surface transport, if there is no alternative flight available on their own aircraft. The 'network airlines' generally have reciprocal agreements enabling them to reroute passengers via other carriers if necessary, at a reasonable price", COM (2007) 168 final, p. 7</p> <p>-Further Interpretation of the right to rerouting 2: "Rerouting alternatives can be proposed by other means of transport, such as train, taxi or bus, if the distance to be covered is appropriate for such transport modes". -Opinion from the Information Document of Directorate-General for Energy and (Transport DGET), p. 11</p> <p>-Further Interpretation of the right to rerouting 3: Rerouting may be conducted by another mode of transport or by another carrier covering the same route or a very similar one, in the same or similar fare class. The "comparable transport conditions" must be defined on the basis of the same or similar class and not on the ticket price paid by the individual passenger. COM(2011) 174 final, p. 8</p>
Enforcement Procedure	Complaint Handling Procedure: To complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf ; and Neb adress:

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and Legal Source	<p>http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012); Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>
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RIC Components	Content Description
Air Transport Passenger Incident	Insolvency
Right and Legal Source	<p>right to rescue fares, Legal Source: 1) agreement (between AEA (Association of European Airlines), ELFAA (European Low Fare Airline Association), IATA (International Air Transport Association) and ERAA (European Regional Airlines Association), in the event of an airline bankruptcy, IATA member airlines flying to and from the EU will make their best efforts to offer repatriation to passengers stranded away from home. These passengers will be provided access to discounted transport to return home, subject to available capacity. The ‘rescue fares’ of a nominal amount will be available for purchase up to a maximum of two weeks after the event to anyone flying to and from or within Europe who does not already possess insurance covering this eventuality. States responsible for the licensing of the insolvent airline should also play their role in communicating to stranded passengers the possibility of this rescue service. 2) In some Member States purchases made by a credit card (and some debit cards) allow consumers to claim a refund from the card provider in the event of the service provider’s insolvency. However, this refund is usually limited to the cost of the original ticket and in some cases subject to a minimum amount</p>
Enforcement Procedure and Legal Source	It shall be for each Member State to decide which of these facilities shall be available and whether to enable the courts or administrative authorities to require prior recourse to other established means of dealing with complaints, Article 11 Directive 2005/29/EC; The Passenger should request help in the local ECC

RIC Components	Content Description

Annex 3 Relevant Legal Information in the ATP domain

Air Transport Passenger Incident	Damaged baggage
Right and Legal Source	Right to 1 000 SDRs, Article 22(2) of the Montreal Convention
Requisite and Legal Source	Baggage Liability Requisite: For the air carrier to be liable for damage, the event that caused the destruction/loss of/damage to checked baggage, have to be taken place on board of the aircraft, or during any period the baggage was in charge of the air carrier, art. 17(2) Montreal Convention
Further Interpretation and Legal Source	<p>- Interpretation Baggage Liability (Article 5, (EC) Regulation 889/2002) states that EU air carriers must 'without delay, and in any event, not later than 15 days after the identity of the natural person entitled to compensation has been established, make such advance payments as may be required to meet immediate economic needs on a basis proportional to the hardship suffered'</p> <p>- Interpretation Baggage Information Request (Article 6(1) (2), Regulation 889/2002) states that "All air carriers shall, when selling carriage by air in the Community:</p> <p>- ensure that a summary of the main provisions governing liability for passengers and their baggage, including deadlines for filing an action for compensation and the possibility of making a special declaration for baggage, is made available to passengers at all points of sale, including sale by telephone and via the Internet. In order to comply with this information requirement, Community air carriers shall use the notice.</p> <p>All air carriers shall, in respect of carriage by air provided or purchased in the Community, provide each passenger with a written indication of:</p> <p>— the applicable limit for that flight on the carrier's liability in respect of destruction, loss of or damage to baggage and a warning that baggage greater in value than this figure should be brought to the airline's attention at check-in or fully insured by the passenger prior to travel;</p> <p>— the applicable limit for that flight on the carrier's liability for damage occasioned by delay".</p> <p>- Interpretation Damage Baggage (Decision of the Court of Justice of the EU on 6th May, Walz v Clickair SA,) in which the Court declared that this limit of 1,000SDRs must be interpreted as including both material and non-material damage.</p>
Exception	<p>-"bad bag exception" If the baggage has any vice or inherent defect, the airline is not liable, Art. 17(2) Montreal Convention</p> <p>- 'negligence, wrongful act, omission of the passenger exception' : If the passenger caused or contributed to the damage, the air carrier is not liable. Legal Source: If the carrier proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of the person claiming compensation, or the person from whom he or she derives his or her rights, the carrier shall be wholly or partly exonerated from its liability to the claimant to the extent that such negligence or wrongful act or omission caused or contributed to the damage, Article 20 Montreal Convention.</p>

Annex 3 Relevant Legal Information in the ATP domain

<p>Enforcement Procedure and Legal Source</p>	<p>Complaint Handling Procedure:</p> <p>1 - To issue the complaint, the time limits to complain should be respected. Failure to do so often results in passengers losing their right to claim from the air carrier. For damaged luggage and items which are missing from bags, the time limit is seven days from the date on which the baggage was placed at the passenger's disposal (Article 17 (3) Montreal Convention). For delayed luggage, the time limit is 21 days from the date of delivery of the bag. For lost luggage, write after 21 days (Article 31 (2) Montreal Convention)</p> <p>2 - A standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>3 - For baggage incidents in particular, an additional form called PIR: Property Irregularity Report should be filled for baggage handling complaints, before leaving the airport. Generally, these desks are located at the baggage pick up point. Upon completion of the report, passengers should be given a copy of it or request for it.</p> <p>4 - Passengers have to prove the extent of their loss. Accordingly, Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use</p> <p><i>Legal Action Procedure</i> -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention</p> <p>- Complaint handling procedure "When the operating and contracting airlines are different, the complaint for damages against can be issued against either. If the name or code of an air carrier is indicated on the ticket, that air carrier is the contracting air carrier". Article 42^o Montreal Convention</p>
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RIC Components	Content Description
Air Transport Passenger Incident	Lost baggage
Right and	Right to 1 000 SDRs, Article 22(2) of the Montreal Convention

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Legal Source	
Requisite and Legal Source	Baggage Liability Requisite: For the air carrier to be liable for damage, the event that caused the destruction/loss of/damage to checked baggage, have to be taken place on board of the aircraft, or during any period the baggage was in charge of the air carrier, art. 17(2) Montreal Convention
Further Interpretation and Legal Source	<p>- Interpretation Baggage Liability (Article 5, (EC) Regulation 889/2002) states that EU air carriers must 'without delay, and in any event, not later than 15 days after the identity of the natural person entitled to compensation has been established, make such advance payments as may be required to meet immediate economic needs on a basis proportional to the hardship suffered'</p> <p>- Interpretation Baggage Information Request (Article 6(1) (2), Regulation 889/2002) states that "All air carriers shall, when selling carriage by air in the Community: -ensure that a summary of the main provisions governing liability for passengers and their baggage, including deadlines for filing an action for compensation and the possibility of making a special declaration for baggage, is made available to passengers at all points of sale, including sale by telephone and via the Internet. In order to comply with this information requirement, Community air carriers shall use the notice. All air carriers shall, in respect of carriage by air provided or purchased in the Community, provide each passenger with a written indication of: — the applicable limit for that flight on the carrier's liability in respect of destruction, loss of or damage to baggage and a warning that baggage greater in value than this figure should be brought to the airline's attention at check-in or fully insured by the passenger prior to travel; — the applicable limit for that flight on the carrier's liability for damage occasioned by delay".</p> <p>- Interpretation Damage Baggage (Decision of the Court of Justice of the EU on 6th May, Walz v Clickair SA,) in which the Court declared that this limit of 1,000SDRs must be interpreted as including both material and non-material damage.</p>
Exception	<p>"bad bag exception" If the baggage has any vice or inherent defect, the airline is not liable, Art. 17(2) Montreal Convention</p> <p>- 'negligence, wrongful act, omission of the passenger exception' : If the passenger caused or contributed to the damage, the air carrier is not liable. Legal Source: If the carrier proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of the person claiming compensation, or the person from whom he or she derives his or her rights, the carrier shall be wholly or partly exonerated from its liability to the claimant to the extent that such negligence or wrongful act or omission caused or contributed to the damage, Article 20 Montreal Convention.</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure:</p> <p>1 - To issue the complaint, the time limits to complain should be respected. Failure to do so often results in passengers losing their right to claim from the air carrier. For damaged luggage and items which are missing from bags, the time limit is seven days from the date on which the baggage was placed at the passenger's disposal (Article 17 (3) Montreal Convention). For delayed luggage,</p>

Annex 3 Relevant Legal Information in the ATP domain

	<p>the time limit is 21 days from the date of delivery of the bag. For lost luggage, write after 21 days (Article 31 (2) Montreal Convention)</p> <p>2 - A standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>3 - For baggage incidents in particular, an additional form called PIR: Property Irregularity Report should be filled for baggage handling complaints, before leaving the airport. Generally, these desks are located at the baggage pick up point. Upon completion of the report, passengers should be given a copy of it or request for it.</p> <p>4 - Passengers have to prove the extent of their loss. Accordingly, Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use</p> <p><i>Legal Action Procedure</i> -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention</p> <p>- Complaint handling procedure "When the operating and contracting airlines are different, the complaint for damages against can be issued against either. If the name or code of an air carrier is indicated on the ticket, that air carrier is the contracting air carrier". Article 42° Montreal Convention</p>
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RIC Components	Content Description
Air Transport Passenger Incident	Destroyed baggage
Right and Legal Source	Right to 1 000 SDRs, Article 22(2) of the Montreal Convention
Requisite and Legal Source	Baggage Liability Requisite: For the air carrier to be liable for damage, the event that caused the destruction/loss of/damage to checked baggage, have to be taken place on board of the aircraft, or during any period the baggage was in charge of the air carrier, art. 17(2) Montreal Convention
Further Interpretation and Legal Source	-Interpretation Baggage Liability (Article 5, (EC) Regulation 889/2002) states that EU air carriers must 'without delay, and in any event, not later than 15 days after the identity of the natural person entitled to compensation has been established, make such advance payments as may be required to meet immediate economic needs on a basis proportional to the hardship suffered'

Annex 3 Relevant Legal Information in the ATP domain

	<p>-Interpretation Baggage Information Request (Article 6(1) (2), Regulation 889/2002) states that "All air carriers shall, when selling carriage by air in the Community:</p> <p>-ensure that a summary of the main provisions governing liability for passengers and their baggage, including deadlines for filing an action for compensation and the possibility of making a special declaration for baggage, is made available to passengers at all points of sale, including sale by telephone and via the Internet. In order to comply with this information requirement, Community air carriers shall use the notice.</p> <p>All air carriers shall, in respect of carriage by air provided or purchased in the Community, provide each passenger with a written indication of:</p> <p>— the applicable limit for that flight on the carrier's liability in respect of destruction, loss of or damage to baggage and a warning that baggage greater in value than this figure should be brought to the airline's attention at check-in or fully insured by the passenger prior to travel;</p> <p>— the applicable limit for that flight on the carrier's liability for damage occasioned by delay".</p> <p>- Interpretation Damage Baggage (Decision of the Court of Justice of the EU on 6th May, Walz v Clickair SA,) in which the Court declared that this limit of 1,000SDRs must be interpreted as including both material and non-material damage.</p>
Exception	<p>-"bad bag exception" If the baggage has any vice or inherent defect, the airline is not liable, Art. 17(2) Montreal Convention</p> <p>- 'negligence, wrongful act, omission of the passenger exception' : If the passenger caused or contributed to the damage, the air carrier is not liable. Legal Source: If the carrier proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of the person claiming compensation, or the person from whom he or she derives his or her rights, the carrier shall be wholly or partly exonerated from its liability to the claimant to the extent that such negligence or wrongful act or omission caused or contributed to the damage, Article 20 Montreal Convention.</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure:</p> <p>1 - To issue the complaint, the time limits to complain should be respected. Failure to do so often results in passengers losing their right to claim from the air carrier. For damaged luggage and items which are missing from bags, the time limit is seven days from the date on which the baggage was placed at the passenger's disposal (Article 17 (3) Montreal Convention). For delayed luggage, the time limit is 21 days from the date of delivery of the bag. For lost luggage, write after 21 days (Article 31 (2) Montreal Convention)</p> <p>2 - A standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>3 - For baggage incidents in particular, an additional form called PIR: Property Irregularity Report should be filled for baggage handling complaints, before leaving the airport. Generally, these desks are located at the baggage pick up</p>

Annex 3 Relevant Legal Information in the ATP domain

	<p>point. Upon completion of the report, passengers should be given a copy of it or request for it.</p> <p>4 - Passengers have to prove the extent of their loss. Accordingly, Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use</p> <p><i>Legal Action Procedure</i> -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention</p> <p>- Complaint handling procedure "When the operating and contracting airlines are different, the complaint for damages against can be issued against either. If the name or code of an air carrier is indicated on the ticket, that air carrier is the contracting air carrier". Article 42° Montreal Conventio</p>
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RIC Components	Content Description
Air Transport Passenger Incident	Delayed baggage
Right and Legal Source	Right to 1 000 SDRs, Article 22(2) of the Montreal Convention
Requisite and Legal Source	Baggage Liability Requisite: For the air carrier to be liable for damage, the event that caused the destruction/loss of/damage to checked baggage, have to be taken place on board of the aircraft, or during any period the baggage was in charge of the air carrier, art. 17(2) Montreal Convention
Further Interpretation and Legal Source	<p>-Interpretation Baggage Liability (Article 5, (EC) Regulation 889/2002) states that EU air carriers must 'without delay, and in any event, not later than 15 days after the identity of the natural person entitled to compensation has been established, make such advance payments as may be required to meet immediate economic needs on a basis proportional to the hardship suffered'</p> <p>-Interpretation Baggage Information Request (Article 6(1) (2), Regulation 889/2002) states that "All air carriers shall, when selling carriage by air in the Community:</p> <p>-ensure that a summary of the main provisions governing liability for passengers and their baggage, including deadlines for filing an action for compensation and the possibility of making a special declaration for baggage, is made available to passengers at all points of sale, including sale by telephone and via the Internet. In order to comply with this information requirement, Community air carriers shall use the notice.</p> <p>All air carriers shall, in respect of carriage by air provided or purchased in the Community, provide each passenger with a written indication of:</p>

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	<p>— the applicable limit for that flight on the carrier's liability in respect of destruction, loss of or damage to baggage and a warning that baggage greater in value than this figure should be brought to the airline's attention at check-in or fully insured by the passenger prior to travel;</p> <p>— the applicable limit for that flight on the carrier's liability for damage occasioned by delay".</p> <p>- Interpretation Damage Baggage (Decision of the Court of Justice of the EU on 6th May, Walz v Clickair SA,) in which the Court declared that this limit of 1,000SDRs must be interpreted as including both material and non-material damage.</p>
Exception	<p>- "bad bag exception" If the baggage has any vice or inherent defect, the airline is not liable, Art. 17(2) Montreal Convention</p> <p>- 'negligence, wrongful act, omission of the passenger exception' : If the passenger caused or contributed to the damage, the air carrier is not liable. Legal Source: If the carrier proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of the person claiming compensation, or the person from whom he or she derives his or her rights, the carrier shall be wholly or partly exonerated from its liability to the claimant to the extent that such negligence or wrongful act or omission caused or contributed to the damage, Article 20 Montreal Convention.</p> <p>- " bad damage unavoidable": Exception "the carrier shall not be liable for damage occasioned by delay if it proves that it and its servants and agents took all measures that could reasonably be required to avoid the damage or that it was impossible for it or them to take such measures", 19 CV Montreal</p>
Enforcement Procedure and Legal Source	<p>Complaint Handling Procedure:</p> <p>1 - To issue the complaint, the time limits to complain should be respected. Failure to do so often results in passengers losing their right to claim from the air carrier. For damaged luggage and items which are missing from bags, the time limit is seven days from the date on which the baggage was placed at the passenger's disposal (Article 17 (3) Montreal Convention). For delayed luggage, the time limit is 21 days from the date of delivery of the bag. For lost luggage, write after 21 days (Article 31 (2) Montreal Convention)</p> <p>2 - A standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf; and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>3 - For baggage incidents in particular, an additional form called PIR: Property Irregularity Report should be filled for baggage handling complaints, before leaving the airport. Generally, these desks are located at the baggage pick up point. Upon completion of the report, passengers should be given a copy of it or request for it.</p> <p>4 - Passengers have to prove the extent of their loss. Accordingly, Copies' of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request (examples such as: proof of purchase for the luggage, receipt/credit card statements, boarding pass, receipts of the essential purchases expenses, PIR). Depreciation rates are applied by the airlines</p>

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	<p>when calculating compensation with the rationale being that as the consumer had the item for a certain period of time they had received some beneficial use</p> <p><i>Legal Action Procedure</i> -Civil action in court to claim damages within 2 years from the date of arrival of the aircraft, or from the date on which the aircraft ought to have arrived, Article 35 Montreal Convention</p> <p>- Complaint handling procedure "When the operating and contracting airlines are different, the complaint for damages against can be issued against either. If the name or code of an air carrier is indicated on the ticket, that air carrier is the contracting air carrier" . Article 42^o Montreal Conventio</p>
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RIC Components	Content Description
Air Transport Passenger Incident	Irresponsiveness, Unfair Commercial Practices, Costumer Service Insatisfaction, Unfair Contract Terms
Right and Legal Source	The rights depend on national legislation
Enforcement Procedure and Legal Source	Complaint to the nearest European Consumer Center, http://ec.europa.eu/consumers/solving_consumer_disputes/non-judicial_redress/ecc-net/index_en.htm

RIC Components	Content Description
Air Transport Passenger Incident	Seat Misplacement: Upgrading
Right and Legal Source	The passenger has no right to request any supplementary payment, Art. 10 (1) Regulation (EC) 261/2004

RIC Components	Content Description
Air Transport Passenger Incident	Seat Misplacement: Downgrading
Right and Legal Source	Right to reimbursement of: a)30 % of the price of the ticket for all flights of 1 500 kilometres or less;

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	<p>b) 50 % of the price of the ticket for all intra-Community flights of more than 1 500 kilometres, except flights between the European territory of the Member States and the French overseas departments, and for all other flights between 1 500 and 3 500 kilometres, or</p> <p>c) 75 % of the price of the ticket for all flights not falling under (a) or (b), including flights between the European territory of the Member States and the French overseas departments.</p> <p>Art. 10 (2) Regulation (EC) 261/2004</p>
<p>Enforcement Procedure and Legal Source</p>	<p>Complaint Handling Procedure: To issue the complaint, a standard complaint format should be used. The complaint may be pursued against the air carrier and also submitted to the NEB. Airline complaint form: http://ec.europa.eu/transport/themes/passengers/air/doc/complain_form/eu_complaint_form_en.pdf); and Neb address: http://ec.europa.eu/transport/themes/passengers/air/doc/2004_261_national_enforcement_bodies.pdf.</p> <p>Copies of the proof documents should be presented in annex to the complaint to confirm the narrated facts to sustain the redress request ((copies of the original receipts, such as boarding pass, receipts of the expenses)</p> <p>Legal Action Procedure, when there is a delayed/cancelled/denied flight, the limitation period under EU 261/2004 should be “determined in accordance with the rules of each Member state on the limitation of actions”. (Joan Cuadrench Moré v Koninklijke Luchtvaart Maatschappij NV (C-139/11) 22/12/2012);</p> <p>Jurisdiction:the CJEU has established that in cases concerning the regulation of air passenger rights jurisdiction can be both at the place of departure and the place of arrival – depending on the passenger’s choice (C-204/08 (Rehder vs. Air Baltic Cooperation)</p>

Annex 4 List of produced papers related to the thesis

This annex presents and explains briefly the papers related to the thesis, according to its importance.

- **Modelling Relevant Legal Information for Consumer Disputes**

Cristiana Santos, Víctor Rodríguez-Doncel, Pompeu Casanovas, Leon Van der Torre
Submitted to Electronic Government and the Information Systems Perspective
EGOVIS (2016)

http://link.springer.com/chapter/10.1007%2F978-3-319-44159-7_11

[This paper corresponds to Chapter 4 of the thesis]

Abstract: Accessing relevant legal information found in text excerpts from heterogeneous sources is essential to the decision making process in consumer disputes. The Ontology of Relevant Legal Information in Consumer Disputes (ric) is the domain-independent ontology modelling this relevant legal information comprising rights, their requisites, exceptions, constraints, enforcement procedures, legal sources. Its use is exemplified with one extension thereof, the Air Transport Passenger Incidents Ontology (ric-atpi), representing both the possible incidents triggered by a complaint in the air transport passenger domain and the related legal information that might be applicable. The Ontology models the key provisions found in hard law, and those in soft law, comprising heterogeneous sources in a structured manner. An ontology-based system provides the knowledge embedded in the legal sources and their relation to the specific scenario

- **On the Concept of Relevance in Legal Information Retrieval**

Marc van Opijnen, Cristiana Santos
Workshop Artificial Intelligence for Justice (AI4Justice), 2016
(ECAI conference proceedings, forthcoming) (2016)

http://www.ai.rug.nl/~verheij/AI4J/papers/AI4J_paper_4_opijnen.pdf

[This paper corresponds to Chapters 2 and 4]

Abstract: This paper discusses a conceptual framework on relevance within legal information retrieval, based on a typology of five relevance dimensions used within general information retrieval science, but tailored to the specific features of legal information

- **Complaint Ontology Pattern**

Cristiana Santos, Cedric Pruski, Marcos da Silveira, Víctor Rodríguez-Doncel, Pompeu Casanovas, Leon Van der Torre, Aldo Gangemi
Workshop on Ontology Patterns (WOP 2016) WOP-ISWC 2016

http://ontologydesignpatterns.org/wiki/images/1/16/WOP2016_paper_09.pdf

[This paper corresponds to the content reflected on Chapter 5]

Abstract: This paper presents an ontology design pattern to conceptualize complaints, an important concept still uncovered by ODPs. The proposed Complaint Ontology Pattern (COP) has been designed based on the analysis of free text complaints from available complaint datasets (banking, air transport, automobile), among other knowledge sources. A detailed use-case is presented in consumer disputes. The pattern is evaluated by annotating the complaints from the use case and by discussing how COP aligns to existing ontologies and with Framenet. Knowledge engineers can further model complaints for specific domains and processes, satisfying different requirements via COP specializations

- **An Approach for Modelling Relevance in Legal Ontologies**

Cristiana Santos, Víctor Rodríguez-Doncel, Pompeu Casanovas, Leon Van der Torre
(AICOL 2016)

[This paper corresponds to the content reflected on Chapter 4]

Abstract: This paper analyses the adopted conceptual framework on relevance based on five relevance manifestations tailored to RIC and RIC-ATPI in order to represent relevant legal information within the case study

- **A Model of Air Transport Passenger Incidents and Rights**

Victor Rodríguez-Doncel, Cristiana Santos, Pompeu Casanovas
Proc. of the 27th Int. Conf. on Legal Knowledge and Information System (JURIX), R. Hoekstra (Ed.) ISBN 978-1-61499-467-1, pp. 55-69, IOS Press (2014)
https://books.google.lu/books?hl=en&lr=&id=sT8oBgAAQBAJ&oi=fnd&pg=PA55&ots=IoDoZ4a9aF&sig=quYq5kYaa5wBwLc3UXY9ZciEIRs&redir_esc=y#v=onepage&q&f=false

[This paper is part of the initial research conducted in the thesis]

Abstract: This paper describes a representation of the legal framework in the air transport passenger's rights domain and the foremost Incidents that trigger the top of consumer Complaints ranking in the EU. It comprises the development of a small network of three ontologies, formalization of scenarios, specification of properties and identification of relations. The approach is illustrated by means of a case study based in the context of a real life cancelled flight incident. This is part of an intended support-system that aims to provide both consumers and companies with relevant legal information to enhance the decision-making process.

- **Ontology-driven Legal Support-System in Air Transport Passenger Domain**

Victor Rodríguez-Doncel, Cristiana Santos, Pompeu Casanovas
Proc. of the Int. Workshop On Semantic Web For The Law (SW4Law 2014), S. Villata et al. (Eds.), ISSN: 1613-0073, CEUR vol. 1296 (2014)
<http://ceur-ws.org/Vol-1296/paper3.pdf>

[This paper is part of the initial research conducted in the thesis]

Abstract: This paper aims to present a preliminary version of a support-system in the air transport passenger domain. This system relies upon an underlying ontological structure representing a normative framework to facilitate the provision of contextualized relevant legal information. This information includes the passenger's rights and it enhances self-litigation and the decision-making process of passengers. Our contribution is based in the attempt of rendering a user-centric-legal information grounded on case-scenarios of the most pronounced incidents related to the consumer complaints in the EU. A number of advantages with respect to the current state-of-the-art services are discussed and a case study illustrates a possible technological application.

- **Enhancing the Decision Making Process through Relevant Legal Information in Consumer Law Disputes - a Case Study in Air Transport Passenger Rights**

Cristiana Santos
Proceedings of the Second Doctoral Consortium Workshops (Jurix2014-DC), M. Palmirani (Ed.), ISSN: 1613-0073, CEUR Vol-1296 (2014), Best Paper Award (2014)
<http://ceur-ws.org/Vol-1296/paper8.pdf>

[This paper is part of the initial research conducted in the thesis]

Abstract: This paper aims to describe an initial stage of research related to the introduction of a new completion to the online dispute resolution landscape in consumer law domain. The aim is to include a legal layer into the life cycle of dispute resolution schemes that has not been yet considered. This is part of an intended support-system that aims to provide both consumers and companies with meaningful and relevant domain-specific legal information and awareness about their rights, in order to enhance the decision-making process, to determine the consumer's legal position at an early stage of dispute, avoiding escalation and legal action conflicts. The approach is illustrated by means of a case study based in the area of air transport passenger rights.

- **Law by Design in ODR. Definition of relevant legal information in consumer law disputes to enhance the decision making process**

Cristiana Santos
Group Decision and Negotiation, Proceedings of the Joint International Conference of the INFORMS GDN Section and the EURO Working Group on DSS, P. Zaraté, G.

Camilleri, D. Kamissoko, F. Amblard (Eds.), Toulouse University, France, ISBN: 978-2-917490-27-3 (2014)

https://books.google.lu/books?hl=en&lr=&id=gA`GBgAAQBAJ&oi=fnd&pg=PA58&ots=xKDCK`DjIX&sig=6RjQBc-t0WjJyJShg-txGtkoq5I&redir_esc=y#v=onepage&q&f=false

[This paper is part of the initial research conducted in the thesis]

Abstract: This contribution introduces a new theoretical completion to the online dispute resolution landscape and portrays the performativity that a legal layer seems to convey to the lifecycle of a dispute, thus, to the decision-making process. We will substantiate the need to provide to consumers relevant and meaningful legal information regarding their consumer dispute. We envision with this perspective to go beyond the cartography of ODR and update the ODR and consumer law framework for a technologically-oriented environment and to and to the marketplace, by giving a new methodological trend, shaping the interface with the end-user and enhancing informed decisions.

- **Mapping Recitals to Normative Provisions in EU Legislation to Assist Legal Interpretation**

Llio Humphreys, Cristiana Santos, Luigi Di Caro, Guido Boella, Leon van der Torre, Livio Robaldo

Proceedings of the 28th International Conference on Legal Knowledge and Information Systems, JURIX 2015: 41-49 (2015)

<http://ebooks.iospress.nl/volumearticle/41975>

[This paper analysis the nature of recitals as part of the heterogeneity of the legal sources used to build RIC and RIC-ATPI ontologies; it corresponds to parts of Chapter 4.

Abstract: This paper looks at the use of recitals in the interpretation of EU legislation, and mechanisms for connecting them to normative provisions. The purposive approach to the interpretation of EU legislation taken by the European Court of Justice makes frequent references to recitals as helping to establish the purpose of normative provisions. Our research uses a cosine similarity based approach to link articles with relevant provisions to help legal professionals and lay end-users interpret the law. Such support can be used in legal knowledge-based systems.

- **Legal Aspects of Linked Data: the European Framework**

Victor Rodríguez-Doncel, Cristiana Santos, Pompeu Casanovas, Asuncion Gómez-Pérez, Computer Law & Security Review, ISSN: 0267-3649, Elsevier (2016)

<http://www.sciencedirect.com/science/article/pii/S0267364916301194>

[This paper is indirectly linked to the content of the thesis; it is mentioned herein as it permitted to analyse how to connect structured data on the Web through the basic resources of linked data: (i) URIs, used as identifiers of the resources; (ii) local resources are connected to resources under other domains; and (iii) RDF triples, under the form subject-property-object, the atomic units of data used to provide any information.

Abstract: This paper portrays a general overview of the existing European legal framework that applies to the publication and consumption of linked data resources in typical settings. The point of view of both data publishers and data consumers is considered, identifying their rights and obligations, with special attention to those derived from the copyright and data protection laws. The goal of this analysis is to identify the practices that help to make the publication and consumption of linked data resources legally compliant processes. An insight on broader regulations, best practices and common situations is given.