Legal Powers, Subjections, Disabilities, and Immunities: Ontological Analysis and Modeling Patterns

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Abstract

The development of dependable information systems in legal contexts requires a precise understanding of the subtleties of the underlying legal phenomena. According to a modern understanding in the philosophy of law, much of these phenomena are relational in nature. In this paper, we employ a theoretically well-grounded legal core ontology (UFO-L) to conduct an ontological analysis focused on fundamental legal relations, namely, the power–subjection and the disability–immunity relations. We show that in certain cases, power–subjection relations are primitive in the sense that by means of institutional acts other legal relations can be generated from them. Examples include relations of rights and duties, permissions and no-rights, liberties, secondary power–subjection, etc. We further show that legal disabilities (and their correlative immunities) are key in constraining the reach of legal powers; together with powers, they form a comprehensive framework for representing the grounds of valid legal acts and to account for the life-cycle of the legal positions that powers create, alter, and possibly extinguish. As a contribution to the practice of conceptual modeling, and leveraging the result of our analysis, we propose conceptual modeling patterns for legal relations, which are then applied to model a real-world case in tax law.

Keywords: UFO, UFO-L, conceptual modeling, legal ontology, legal power, disability, immunity.

1. Introduction

Transparency is increasingly valued in social relations in part due to their complex dynamics and fluidity in modern settings [1]. In particular, for social and even more for legal relationships, such transparency is often required by the parties that participate in them (e.g., citizens in their relations to the state, consumers in their relations to businesses). For these reasons, it is natural that the information systems we adopt in social and legal settings should be able to keep up with these changes and to explicitly cater for the social and legal contexts in which they are embedded. Thus, conceptual models that represent social or legal relationships in an opaque way – like black boxes – tend to obsolescence.

We argue that the development of dependable information systems in critical contexts and applications requires a precise understanding of the subtleties of the domain at hand. In these contexts, *Ontology-Driven Conceptual Modeling*, i.e., the practice of conceptual modeling driven by formal ontological analysis [2], has the potential to support modelers in producing higher quality models, especially concerning the more challenging and advanced facets of the domain [3].

In some situations, the phenomena being analyzed crosscut several specific classes of applications. For example, an analysis of the general notion of *Service Contract* [4] can be captured in general reference models called *Core Ontologies* [5, 6]. From these ontologies, a number of *Ontology Design Patterns* can be systematically extracted [5]. Finally, these patterns are reusable higher-granularity modeling primitives that can then be employed to create conceptual models in specific domains (e.g., healthcare service contracts, telecommunication service contracts, etc.) [6].

The legal domain is an example of such a critical domain and one that crosscuts several specific application areas. Over the years, a multitude of authors have contributed to the ontological analysis of different legal notions (e.g., [7, 8, 9, 10, 11]). In particular, some of us have proposed a *Legal Core Ontology* termed UFO-L [12], which was developed by extending the foundational ontology UFO (Unified Foundational Ontology) [13], and by incorporating the theory of constitutional rights proposed by the German philosopher of law Robert Alexy [14], which in turn incorporates Hohfeld's fundamental legal relations [15]. Besides its appropriateness for understanding legal cases (e.g., analyzing judicial decision-making [16]), this perspective turned to be particularly fruitful for conceptual modeling of information systems [12] (given the central role of relations in their design).

In previous work, we have managed to extract from UFO-L a catalog of ontology design patterns addressing different legal relations. These include the *Unpro-*

tected Liberty Pattern, the *Right–Duty to an Action Pattern*, and the *Right–Duty to an Omission Pattern* [17, 12]. Other authors have proposed ontology patterns to address notions such as *complaint behavior* [18], *personal data* [19, 20], *norm* and *case* [21, 22], and some legal relations, such as "rights and obligations relationships" [20]. What has been missing from the literature is an ontological analysis (and, hence, corresponding modeling patterns) addressing *Power–Subjection Relations* and their opposing *Disability–Immunity Relations*.

Generally speaking, power–subjection relations abound [23, 24], and different notions of *power* can be connected to different outcomes of their exercise. For example, power–subjection relations based on *utilitarian power* will result in some performance-reward contingency; if based on *coercive power* will result on imposing conduct on others by means of fear; if based on *charismatic power*, will result on negligence of personal interests due to personal admiration of the charismatic-power holder; if based on *normative power* will result in the subjection-holder's belief that the social institution has the "right" to govern/submit his/her behavior [23]. It is in this latter type, i.e., *Legal Power–Subjection Relations* that we are interested in here.

In contrast to the other types of legal relations, power–subjection relations are in a sense "reflexive", meta (or higher-order) relations, since they bestow legal agents with the capacity of creating other legal relationships. For example, the law makes certain individuals (playing a certain legal role) capable of joining couples in matrimony. This capacity is not a natural ability, but an artificial one constructed by legal norms. When they are exercised, they generate new legal relations with new legal positions of conduct or derivative powers.

On the other hand, legal relations such as right–duty, permission–no-right, and liberties [25] are related to the performance or abstention of actions of conduct, which, in general, demand only natural (or otherwise preexisting) abilities. This means that the legal positions of conduct only regulate the action or omission that was already possible, e.g., by virtue of natural capacity, such as expressing an opinion, entering a building, etc. As Alexy points out, power is more than permission to act and more than natural ability to act [14]. Suitably understanding the specific nature of these relations is fundamental, e.g., for correctly representing (and monitoring) certain computational contracts [25, 26] as bearers of legal powers have the capacity of changing the contract itself (often unilaterally).

It is in this context of representing relations and legal positions that this paper is placed. The contributions to this investigative field presented here are three-fold: firstly, we present an ontological analysis of Legal Power–Subjection Relations based on UFO-L; secondly, we also conduct an ontological analysis of Legal

Disability-Immunity Relations using the same ontological framework; thirdly, we leverage on these analyses to propose ontology design patterns for modeling these types of relations. The patterns are then employed to analyze and model a case study in Brazilian tax law.

This paper extends [27] by providing a more thorough treatment of the underlying legal theory and ontological analysis, but also by extending the original analysis of powers and subjections with an analogous analysis of legal disabilities and immunities. Complementing the original work with a proper analysis of disabilities and immunities is key to form a comprehensive framework to shape legal power and account for the grounds of valid legal acts in the exercise of power.

The remainder of the paper is structured as follows: Section 2 reviews the notion of power in the relevant literature with a particular focus on legal powers; Section 3 presents our ontological analysis based on UFO-L; Section 4 presents the resulting ontology design patterns; Section 5 presents our case study; Section 6 positions our contributions with respect to related work; finally, Section 7 presents some final considerations.

2. Legal Powers and No-Powers

The question of *what is power* has had significant attention in law [15, 28, 14] and social psychology [23, 24]. Several works in the field of computer science have also addressed this notion, among which we highlight the works on *normative positions* [29], *powers and permissions* in security systems [30] and norm-governed computational societies [31]. There are also works focused on logical formalization of *power* or *institutional power*, for instance, [32, 33, 34, 35, 36, 37].

The concept of legal power[1] [14], or legal competence [28, 38, 39, 40], or institutional power [32], has been intensively discussed by legal [15, 41, 42, 43] as well as computer science scholars. For example, Sartor [44] as well as Governatori and Rotolo [45] distinguish different types of power: enabling-power, potestative right, and declarative power; Boella *et al.* [10], by proposing an action-based ontology of legal relations, introduce the idea of *recursion* from *power*. Differently from what was proposed in [10], we understand that exercising power not only creates duties and obligations, but it may also create other power–subjection legal

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[1]In both legal and computer science literature, *power* appears as a synonym to legal capacity, legal competence, competence norm, constitutive norm, etc. Here, we use the terms 'legal power', 'legal competence', 'legal ability', 'legal capacity', and 'power' interchangeably.

relations in a recursive manner. Also, we understand the difference between legal power and the exercise of legal power in the same terms defined by [38].

In this paper, the notion of legal power is the one proposed by Alexy [14], who extends Hohfeld's concept of power [15]. For Hohfeld, a power relation involves a power-holder *a* and the subjection-holder *b* as agents playing correlative roles in a *dyadic (two-place) relation*. Alexy [14] and other authors [28, 46] employ a triadic relation making explicit not only the power-holder and the subjection-holder but also the relation's "object", which in the case of power is an action of creating, modifying, or extinguishing legal positions of the subjection-holder.

In a power relation, there is at one end the *power-holder* and at the other end the *subjection-holder*. Power inheres[2] in a power-holder and is *externally dependent*[3] on a subjection-holder. On the other hand, subjection inheres in a subjection-holder and is externally dependent on a power-holder. Thus, in the formulation proposed by Alexy [14], $Kab(Xb)$, a subject *a* has the *power K* in face of subject *b* to create, change, or extinguish a legal position *X* for subject *b* by means of institutional actions.

Regarding the exercise of legal power, both Alexy and Hohfeld understand power as a legal position able to alter a legal situation [14]. The exercise of a power is the performance of an *institutional act* [49, 14]. An *institutional act* is a type of speech act that constructs a social/legal reality. For example, in a condominium, by laws may established that the vote of a home owner or his/her legal representative is manifested by means of the raising of his/her hand at the appropriate time during the home owner's meeting. The act of raising one's hand – even if a brute fact [49, 50] – becomes an institutional fact due to the value given to it by the condominium regulations. The same can occur through contracts and laws in general, even unwritten ones in the case of customary law[4].

In general, legal relations are founded on the occurrence of legal events, and certain legal events (e.g., signing of contracts, breaking laws, paying taxes, etc.) can create, change or extinguish legal relations. Therefore, there are types of powers that establish powers in a meta-level (i.e., the constituent power); and

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[2]Inherence is a non-reflexive, asymmetric and anti-transitive existential dependence relation connecting an aspect to its bearer [47].

[3]External dependence is a type of existential dependence relation. We have that *x* is externally dependent on *y* iff *x* is existentially dependent on *y* and *y* is mereologically disjoint from *x* (see [48] for details).

[4]Customary law or consuetudinary law is the set of customs and practices of a society, which are accepted as if they were laws, without being formalized in writing or by legislative processes.

constituted powers that are activated by designated authorities established by the constituent power.

The *constituent power*, understood as the original power of the people to create a new legal-political order, functions as a 'bridge concept' between the sphere of law and that of politics [51]. Being outside the legal sphere, the exercise of this power cannot be considered an institutional legal act. *Constituted power*, on the other hand, refers to the derived legal powers exercised by institutions that are established as a result of the exercise of constituent power. Constituted power concerns the functioning and legitimacy of institutions that emerge from the constitutional framework, such as constitutional courts, legislatures, and federalism [51].

The power granted by the constitution to municipalities to create taxes of a specific type exemplifies constituted legal power derived from the broader political constituent power. As an extension of the constitution, which is formed through the exercise of constituent power, municipalities are granted the authority to establish taxes within their jurisdiction. This delegated authority, derived from the larger constitutional framework, showcases the relationship between constituent power and constituted power.

2.1. Comparison with Legal Permissions

Legal powers and legal permissions have been the subject of significant debate in legal philosophy. Alexy emphasizes the importance of distinguishing between the two concepts, arguing that while an action that exercises a legal power is generally also permitted, an action that is merely permitted does not constitute the exercise of a legal power [52]. This distinction is evident in the variety of permitted actions that do not result in a change in a legal situation [52]. Furthermore, Alexy notes that the difference between permissions and powers is also reflected in their negations: the negation of a permission is a prohibition, while the negation of a legal power is a lack of (legal) competence [52].

Lindahl and Reidhav further elaborate on this distinction by comparing the concept of legal power to two other ideas: permissibility and practical ability. All three concepts are connected to notions of liberty, autonomy, and power, making this comparison useful for gaining a better understanding of legal power [38]. According to these authors, legal powers, as opposed to permissions and practical abilities, appear to have been developed by the idea of legal institutions that benefit people living in a society by providing them with means to achieve desired legal outcomes [38]. In this sense, these authors' conclusion is similar to Alexy's view, according to which "acts in the exercise of powers are institutional acts", which presuppose the existence of rules that are constitutive of them [52].

2.2. No-Powers and Immunities

Normative systems are also structured in ways to purposefully constrain the power of agents. Because of this, we can distinguish the mere absence of legal power from its explicit denial, which requires the notion of *disability* (or *no-power*). The relevance of this legal position in accounting for aspects of legal reality was already recognized in the beginning of the 20th century as it figured in Hohfeld's taxonomy composed of eight "fundamental" concepts [53]. The exercise of legal power (the performance of an institutional act) is impossible in the presence of an opposing disability (and any attempts to exercise the disabled acts would be deemed invalid or void).

Correlative to the *disability* position, Hohfeld identified the *immunity* position, forming thus the disability–immunity relation. Immunities are an important element of legal systems and are often posited in fundamental legal norms (such as constitutional norms) to limit the power of institutional actors such as the state. Similarly to powers, disabilities are forms of meta- or higher-order legal positions: by establishing that an agent is immune, it is possible to prevent (legal) alterations of other legal positions (such as duties, permissions, powers, etc.).

3. UFO-L: A Core Ontology of Legal Concepts Built from a Legal Relations Perspective

UFO-L is a core legal ontology grounded on the *Unified Foundational Ontology (UFO)* [47, 48]. It employs UFO's *theory of relations* [54, 55] to model legal positions (e.g., rights, duties, powers, subjections, etc.) from the relational perspective advocated by Hohfeld and Alexy. In the next section, we present an ontological analysis of the legal power–subjection relation in the context of UFO-L, and use it to propose our modeling patterns.

UFO [47, 48, 56] makes a fundamental distinction between *endurants* and *events* (*perdurants*). Endurants are entities that exist in time maintaining their identity while possibly changing in a qualitative manner (e.g., the United Nations, Mick Jagger, the Moon, Mick Jagger's ability to sing). Events are entities that unfold in time accumulating temporal parts. Events can relate to each other through a number of relations (e.g., causation, temporal ordering, parthood [56]). Endurants participate in events and are created, terminated, or changed by events. Within the category of endurants, we have *substantials*. Substantials (roughly, objects) are entities that are enjoy a high degree of independence. This is in contrast with *moments* (or *aspects*), which are endurants that are parasitic to other endurants, i.e., they inhere (and, hence, are existentially dependent) on other

endurants termed their bearers. Many moments are intrinsic (e.g., John's height, Mary's knowledge of Greek), while other moments are externally dependent (e.g., John's love for Mary, Mary's commitment to meet John for lunch next Sunday).

UFO's theory of (material) relations is founded on the central notion of *relator* [54, 48]. A relator is a bundle of *externally dependent moments* that, by being existentially dependent on a number of relata, connects them (see details in [54, 48]). For example, marriages, enrollments, employments, and presidential mandates are relators. On the one hand, they are object-like entities having properties and a life-cycle of their own; on the other hand, they are the so-called *truthmakers* of relational propositions and inducers of role-playing, in the sense, for example, in which the marriage between John and Mary makes true the proposition "John and Mary are married" but also that "John is a Husband" and "Mary is a Wife" in the situations in which that relator exists.

UFO-L [12, 25] extends this notion by proposing the notion of *legal relator*, which are the truthmakers of *legal relations*. Figure 1 shows the fragment of UFO-L concerning legal relators. Simple legal relators are classified according to their legal nature as: *Right–Duty relators, NoRight–Permission relators, Power–Subjection relators, Disability–Immunity relators*, etc. They are composed of the *externally dependent legal moments* (or legal positions) that inhere in the parties of a legal relation. In the case of positions embedded in conduct norms these positions may be *Rights* to actions or omissions, correlative *Duties* to act or to omit, *NoRights* to omissions or actions, and correlative *Permissions* to act or to omit. Complex legal relators, in turn, (such as *Unprotected Liberties*) are composed of simple legal relators [25].

Legal Powers are special types of *externally dependent legal moments*. Their exercise occurs by means of institutional acts [52], whose types (along with the types of *situations* [56] they bring about) are explicitly prescribed in Legal Normative Descriptions or Legal Norms [25]. Their correlative legal aspects are *Legal Subjections*. Thus, legal Power–Subjection relations, are composed of correlative power–subjection pairs (inhering in opposing agents).

Legal Power–Subjection Relations can be divided in two groups: *Original Legal Power–Subjection Relations* and *Derived Legal Power–Subjection Relations*. *Original Legal Power–Subjection Relations* are those that were introduced by constituent powers, which have a political nature and are grounded on political events. For example, in the Brazilian constitution, a constituent power gives Brazilian municipalities the power to impose certain kinds of taxes on their subjects (citizens, organizations). On the other hand, derived power–subjection relations are those that are created by the exercise of some other legal power–subjection
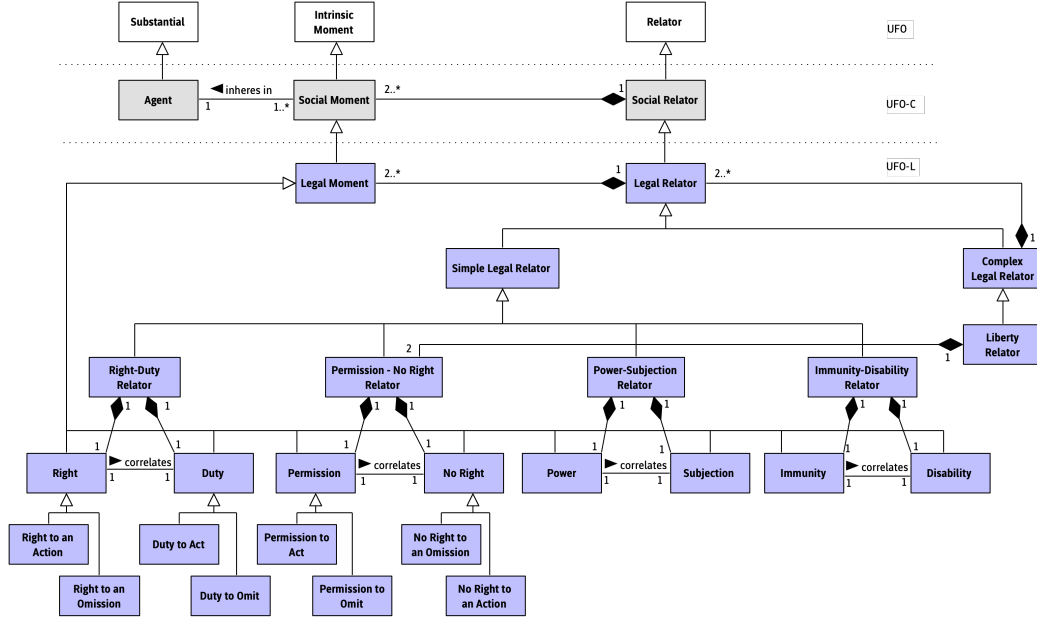
Figure 1: UFO-L's Taxonomy of Legal Relators [25]

relation. For example, the municipal law approved by the Vitória City Council and sanctioned by the mayor of Vitória gives the municipality of Vitória the power to levy the urban property tax (IPTU). This local law defines a legal power–subjection relation derived from the original legal power to institute taxes prescribed by the Brazilian constitution.

Derived Legal Relations require additional *founding events* [57, 48], which are *historically dependent*[5] on the legal events founding the relations from which they are derived. For example, when a consumer clicks the "I Agree" button to hire an Internet service, they agree to the terms of that service, including the clause allowing the service provider to unilaterally change the contract terms with or without the consumer's consent. In cases where the service provider changes any clause without the need for consumer consent, the event that will provide the basis for the new legal positions will be the publishing of the modified agreement (historically dependent on the original event). In cases where the consumer consent

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[5]An event *a* is historically dependent on an event *b* iff *a* could not have happened without *b* having happened before. In a sense, historical dependence is more committing than temporal precedence and less committing than causation. For details one should refer to [58].

is required for those changes to be applicable, the new founding event will be the clicking of the "I consent" button, which is also historically dependent on the event grounding the relation of agreement.

4. Ontology Design Patterns: Legal Power–Subjection and Disability–Immunity

4.1. Legal Power–Subjection Relator Pattern (P7-PS-LR)

In this section, we leverage UFO–L's ontological analysis of the power–subjection relations to identify a reusable modeling pattern. The proposed *Legal Power–Subjection Relator* pattern (henceforth identified as *P7-PS-LR* in UFO-L's pattern catalog) is presented here with rationale, guidelines for use and suggested representation in the UFO-based conceptual modeling language OntoUML[6], along with applicable constraints.

Rationale. A Legal Power–Subjection Relator is established between a Power Holder and a Subjection Holder. This type of legal relator is composed of a pair of legal positions: a Legal Power, which is inherent in the Power Holder and externally dependent on the Subjection Holder; and a Legal Subjection, which is inherent in the Subjection Holder and externally dependent on the Power Holder. By means of an institutional act in a power–subjection relation, the Power Holder creates, modifies, or extinguishes legal positions held by the Subjection Holder.

Guidelines for use. This pattern must be used in potestative relations (competence, legal capacity, legal power) with some changes to the legal position of the Subjection Holder. The action must be conducted by a Power Holder and it needs to be an institutional act, i.e., it must be prescribed by the law – in a wider sense of the term (e.g. statutes, contracts).

We show in Figures 2, 3, and 4 three variations of this pattern[7]. The first one (Figure 2) focuses on the *creation of a derived legal relator* by the exercise of power. In this case, the type of the created legal relator[8] is determined in a specific application of the pattern. For example, this could be a Right–Duty Relator to represent the setting in which an authority can exercise her power to impose a fine, or a No-Right–Permission Relator to represent the setting in

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[6]OntoUML is an ontologically well-founded version of UML that is based on UFO's ontological distinctions and axiomatization [48].

[7]These models use the OntoUML community color convention of using salmon for substantial types, green for relator types, blue for moment types, and yellow for event types.

[8]The type Derived Legal Relator in Fig. 2 is a placeholder for a subtype of Legal Relator that is created by events of this kind, as opposed to being created by constitutional events.

which a contracting party can, in virtue of contract clauses, grant permissions to other contracting parties. The second one (Figure 3) concerns changes to an existing legal relator that is modified by the exercise of power. Finally, the third one (Figure 4) concerns the extinction of the legal relation with the consequent termination of legal positions.
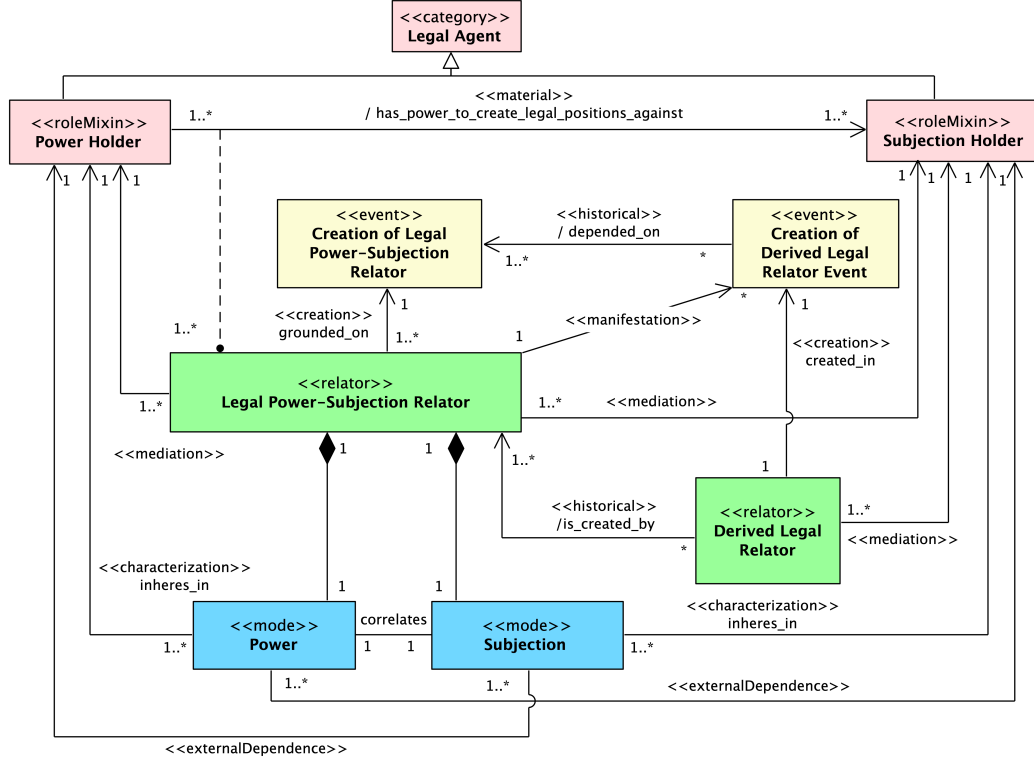

Figure 2: Legal Power–Subjection Relator Pattern: creation of derived legal relator

A *Power–Subjection Relator* is composed of two types of *legal aspects*: *Power* and *Subjection*. The legal *Power–Subjection* relator mediates legal agents, who play legal roles (represented here as *Legal RoleMixins*, given that they may be played by agents of different kinds).[9] The legal relation between Power Holder and Subjection Holder is a *material relation* called *has the power to create legal positions against*, which connects Power Holders to Subjection Holders. Power

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[9]UFO-L patterns employ UFO's notions of role mixin, agent, category, mode, event, and relator. Moreover, it employs a number of relations involving entities in these categories (e.g., characterization, external and historical dependence, manifestation, among others). For details, one should refer to [48, 56, 59, 54, 58].

inheres in Power Holder and is externally dependent on Subjection Holder. On the other hand, Subjection inheres in Subjection Holder and is externally dependent on Power Holder. This implies that it is only meaningful to talk about power in a relational context. Thus, at the other end of the relation is the correlative position called *subjection*.

The material relation *has power to create legal positions against* is *derived* from a corresponding Legal Power–Subjection Relator. A derivation relation (the dashed line in Figure 2) connecting tuples (instance of this material relation) and instances of that relator type indicates that the very same entities (Power Holder and Subjection Holder) can be bound by several Legal Power–Subjection Relators (see cardinality constraints 1..* on the side of the relator type).

A Legal Power–Subjection Relator is created by a *Creation of a Legal Power-Subjection Relator* event. Once created, these relators can give rise to institutional acts (*Creation of Derived Legal Relator* events) that are themselves creators of *Derived Legal Relators*. In other words, events that create *Derived Legal Relators* are the combined manifestations of the Power and Subjection moments constituting a Legal Power–Subjection Relator.

If an event E is a manifestation of relator R created by another event E' then E is historically dependent on E'. Moreover, if E creates another relator R' then R' is historically dependent on R. That is why in Figure 2, we have that a *Creation of Derived Legal Relator* event E is historically dependent[10] on the event E' that creates the Legal Power–Subjection Relation R. Moreover, we have that the Derived Legal Relator R' created by E is historically dependent on R.

A Power Holder has the power to create, alter or extinguish legal relations in which the Subjection Holder participates. It means that a Power Holder has the legal ability to change the Subjection Holder's legal reality. This change is possible because the legal power is performed as an action prescribed by law (i.e., an institutional act). In addition, Power–Subjection relators are grounded on *Legal Events*, for instance, the publishing of a law conferring powers to an entity to institute taxes. This kind of event brings about situations, which can activate other dispositions (including other legal aspects) of individuals [56].
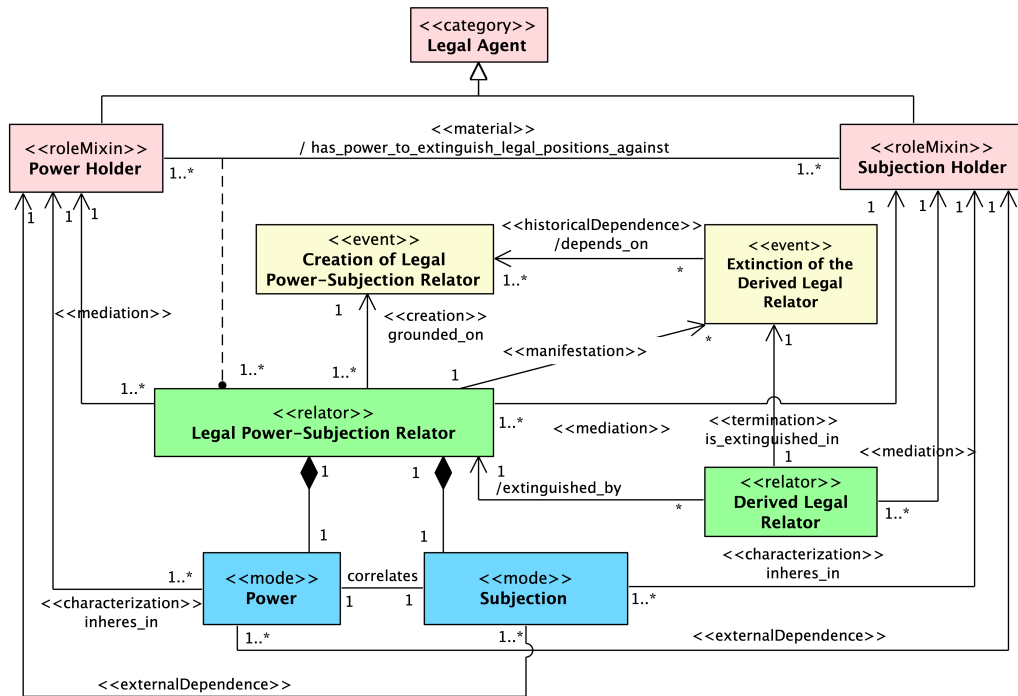
One should notice that there is a consequent dynamics in the interpretation of these models. For example, in Figure 2, we have that: (i) an event of Creation of

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[10]We use here the «historical» stereotype [55] for all associations representing historical dependence. These were first represented using the «historical dependence» stereotype in the particular case of historical dependence between events [58].

Legal Power–Subjection Relator brings about a Legal Power–Subjection Relator; (ii) the combined manifestation of the Power and Subjection constituting this relator is an event that brings about a Derived Legal Relator. This Derived Legal Relator can be of all subtypes of Legal Relator in Figure 1, hence, it can also be a Legal Power–Subjection Relator, whose manifestation can bring about other Derived Legal Relators, and so on. The relations of historical dependence between these events (and, as a consequence, between the endurants created by these events) are ultimately derived from this interplay between creation and manifestation – as in (i) and (ii). However, since historical dependence is a transitive relation, we have a chain of dependence between these events and endurants established in this way, and that is why we have the 1..* cardinality constraints on the side of the dependee in these models.

The model of Figure 2 should be enriched with constraints to eliminate a number of anti-patterns that would otherwise be present in its structure. For example, one should guarantee that: if a Derived Legal Relator R is created by an event E that is the manifestation of a Legal Power-Subjection Relator R' then R is historically dependent on R' (on on whatever R' is historically dependent of), and E is historically dependent on the event E' that creates R' (and whatever E' is historically dependent of). Moreover, we should guarantee that Power–Subjection moments that are correlatives are parts (in fact, *inseparable* parts [48]) of the same Legal Power–Subjection Relator. These are all instances of the *Association Cycle* anti-pattern.

Now that we have discussed in details the model of Figure 2, we can be brief in discussing the models Figures 3 and 4, and focus on simply highlighting some important differences. Regarding the model of Figure 3, we highlight that the relation of *changed in* is a derived relation from other relations that are not shown in the model (for reasons of simplicity). A change in a Derived Legal Relator is either: the creation or termination of legal positions constituting that relator; the creation, termination or change in the value of qualities inhering in that relator [48]. One should also notice that the relations of *changed by* and *extinguished by* in these figures are also relations derived from the interplay between change and extinction events and the Legal Power–Subjection Relators of which these events are manifestations. However, unlike *created by* (Fig. 2), these are not relations of historical dependence, as a Derived Legal Relator can be modified by many Legal Power-Subjection Relators (provided that they embed the right powers) and not only by the relator that creates this derived relator. Finally, these two models must be enriched by constraints analogous to the ones previously mentioned to eliminate incurring anti-patterns.

Figure 3: Legal Power–Subjection Relator Pattern: change of a legal relator

Applicability Conditions and Competence of the Pattern. The Legal Power–Subjection Relator Pattern should be used when: (1) we need to represent the mechanism and dynamics of altering the legal positions of agents participating in a legal relation via the exercise of powers and subjections; (2) we want to understand how Legal Power–Subjection relators come about, i.e., which events bring about these relators; (3) we want to understand which powers and correlative subjections constitute particular Legal Power–Subjection Relators.

4.2. *Legal Disability–Immunity Relator Pattern (P8-DI-LR)*

In this section, we introduce the *Legal Disability–Immunity Relator Pattern* (shown in Figure 5). In this legal relation, the Disability Holder lacks any legal power to create, modify or extinguish legal positions against Immunity Holder. It is the denial of the *Legal Power–Subjection* relation. For instance, the municipality of Vitória does not have the legal power to modify the rules of marriage celebration in face of the citizen, and, hence, the citizen holds an immunity against the municipality of Vitória preventing it from altering the rules of marriage celebration.

Since *legal powers* are the (legal) capacity to do something by means of

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Figure 4: Legal Power–Subjection Relator Pattern: extinction of a legal relator

institutional acts, then the absence of legal power (no-power) is the (legal) *disability* to do something through institutional acts. For instance, the act of raising one's hand will only mean the act of voting if an institutional act defines it as such, i.e., if, for example, a law defines that the act of raising one's hand is a (valid) act of voting. In the absence of an institutional act that defines the act of raising the hand as a valid act of voting, the mere raising of the hand is just the manifestation of a physical capacity without legal consequence.

In UFO-L, *Disability* and *Immunity* are categorized as *Externally Dependent Legal Moments*. Disability is characterized by the denial of Legal Power (non-power). In this case, a Legal Agent in the Disability position does not have the legal ability to change the legal position of another Legal Agent of the relation even if it makes use of institutional acts. The absence of power makes the institutional act innocuous, void of existence in the legal sphere.

The correlative position of Disability is the position of non-subjection (Immunity in UFO-L). An example of Disability–Immunity relation is the institutional entity that legislates on matters beyond its competence. When a Legal Agent is in the Immunity position, this means that Legal Agent has no power to act in the
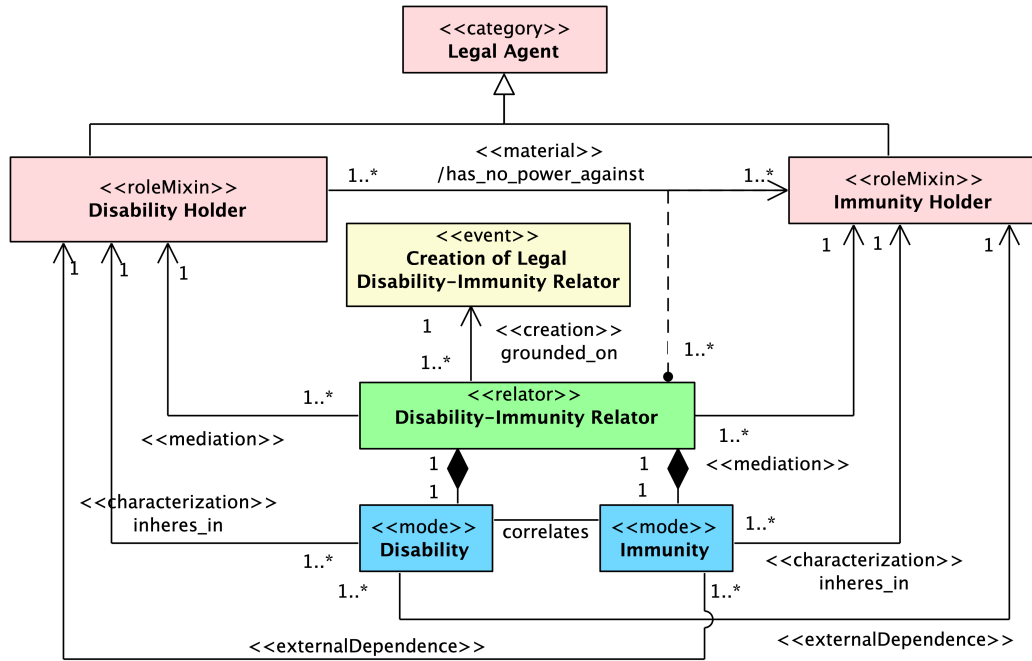
Figure 5: Legal Disability–Immunity Pattern

scope of non-subjection. For example, the municipality of Vitória collects the IPTU from property owners located within the city. The Federal Government is in a position of no-power (Disability) to demand payment of IPTU of the property owners located in Vitória. In this case, the owners are in a no-subjection (i.e., Immunity) position before the Federal Government. A Federal Government statute requiring the collection of IPTU against the owners of urban properties located in Vitória would be void. In other words, it is not illegal not to pay a tax charged by someone who does not have the legal power to impose it.

The Disability and Immunity positions are necessary to delimit the non-power and non-subjection spaces existing in legal relations. They are not to be confused with the *Duty to an Omission* and *Permission to Omit* positions, which are positions that regulate conduct. A violation of a Right–Duty is illegal behaviour that can be sanctioned; in its turn, an attempt to change a legal relation in the presence of a Disability–Immunity is a void act.

Rationale. A Disability–Immunity Relator is established between a Disability Holder and an Immunity Holder. The Legal Relator is formed by a pair of legal positions: a Disability, inherent to the Disability Holder and externally dependent

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on the Immunity Holder; and an Immunity, inherent to the Immunity Holder and externally dependent on the Disability Holder. This legal relation expresses the cases in which Agents do not need to submit to another Agent by the absence of power (competence or legal capacity) of the latter over the former.

Guidelines for use. The pattern P8-DI-LR must be used in legal relations to express the absence of legal powers and the presence of immunity. In legal ontologies instantiating this pattern, the categories of legal roles (Legal RoleMixins) must be specialized into Legal Roles.

Applicability Conditions and Competence of the Pattern. The Legal Disability–Immunity Pattern should be used when: (1) we need to represent the lack of legal competence of agents w.r.t. altering the legal position of other agents; (2) we want to understand how Legal Disability–Immunity relators come about, i.e., which events bring about these relators; (3) we want to understand which powers and correlative subjections constitute particular Legal Disability–Immunity Relators.

5. Case Study: Legal Power in Brazilian Tax Law

5.1. Preliminaries

Motivation. This study extends the case study presented in [27]. We elaborate on the original modeling case by extending the application of Power–Subjection Pattern. Moreover, we present new aspects of the modeled domain that are addressed via the application of the Disability–Immunity Pattern. Regarding the choice of domain, Tax law was selected for containing legal Power–Subjection relations that are generally known to law experts and laypeople alike.

Description. Brazilian tax law is regulated by the Federal Constitution, the National Tax Code, and state or municipal laws. The case analyzed here is the urban property tax (*aka* IPTU[11]) collected by municipalities and the Federal District. There must be a law promulgated by these entities, in accordance with the norm of legal power prescribed by the Federal Constitution. The selected municipality is the municipality of Vitória in the state of Espírito Santo, Brazil, where the Act no. 4476/1997 governs the tax on urban property (IPTU).

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[11]IPTU stands for *Imposto Predial e Territorial Urbano*, which can be translated as *Building and Land Urban Property Tax*.

Techniques and methods. We first identified the articles that regulate taxes and are contained in the Brazilian Federal Constitution (CRFB/1988), the National Tax Code (CTN), and the applicable municipal law (Act no. 4476/1997); then, we used the set of applicability and competence conditions for each of the patterns (see Section 4) to scope the legal relations therein. As a result, the following aspects of legal scope were identified: material (real estate), temporal (January 1st of each year), jurisdictional/territorial (municipality of Vitória, Espírito Santo State, Brazil), quantitative (progressive rate on property market value), and subjective (taxpayers/owners own real estate in Vitória; collector/municipality) aspects. After that, the P7-PS-LR and the P8-DI-LR pattern were instantiated to model the legal relations of power–subjection and disability-immunity at hand.

Materials and tools. Brazilian federal constitution as well as federal, state, and municipal laws were used to elaborate our ontological analysis. The main fragments are shown in Table 1.

Table 1: Relevant fragments of Brazilian Tax Law

CRFB/1988. *Article 145. The Union, the states, the Federal District, and the municipalities may institute the following tributes: I – taxes; (...) (...)*
Article 150. Without prejudice to any other guarantees ensured to the taxpayers, the Union, the states, the Federal District and the municipalities are forbidden to: (...) VI – institute taxes on: (...) b) temples of any denomination; (...) *Article 156. The municipalities shall have the competence to institute taxes on: (...) I – urban buildings and urban land property; (...)*;
CTN. *Article 32. The tax, which is the competence of the Municipalities, on urban land and property has as a triggering event the ownership, useful domain or possession of immovable property by nature or by physical accession, as defined in civil law, located in the urban area of the Municipality.(...)*;
Law no. 4476/1997. *Art. 1 The Tax on Urban Property and Territorial Property has as a triggering event the property, useful domain or possession of urban immovable property.* (...)
Article 2. The triggering event is considered to have occurred on the first day of January of each year (...)
Article 6. Taxpayer is the owner, holder of the useful domain or possessor of the property in any capacity. (...)

Article 7. The basis for calculating the tax is the market value of the property, as set out in this law. (...)
Article 9. The tax rates, differentiated according to the use and progressive according to the market value of the properties, observing the respective value range, (...)

We then proceed with our **ontological analysis** of this case.

5.2. Identifying Legal Agents

The UFO-L notion of *Legal Agent* is related to being a legal person, i.e., a person in the legal sphere. A legal person is an agent capable of acquiring rights and contracting obligations (Pereira *apud* [60]). However, this capability is not only given to natural persons (i.e., human beings) but also to artificial agents constructed in social reality, such as companies, associations, societies and foundations. Thus, legal agents are (legal) persons – natural or artificial – who play relevant roles for the law into legal relations. In this case study, we identified a set of legal roles which were categorized as *roles* or *rolemixins*, as shown in Figure 6.
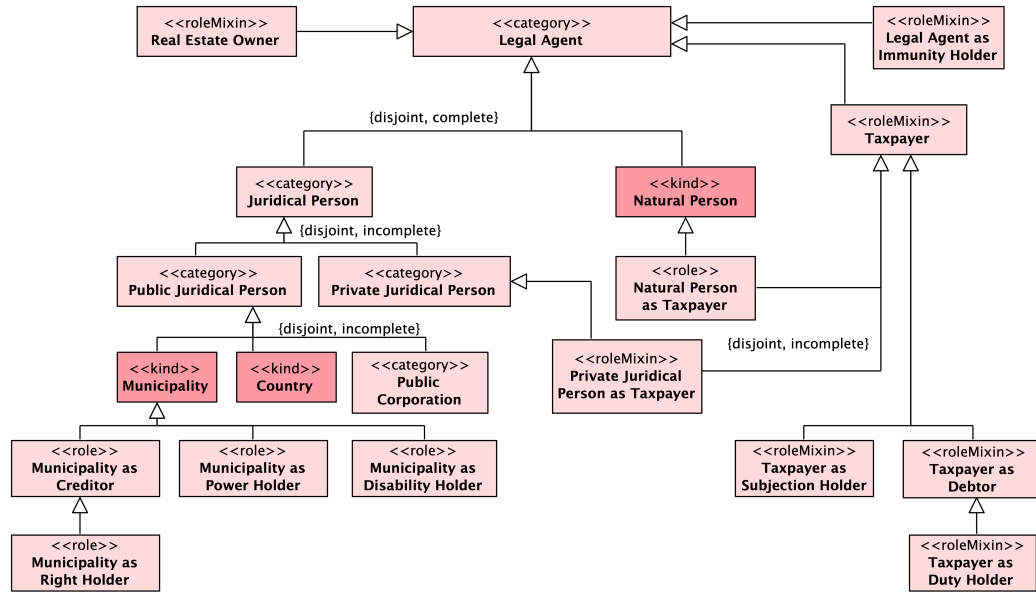

Figure 6: Taxonomy of Legal Agents

These are characterized as follows:

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- A *Legal Agent* is a Natural or Juridical Person who holds legal positions (e.g. rights, duties, permissions, no-rights, powers, subjections, disabilities, immunities, etc.).

- A *Municipality*, in this context, is a legally recognized part of a Brazilian state. A Brazilian state has its territory divided into municipalities. The Federal District is a special type of municipality with specific characteristics (formerly called a neutral municipality). In this case study, we did not analyze the Public Juridical Person as Taxpayer, which is possible in specific cases of the Brazilian legislation.

- A *Municipality as Power Holder* is the municipality that holds a position of Legal Power, in this case, the power to institute Urban Building and Land Property Taxation in its territory.

- A *Municipality as Creditor* is the municipality that, every 1st. of January of each year, establishes the accounting entry of IPTU credits (assessment of IPTU Credit-Debit) to be charged. At that time, the municipality is in a position as an accounting creditor of the tax.

- A *Municipality as Right Holder* is the *Municipality as Creditor* that has the right to IPTU tax collection. This happens after the notification of a Taxpayer as Debtor.

- A *Municipality as Disability Holder* is the municipality that does not hold the position of collecting taxes and therefore has no right to tax collection. Example: the municipalities in Brazil have no power to tax the properties of religious entities.

- A *Taxpayer* is a *Legal Agent* who is subject to the burden to pay taxes, according to the law.

- A *Taxpayer as Subjection Holder* is a *Taxpayer* who submits to the Municipality's legal power to lay tax rules, in particular, the IPTU tax law.

- *Taxpayer as Debtor* is a *Taxpayer* who, every 1st. of January of each year, becomes an IPTU debtor by the municipality where they have a real estate.

- A *Taxpayer as Duty Holder* is the *Taxpayer as Debtor* who is notified by the municipality about the duty to pay IPTU tax due to the IPTU assessment.

• A *Legal Agent as Immunity Holder* is the *Legal Agent* whose immunity to taxation is prescribed by law.

5.3. Modeling Power–Subjection

We have here taken as a starting point the federal constitution promulgation in which the powers to legislate on taxes are prescribed. The power to legislate in Brazil is given to the Union, the States, the Federal District and the Municipalities (Articles 145 and 156), according to the characteristics prescribed in CRFB/1988 [61]. A *material relation* is then established between *Municipality* and *Taxpayer*. In this relation, the Municipality as Power Holder has the legal position of *Power to Institute Urban Building and Land Property Tax*. This moment (aspect) is correlated to another moment that inheres in the Taxpayer as Subjection Holder who has the legal position of *Subjection to Urban Building and Land Property Taxation*, as shown in Figure 7. This model is an application of the pattern of Figure 2. As it can happen in these specific applications some of the cardinality constraints can become more restrictive. For example, *Local Tax Law Promulgation* events are dependent on a single *Constitution Promulgation* event. Moreover, the Municipality bears a single *Power–Subjection* relator with the same Taxpayer. The constitution promulgation gives rise to several Power–Subjection relators (one of each municipality against each taxpayer). Instead of using the «creation» stereotype (cf. Figure 2), we employ here the «historical» stereotype for the *grounded on* relation. This is because the event that creates the *Power–Subjection* relator connecting a particular municipality to a particular taxpayer is a complex event that includes the *Constitution Promulgation* as part, but also the creation of municipality and the creation of the taxpayer. This allow us to consider the cases in which the municipality is created before or after the promulgation of the constitution (and the same with respect to taxpayers). The same applies to the relation between *Local Tax Law Promulgation* and the *Power–Subjection to Levy IPTU Tax*.

The exercise of the legal power to institute taxes by means of an institutional act enables municipalities to establish the relation of Power–Subjection with Taxpayers. In (Figure 8), we have the case that, on the legal ground provided by the municipal Act no. 4476/1997, the municipality of Vitória becomes *Municipality as Power Holder* to levy IPTU tax against taxpayers (*as Subjection Holders*). The municipality of Vitória is an instance of *Municipality*, which is a *kind* of juridical person; on the other hand, taxpayers may be of different types, i.e., natural persons or juristic persons (e.g. companies, universities), each of which can supply a different principle of identity to their instances (hence, the stereotype «roleMixin» is employed).
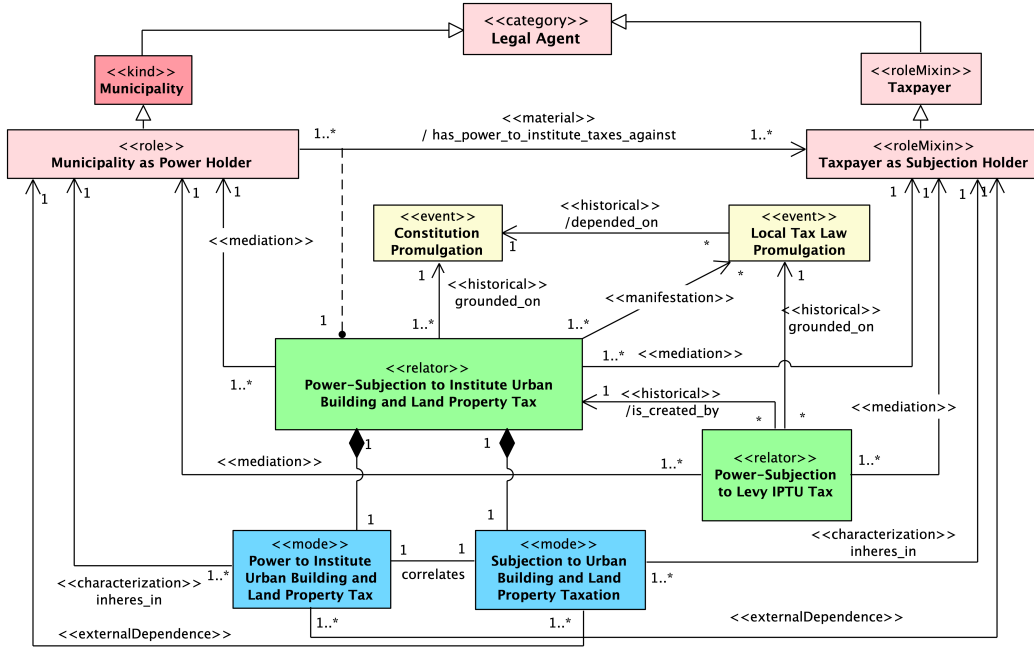
Figure 7: Legal Power–Subjection to institute tax norms, creating Power–Subjection to levy IPTU

This power to levy IPTU tax is manifested only in the applicable legal circumstances. The law is explicit with respect to those circumstances by defining hypotheses of tax incidence, i.e., defining *situation types*, whose instances can trigger [62, 56] certain *events*, such as the assessment of the IPTU tax credit-debit by the municipality. The *event* of assessment of the IPTU credit-debit is the manifestation of the legal power to levy the IPTU tax as shown in Figure 8, and depends on what in tax law is known as a *taxable event*. In this case, such an event is the registration of a real estate in a given municipality (a *Real Estate Registration* event). This is represented in Figure 8, through the historical dependence of the *Assessment of IPTU Credit-Debit* event to the event of *Local Tax Law Promulgation* and the event of *Real Estate Registration*. Given that the *Assessment of IPTU Credit-Debit* event is dependent on a particular registration (of a particular real estate), we can have several events of this kind involving the same municipality and the same tax player each year for each of these different properties. Each of these events creates a different *IPTU Credit-Debit* relator for that tax payer.

In summary, a combination of events (and situations brought about by these events) is required for the assessment of IPTU tax credit-debit to occur. The first type, as seen, is the legal power of the municipality to institute the tax through
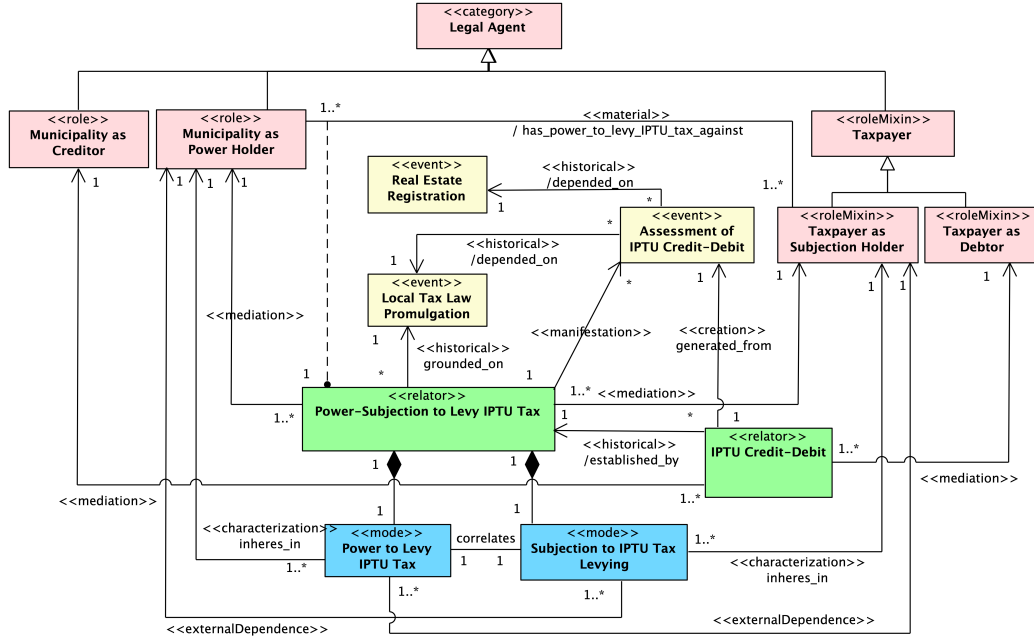
Figure 8: Legal Power–Subjection to levy IPTU, creating Credit-Debit relators

a valid institutional act. The second is the phenomenon of a person (e.g. an individual or a company) owning a real estate. For example, having the ownership of a building in the territory of Vitória as per January 1st of a given year, enables (together with legal power of the municipality of Vitória to levy tax) events that culminate with creation of a duty to pay taxes. For example, Maria owns an apartment in Vitória. In January 1st, 2021, the municipality of Vitória verified the group of ownerships in which the IPTU tax is levied on, generating the IPTU tax credits in its favor *(municipality of Vitória as Creditor)* (Figure 8). Now, Maria, as an apartment's owner, will be notified about her IPTU tax duty. After the *Assessment of IPTU Credit-Debit*, the municipality officially notifies taxpayers. The taxpayer notification is the event that creates the valid duty of the taxpayer to pay IPTU tax in a Right–Duty relation (modeled with a pattern described in [12]). According to the legislation, the obligation to pay exists only when taxpayers have been notified. In our example, Maria ought to pay the IPTU tax to the municipality of Vitória after receiving the notification of the obligation to pay the IPTU tax (Figure 9).
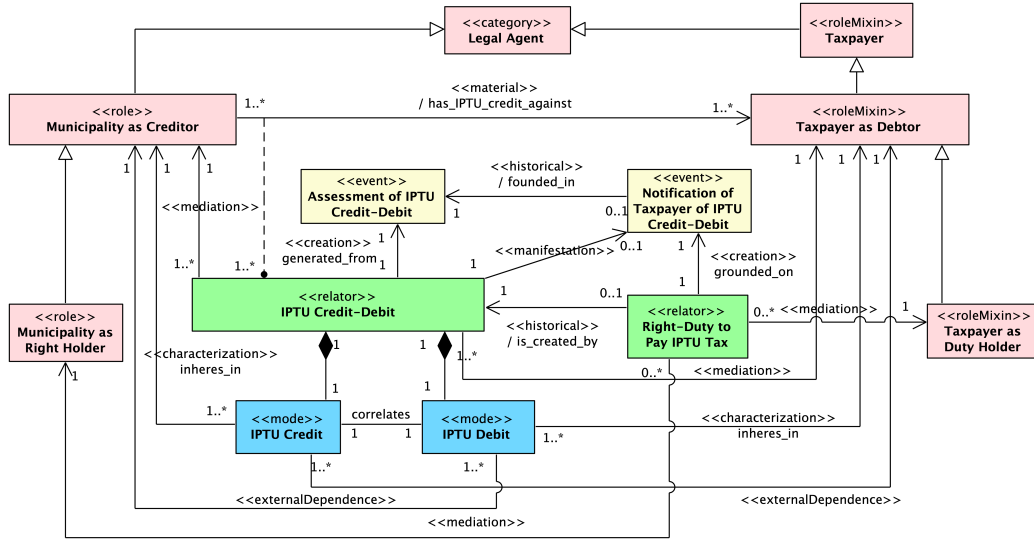
Figure 9: IPTU Credit-Debit, its notification and the consequent Right–Duty to Pay

5.4. Modeling Disability–Immunity

There are also situations that prevent IPTU taxation. For example, explicit immunity clauses in the Brazilian Constitution make it impossible for Brazilian municipalities and the Federal District to impose taxes of any kind on religious temples[12]. This situation can be modeled in a straightforward manner with the Disability–Immunity pattern as shown in Figure 10 (*Religious Entity as Immunity Holder* is a specialization of *Legal Agent as Immunity Holder* from Figure 6). As discussed in [46], the Disability–Immunity defeases the Power–Subjection, forming what is called "qualified competence".

In addition to immunity from taxation, there are also cases of *exemption*. Differently from immunity, *exemption* is a reason for exclusion or waiver of the tax credit and depends on explicit prescription in ordinary law formulated by a competent entity (in this case the municipality). Exemption – unlike (constitutional) immunity – can be revoked at any time in ordinary law. In our case study, the municipality of Vitória exempts former war combatants from paying IPTU levied on the property in which he or his widow/partner resides.

Our model for IPTU exemption is shown in Figure 11. The event on which the

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[12]We assume here the recent understanding of the Brazilian Supreme Court, which extended the immunity of 'social assistance institutions' in Art. 150 VI c to religious entities.
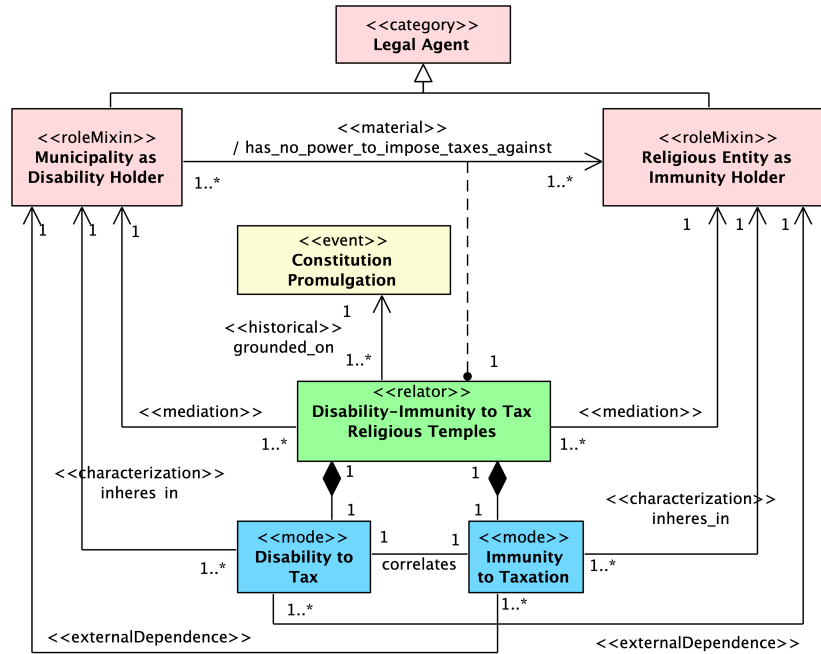
Figure 10: Legal Immunity–Disability pattern applied to the tax system

Power–Subjection to Exempt IPTU Tax relator is founded is the promulgation of a municipal or federal district law (in narrow sense) prescribed by the same entity that instituted those taxes. Explicit legal provision for exemptions is required in the Brazilian national tax code. In this case, the same municipal Act no. 4476/1997 that instituted the IPTU tax in Vitória also created a number of situations leading to exemption. The exemption was included as an exception to the taxation rule, i.e., the municipality has the power to levy tax to real estate owners, but creates some exceptions not to tax certain groups, as is the case of former war combatant and their widow/partner. This power is manifested in the *Assessment of IPTU Credit-Debit*, in which case, the resulting *IPTU Credit-Debit* is already created in a special phase (*Exempted IPTU Credit-Debit*). This is necessary to account for the fiscal impact of exemptions (keeping track of fiscal waivers). In addition to creating the municipality's power to exempt, the municipal act also may create a taxpayer's *right* that the municipality exercises this exemption under certain conditions. This is exactly the case here, as former war combatants have the right that the municipality exempts their IPTU Credits-Debits. In sum, the municipality used the powers granted by the constitution to grant citizens a right, imposing on itself a duty (that is fulfilled when the IPTU credits are assessed as exempted). This

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case serves to show the use of patterns of legal relations in tandem, and reveals that exemption is not an act at the discretion of the municipality.
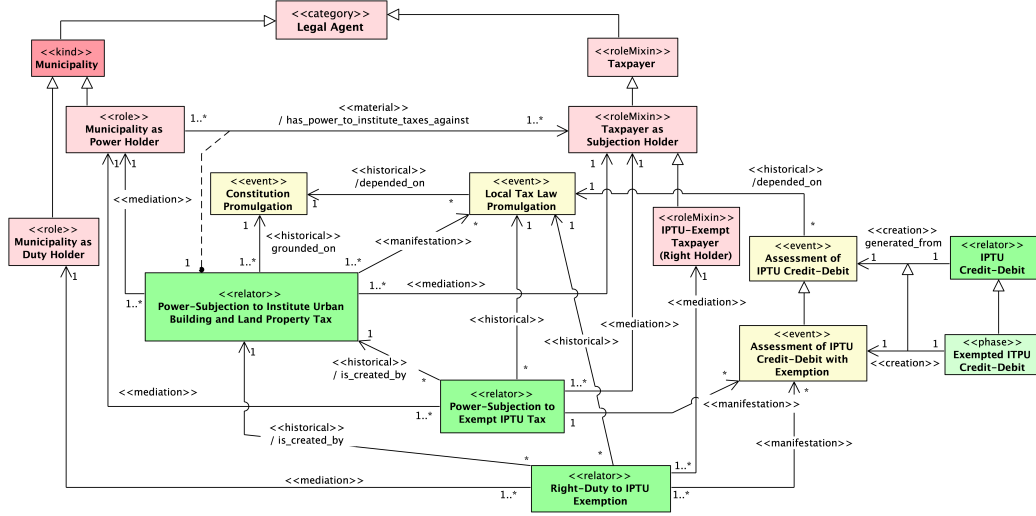

Figure 11: Legal Power-Subjection pattern applied to an exemption of IPTU tax

6. Related Work

The legal power-subjection relator pattern proposed here is different from other UFO-L patterns that represent norms of conduct applied to legal relations. These include *Unprotected Liberty (P5-UL-LR) [12]*, *Right-Duty to an Action Relator pattern (P1-RDA-LR)*, and *Right-Duty to an Omission (P2-RDA-LR) [12]*. The difference lies in the fact that relations of power and subjection are defined by norms that declare a legal agent capable of creating, modifying, and extinguishing other legal relations. For example, the law gives the legal power to people to marry and establishes the possibility for people to bind by means of legal contracts. These capacities are not natural abilities, but artificial abilities constructed by legal statements. When they are exercised, they generate new legal relations with new legal positions of conduct or derivative powers. On the contrary, legal relations such as right-duty, permission-no-right, and liberties are related to the performance or abstention of actions of conduct, which, in general, demand only natural abilities. This means that the legal positions of conduct only regulates the action or omission that was already possible by virtue of natural capacity (e.g. expressing an opinion, entering a building). As Robert Alexy points out, power is more than permission to act and more than natural ability to act [14].

There are a few approaches in the literature that explicitly consider power-related notions. For example:

- In the same line of our work, the RuleML initiative planned to differentiate the concept of legal power from the concept of permission, by introducing "empowerment rules".[13] (But without mentioning disabilities or immunities.) In any case, powers and correlative subjections have not been incorporated in LegalRuleML to the present date (a related notion of constitutive rule is included in that specification instead) [63];

- Symboleo [26] is a formal specification language for contracts, in which contracts consist of collections of obligations and powers. Since the contract domain ontology behind the Symboleo language is based on UFO-L, the concept of power is similarly defined as *"the right of a party to create, change, suspend or extinguish legal positions (...)"*. Differently from the pattern proposed here, the correlated position of power (subjection) is not explicit countenanced in Symboleo. Making these elements explicit is important in practice, given that the representation of the correlative legal positions is relevant for analyzing violations of powers and duties. For example, in the analysis of a concrete case, if Mary does not submit herself to the power of municipality of Vitória to levy the IPTU tax, the municipality can by coercion subject Mary to that power, imposing administrative sanctions or initiating legal actions against her. In UFO-L, with the use of legal relator pattern, it is possible to indicate, at the instance level, who violates a legal power–subjection relation. Symboleo does not cater for disabilities and immunities; as we have discussed, these elements can serve to establish the grounds for the invalidation of illegitimate legal acts.

- Similarly to Symboleo, Nòmos2 [64] defines power as the (legal) capability to produce changes "in the legal system towards another subject". The latter acquires the corresponding *liability* but not explicit the correlated legal position. Again, disabilities and immunities are not addressed.

- In contrast, in FIBO's legal capacity ontology[14], the notion of *legal power* we employ here could be considered to overlap with *legal capacity* which

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[13]https://web.archive.org/web/20220526054144/http://ruleml.org/policy/
[14]https://spec.edmcouncil.org/fibo/ontology/FND/Law/LegalCapacity/

is defined as "*the capability to carry out certain actions or to have certain rights together with the resources to do so*". The correlative notion of subjection, however, is not explicitly identified, an, hence, powers are not considered in a relational perspective in that ontology. Instead of a notion correlative to power, a notion of *liability capability* as a *subclass* of *legal capacity* is included. This means that *legal capacity* in FIBO encompasses *both* the capacity to perform acts as well as the potential of suffering the (legal) consequences of acts performed by others. This constitutes a case of *construct overload*[15]. Further, FIBO also includes an unspecific notion of *right* that, according to its documentation, encompasses the Hohfeldian positions of privilege, claim, power and immunity. Again, this constitutes a case of construct overload (one that Hohfeld had himself identified). Strangely, we also have a case of *construct excess*[16] representation, since the notion of legal power is represented both by *legal capacity* as well as the notion of *right*.

7. Final Considerations

Information systems represent aspects of social and often legal reality. More and more, these systems must satisfy requirements of semantic precision and transparency. In order to achieve that, they must embed information structures that do justice to complexity of the legal reality represented therein. For this reason, legal informatics become one of the areas of central interest to Applied Ontology and Ontology-Driven Conceptual Modeling.

In this paper, we make a set of contributions to the theory and practice of ontology-based legal informatics. Firstly, we conduct an ontological analysis of two fundamental strongly connected legal relations, namely, the *power–subjection* and the *disability–immunity* relations. These two relations are of critical importance. The former bestows legal agents the power to alter legal positions by creating, changing, extinguishing rights, duties, permissions, powers, immunities, etc., in the scope of enduring legal relations. In contrast, the latter restricts the range and effects of powers representing situations in which we have prevention

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[15]We have a case of *construct overload* in a model when an element of that model ambiguously represents more than one domain concept [48].

[16]We have a case of *construct excess* in a model when a domain notion is represented by more than one construct in a model [48].

of the exercise of power, i.e., the prevention of changes in some legal positions of the Immunity Holder.

In addition to these theoretical contributions (and systematically employing them), we have propose a *Legal Power–Subjection Relator* pattern and a *Disability–Immunity Relator* pattern. These patterns are new methodological devices to be added to the UFO-L pattern catalog [12, 17].

Finally, to demonstrate the applicability of the proposed patterns in a real-world scenario, we modeled a case around the *legal power to institute taxes* as well as the legal relations derived from it. By using the proposed pattern, we were able to reveal a number of aspects of the case at hand. For instance, we showed that it is possible to represent that a municipality has the power to collect IPTU taxes from real estate owners but has no-power to collect taxes against real estate owners that are Religious Entities. The proper modeling of these situations is only possible with the triadic representation of legal relations (i.e. the explicit representation of the parties and the regulated action/omission types at hand). In other words, these situations cannot be properly modeled if the representations of these correlative roles (e.g., *subjection holder*, in this case the taxpayer) are not explicit. For instance, if restricted to monadic deontic operators, one would typically represent this situation as follows: $\neg S(x)$ (where $\neg S$ is the "not subject to the payment of" and x is the IPTU tax). In the same legal system, we would then have $\neg S(x)$ for Religious Entities and $S(x)$ for other taxpayers. By not making explicit the instances of regular and tax-exempt taxpayers, a monadic system would risk creating inconsistency.

Regarding future work, we plan to extend our ontological analysis and modeling in the following directions: (i) addressing violations of power–subjection relations by applying types of powers and non-powers; (ii) conducting a systematic comparison with other types of legal relations, in particular, rights–duties and permissions–no-rights relations; (iii) in line with [12], we also intend to conduct empirical studies to assess the usability of the proposed patterns by legal experts; finally, we speculate that the patterns we have discussed here are general given their root in foundational theories of jurisprudence. However, an analysis of legal texts in light of the patterns we have discussed here could provide further support for their generality. It could also reveal pattern variants that correspond to common structures in specific legal texts or legal systems.

The conclude with two questions that we still leave open. The first one is whether the pattern proposed here for legal powers can somehow be applied to other types of power (e.g., in autonomous systems). In this case, an interesting issue is the connection between a relational notion of power, and a non-relational

(monadic) notion of power or capacity. The second question is whether there is the possibility to distinguish the original and derived legal power–subjection relations by means of intrinsic aspects. We have observed that several aspects of a legal nature are only activated when their bearers are related to others individuals. In the case of original legal power–subjection relations, they are usually perceived in socio-political contexts depending on events to occur.

Acknowledgments

References

[1] Z. Bauman, Liquid Modernity [Modernità liquida], Marcherita Marvulli. Le Collezioni del Corriere della Sera, 2019.

[2] G. Guizzardi, Ontological Patterns, Anti-Patterns and Pattern Languages for Next-Generation Conceptual Modeling, in: Int. Conf. Concept. Model., Springer, 2014, pp. 13–27. doi:`10.1007/978-3-319-12206-9_2`.

[3] M. Verdonck, F. Gailly, R. Pergl, G. Guizzardi, B. Martins, O. Pastor, Comparing traditional conceptual modeling with ontology-driven conceptual modeling: An empirical study, Information Systems 81 (2019) 92–103.

[4] I. Fabio, et al., 'What exactly is a lockdown?': towards an ontology-based modeling of lockdown interventions during the COVID-19 pandemic, in: Proc. XIV Seminar on Ontology Research in Brazil (ONTOBRAS) and V Doctoral and Masters Consortium on Ontologies (WTDO), volume 3050 of *CEUR Workshop Proceedings*, CEUR-WS.org, 2021, pp. 151–165. URL: `http://ceur-ws.org/Vol-3050/Paper12.pdf`.

[5] R. Falbo, et al., Organizing ontology design patterns as ontology pattern languages, in: Extended Semantic Web Conference, Springer, 2013, pp. 61–75. doi:`10.1007/978-3-642-38288-8_5`.

[6] R. Falbo, et al., An ontology pattern language for service modeling, in: Proceedings of the 31st Annual ACM Symposium on Applied Computing, 2016, pp. 321–326.

[7] A. Valente, J. Breuker, A Functional Ontology of Law, in: S. Binazzi, G. Bargellini (Eds.), Towards a Global Expert System in Law, CEDAM publishers, 1994, pp. 201–212.

[8] R. Hoekstra, J. Breuker, M. Di Bello, A. Boer, LKIF Core: Principled Ontology Development For The Legal Domain, in: Proc. 2009 Conf.Law, Ontologies and the Semantic Web: Channelling the Legal Information Flood, volume 188, IOS Press, 2009, pp. 21–52.

[9] J. Breuker, R. Hoekstra, et al., Core concepts of law: taking common-sense seriously, in: Proceedings of formal ontologies in information systems (FOIS-2004), 2004, pp. 210–221.

[10] G. Boella, L. Favali, L. Lesmo, An action-based ontology of legal relations, in: Proceedings of the 8th international conference on Artificial intelligence and law, 2001, pp. 227–228.

[11] M. P. Singh, An ontology for commitments in multiagent systems, Artificial intelligence and law 7 (1999) 97–113.

[12] C. Griffo, J. P. A. Almeida, G. Guizzardi, Conceptual Modeling of Legal Relations, in: Conceptual Modeling - 37th International Conference, ER 2018, volume 11157 of *Lecture Notes in Computer Science*, Springer, 2018, pp. 169–183. doi:`10.1007/978-3-030-00847-5_14`.

[13] G. Guizzardi, G. Wagner, Some applications of a unified foundational ontology in business modeling, in: Business systems analysis with ontologies, IGI Global, 2005, pp. 345–367.

[14] R. Alexy, A Theory of Constitutional Rights, Oxford Univ. Press, Oxford, 2009.

[15] W. N. Hohfeld, Some fundamental legal conceptions as applied in judicial reasoning, Yale Lj 23 (1913) 16.

[16] C. Griffo, J. P. A. Almeida, G. Guizzardi, Legal theories and judicial decision-making: An ontological analysis, in: Formal Ontology in Information Systems: Proceedings of the 11th International Conference (FOIS 2020), volume 330, IOS Press, 2020, p. 63. doi:`10.3233/FAIA200661`.

[17] C. Griffo, J. P. A. Almeida, G. Guizzardi, A Pattern for the Representation of Legal Relations in a Legal Core Ontology, in: Front. Artif. Intell. Appl., volume 294, 2016, pp. 191–194. doi:`10.3233/978-1-61499-726-9-191`.

[18] C. Santos, C. Pruski, M. Da Silveira, V. Rodríguez-Doncel, A. Gangemi, L. Van der Torre, P. Casanovas, Complaint ontology pattern-cop, Advances in Ontology Design and Patterns 32 (2016) 69–83.

[19] H. J. Pandit, D. O'Sullivan, D. Lewis, An ontology design pattern for describing personal data in privacy policies., in: WOP@ ISWC, 2018, pp. 29–39.

[20] M. Palmirani, M. Martoni, A. Rossi, C. Bartolini, L. Robaldo, Legal ontology for modelling GDPR concepts and norms, in: Legal Knowledge and Information Systems, IOS Press, 2018, pp. 91–100.

[21] A. Gangemi, Design Patterns for Legal Ontology Construction, in: Proc. 2nd Workshop on Legal Ontologies and Artificial Intelligence Techniques (LOAIT), volume 321 of *CEUR Workshop Proceedings*, CEUR-WS.org, 2007, pp. 65–85. URL: `https://ceur-ws.org/Vol-321/paper4.pdf`.

[22] A. Gangemi, Introducing pattern-based design for legal ontologies, in: Law, Ontologies and the Semantic Web, IOS Press, 2009, pp. 53–71.

[23] J. R. French, B. Raven, D. Cartwright, The bases of social power, Classics of organization theory 7 (1959) 311–320.

[24] J. C. Turner, Explaining the nature of power: A three-process theory, European journal of social psychology 35 (2005) 1–22.

[25] C. Griffo, J. P. A. Almeida, G. Guizzardi, J. C. Nardi, Service contract modeling in enterprise architecture: An ontology-based approach, Information Systems 101 (2021) 101454. doi:`10.1016/j.is.2019.101454`.

[26] S. Sharifi, A. Parvizimosaed, D. Amyot, L. Logrippo, J. Mylopoulos, Symboleo: Towards a specification language for legal contracts, in: 2020 RE Conf., IEEE, 2020, pp. 364–369.

[27] C. Griffo, T. P. Sales, G. Guizzardi, J. P. A. Almeida, Legal power-subjection relations: Ontological analysis and modeling pattern, in: Conceptual Modeling - 41st International Conference, ER 2022, Hyderabad, India, October

17-20, 2022, Proceedings, volume 13607 of *Lecture Notes in Computer Science*, Springer, 2022, pp. 65–81. doi:`10.1007/978-3-031-17995-2_5`.

[28] L. Lindahl, Position and Change. A Study in Law and Logic, volume 112 of *Synthese Library*, Springer Dordrecht, 1977. doi:`10.1007/978-94-010-1202-7`.

[29] M. Sergot, Normative positions, in: D. Gabbay, J. Horty, X. Parent (Eds.), Handbook of deontic logic and normative systems, volume 1, College Publications, London, 2013, pp. 353–406.

[30] B. S. Firozabadi, M. Sergot, Power and permission in security systems, in: International Workshop on Security Protocols, Springer, 1999, pp. 48–53. doi:`10.1007/10720107_6`.

[31] A. Artikis, M. Sergot, J. Pitt, Specifying norm-governed computational societies, ACM Transactions on Computational Logic (TOCL) 10 (2009) 1–42. doi:`10.1145/1459010.1459011`.

[32] A. J. I. Jones, M. Sergot, A formal characterisation of institutionalised power, Logic Journal of the IGPL 4 (1996) 427–443. doi:`10.1093/jigpal/4.3.427`.

[33] J. Gelati, G. Governatori, A. Rotolo, G. Sartor, Declarative power, representation, and mandate. a formal analysis, Proc JURIX 2 (2002) 41–52.

[34] G. Sartor, Fundamental legal concepts: A formal and teleological characterisation, Artificial Intelligence and Law 14 (2006) 101–142.

[35] J. Gelati, A. Rotolo, G. Sartor, G. Governatori, Normative autonomy and normative co-ordination: Declarative power, representation, and mandate, Artificial Intelligence and Law 12 (2004) 53–81.

[36] G. Boella, L. Sauro, L. van der Torre, Power and dependence relations in groups of agents, in: Proceedings. IEEE/WIC/ACM IAT 2004., IEEE, 2004, pp. 246–252.

[37] G. Boella, L. van der Torre, The ontological properties of social roles in multi-agent systems: definitional dependence, powers and roles playing roles, Artif. Intell. Law 15 (2007) 201–221. doi:`10.1007/s10506-007-9030-8`.

[38] L. Lindahl, D. Reidhav, Legal power: The basic definition, Ratio Juris 30 (2017) 158–185.

[39] T. Spaak, The concept of legal competence: An essay in conceptual analysis, 1994.

[40] T. Spaak, Explicating the concept of legal competence, in: Concepts in law, Springer, 2009, pp. 67–80.

[41] H. L. A. Hart, The Concept of Law, Oxford Univ Press, 1976.

[42] N. MacCormick, Norms, Institutions, and Institutional Facts, Law Philos. 17 (1998) 301–345.

[43] A. Halpin, The concept of a legal power, Oxford J. Legal Stud. 16 (1996) 129.

[44] G. Sartor, A teleological approach to legal dialogues, EUI Law Working Paper No. 2006/28 (2006). doi:`10.2139/ssrn.963374`.

[45] G. Governatori, A. Rotolo, Modelling Contracts using RuleML, in: T. G. (ed.) (Ed.), Jurix 2004 17th Annu. Conf. IOS Press, Amsterdam, 2004, pp. 141–150.

[46] J. A. O. Lima, C. Griffo, J. P. A. Almeida, G. Guizzardi, M. I. Aranha, Casting the light of the theory of opposition onto Hohfeld's fundamental legal concepts, Legal Theory 27 (2021) 2–35. doi:`10.1017/S1352325221000070`.

[47] G. Guizzardi, A. Benevides, C. Fonseca, D. Porello, J. Almeida, T. Sales, UFO: Unified Foundational Ontology, Applied Ontology 17 (2022) 167–210. URL: `http://dx.doi.org/10.3233/AO-210256`. doi:`10.3233/AO-210256`.

[48] G. Guizzardi, Ontological foundations for structural conceptual models, Ph.D. thesis, CTIT Ph.D. thesis series, Amsterdam, 2005.

[49] J. R. Searle, The Construction of Social Reality, The Free Press, New York, 1995.

[50] J. R. Searle, Speech acts: An essay in the philosophy of language, Cambridge University Press, 1995.

[51] J. I. Colón-Ríos, E. M. Hausteiner, H. Lokdam, P. Pasquino, L. Rubinelli, W. Selinger, Constituent power and its institutions, Contemporary Political Theory (2021) 1–31.

[52] R. Alexy, A Theory of Constitutional Rights, Oxford Univ. Press, Oxford, 2009.

[53] A. Kocourek, The Hohfeld System of Fundamental Legal Concepts, Illinois Law Rev. 15 (1920) 24–39.

[54] N. Guarino, G. Guizzardi, "We need to discuss the Relationship": Revisiting Relationships as Modeling Constructs., in: 27th Int. Conf. CAiSE 2015 Proc., volume 9097 of *Lecture Notes in Computer Science*, Springer, 2015, pp. 279–294. doi:`10.1007/978-3-319-19069-3_18`.

[55] C. M. Fonseca, D. Porello, G. Guizzardi, J. P. A. Almeida, N. Guarino, Relations in ontology-driven conceptual modeling, in: 38th International Conference on Conceptual Modeling (ER 2019), volume 11788 of *Lecture Notes in Computer Science*, Springer, 2019, pp. 1–15. doi:`10.1007/978-3-030-33223-5_4`.

[56] A. B. Benevides, J. R. Bourguet, G. Guizzardi, R. Penãloza, J. P. A. Almeida, Representing a reference foundational ontology of events in SROIQ, Applied Ontology 14 (2019) 293–334. doi:`10.3233/AO-190214`.

[57] N. Guarino, R. Poli, Formal Ontology in Conceptual Analysis and Knowledge Representation., Int. J. Hum. Comput. Stud. 43 (1995) 1–21.

[58] J. P. A. Almeida, R. A. Falbo, G. Guizzardi, Events as entities in ontology-driven conceptual modeling, in: 38th International Conference on Conceptual Modeling (ER 2019), LNCS, 2019. v. 11788, volume 11788 of *Lecture Notes in Computer Science*, Springer, 2019, pp. 1–16. doi:`10.1007/978-3-030-33223-5_39`.

[59] P. S. Santos, J. P. A. Almeida, G. Guizzardi, An Ontology-based Analysis and Semantics for Organizational Structure Modeling in the ARIS Method, Inf. Syst. 38 (2013) 690–708. doi:`10.1016/j.is.2012.09.004`.

[60] C. Griffo, UFO-L: Uma Ontologia Núcleo de Aspectos Jurídicos Construída sob a Perspectiva das Relações Jurídicas, Ph.d. thesis, Ufes, 2018.

[61] Brasil, Constituição da República Federativa do Brasil, Coleção Saraiva de Legislação, 38 ed., Saraiva,, São Paulo, 2006.

[62] G. Guizzardi, G. Wagner, R. A. Falbo, R. S. S. Guizzardi, J. P. A. Almeida, Towards Ontological Foundations for the Conceptual Modeling of Events, in: Proc. 32th International Conference on Conceptual Modeling (ER), volume 8217 of *Lecture Notes in Computer Science*, Springer, 2013, pp. 327–341. doi:`10.1007/978-3-642-41924-9_27`.

[63] M. Palmirani, G. Governatori, T. Athan, H. Boley, A. Paschke, A. Wyner, LegalRuleML Core Specification Version 1.0, 2017.

[64] A. Siena, Engineering Law-Compliant Requirements The Nòmos Framework, Ph.D. thesis, DISI-University of Trento, 2010.